EDUCATIONAL STAKEHOLDERS' PERCEPTION ON THE FEASIBILITY OF USING MOBILE PHONES IN TEACHING AND LEARNING: A CASE OF PILOTED PUBLIC SECONDARY SCHOOLS IN KINONDONI MUNICIPALITY, DAR ES SALAAM

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2025

CERTIFICATION

The undersigned certifies that they have read and hereby recommends for acceptance by the Open University of Tanzania a thesis titled: *"Educational Stakeholders' Perception on the Feasibility of Using Mobile Phones in Teaching and Learning: A Case of Piloted Public Secondary Schools in Kinondoni Municipality: Dar es Salaam",* in fulfilment of the requirements for the Degree of Doctor of Philosophy in Education of the Open University of Tanzania.

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DECLARATION

I, **Felister Noah Masasi**, do hereby declare that this thesis is my original work and has never and will not be presented to any other University or institution for the same or similar award. It is in this context that I declare this work as originally mine. It is hereby presented in fulfilment of the requirements for the Degree of Doctor of Philosophy in Education of the Open University of Tanzania.

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Signature

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Date

DEDICATION

This work is dedicated to my beloved father, the late Noah Jacob Masasi, and my mother, Emiliana Masasi, for their loving care during my childhood.

ACKNOWLEDGEMENT

ABSTRACT

This study examined stakeholders' perceptions on the feasibility of using mobile phones in teaching and learning in piloted public secondary schools in Kinondoni Municipality, Dar es Salaam. It focused on three objectives: assessing knowledge, attitudes, and practices of mobile phone use in education. A mixed-methods approach with a convergent parallel design was employed, involving 678 participants. Stratified sampling selected 394 students and 284 teachers, while purposive sampling included heads of schools, academic masters, quality assurance officers, and the District Education Officer. Data were collected through questionnaires, interviews, and observations, and analyse using SPSS for quantitative results and content analysis for qualitative insights. Findings showed that 70% of teachers acknowledged mobile phones' usefulness in lesson preparation and delivery. Regression confirmed that knowledge improved teaching performance ($\beta=0.13$, $p=0.03$), while attitude was the strongest predictor for both students ($\beta=0.28$, $p=0.00$) and teachers ($\beta=0.18$, $p=0.00$). Practices influenced teachers ($\beta=0.16$, $p=0.01$) but not students due to limited device access. The study concluded that mobile phones enhance mobility, collaboration, and personalized learning, though challenges such as unreliable internet and financial constraints hinder effective use. Policy recommendations include training teachers, providing digital resources, and ensuring equitable access. The study shows that mobile phones can strengthen interactive, student-centred learning if backed by supportive policies and infrastructures.

Keywords: *educational stakeholders, mobile phones, teaching and learning, perception*

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LIST OF ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
APP	Application
BYOD	Bring Your Own Device
CC	City Centre
CEP	Central for Economic Performance
CIPP	Context, Input, Process, Product
CoICT	College of Information and Communication Technologies
COVID-19	Corona Virus Disease (2019)
DAS	District Administrative Secretary
DC	District Council
DED	District Executive Director
DEEP	Digital Educational Enhancement Project
DEO	District Education Officer
DEQO	District Education Quality Officer
DSEO	District Secondary Education Officer
ETP	Educational and Training Policy
HIV	Human Immunodeficiency Virus
ICT	Information and Communication Technology
IT	Information Technology
ITU	International Telecommunication Union
KAP	Knowledge, Attitudes, and Practices
MIS	Management Information System
MMRA	Mixed Method Research Approach

MoEVT	Ministry of Education and Vocational Training
MOSAD	Mobile System Analysis and Design
MP3	MPEG Audio Layer - 3
NASGBS	National Association of School Governing Bodies
PACT	Pan African Conference on Science Computing and Telecommunications
PC	Personal Computer
PEOU	Perceived Ease of Use
PLS-SEM	Partial Least Squares Structural Equation Modelling
PU	Perceived Usefulness
RAS	Regional Administrative Secretary
REO	Regional education Officer
SMS	Short message services
SPSS	Scientific Package for Social Science
SQAO	School Quality Assurance Officers
TAM	Technology Acceptance Model
TCRA	Tanzania Communications Regulatory Authority
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
URT	United Republic of Tanzania
USA	United States of America
WBEC	Web-Based Education Commission
Wi-Fi	Wireless Fidelity

ZPD   Zone of Proximal Development

CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter discusses educational stakeholders' knowledge, attitudes, and practices regarding using mobile phones as teaching and learning. It provides background, a statement of the research problem, objectives of the study, scope of the study, study limitations, the operational definitions and a summary of the study.

1.2 Background to the Study

Information and Communication Technology (ICT) has significantly advanced in the 21st century. One of the ICT-based inventions is the mobile phone. Prompt advancements and affordability have made the device the most used personally owned ICT device (Guspatni, 2018). As noted by the International Telecommunication Union [ITU], there was approximately an average of 267 million new mobile phone subscribers yearly from 2019 to 2021 (ITU, 2022). Additionally, due to its multiple functions, the mobile phone is no longer a tool just for traditional communication and/or a fashion emblem but an instrument for enhancing development in various sectors, including education (Tuncay, 2016; URT, 2007).

One of the areas in which the use of mobile phones enhances development is the area of teaching and learning. Rapid advances in ICT have produced a range of mobile phone technologies, attracted new users and introduced new forms of usage. These technological innovations and improvements have increased mobile phone capacity, accommodating more sophisticated usage. Increased sophistication and functions in

mobile phones have enabled the usage of mobile phones as a tool for inclusive teaching and learning at various levels of education worldwide (Viberg & Gronlund, 2012).

However, the adoption of mobile phones in education is not without challenges. Concerns such as classroom distractions, equity in device access, digital literacy, discipline and data security remain significant barriers (Gibbons, 2018). Moreover, the feasibility of using mobile phones in education varies across contexts, depending on factors such as infrastructure, socioeconomic conditions, and cultural attitudes toward technology use. In this context, the perceptions of educational stakeholders teachers, students, parents, school administrators, and policymakers play a crucial role in determining the feasibility and effectiveness of mobile phones as educational tools. Their insights can provide valuable guidance for successfully implementing mobile learning initiatives, addressing potential challenges and maximising benefits.

In Tanzania, the government is committed to developing mobile phones to enable schools to deliver quality education (URT, 2007). Including mobile phones among the important forms of technology for effective learning is crucial. It shows that the government of Tanzania is trying not to miss the opportunity offered by this technology. In short, to realise the aim of effective use of mobile phones in teaching and learning, the Tanzania National ICT Policy for Basic Education of 2007 recognises mobile phones as a potentially essential channel for diversifying education and creating a knowledgeable Tanzanian workforce (Gibbons, 2018; URT, 2007).

In the process of implementing the aims of this national policy, several pilot projects that put in practice the educational worth of mobile phones have been conducted. Bridge-IT is one of the projects launched in 2007 to increase access to quality education among grade five and six pupils (UNESCO, 2012). The project used mobile phones to provide teachers with digital video content in Mathematics, Science, English and life skills (Urassa, 2012). This project reached 536 schools and 116,000 pupils in Lindi, Mtwara, Coast, Dar es Salaam, Tanga and Kilimanjaro regions. Likewise, the MoEVT, in collaboration with the College of Information and Communication Technologies (ICT) of the University of Dar es Salaam, conducted a pilot project on the use of SMS in upgrading the subject content knowledge of secondary school science and mathematics teachers (Mtebe, Kandoro, Kissaka & Kibga, 2015).

The results from these pilot projects and a range of research conducted in the country (Kafyulilo, 2014; Kibona & Mgaya, 2015; Mtebe et al., 2015; Mtega et al., 2014; Msuya, 2015; Kiwhele & Bali., 2013; Urassa, 2012 and Gibbons et al., 2018) have proven that there are enormous benefits of using mobile phones as a tool for teaching and learning in schools. For instance, Gibbons et al., (ibid.) showed that mobile phone learning could be personal, unobtrusive and spontaneous. Therefore, this calls for the appropriate use of the facility for positive results.

Kafyulilo (2014) noted that mobile phones are ideal tools for teaching and learning in schools because they are convenient, portable, affordable, accessible, and easy to handle. There were also gains in student attendance and evidence of improved

attainment, such as understanding of the content and overall performance in examinations. Reporting on the success of using technology in education, Gibbons et al. (2018), quoting Kasumuni (2011), cite one of the successful ICT projects, the Bridge-IT project ('Elimu kwa Teknolojia'), in which mobile phones were used in teaching and learning. In this project, teachers downloaded videos on Mathematics, Science and HIV/AIDS education subjects and watched them with students during regular school lessons. Positive effects were reported on students' motivation and reduced lesson planning and preparation time for teachers.

According to Gibbons et al. (2018), using mobile phones in teaching and learning is beneficial because technology changes how learners approach learning. Thus, there should be a change in the approaches to teaching and learning at policy and practical levels whereby lessons become learner-centred and make learners determine how and for what purpose they use mobile devices. Having realised the importance of using mobile phones as an ICT tool for quality education, the government of Tanzania has taken measures to ensure the application of ICT technology through mobile phones (Gibbons et al, 2018; Mwandosya, 2021). Mobile phone technology is a potentially important channel for diversifying education to increase competitiveness in the Tanzanian workforce in an increasingly globalised future (Mfaume, 2019).

Again, the Tanzania National ICT policy advocates broadening the basis of education financing while optimising the use of education resources through partnerships and stakeholders' participation. The expected outcomes articulated by

the policy are to be garnered through ICT tools (radios, televisions, videos, telephones; both fixed line and mobile, computers as well as various equipment's and services associated with these technologies, including electronic mail, text messaging and radio broadcasts) which are used for communication purposes, transmitting, storing, creating and sharing information (URT, 2007).

Generally, literature shows that using mobile phones in teaching and learning in schools has apparent educational benefits, including searching for materials, taking photos, sending text and attending online classes (Gibbons et al. 2018; UNICEF, 2013). It is also noted that the Tanzanian government, owing to the realisation of the importance of using ICT to bring about quality education, has taken several initiatives to make the use of mobile phones a reality. Among those efforts, the government collaborated with various non-governmental institutions to start pilot projects on the use of mobile phones in a few public secondary schools.

Most of the empirical studies related to mobile phone use in the country (Kibona & Rugina, 2015; Kihwele & Bali, 2013; Mtebe et al., 2015; Msuya, 2015; Urassa, 2012), focused their attention on the use of mobile phones and their implications on students' performance and discipline. The studies also focused on secondary schools in general. This study focused on a piloted project for public secondary schools in Kinondoni Municipality. Based on this background, the researcher thought it was critical and timely to undertake a study to assess educational stakeholders' perception of the feasibility of using mobile phones in teaching and learning in piloted public secondary schools in Dar es Salaam, Tanzania. This focus gave this

study a unique feature of exploring the perceptions of those respondents (educational stakeholders) who experimented with mobile phones in teaching and learning.

1.3 Statement of the Problem

The rapid advancement of technology has transformed various aspects of human life, including education. Once considered mere communication tools, mobile phones have evolved into multifunctional devices supporting diverse educational activities. Their portability, affordability, and connectivity make them accessible to many users, including students and teachers. Globally, a growing interest is in integrating mobile phones into teaching and learning processes. Mobile phones have been recognised for their potential to enhance learning outcomes by providing instant access to educational resources, enabling collaborative learning, and supporting personalised education. This learning mode aligns with contemporary pedagogical practices, emphasising flexibility, accessibility, and integrating digital tools into traditional classrooms.

However, using mobile phones for teaching and learning has not been a reality due to inadequate infrastructure, stakeholder attitudes and limited resources (funds and manpower) (Mayega, 2019; Msuya, 2015; Urasa, 2012). Following the implementation of pilot projects, evaluating the perceived results of using mobile phones in teaching and learning in secondary schools is crucial. While mobile phones have been widely recognised for their potential to enhance teaching and learning, there is limited research exploring the specific perceptions of key educational stakeholders; teachers, students, parents, school administrators, and

policymakers regarding the feasibility of integrating these devices into educational practices.

This gap is particularly pronounced in resource-constrained settings, where challenges such as equity, digital literacy, and infrastructure may significantly influence the adoption and effectiveness of mobile phone learning (Kafyulilo, 2014; Mfaume, 2019; Omarimba, Ndichu, Gitau & Ayot. 2016). Understanding these perceptions is essential to developing context-specific strategies for successful implementation, yet remains underexplored in existing literature. Therefore, this study intends to investigate the views of educational stakeholders on the extent to which using mobile phones in teaching and learning is still feasible based on the lived experiences of these stakeholders in terms of their knowledge, attitude, and practice (KAP Analysis Model).

1.4 Objectives of the Study

1.4.1 General Objective

The study's general objective was to investigate the educational stakeholders' perceptions of the feasibility of using mobile phones in teaching and learning in public secondary schools in Tanzania using the Kinondoni Municipality in Dar es Salaam as a study case.

1.4.2 Specific Objectives

Specifically, the study seeks to;

i. Assess stakeholders' knowledge of mobile phones for teaching and learning in piloted public secondary schools.

ii. Assess stakeholders' attitudes towards using mobile phones for teaching and learning in piloted public secondary schools.

iii. Evaluate stakeholders' practices on the use of mobile phones in piloted public secondary schools.

1.5 Research Questions

The following research questions guided the study;

i. What are stakeholders' knowledge on using mobile phones as a tool for teaching and learning in piloted public secondary schools?

ii. What are stakeholders' attitudes on using mobile phones as a tool for teaching and learning in piloted public secondary schools?

iii. How do stakeholders practically use mobile phones as a tool for teaching and learning in piloted public secondary schools?

1.6 Significance of the Study

Studies on educational stakeholders' knowledge, attitudes and practices are important sources of knowledge for effective adaptation policies. The study adds to the literature by identifying or signalling educational research topical areas similar to the one in the current study that remains controversial and, hence, a subject of further studies. Moreover, this research fills a critical gap in the literature by focusing on the perceptions of a diverse group of educational stakeholders, particularly in resource-constrained settings. It will contribute to a growing body of knowledge on mobile learning and inform future studies on technology integration in education. The study also informs the government's efforts to develop the use of electronic devices,

particularly mobile phones, as a teaching and learning tool in secondary schools. This study will explicitly inform stakeholders on best practices for sustainable funding and monitoring of various mobile phone projects. By exploring the feasibility of mobile phone usage, especially in underprivileged areas, the research has the potential to promote equitable access to quality education through cost-effective and widely available mobile technologies. By highlighting the feasibility and practical implications of mobile phone usage, the study can empower teachers to adopt innovative teaching strategies and equip students with 21st-century skills, such as digital literacy and self-directed learning.

1.7 Scope and Delimitation of the Study

The use of mobile phones occurs at different education levels and involves a variety of education stakeholders. This study tracked the use of mobile phones in Teaching and Learning in the piloted project schools at Kinondoni municipal. Therefore, the current study focused only on using mobile phones as a tool for teaching and learning in five secondary schools that participated in a pilot project on using mobile phones in public secondary schools. Geographically, the study confined itself to the Kinondoni Municipality in Dar es Salaam.

1.8 Limitations of the Study

When the study was being conducted, the project implementation was approaching an end, and mobile phone devices remaining were limited to both teachers and students demonstration. This affected student participation in classroom activities due to less interaction. Changes in technology are also likely, as the project was

implemented over a decade ago. The fast-paced evolution of mobile technology can render some aspects of the study out-dated if changes occur during or after the research period. There was a problem with tracking the questionnaires which resulted thirteen questionnaires for teachers and fourteen questionnaires for students not being returned; however, this did not affect the sample size.

1.9 Operational Definitions of Research Terms

1.9.1 Mobile Phone

A mobile phone is a portable device that allows one to make and receive calls, send text messages, and access the internet for different purposes (Ott, 2017). Based on this study, a mobile phone is a portable, handheld communication device connected to a wireless network. Users make voice calls, send text messages, and run various applications that teachers and learners can use for teaching and learning if they are well-handled.

1.9.2 Perception

Perception is how individuals interpret and organise sensory information to understand their environment. It involves recognising and interpreting sensory stimuli based on past experiences, expectations, and context (Urassa, 2012). In this study, perception refers to stakeholders' views, beliefs, interpretations, attitudes, or mind-sets regarding using mobile phones to enhance school teaching and learning.

1.9.3 Educational Stakeholders

Stakeholders are individuals, groups, or organisations interested in or concerned about a particular project, business, or decision (Bastedo & Jaquette, 2011). The

stakeholders related to this study are educational stakeholders. These included teachers, students, and educational administrators at the municipality level.

1.10 Organization of the Thesis

This thesis is organised into six chapters. Chapter one presents the background of the study, a statement of the problem, and the purpose and significance of the study. It also contains the definition of key terms and concepts used in the study.

Chapter Two presents the review of related literature that helped to establish the knowledge gap addressed by the study. It reviews the theoretical stances that guided the study, the evolution and spread of the mobile phone, and the influence of mobile phones in teaching and learning today. Finally, the chapter presents a synthesis of literature and the knowledge gap.

Chapter three introduces the methodological procedures used for collecting and analysing data. The major themes contained in the chapter are the philosophical paradigm employed in the study, the research approach and design used, the target population, sample size and sampling procedures. The chapter also describes data collection and analysis procedures, trustworthiness, and ethical considerations.

Chapter Four presents the findings of the study in line with the research objectives and research questions, whereas Chapter Five provides a discussion of the study findings. Chapter Six summarises the research findings, conclusions, and recommendations for policy, action and further studies.

1.11 Chapter Summary

In this chapter, the background to the study and the research problem which the study sought to address were delineated. The purpose, specific objectives, research questions and significance of the study were outlined as well. Furthermore, the scope and limitations of the study as well as key terms applied in the context of this study were described. Also, the organization of the study is among the themes contained in the chapter. The next chapter focuses on the review of the literature related to this study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a literature review consistent with this study's objectives. The theoretical review covers the theories and models used in this study. The empirical review covers the literature from empirical studies reflecting knowledge, attitudes, and practice, knowledge gap and conceptual framework.

2.2 Theoretical Review

2.2.1 Social Constructivism Theory (SCT)

The social constructivism theory guided the proposed study on the stakeholder's perceptions of the feasibility of using mobile phone devices in teaching and learning. The theory assumes that learners have a rich background regarding life experience (Brooks & Brooks, 1999; Papert, 1991). The theory emanates from the work of Lev Vygotsky (1978), who emphasised the social aspects of learning, introducing the importance of social interaction in cognitive development and contending that human development is a socially mediated process. Also, the theory posits that individuals construct knowledge through their life experiences and interactions with the world (Erciyes, 2020). The theory is grounded in the following principles: (i) learning is socially mediated, (ii) Zone of Proximal Development (ZPD) is the range of tasks a learner can perform with guidance, (iii) scaffolding and (iv) cultural context.

In Social Constructivist Theory, learners actively learn, constructing their understanding rather than passively receiving information (Taylor, 2018). This

theory helped the researcher in data contextualisation emphasise how stakeholders' background, for example, teaching experience, learning experience, and technological familiarity, influence their attitudes (Masata, 2020). This involved how individuals' experiences shaped their knowledge and attitudes towards mobile phone device integration in teaching and learning.

The theory has several strengths: (i) it promotes active learning, as it encourages learners to engage actively in the learning process through dialogue, collaboration, and problem-solving; it facilitates deeper understanding by connecting new information to prior knowledge within meaningful contexts; (ii) it enhances collaboration and communication skills; group work and social interactions develop interpersonal and communication skills, preparing learners for real-world collaboration; (iii) cultural sensitivity, i.e., recognising the influence of cultural tools and values, ensuring that learning is relevant to the learner's environment, and encouraging diverse perspectives, which fosters inclusivity and critical thinking.; (iv) supportive learning environment, i.e. scaffolding that allows learners to tackle challenging tasks while feeling supported, increasing motivation and confidence and (v) application to real-world problems whereby it encourages learners to apply theoretical concepts to practical situations, bridging the gap between academic knowledge and real-life applications.

Despite its usefulness in teaching and learning, the theory has the following limitations: (i) dependency on social interaction, which implies that overemphasis on social contexts may neglect individual learning styles and preferences, particularly

for learners who thrive in solitary or self-directed environments; (ii) challenges in implementation whereby teachers must possess strong facilitation skills to guide discussions, provide appropriate scaffolding, and manage diverse group dynamics effectively. Also, implementation in large or resource-limited classrooms can be complex due to constraints like time, materials, or teacher-to-student ratios. Moreover, (iii) risk of unequal participation entails that group-based learning can lead to unequal participation, where more assertive or knowledgeable individuals dominate, leaving others passive or disengaged; (iv) limited structure, i.e. the emphasis on learner-driven discovery, can sometimes result in a lack of focus or direction, particularly for learners who require clear guidelines and structured instruction; (v) cultural bias: i.e. the theory's reliance on specific cultural tools may limit its applicability in contexts where such tools are unavailable or where cultural norms differ significantly from the theory's foundational assumptions, and (vi) difficulty in assessment:

Nonetheless, the Social Constructivist Theory, developed by Lev Vygotsky, emphasises the importance of social interaction, cultural context, and shared experiences in constructing knowledge. When applied to data analysis and presentation for a study examining the use of mobile phones in teaching and learning, the theory provides a robust framework that emphasises interpreting stakeholders' perceptions and practices in their social and cultural contexts.

In data analysis, by focusing on social interaction, for example, qualitative data (e.g., interviews) analysis was conducted to explore how collaboration and communication

impact the integration of mobile phones in the learning process. The analysis considered the sociocultural norms and institutional policies influencing stakeholders' perceptions and practices by considering cultural and institutional contexts. Themes such as resistance due to cultural beliefs or policy restrictions were examined to understand the broader context.

The theory was also used to analyse stakeholder perspectives in several aspects, such as the co-construction of knowledge. Social constructivism suggests that knowledge is co-constructed through social interactions. The analysis should identify patterns in how stakeholders collectively perceive and negotiate the use of mobile phones in education. Stakeholders' individual and shared experiences were central to the analysis. Their narratives about challenges, benefits, and attitudes towards mobile phone use can reveal underlying social dynamics and cultural influences.

The theory also identified Zones of Proximal Development (ZPD). ZPD refers to the gap between what individuals can achieve independently and what they can achieve with guidance (Vygotsky, 1978). The analysis was used to identify areas where stakeholders need support or training to maximise the use of mobile phones in teaching and learning for example, exploring how professional development for teachers can enhance their ability to integrate mobile phones into instructional practices. Data were analysed to examine how tools (mobile phones) and mediators (e.g., peers, trainers) facilitate learning and practice improvement among stakeholders. The theory explored social and cultural influences on coding and categorising themes. Coding emphasises themes related to social interactions and

cultural contexts, such as collaboration, communication, resistance, and innovation. The theory encourages recognising patterns of shared understanding or collective behaviour that emerge from stakeholders' interactions, which was categorised and analysed to understand the dynamics of mobile phone use in education.

2.2.2 SCT and use of Mobile Phones in Teaching and Learning

Social constructivism emphasises collaborative, culturally embedded learning mediated through social interactions and tools like mobile phones. Teachers use mobile phones for real-time feedback and multimedia content delivery, exemplifying the social constructivist principle of knowledge construction through interaction (Brau, 2020). Tools like Google Forms or Kahoot! Support active engagement and collaboration, fostering learning within the social context of the classroom (Sani, 2020). Teachers provide scaffolding by guiding students through mobile phone for educational tasks, gradually reducing support as students become more adept at independent use (Akpan, Igwe, Mpamah, & Okoro, 2020). Limited integration of advanced tools indicates a gap in teachers' ability to scaffold effectively, which is essential in facilitating learning within the Zone of Proximal Development (Brau, 2020).

According to Sani (2020) mobile phones enable peer collaboration through shared projects and communication tools. Apps like WhatsApp and Google Classroom allow students to co-construct knowledge and solve problems collaboratively, reflecting the importance of social interaction in learning. Students using mobile phones for self-directed learning, such as accessing resources and organising notes,

aligns with the theory's emphasis on learners actively constructing their understanding through interaction with tools and their environment. Non-educational use, such as gaming or social media, reflects a deviation from productive social constructivist engagement, as it fails to contribute meaningfully to collaborative knowledge building.

Parental involvement in monitoring and guiding mobile phone use reflects the theory's acknowledgement of external agents in scaffolding a learner's experience. Parents' influence in shaping the cultural and contextual relevance of mobile learning aligns with social constructivism's focus on the role of cultural tools and values in shaping knowledge. Limited parental involvement or resistance to mobile phone use in schools may hinder the collaborative environment necessary for effective social constructivist learning.

Nonetheless, administrators play a crucial role in creating a structured environment where mobile phones serve as cultural tools for learning. Policies that promote teacher training and regulate usage reflect scaffolding practices at an institutional level. Facilitating workshops and training for teachers fosters a collaborative culture of shared learning, directly supporting social constructivist principles. Enforcement challenges and resource limitations may undermine the creation of a robust social context necessary for effective mobile-mediated learning.

Combining mobile phone with traditional teaching methods supports the integration of cultural tools into the learning process, enhancing social interaction and

knowledge construction (Akpan et al, 2020). Using mobile phones for group projects exemplifies Vygotsky's emphasis on the social origins of cognitive development. Rather than active problem-solving, passive consumption of content limits the full potential of social constructivism, which values active, meaningful engagement with learning materials. Adopting educational apps and cloud-based platforms underscores the role of cultural tools in mediating learning, a central tenet of social constructivism. Mobile phones as tools bridge gaps in resource availability, providing access to collaborative and interactive learning opportunities even in underserved areas. Technical and infrastructural issues disrupt the continuity of scaffolded learning experiences, impeding practical knowledge construction (Barak, 2017).

Efforts to address the digital divide through subsidised resources reflect the theory's emphasis on creating equitable opportunities for learners to engage in collaborative, culturally contextualised learning (Mbati, 2020). Mobile phones enable interaction across diverse social and cultural contexts, fostering a more decadent, more inclusive construction of knowledge. Persistent inequities limit access to the social and cultural tools necessary for implementing social constructivist learning effectively, particularly in resource-limited settings (Barak, 2017). However, challenges such as inequitable access, non-educational use, and insufficient training highlight gaps that must be addressed. Adopting targeted strategies to overcome these barriers can ensure that mobile phone practices fully realise their potential within the social constructivist framework (Akpan et al, 2020).

2.2.3 KAP Analysis Model

The Knowledge-Attitude-Practice (KAP) Model is a behavioural framework that explains how knowledge influences attitudes and how both affect practices or behaviours. KAP (Knowledge, Attitudes, and Practices) analysis is considered a valuable framework for understanding stakeholders' knowledge, attitudes and practices regarding the use of mobile phone devices in public secondary schools (Andrade et al., 2020). The researcher used the KAP Analysis model to formulate research objectives. The model assessed teachers' and students' knowledge of mobile phone devices to enhance effective teaching and learning in piloted public secondary schools. It was also used to assess teachers' and students' attitudes towards using mobile phones in piloted public secondary schools (Arifa & Rahman, 2015).

Knowledge refers to the information or awareness individuals possess about a specific topic, behaviour, or innovation. Knowledge is typically the foundation for change, providing individuals with the necessary understanding to evaluate a situation. Example: Knowing that washing hands with soap reduces the spread of germs. The study gathered opinions on the effectiveness of mobile phones in improving educational outcomes. This included evaluating teachers' and students' practices using mobile phones in piloted public secondary schools to indicate whether mobile phone devices were incorporated into lesson planning and teaching strategies. Attitude refers to individuals' feelings, beliefs, perceptions, or evaluations about a specific topic or behaviour. Attitudes are shaped by knowledge and external factors such as cultural norms, social influences, and personal experiences. Practice

refers to individuals' actual application or behaviour based on their knowledge and attitudes. Personal, social, and environmental factors can influence practices.

2.2.4 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Fred D. Davis in 1986, is a framework designed to explain and predict users' acceptance and use of technology. TAM identifies key factors influencing an individual's decision to adopt and use a technological system, making it a widely used model in information systems and technology research. TAM is grounded in the Theory of Reasoned Action (TRA) and posits that two primary factors determine technology acceptance: These include Perceived Usefulness (PU) and Ease of Use (PEOU). PU refers to the degree to which an individual believes using a particular technology will enhance their job performance or achieve desired outcomes. PEOU is the degree to which an individual believes using a particular technology will be effort-free. For example, a teacher feels mobile phones are simple to operate and integrate into lessons.

TAM describes the technology acceptance process as a progression through the following constructs. External variables include organisational factors, user training, system design, and personal characteristics that influence PU and PEOU. For instance, training programs on mobile phone use for education are available. Perceived Usefulness (PU) influences users' attitudes toward the technology and their likelihood of adopting it. Perceived Ease of Use (PEOU) directly influences PU, as technologies perceived as more straightforward to use are also perceived as more valuable.

Nonetheless, perceived Ease of Use (PEOU) directly influences PU, as technologies perceived as more straightforward to use are also perceived as more practical. Attitude toward using refers to the user's overall affective reaction (positive or negative) toward using the technology. In particular, a positive attitude toward mobile phones enhances a teacher's willingness to adopt them. Moreover, behavioural Intention to Use (BI) refers to the user's intention to adopt or reject the technology, influenced by attitude and PU. For example, a teacher intends to incorporate mobile phones into their teaching practices. Actual Use refers to the actual adoption and use of the technology.

The following model assumptions: (i) user rationality, which assumes users act rationally and base their decisions on PU and PEOU; (ii) technology-specific focus, tailored to assess the adoption of a specific technology rather than general behaviours and iii) predictive nature, aiming at predicting technology acceptance rather than explaining past behaviour. Several strengths are deduced from the model: (i) simplicity and clarity, providing a straightforward and intuitive explanation of technology adoption, and (ii) widely validated in various contexts, including education, healthcare, and business; (iii) predictive power, i.e. effectively predicts user behaviour toward technology adoption; (v) adaptability, i.e., it is easily modified and extended to include additional factors like social influence and organisational support. The assumptions are based on the fact that people tend to develop cold feet whenever new technology occurs. Some may oppose the new technology in favour of the old ways of doing things (Ekberg & Gao, 2018).

However, TAM has limitations: (i) it is oversimplified, i.e., it excludes external factors like culture, social norms, and organisational barriers that may influence adoption; (ii) It does not fully address group or organisational dynamics in technology adoption) (iii) linear process iv assumes a unidirectional flow from perceptions to behaviour, ignoring potential feedback loops iv) limited focus on attitudes, emphasises perceived usefulness over the emotional or habitual aspects of attitude formation.

Efforts to address these limitations include (i) additional factors like subjective norms, image, and output quality to account for social and organisational influences and (ii) combining TAM with other models to include factors like performance expectancy, social influence, and facilitating conditions and (iii) adding factors like trust, security, and accessibility to tailor TAM for specific contexts. The SCT, KAP Model, and TAM are interlinked because they focus on how social interactions, external factors, and iterative feedback influence knowledge, attitudes, and practices. Together, they provide a comprehensive lens to understand and guide behavioural change and technology adoption in education and beyond.

2.3 Empirical Literature Review

2.3.1 Knowledge of Mobile Phones Use for Teaching and Learning

Many studies have been conducted about stakeholders' knowledge of using mobile phones in teaching and learning in secondary schools. Garcial, Moizer and Haddoud (2019) conducted a study on student learning in higher education through blogging in the classroom in the UK. The study adopted a post-positivist research approach and a

quantitative research design that used Partial least squares structural equation modelling (PLS-SEM). The study revealed that students were ready to use the mobile phone as a learning tool. About 73.2% agreed they would use the learning package designed on a mobile medium. This view is supported by a study that used Mobile System Analysis and Design (MOSAD) to explore the satisfaction level towards mobile learning. Based on the results, the MOSAD application usability level was good, and it was reported to be a useful revision tool for higher education students.

Mohtar, Hassan, Hassan and Osman (2013) studied the usage of smartphones among Malaysian students. The study used both qualitative and quantitative research methods. Data were collected through interviews and questionnaires. The study revealed that university students in Malaysia had adopted smartphones as a necessity for learning at higher learning institutions. Students used smartphones for sharing notes with classmates, recording lectures, as well as helping to take pictures of assignments for future reference and sharing exam results on Facebook through their smartphones. This experience in Malaysia informed this study of what could be the possible usage of mobile phones in teaching and learning and its benefits for students.

In the same vein, it has also been reported that teachers can use social media outlets to interact with their students on educational matters. For example, Enayati, Yazdanpanah, and Behnamfar (2014) observe that there is a Twitter feed explicitly made for the classroom to post assignments and due dates, which can help students

stay connected. Teachers can also use Twitter feeds to field questions from students who might be otherwise too shy to ask. Students can ask a question using the class Twitter feed, and teachers can respond in class without singling out the student. Other forms of social media can be used for similar purposes, such as maintaining a classroom Facebook page to keep students updated.

Some studies focus only on the views of students. Taleb and Sohrabi (2012) studied using mobile technology to support learning for university students in Iran. The study used both qualitative and quantitative research methods. Data were collected through interviews and questionnaires. The study sought to determine the students' viewpoint on using mobile phones in learning. It was found that students had positive views and interests regarding learning using mobile phones. The study found that students believed using mobile phones in learning could benefit their learning processes. Besides, the mobile technology learners were more motivated to learn than others.

In Ghana, Darko-Adjei (2019) investigated the effects of the use of mobile phones on second-cycle students in Ghana. The study used both qualitative and quantitative methods of collecting data. The study brought to bear that using smartphones enhances learning activities; it helps students conduct research at their own pace and retrieve relevant and up-to-date information for their assignments and projects without physically visiting the library. It also enables students to read before class to have a fair idea of lessons yet to be taught. However, the study does not show how mobile phones are used to support teaching. With this aspect missing, one cannot

address the challenge of scepticism surrounding the use of mobile phones in teaching by education stakeholders. This scepticism fuels negative perceptions of the use of that device in teaching. The current study focused on educational stakeholders' perceptions regarding the use of mobile phones in teaching secondary school students and, therefore, complemented the available literature.

Other literature focuses specifically on the value of using mobile phones in teaching. Ngesi, Landa, Madikiza, Cekiso, Tshotsho, and Walters (2018) studied using mobile phones as supplementary teaching and learning tools by learners in South Africa. This paper emanated from a burning desire to help learners in South African educational institutions, especially those in remote areas, increase learner-teacher-content opportunities. The deployment of mobile phones as tools to supplement teaching and learning off-campus and after school hours is presumed in this study to be one attempt to increase contact time for learners. An interpretive qualitative research methodology was used. The study used a descriptive case study research design. It used a sample of 44 learners drawn from Grade 9 English First Additional Language learners in one school in the Eastern Cape. The participants were sampled using purposive and volunteer sampling techniques. Mobile phones collected data through short message services (SMSs) and Mxit messages. A questionnaire with open-ended questions was also used to collect data about learners' perceptions of using these devices in the educational process.

The data were analysed by incorporating content and discourse analysis elements. Even though some participants believed that SMS would corrupt their language and

spelling, findings indicate that most SMS and Mxit texts displayed entire sentences, punctuation marks, correct spelling of most words, acceptable grammar and proper sentence use. Further, findings indicated that while SMS and Mxit communication was characterised mainly by shorthand and informal writing when learners were aware that they were using these platforms for learning purposes, the traditional formal writing rules were applied. The authors concluded that mobile devices could improve the language acquisition of second-language learners. They recommended considering the official inclusion of mobile devices as supplementary learning tools in South Africa's learning programmes. This is important information for this study because it shows how policy recommendations could emanate directly from educational stakeholder experiences.

Makewa, Magaleta and Role (2017) studied the prevalence of mobile phone use in the academic and social life of students and educators in government boarding schools in Malawi. This was a quantitative study informed by both descriptive and comparative research designs. The study involved four hundred and forty-four (444) respondents, including teachers and students. The study's findings indicated that students and teachers were well informed of the benefits of a mobile phone in teaching and learning. Students found it easy to communicate with their parents about their academic progress over the device; they often used it to record and save information and find notes and meanings of different concepts and vocabulary.

Consequently, teachers used the device to access educational materials and find notes for teaching various subjects. The head teachers were found to use the device to

access administrative reports and information dealing with school management, record, save and retrieve information and communicate with staff and parents on school-related matters. The study recommended that parents and school management encourage students to use their devices responsibly, especially for academic purposes. This study was limited to students' and teachers' use of mobile phones for academic matters. It neither explored the barriers teachers face towards using the devices for educational purposes nor misuse of the devices by teachers and their implication in the teaching and learning process, which were a subject of the current study.

Some studies have reported the benefits of using mobile phones in teaching and learning in other countries, including Tanzania. A study by Mfaume (2019), which sought to determine if teachers in Tanzania were aware of using mobile phones as a pedagogical tool, found that teachers regarded a mobile phone as a pedagogical tool that could enhance teaching and learning. The respondents to Mfaume's study was able to identify the uses of mobile phones as a pedagogical tool, including first, enhancing teachers' interaction and collaboration by promoting interaction and collaborative learning where platforms like WhatsApp, Shule Direct and tHL could help teachers interact with each other, with students, and competent professionals, sharing knowledge and experiences and addressing a diversity of academic challenges together.

Mobile phones were also reported to be beneficial as they facilitated easy communication and access to information by allowing teachers to quickly

communicate with parents, other educators and educational authorities anytime and anywhere. Moreover, its internet connectivity could allow them access to current information about new policies, circulars, meetings and opportunities for professional development. Equally, mobile phone devices enable teachers to store and manage educational information through a memory card and other storage spaces available in the device. Teachers could keep and manage their data, students' records, and hundreds of teachings and learning materials for reference in the future. Because of access to educational tools like dictionaries available on the internet, the mobile phone was identified as a potential tool for learning vocabulary and translation.

Available textual, audio and video tools are helpful in the learning of spelling and pronunciation, acquisition of new vocabulary and explanations of challenging concepts for different subjects. Some other accessories of mobile phone devices support the management of time. These are like mobile phone watches and alarms that help people be more prepared for their daily academic routines, and the calendar is installed on the phone.

In summary, the benefits of using mobile phones are seen in what this new technology can do. Using mobile phones, class-wide texts can keep students updated on assignments, and students can use their phones as class planners to record important dates. Cell phones can also play an important role in gathering media for projects. Cell phones can take photos, record videos, and make audio logs. Photos and video can be added to PowerPoint presentations. Alternatively, students can

make entire videos, post them on YouTube, and then share them with the class. These video projects can document historic sites or act like running research documentaries. Audio recording can be used similarly as a voice-over for projects.

Teachers can also use different apps to help deliver instruction and lessons to students. There are plenty of apps that can be used for instructional delivery. These apps target different subjects and can help engage students more closely with their lessons. For instance, the apps can help educate students taking a foreign language course. For example, Duolingo provides flashcards that students can use, records students' responses to gauge whether they are pronouncing words correctly, and has theme lessons that let students learn specific parts of a new language (Enayati et al., 2014).

2.3.2 Attitudes towards the Use of Mobile Phones in Teaching and Learning

Several studies have been conducted in different parts of the world on attitudes toward using mobile phones in teaching and learning in schools. This category focuses on studies that have reported limitations and perceived scepticism over using mobile phones in teaching and learning; in Malaysia, Ismail, Azizan, and Azman (2013) studied teachers' readiness to use mobile phones in teaching and learning. The study used a quantitative approach to solicit teachers' perceptions of implementing mobile phones in schools.

A total sample size of thirty-eight (38) was used to generate information. Participants were purposively selected due to their familiarity with technology in the teaching and

learning process. The study found that the adoption of mobile phones as pedagogical tools in teaching and learning processes was not successful due to several reasons, such as the lack of policy that supports the use of mobile phones in teaching and learning. This information proves that institutional arrangements are important for the success of mobile phones in teaching. In Tanzania, the ICT policy supports using mobile phones in teaching and learning.

Alsadoon (2012) explored the use of cell phones in education at King Saud University in the Kingdom of Saudi Arabia. The study aimed to explore Saudi students' perceptions of how cell phones can be used in teaching and learning and the possible obstacles that could prevent their use in education. The study also investigated whether there was a gender difference in perceptions of cell phone use and educational barriers. The study's results revealed that students had positive attitudes towards using cell phones in education. They were of the view that the most useful way to use cell phone was to send notifications and to use the cell phone applications. The most serious negative concerns were that students could cheat using cell phones and that the phones had the potential to distract students. Like many other reviewed studies, this study was specifically focused on university students. The current study specifically focuses on the use and misuse of the devices on the part of teachers in secondary schools.

In Turkey, Cumaoglu (2015) examined Turkish teachers' beliefs concerning the effects of students using mobile devices and determine whether those beliefs varied according to demographic characteristics and internet usage purposes. The study

sample involved 200 teachers who filled out questionnaires. The study results indicated that teachers believed mobile devices affected students in social, psychological and learning dimensions. The most prominent result of the study was related to the learning dimension of the beliefs concerning the mobile device scale. Every learning dimension is always more favourable than those not using the internet for any given purpose. Consequently, the study determined that teachers' beliefs concerning mobile devices changed significantly according to age. Older teachers had more negative beliefs, particularly concerning the social effects of mobile devices. Contrary to the present study that determined teachers' awareness of the educational benefits of mobile phones, educational utilisation of the devices, constraints facing teachers towards the educational use of the devices and forms of mobile phone abuse by teachers in schools. The study by Cumaoglu focused on the teachers' beliefs about the effects of students using mobile devices in schools.

Porter, Hampshire, Milner, Munthali, Robson, de Lannoy, and Abane (2016) conducted mixed-method field research in 24 sites across Ghana, Malawi and South Africa. The study examined young people's mobile phone usage and its impacts across the countries. A questionnaire survey of approximately 1500 young people per country, including 1000 young people aged 9-18 years and approximately 500 aged 19-25 years, was evenly distributed across the research sites for generating data. During data generation, discussions were held with educational institutions, public policymakers, and network providers. The study's findings indicated that mobile phones played a mundane role in promoting education. Likewise, there were many calls between pupils to clarify homework and ask for examination results from

teachers. A number of calls was made by pupils requesting money, uniforms, books, and the like.

The results also indicated enormous unethical practices resulting from inappropriate use of mobile phones by both pupils and teachers. The evident practices included class disruption from teachers and pupils' calls, bullying and harassment, much time consumed on social networks and pornography watching, among others. Although this study reported on the harmful use of mobile phones by both students and teachers, it did not explore teachers' awareness of the educational benefits of a mobile phone, their utilisation for educational purposes and the constraints faced in using the devices for educational purposes. The study has not also examined the causes of the negative use of the devices by teachers in schools and the efforts taken by educational management to address the problem. These gaps are addressed in the present study.

Furthermore, Farai (2018) conducted a study on quality improvement and time to lift the bans on mobile phones in secondary schools in Zimbabwe. The study investigated stakeholders' perceptions of the potential utilisation of cell phones by secondary school students as learning tools that enhance quality education. The sample included fifteen (15) secondary schools in Mazombwe District. A qualitative research methodology was applied, and the data collection methods were interviews. The findings of this study revealed that cell phones in schools were good for communication and learning purposes in secondary schools. It was also learned that the decision by the Zimbabwean government to allow the usage of mobile phones in

schools was likely to improve the quality of exam results and instructional competencies among students. The fact that most students were familiar with how mobile phones could be used for various purposes was a starting point in introducing mobile technology in secondary schools. According to the study, stakeholders agreed to emphasise the use of mobile phones in teaching and learning without compromising cultural and social values. It was argued that removing the blanket ban on the use of mobile phones was critical, and policymakers were urged to develop strategies addressing the implementation challenges.

Matimbwa and Anney (2016) investigated teachers' and students' perceptions of self-driven acceptance of the mobile phone as an ICT telling tool in Tanzanian secondary schools. The study employed a mixed methods approach through cross-section survey whereby embedded design was employed while focusing more on the quantitative approaches. Data were collected from 184 respondents who were selected using stratified and purposive sampling techniques. Questionnaires and semi-structured interviews were used in collecting the data. The findings revealed that teachers and students were accessing mobile phones with the internet, even though the use of mobile phones for students had been banned. The study revealed further that teachers and students were of the view that the mobile phone was easy to use and was a valuable tool in education, although they felt that there must be policy guidelines for teachers and students directing how to use it appropriately as the teaching and learning tools.

Kihwele and Bali (2013) examined parents', teachers' and students' perceptions of the effects of students' access to mobile phones on students' learning performance.

The study was conducted in four selected secondary schools in Dodoma municipality. The mixed methods approach informed the study, and data were collected from 280 respondents through questionnaires, interview schedules and documentary reviews. Cross-tabulation and Chi-square tests were among the data analysis techniques employed in the study. Among others, the study's findings showed that parents and teachers agreed that students with mobile phones perform poorly and misbehave more often than their counterparts without mobile phones.

The study recommended the need to provide proper education on mobile phone use and re-introducing a censorship board to control the quality of content on websites. This study varies from the present one in that it was based on the effects of mobile phone use on students' performance. It has not investigated the educational use and misuse of the devices by teachers and possible measures to be taken to mitigate that vice in schools.

Urassa (2012) determined the education stakeholders' views towards students' use of mobile phones in secondary schools in Tabora municipality. Specifically, the study focused on the determinants of stakeholders' views on the students' use of mobile phones in schools, establishing the reasons which make teachers prohibit students from having and using mobile phones in schools and the reasons which compel students to go to school with mobile phones despite being prohibited. The study involved 142 respondents, including 96 students, four academic masters, four discipline masters, 16 class teachers, 20 parents, one REO and one DEO selected through purposive and simple random sampling. The study used a mixed methods

approach informed by a case study design. Data for the study were generated through questionnaires, interviews and documentary search and analysed using content analysis and SPSS version 16.

The findings revealed differing views from stakeholders as most students preferred to possess and use mobile phones in schools, while most teachers and all education officers did not support the view. The majority of parents, on the other hand, were in favour of the use of mobile phones in schools. Teachers prohibited the use of mobile phones in order to maintain academic performance, control students' behaviour, prevent threatening information to students, and maintain school rules and regulations that prohibited mobile phone use in schools. Like many other empirical studies reviewed, this study specifically focused on mobile phone use among students in schools, not on teachers.

Gibbons, Gallaway, Mollel, Mgoma, Pima and Deogratias (2018) conducted a study on Mobile phone use in two secondary schools in Tanzania. The study aimed to show how students and teachers in two rural secondary schools perceived the use of mobile phones. The sample comprised 252 respondents, including teachers and students. Students completed a questionnaire with their teachers; they participated in separate focus group discussions and discussed the uses and misuse of mobile phones in schools. The study revealed that most students had mobile phone access but could not take them to school. The findings also indicated that few teachers could see a positive use of devices in the curriculum. Teachers were found to be more concerned with the misuse of mobile phones by students in schools, such as students flirting,

watching pornography or socialising through social media platforms such as WhatsApp and Facebook instead of studying.

2.3.3 Practices for Using Mobile Phones in Teaching and Learning

Studies on the use of mobile phones in teaching, have not only reported on the benefits and limitations but have also proposed best practices for mitigating the reported limitations in order to make the usage successful. A study by Little (2014) investigated the association between mobile phone use in high school classrooms, student perceptions of school policy, and enforcement of mobile phone policy and learning in the USA. This study used a cross-sectional design from a sample of high school students in the south eastern United States. It was revealed that the use of mobile phones was significantly associated with student achievement. Based on the findings, it was revealed that mobile phone devices may not be disruptive to the learning environment under the condition that the cognitive load is not too long. This study, therefore, proposed that success of using mobile phones in teaching and learning will depend on the level of cognitive load. It suggests that the devices should be limited regarding the content they can access.

Sumathi, Lakshmi and Kundhawai (2018) conducted a study on the impact of smartphone usage on academic performance among students of higher learning in India. The study used a qualitative research method. The data were collected through open-ended interviews. Results showcase that smartphones tremendously impact higher education, especially with easy internet access and high-speed browsing, as they save time and money rather than going to cybercafé/college libraries. Most of

the students use their mobile phones on academic networks, such as using them to learn eBooks rather than using them for social networks. Moreover, the lack of experts who are technically strong on repairs during fault occurrence, operational difficulties, high cost of data subscription from service providers, and fragility are significant problems encountered while using smartphones. The study revealed several challenges, including a lack of experts who were technically strong on repairs during fault occurrence, operational difficulties, high cost of data subscription from service providers, and fragility, which are impediments to using smartphones in teaching and learning.

Enayati, Yazdanpanah, and Behnamfar (2014) evaluated the use of mobile phones to provide educational content to students in Iran. The study used a quantitative research approach, collecting data through close-ended questionnaires. The study found that course materials can be transferred via mobile phones and text messages, which proves effective in learning. Mobile phones could also be used in the classroom as a research tool. They can be used to link to the Internet and find information from reputable sources that can be used in reports.

In Kenya, Kyalo and Munuki (2018) assessed the influence of Facebook as a pedagogical interaction tool on learning outcomes among learners in secondary schools. The study emanated from a systematic desk literature review that established how Facebook is used in teaching and learning to promote pedagogical interactions and influence learning outcomes. The findings indicated that pedagogical interactions through Facebook influence learning outcomes differently,

including social interactions, affecting academic performance among its users, especially students in schools and colleges. It was recommended that since Facebook has become part of the student's life, parents and teachers should establish ways of leveraging its use for optional pedagogical interactions and better learning outcomes instead of condemning it. This would make Facebook a potential tool for creating apt virtual learning communities where pedagogical interactions between students and teachers and students and fellow students collaborate and support each other.

Msuya (2015) conducted a cross-sectional survey on using mobile phones in teaching and learning in secondary schools in Tanzania. Specifically, the focus was on how secondary school teachers use mobile phones in teaching and learning. The study involved 100 teachers from public and private secondary schools drawn from Mwanga and Chamwino districts in Kilimanjaro and Dodoma regions, respectively. The respondents were selected purposely because they owned smartphones. Data for the study were collected through questionnaires and semi-structured interviews.

The study found that most teachers had little knowledge of using mobile phones as a tool for pedagogical uses. It was also found that the teachers were competent in the basic uses of mobile phones but could not create, upload, download and share academic resources through their smartphones, and some were not aware of the capacity of their mobile phones. Overall, the study findings indicated that teachers acknowledged that mobile phones were relevant for teaching and learning, though most teachers were not using them for academic purposes. The teachers were also found to be against the idea of allowing their students to carry the devices into the

classroom. However, this study neither examined teachers' misuse of mobile phones in schools nor proposed measures to curb it.

Mtega (2012) investigated how mobile phones have been used for teaching and learning in higher learning institutions in Tanzania. The study was conducted at Sokoine University of Agriculture in Tanzania. Specifically, the study assessed how mobile phones facilitated the teaching and learning process, identified the mobile phone applications used for teaching and learning and assessed the limitations of mobile learning at the university. The study sample involved 30 teaching staff and 40 students, who were randomly selected. Data were collected through in-depth interviews, observation and questionnaires.

The findings revealed that most respondents used their mobile phones for the teaching and learning process. It was found that most respondents mainly used basic applications, in particular text messages and calls. Few respondents, mainly lecturers, owned smartphones embedded in multiple applications, which enabled them to create, download and share academic resources. The study also revealed that most teaching staff were unaware of their devices' capacity, so they underutilised them. The study revealed the costs associated with downloading, lack of knowledge, and so on as key constraints limiting mobile phone use in education. Contrary to the present study, this study neither investigated the misuse of mobile phones by teachers in schools nor the measures to curb the misuse of the devices in academic settings in Tanzania.

2.4 Synthesis of Literature and Knowledge Gap

A great deal of recent studies has generally focused on mobile phone use and its impact on students' learning and discipline (Kihwele et al., 2013; Matimbwa & Anney, 2016; Msuya, 2015; Twum, 2014; Urassa, 2012). A few studies focused on teachers' views on using the devices among school students and how they can support their career performance and learning (Aubusson et al., 2009; Kihwele et al., 2013; Urassa, 2012). The literature on using devices among teachers and students in piloted public secondary schools is insufficient, including Mfaume's (2019) study in three pilot public secondary schools that focused only on teachers.

The reviewed empirical studies vary from the current study in many ways; many reviewed studies use qualitative methods, and the data collection method was interview only. This method uses few respondents, limiting broad knowledge of the contents studied with a limited sample size (Sumath et al., 2014; Zengning Hu, 2013; Farai (2018). Others employ the quantitative method only (Kaliisa & Picard, 2017). While many of the existing studies have been conducted in developed countries (Ismail et al., 2013; Sumathi, Lakshmi & Kundhawai, 2018; Mohtar *et al*., 2013; Zengning Hu, 2013), so far, only a few studies are from Tanzania and were not focused on piloted public secondary schools (Kihwele & Bali, 2013; Msuya, 2015; Chambo *et al*., 2013).

Despite growing evidence on stakeholders' practices regarding mobile phone use in piloted public secondary schools, research has yet to adequately address this integration's contextual, equitable, pedagogical, and policy-related dimensions. Little

is known about (i) context-specific challenges and opportunities for mobile phones, (ii) strategies to ensure equitable stakeholder engagement, and (iii) sustainable and curriculum-aligned integration of mobile phones into teaching and learning.

2.5 The Conceptual Framework on Educational stakeholders on the Feasibility of Using Mobile Phones in Teaching and Learning.

The conceptual framework (Figure 2.1) visually represents the relationships between the variables. This framework is a modification from established conceptual models, specifically drawing elements from (i) the KAP Model, which emphasises the sequential relationship where knowledge informs attitudes and attitudes influence practices; (ii) Social Constructivist Theory, which highlights the roles of social interaction and cultural context in shaping knowledge and behaviour and (iii) Technology Acceptance Model (TAM) to emphasise external factors like perceived usefulness and ease of use, which can align with knowledge and attitude formation.

The framework was modified by integrating key elements from different theoretical models and aligning them with the study's objectives: (i) incorporation of external factors; while traditional KAP frameworks focus on individual-level dynamics, the addition of external factors such as infrastructure, policies, and training reflects broader influences relevant to the study context; (ii) integration of social and cultural dynamics: i.e. the influence of social interaction and cultural context aligns the framework with social constructivist principles, highlighting that knowledge and attitudes are co-constructed in a specific environment; (iii) non-linear relationships; i.e. traditional KAP frameworks often present a linear progression from knowledge

to practice. This framework allows for feedback loops and reciprocal relationships, where practice can influence knowledge and attitudes.

This study's conceptual framework linking knowledge, attitude, and practice blends the adoption of the KAP model with insights from the TAM model. From the framework, external factors create the foundational conditions for mobile phone integration. Supportive policies, adequate training, and sufficient resources are necessary to shape positive stakeholder perceptions and facilitate practical use. Positive stakeholder perceptions are grounded in the TAM. They are pivotal for determining whether mobile phones are perceived as valuable and easy to use in education and (iii) focus on educational technology use: By emphasising mobile phone practices in education, the framework incorporates technology adoption principles, making it specific to the study's context.

In the conceptual framework, independent variables entail stakeholders' perceptions of mobile phones' usefulness in education, ease of use for teaching and learning, and attitudes toward mobile phone usage. External factors entail infrastructure and technological support (e.g., internet availability and device access), training and capacity building for teachers and students, and policies and regulations governing school mobile phone use. Mediating variables include the behavioural intention to use mobile phones for educational purposes. The dependent variable is the actual practices of using mobile phones in teaching and learning. Behavioural intention is a mediating variable, translating perceptions and attitudes into actionable practices (Kukulska-Hulme, 2008; Ally, 2009). Actual practices mark an end goal: the

practical and equitable use of mobile phones by teachers, students' parents, and administrators to improve educational outcomes.
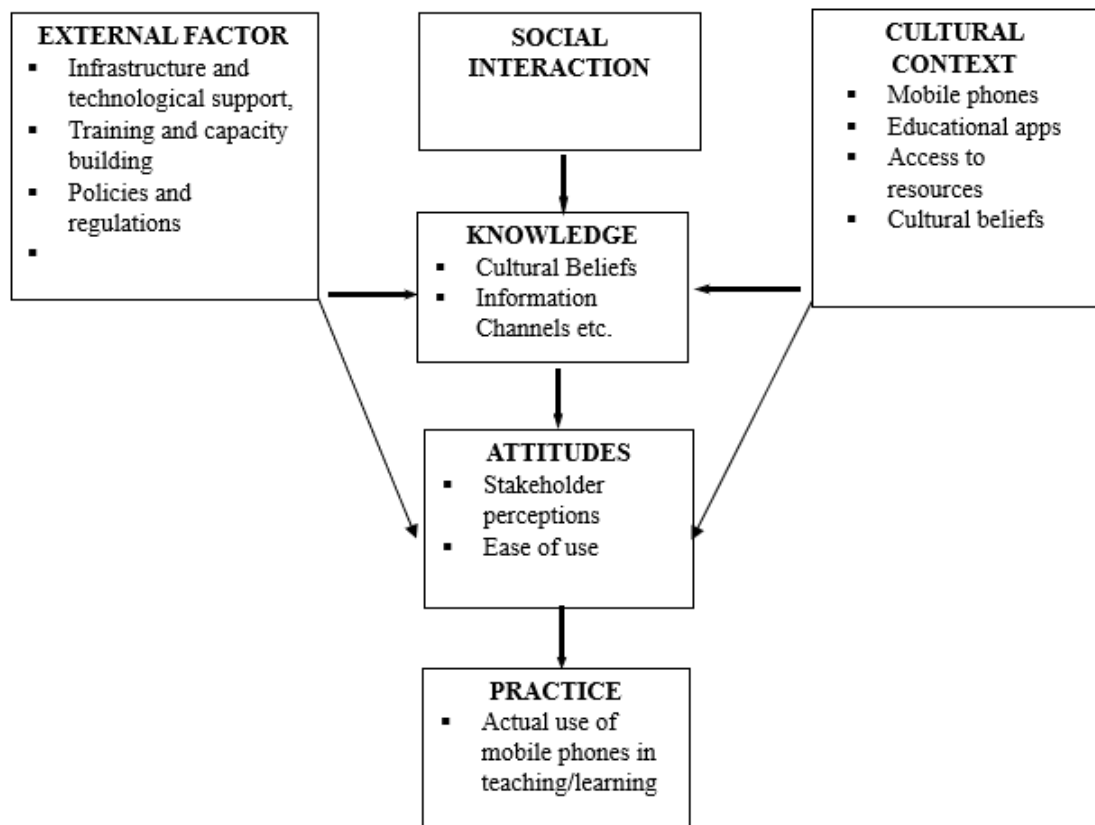
Figure 2.1: Conceptual Framework – from the current Educational Context towards Successful Use of Mobile Phones in Teaching and Learning.

Source: Adapted and modified from the KAP model (Rosenstock, 1966; Rogers, 1962), TAM model and Social Constructivist Theory (Vygotsky, 1978).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents and discusses all methodological procedures that facilitated the undertaking of this study. It discusses the research's philosophical underpinning, approach design, study area, population, and sampling procedures. The chapter also discusses the data collection methods, instrumentation, data analysis and presentation, and the proposed mechanisms to ensure the validity of the findings.

3.2 Research Paradigm

The research paradigm for a study exploring stakeholders' knowledge, attitudes, and practices (KAP) regarding the use of mobile phones in teaching and learning is grounded in pragmatism. Pragmatism is particularly suited to studies addressing practical issues, where mixed methods can provide comprehensive insights. This paradigm aligns well with the study's objectives, which aim to understand perceptions and behaviours while identifying actionable strategies to enhance mobile phone usage in education. Pragmatism was initiated in the late 19th century in the United States in the early 1870s by John Dewey (Kaushik & Walsh, 2019).

The philosophical foundations of the paradigm lie in (i) ontology (nature of reality). Pragmatism assumes that reality is dynamic and context-dependent. It views knowledge as constructed through experiences and interactions, influenced by social, cultural, and technological contexts. In this study, stakeholders' realities regarding mobile phone usage in education are subjective and influenced by their roles, access,

and familiarity with technology; (ii) epistemology (nature of knowledge): Pragmatism emphasises knowledge derived from action and experience. It prioritises practical outcomes over theoretical debates. This study seeks actionable insights into how stakeholders perceive, accept, and use mobile phones, combining subjective (qualitative) and objective (quantitative) data.

Moreover, it lies in (iii) axiology vests on the role of values: The pragmatic paradigm emphasises practical solutions and real-world applications. In this study, the values and beliefs of stakeholders about technology's role in education are central to understanding their KAP. Nonetheless, (iv) Methodology entails an approach to inquiry. Pragmatism advocates for a mixed-methods approach, using quantitative and qualitative methods to address research questions. In this study, surveys assess knowledge and practices quantitatively. On the other hand, Interviews explore attitudes qualitatively to uncover nuanced insights.

Pragmatism is relevant in this study because it focuses on practical problem-solving. The study aims to understand and improve the integration of mobile phones in teaching and learning, focusing on actionable recommendations. Pragmatism accommodates diverse stakeholder views (teachers, students, administrators), ensuring a holistic understanding of the issue. Pragmatism entails flexibility in methods whereby the mixed-methods approach aligns with the study's need to capture numerical data and rich, contextual insights. Pragmatism accounts for the educational, cultural, and technological context of piloted public secondary schools in Kinondoni Municipality.

The mixed-methods approach combines surveys, interviews, and observations to capture the breadth and depth of stakeholders' KAP. The focus on stakeholders' contexts acknowledges the diversity of experiences and resource access among teachers, students, and administrators. The interdisciplinary framework incorporates insights from social constructivist theory, the Technology Acceptance Model (TAM), and the KAP model to guide data interpretation. Practical outcomes aim to identify barriers and enablers of mobile phone use, providing recommendations to policymakers and educators for improved implementation.

Pragmatism is integrated with the theoretical frameworks of Social Constructivist Theory, as it explains how stakeholders construct knowledge about mobile phones through social interaction and shared experiences. Technology Acceptance Model (TAM) provides a lens to understand how perceptions of usefulness and ease of use influence attitudes and behaviours. KAP Model offers a structured framework to systematically analyse stakeholders' knowledge, attitudes, and practices.

3.3 Research Approach

The research approach outlines the strategy and methods to systematically address the study's objectives. A mixed-methods approach is most suitable for a study examining stakeholders' knowledge, attitudes, and practices (KAP) regarding the use of mobile phones in teaching and learning. This approach integrates qualitative and quantitative methodologies, comprehensively understanding the research problem. Mixed methods allow exploration (qualitative) followed by confirmation (quantitative), starting with open-ended questions and then identifying patterns

quantitatively (Creswell, 2013). The approach incorporates triangulation (combining different data sources and methods to validate findings and enhance reliability), complementarity (using qualitative insights to explain and enrich quantitative findings), and practical orientation (focusing on actionable solutions, aligning with the pragmatic paradigm). Creswell (2012) shows that each method compensates for the limitations of the other.

3.4 Research Design

This study adopted a convergent parallel design. This design adopts a mixed-method approach where quantitative and qualitative data are collected simultaneously (Creswell & Plano Clark, 2018). This design combines quantitative methods' strengths and non-overlapping weaknesses (large sample size, trends, and generalisation) with qualitative methods, with small numbers, details, and in-depth (Rubin & Babbie, 2011). This design is used when a researcher wants to directly compare and contrast quantitative statistical results with qualitative findings (Samzugi, 2012). Also, in data collection, the researcher gathered quantitative data through questionnaires and qualitative data through interviews and observations towards the educational stakeholder's perceptions on the feasibility of using mobile phones in teaching and learning in piloted public secondary schools in Kinondoni Municipal.

This study sought to investigate educational stakeholder perceptions regarding the use of mobile phones in the teaching and learning process in secondary schools, so the choice of this design is logical. Using the convergent parallel design validates the

findings generated by each method through evidence produced by the other. It allows the use of varied questions that generate a wide range of responses from the field, thus giving the study a rich source of information (Saunders *et al*., 2007).

3.5 Study Area

The study was conducted in the Kinondoni municipality, Dares Salaam region. Kinondoni Municipality is located between Latitude 6030`S and 6050`S and Longitude 3904`E to 39016`E (Figure 3.1). The selection of Kinondoni was based on pilot projects for integrating ICTs like mobile phones in teaching and learning processes. Teaching and learning projects like Bridge IT were implemented or piloted in Kinondoni Municipality schools. In Dar es Salaam, the Bridge-IT project ('Elimu kwa Teknolojia'), for instance, has explored the use of mobile phones in teaching and learning (Urassa, 2012).

Moreover, the Tanzania Ministry of Education, Science and Technology (MoEST), in collaboration with the College of Information and Communication Technologies (ICT) of the University of Dar es Salaam, conducted a pilot project on the use of Short Messages Services (SMS) to upgrade subject content knowledge of secondary school science and mathematics teachers (Mtebe et al., & Kisaka 2015) was piloted in this municipality. The pilot schools in the areas for this study were explicitly selected for the pilot project, meaning they have the necessary permissions, resources, and institutional readiness to experiment with mobile phone use in education despite the broader prohibition. The area offers a controlled pilot nature to ensure structured implementation, monitoring, and evaluation.

Their area had supportive infrastructure, whereby pilot schools are often equipped with better technological infrastructure, such as internet access, charging facilities, flat screens for displaying contents and trained personnel, making them more conducive to conducting a study on mobile phone use in education. Nonetheless, a representative sample could be drawn. Kinondoni Municipality is a diverse urban area with schools that serve students from varied socio-economic, cultural, and educational backgrounds. This diversity ensures that the findings reflect various experiences and perspectives, increasing the study's relevance and generalizability.
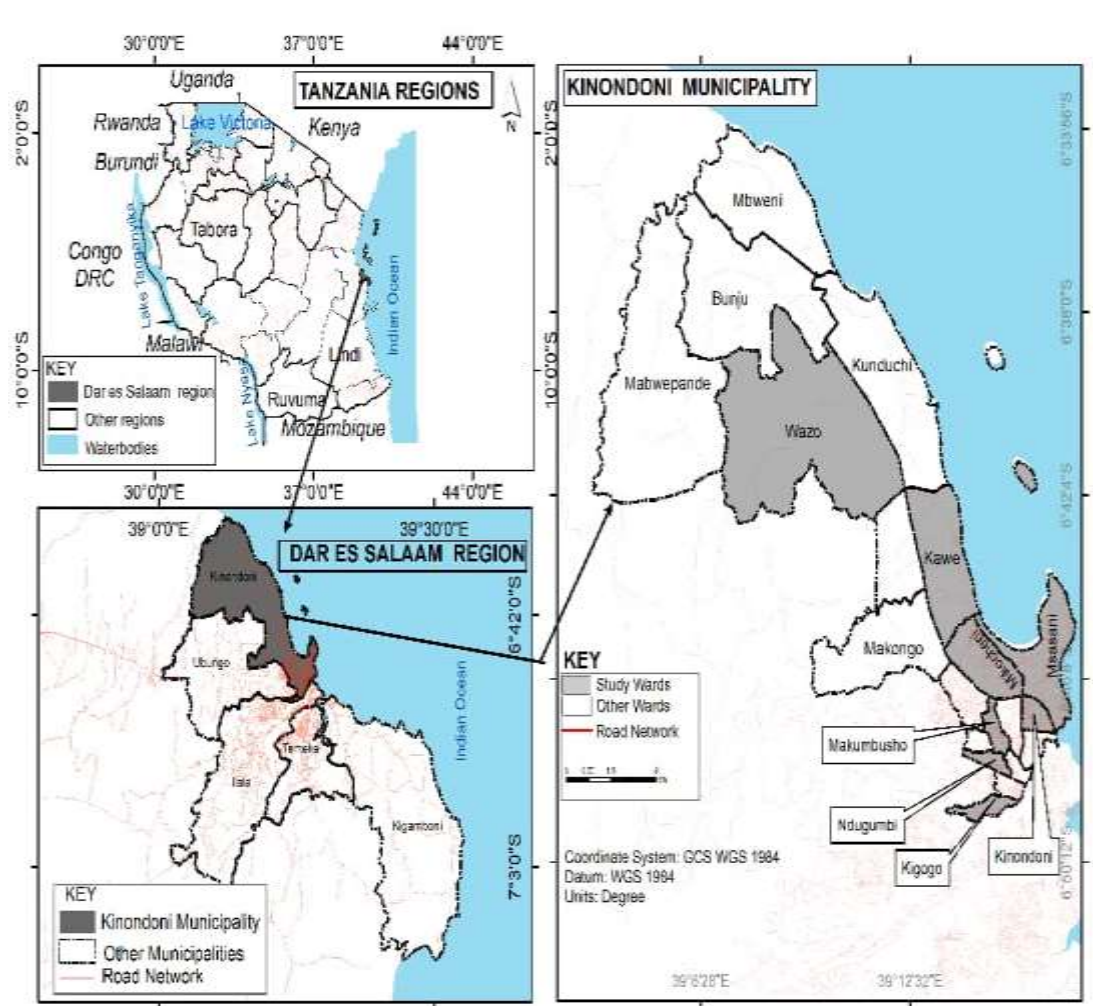
Figure 3.1: Map showing the Location of Kinondoni Municipality

Source: Cartographic Unit, University of Dar es Salaam, (2023).

Furthermore, the area offers a conducive environment that aligns with study objectives, focusing on knowledge, attitudes, and practices (KAP. Pilot schools offer a unique opportunity to analyse stakeholders' KAP regarding mobile phones in teaching and learning, as these schools are the only ones allowed to experiment with this technology within the municipality. They serve as a practical testing ground for exploring how mobile phones influence educational practices. The study evaluates the feasibility of integrating mobile phones into teaching and learning. Pilot schools, exceptions to the prohibition, provide a precise setting to assess real-world applications and outcomes.

Being in the pilot status, the area obtained support from educational authorities. Pilot schools in Kinondoni were selected under the guidance of educational authorities to ensure that the study aligns with national and local educational goals. Policy support legitimises the research and facilitates access to schools, resources, and stakeholders. Pilot projects typically involve baseline data collection, monitoring, and evaluation. This pre-existing data can complement the study and enhance its depth and reliability.

The study examines how mobile phones can help bridge gaps and address resource challenges within these settings. Moreover, findings from pilot schools in Kinondoni can serve as a model for scaling mobile phone use in teaching and learning in other schools in the municipality and beyond. Insights gained will inform policies, training programs, and resource allocation for broader implementation. Conducting the study in Kinondoni's pilot schools highlights how mobile phone use can be responsibly

managed and integrated into education even in a broader context of prohibition, providing evidence to reconsider restrictive policies.

Last but not least, Kinondoni Municipality's urban setting offers easier access to schools, stakeholders, and resources, facilitating data collection and researcher engagement. Transportation, communication, and support infrastructure availability ensures smooth study implementation. As part of a pilot project, these schools will likely have established partnerships with educational authorities, NGOs, and researchers, creating an enabling environment for collaborative research.

3.6 Population for the Study

The study's targeted population was varied, comprising 27 public secondary schools and six categories of respondents, including one district secondary education officer (DSEO), eight district school quality assurance officers (SQAOs), and 27 heads of public secondary schools. Also, it comprised 962 school teachers and 27,759 students in public secondary schools in Kinondoni Municipality.

3.7 Sample Size and Sampling Procedures

3.7.1 Sample Size for Quantitative Data

As for quantitative data, this study selected the sample using the Yamane formula (1967), as cited in (Ghauri & Kjell, 2005). The formula was chosen to derive sample size because it offers a straightforward method for calculating sample size from a finite population. Calculating the sample size minimised sample error, leading to more reliable results in assessing experiential knowledge, attitudes and practice. This

formula was convenient for this study as it enhanced the generalisation of findings. Moreover, the quantitative sample size was determined through probability sampling techniques (stratified sampling), hence using a formula for mathematical calculations. The aim was to get the actual sample size to generalise findings. Therefore, in this study, sample size was determined by the following general formula.

$$n = \frac{N}{1 + N(e^2)}$$

Where: n= Sample size

N= Population (universe)

e = Marginal error or level of precision of 5%

$$n = \frac{N}{1 + N(e^2)}$$

$$n = \frac{962}{1 + 962(0.05^2)}$$

$$n = 284$$

For students

$$n = \frac{N}{1 + N(e^2)}$$

$$n = \frac{27759}{1 + 27759(0.05^2)}$$

$$n = 394$$

Therefore, the quantitative sample size of this study for teachers and students are 284

+ 394 = 678

Table 3.1: Sample Size for Quantitative Data

Schools	No of students	No of Teachers
A	78	56
B	78	56
C	78	56
D	78	56
E	82	60
TOTAL	**394**	**284**

Source: Field Data (2021).

3.7.2 Sampling Procedure for Quantitative Data

The researcher used probability sampling (stratified sampling). Probability sampling involves the random selection of subjects to be included in the study to generalise the findings (Magwa & Magwa, 2015). By sampling from each stratum, the researcher ensured that all relevant groups were represented in the study. This is crucial for understanding the different demographics varying in levels of knowledge, attitudes and practices regarding mobile phone use. Also, this helped the researcher to control specific characteristics like age and gender, thus reducing variability within the sample, leading to more reliable and valid results.

The researcher drew the sample from among form three and form four students. The sample of teachers was selected from among all teachers. The rationale behind the sample selection was that students from these classes were selected due to their maturity and experience, as they had been in school for longer. They provided their

views on the educational use of mobile phones in learning in their respective schools. According to Enke and Shubatt (2023), researchers selected the sample size by using the following steps:

First, the entire population was divided into distinct subgroups according to gender to show gender balance. Second, the researcher decided on how many individuals were to be sampled from each stratum; for example, 39 participants were selected at each level in school A. Third, the researcher prepared 39 pieces of paper, put a "Yes" mark on them and folded them, then prepared other unmarked pieces of paper, according to the remaining number of female students in the class and folded them. Both marked and unmarked folded papers were mixed, and students had to pick only one piece. Thus, students with 39 marked papers were engaged as a sample, while those with unmarked papers were excluded. The same procedure was followed for male students in all the schools.

3.7.3 Sample Size for Qualitative Data

The sample size for qualitative studies has been a debatable issue in the literature so much that there is no definitive answer for the appropriate sample size (Bryman, 2012). For example, Cohen et al. (2011) contend that the appropriate sample size depends upon the purpose of the study, the nature of the population and the research approach employed in a particular study. Marshal, Cardon, Poddar, and Fontenot (2013) suggested that there should be between 20 and 30 interviews for grounded theory and 15 to 30 interviews for a single case study. Some researchers (Bogdan & Biklen, 2007; Lincoln & Guba, 2010; Patton, 2015) have suggested that an

appropriate sample size for a qualitative study is determined when new themes stop emerging from the data. In this regard, the study drew five piloted public secondary schools and 23 respondents from a population of public secondary schools, the heads of public secondary schools, district educational officers, academic teachers, district educational officers (DEO) and students as well as the school quality assurance officers (SQAO).

Table 3.2: Sample Size for Qualitative Data

Respondents	Total
Head of schools	5
Students	10
Academic Teachers	5
District Quality Assurance Officer	2
District Secondary Educational Officer	1
Total	**23**

Source: Field Data (2021).

3.7.4 Sampling Procedures for Qualitative Data

Non-probability sampling involves selecting specific subjects to understand their experiences with a particular phenomenon (Oliver, 2010; Patton, 2015). Because the study sought to generate new insights and an in-depth understanding of the subject under inquiry from the respondents' point of view, the researcher adopted a non-probability sampling technique to select the sample (Patton, 2015). Using non-probability sampling, the researcher obtained a sample using purposive sampling. The purposive sampling technique enabled the study to use judgment to identify and select information-rich cases, which provided a great deal of data to respond to the study's objectives (Magwa & Magwa, 2015; Oliver, 2010). The following

explanations show how the technique was used to obtain different categories of samples.

3.7.4.1 Selection of Heads of School

Five school heads, one from each sampled school, were purposely chosen to be involved in the study under their position. Heads of schools are in charge of education management overall; hence, they are responsible for promoting and maintaining the use of mobile phones in schools. They provided adequate information on teachers' use of mobile phones in their respective schools.

3.7.4.2 Selection of Academic Teachers

Five academic teachers were purposely selected from five schools and involved in this study based on the positions and responsibilities they held in their respective schools, such as supervising and ensuring effective teaching and learning processes and solving academic issues, including mobile phones. Also, they acted as mediators between teachers, students, and the school management. They provided relevant and adequate information regarding awareness of mobile phones as potential pedagogical tools, their educational utilisation, and barriers to educational use of the devices.

3.7.4.3 Selection of Students

Students were involved in the study because they are the primary users of mobile phones in the teaching and learning processes. A total of ten (10) students were selected from the five (5) sample schools with two (2) students each. These students were selected because they were leaders and, therefore, most likely to be more

informed when providing information for this study. The students represent diverse perspectives on experiences of using mobile phones. These were the head boy and the head girl from sampled schools. They provided their views on the educational use of mobile phones in learning in their respective schools.

3.7.4.4 Selection of the District Secondary Education Officer (DSEO)

The officer was purposely involved in the validation of the findings. By one's position, the DSEO is overall in charge of education management. Therefore, one's involvement in this study yielded relevant information concerning common forms of mobile phone use by school teachers and students. The respondent also proposed strategies that could be used to ensure effective use of the devices in school settings.

3.7.4.5 Selection of School Quality Assurance Officer (SQAO)

The researcher purposely selected the chief School Quality Assurance Officer for her position. The officer oversees the performance of schools and their staff, including teachers. The SQAO provided data on prevalent forms of mobile phone use by teachers as they were revealed during the school inspections. The officer also shared views on using mobile phone devices as a tool for teaching and learning.

3.8 Sources of Data

The data was collected from primary and secondary sources.

3.8.1 Sources of Primary Data

Primary data are first-hand information gathered by researchers directly from their original sources. This study's primary data on the subject under inquiry was

generated directly from various categories of respondents: heads of schools, teachers, students, the Education Officer, and the Quality Assurance Officer.

3.8.2 Sources of Secondary Data

Secondary data are usually collected from sources such as encyclopaedias, newspapers, books, statistical reports and various official documents, to mention but a few (Esling & Agon, 2012). The researcher reviewed different sources in this study, including lesson plans, ICT policies and regional data for 2020. These varied sources provided the researcher with adequate and relevant data which could not be acquired quickly in the field. The data enabled the researcher to complement and verify the trustworthiness of the data collected through primary sources. In this study, the researcher employed multiple data collection methods to collect relevant data to answer the research questions. Using multiple sources and methods (data triangulation) in this mixed-method study was critical in validating data (Henning et al., 2011). Specifically, the researcher generated data through interviews, questionnaires, observation, and documentary review.

3.9 Data Collection Methods

Data was collected using questionnaires, interviews and observations.

3.9.1 Structured Questionnaires

This study used a structured questionnaire to collect data. In this kind of questionnaire, the researcher usually identifies topics and sub-topics for investigations related to specific questions (Magwa & Magwa, 2015). Questionnaires

were self-completed by teachers and students. The questionnaire focused on respondents' knowledge, attitudes, and practices regarding using mobile phones as a tool for teaching and learning in secondary schools. Initially administering the questionnaires, the researcher visited the respective offices a few days before. The pre-visit enabled the researcher to meet with the respondents individually, get familiar with each other, and make arrangements for administering the questionnaire (Lewis & Ritchie, 2014). Thereafter, questionnaires for students in all schools were administered in a unique venue prepared by the academic master to gather the participants selected for the research. The respondents gathered in these venues to fill in questionnaires.

The questionnaires were distributed to each participant to fill. Each questionnaire session lasted for approximately one hour. After being introduced to teachers during the tea break, the researcher team was introduced, which clarified the research's purpose. The teachers asked the researcher to leave those questionnaires with them, and then, after three days, the researcher collected the questionnaires. The academic master helped the researcher to collect all the questionnaires. The format of the questionnaires was adopted and modified by (Simbeye, 2020).

3.9.1.1 Interviews

Semi-structured interviews were used to collect data. In these interviews, the researcher identifies topics and sub-topics as probes rather than specific questions (Magwa & Magwa, 2015). This method enhances the collection of rich, qualitative data, provides the flexibility to probe deeper into complex perceptions, helps

understand the contextual factors influencing stakeholders' attitudes, and allows for exploring nuanced and diverse perspectives (Creswell, 2014). The insights gathered through interviews can be valuable in interpreting KAP findings and developing evidence-based recommendations for improving the integration of mobile phones in education. Specific questions come out during the exploration of the identified topics and sub-topics.

Thus, interview schedules were administered to the district secondary education officer, school quality assurance officer, heads of school, academic masters, teachers and students. The questionnaire focused on respondents' knowledge and attitudes toward mobile phones in teaching and learning. In administering the interviews, the researcher initially made a preliminary visit to each of the five sample schools and the respective offices a few days before. The pre-visit enabled the researcher to meet with the respondents individually, get familiar with each other and make arrangements for the actual interviews (Englander, 2012).

Thereafter, interviews with teachers in all schools were held in special offices provided by the school management during tea and lunch breaks. At any convenient time, an individual teacher was free. The interviews with the school heads, SQAO, and the DSEO were held in their respective offices. All the offices where the interviews were held were interruptions-free (Willig, 2013).

During the interviews, the researcher posed questions and attentively concentrated on listening, probing, clarifying, and responding to some issues raised by the

respondents. In encouraging the respondents to elicit more data, the researcher used visual cues and other non-linguistic expressions such as nodding, smiling or avoiding strong emotions and reactions such as pain, anger or panic to the responses or views given by the respondents (Seidman, 2013; Turner, 2010).

All the interviews were tape-recorded with the respondents' consent, enabling the researcher to capture all the responses. The tape recording was also used, and it functioned well in protecting the researcher against bias and providing the team with a lasting record of what had been reported (Willig, 2013). Each interview session lasted for approximately one hour or less. Semi-structured interviews allowed the researcher to elicit detailed information on the subject under inquiry through follow-up questions (Turner, 2010). Its flexibility gave the researcher more freedom to change the wording and series of questions depending on the context and direction of the interview itself.

Furthermore, the open-ended nature of the questions motivated the respondents to articulate their opinions and experiences fully, thus enabling the researcher to explore the insider perspectives in-depth (Turner, 2010; Willig, 2013). The direct interaction with the respondents allowed the team to clarify misinterpretations of the questions by the respondents. This helped the researcher avoid unnecessary deviation from the main focus of the study (Bryman, 2012; Willig, 2013). Also, all interviews were tape-recorded, transcribed and checked by the researcher and were then returned to the respondents to be checked for accuracy.

3.9.1.2 Observation

The observation was a powerful qualitative data collection method that allowed researcher to gather first-hand information about teachers' and students' engagement and participation levels in mobile phone devices in an ICT laboratory setting (Creswell, 2014). Before conducting an observation, the researcher initially made a preliminary visit to each of the five sample schools and their respective offices a few days before. The pre-visit enabled the researcher to meet with the participants (teachers and students) in an actual classroom setting (ICT laboratory, which was used for teachers and students when teachers needed to integrate mobile phone devices into their lessons). Academic masters arranged periods and timing, which enabled the researcher to conduct the observation. During observation, the researcher used a structured pre-defined observation checklist to guide the observation and then took general notes on everything observed (Yin, 2014). The researcher used the developed observation checklist to observe students' engagement and participation level in lessons, teachers' strategies for integrating mobile phones in teaching and learning, and students' and teachers' interaction with mobile phone devices.

3.10 Data Analysis

In this study, data analysis processes relied on the adopted research methodology related to qualitative and quantitative approaches.

3.110.1 Quantitative Analysis

The data collected was sorted out (curetted) and placed into categories following the research objectives. Quantitative data were analysed through descriptive and

inferential analysis. In descriptive analysis data were presented in tables, percentages and frequencies from which the mean and standard deviation of the responses were summarised. These results depict the degree to which the participants respond from strongly agree to strongly disagree, thereby giving the research a clear picture of the extent to which improvement in teaching and learning is significantly related to the use of mobile phones as perceived by the respondents. From the obtained data, the regression analysis was conducted following a test for normality done in priori to investigate the relationship between various variables related to the use of mobile phone devices and performance in teaching and learning at a 95% confidence level (Yin, 2014).

The rationale for using the regression analysis model was to provide the predictive results that can be applied to policymaking and the control factors' importance and degree of influence on the response variables, hence solving the data in blocks formed by many respondents. Statistical Package for Social Science (SPSS) Version 22 used all statistical analyses to simulate the8 regression model and the corresponding coefficients that make the study predictive and robust. Descriptive statistics (frequency, mean and standard deviation) and inferential statistics (correlation coefficient, regression coefficient) were exhibited.

The results revealed two regression models: one for teachers and the other for students. The models describe the significant relationship between knowledge, attitude and practice in using mobile phones. Furthermore, the model unveiled which variable provided more contribution than the rest so that policymaking can use the

results to suggest good strategies for improving teaching and learning by integrating mobile phones. Using SPSS software, the coefficients of regression simulation also revealed how the researcher could identify the strength of the relationship between the dependent variable (improvement in teaching and learning) and independent variable (knowledge, attitude and the practice of the use of mobile phones) and corresponding standard errors that determine how far the data fits the regression lines. Finally, the researcher used descriptive results tables, regression models and regression coefficients to interpret the empirical outcomes of the study, including the significant relationship between knowledge, attitude and practice with the use of mobile phones and improvement in teaching and learning.

3.10.2 Qualitative Analysis

There is no single way of data analysis in qualitative research (Miles, Huberman & Saldana, 2018). The data analysis method depends on the research questions, how data will be used, and the resources available to facilitate the process (Yin, 2014). Thus, the collected data was analysed manually using thematic data analysis procedures. The conceptual framework of the thematic data analysis used in this study hinged on the theoretical perspectives of Cohen, Manion, and Keith. (2011).

The procedures employed for data analysis involved six concurrent steps, as Yin (2014) proposed. The steps included data familiarisation, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the reports. In the first step, the researcher prepared the data by transcribing the interviews and organising them properly (Leavy, 2011; Shalin, 2014). All the

transcriptions were done by the researcher herself to avoid incorrect decisions, especially on what to include or exclude, which could compromise the credibility of the findings if the transcription was done by someone else (Shalin, 2014). Bearing in mind that good analysis depends on understanding the data (Leavy, 2011), the researcher familiarised herself with the data to comprehend the breadth and depth of the content of the data.

This process involved repeated reading of each written transcript and thorough listening to the original audio tape while searching for meaning and patterns (Braun & Clarke, 2006). After being thoroughly engrossed with the data, the transcripts of each interview question were cross-checked against the original audio tape and each key question in the interview schedule for accuracy before the researcher moved forward to another stage. This stage enabled the researcher to understand the collected data better and be better positioned to determine whether the data generated were relevant and adequate or needed more data.

In the second step, the process of interpreting the data to generate initial codes began. Braun and Clarke (2006) state that this process begins after the researcher has read and understands the data comprehensively. At this stage, the researcher reviewed the purpose and objectives of the study. Then, the researcher compiled the data into categories of repetitive ideas across the transcripts of different respondents. The aim was to identify the initial lists of key ideas in the data that could be linked to the key research questions and analysed meaningfully (Miller & Day, 2013). The data were labelled, and each producing initial code was identified with different colours, with

comments written in the margins next to the coloured categories. The initial codes were finally identified and refined. In the third step, the researcher went beyond searching for themes by sorting out different generated initial codes with similar ideas and seeing how they could be aggregated to form potential candidate themes under research questions (Braun & Clarke, 2006; King et al., 2010). Having aggregated all the relevant coded data extracts within identified themes, the researcher decided on the initial codes reflecting the candidate themes.

The themes were then reviewed and refined to identify the relationships within and between various categories. After the main categories of themes had been identified, the researcher summarised the information about each theme within the category based on the responses and took note of the similarities and differences in those responses (Miles, Huberman & Saldana, 2018; Braun & Clarke, 2006). Finally, the researcher reorganised the quotations and statements from their original context under the newly developed themes. In the fifth step of data analysis, the researcher defined and named the themes presented for analysis. This was done by identifying the real meaning each theme captured based on the respondents' responses (Braun & Clarke, 2006). To accomplish this, the researcher went back through each collated data extract for each theme to ensure they were organised into logical and reliable descriptions with accompanying stories (Braun & Clarke, 2006).

The researcher finally analysed the selected extracts and related themes to the literature reviewed and the research objectives and reported the findings according to the key themes and sub-themes related to the key focus of the study. After

identifying themes and sub-themes, the sixth and final step was to produce the research report (Braun & Clarke, 2006). This stage allowed the researcher to conceptualise, interpret the data, and provide sufficient evidence of each theme within the data to capture the essence of each precisely conveyed message before concluding. The method was chosen because it organises and describes the data in detail and can produce an insightful analysis to answer the research questions (Braun & Clarke, 2006).

Additionally, the method goes beyond organising and describing data sets in detail; it also interprets various aspects of the research topic (Braun & Clarke, 2006). The method does not need detailed theoretical and technological knowledge, such as grounded theory (Braun & Clarke, 2006). This theoretical freedom gave the researcher flexibility and valuable research tools, providing a rich, detailed, and complex data account (Braun & Clarke, 2006). Ibrahim (2012) adds that thematic analysis is the most appropriate technique for any study that seeks to discover using interpretations. It allows the researcher to determine accurately the relationship within and between the key concepts and compare them with the replicated data.

3.11 Reliability and Validity

According to Doody and Noonan (2013), validity is the degree to which data analysis results represent the phenomena under study. Reliability is the consistency of the research instrument. A valid instrument should collect accurate and consistent data. To ensure reliability and validity, the research instruments were pre-tested to determine whether they could provide accurate and consistent data. The researcher

conducted a pilot study on twenty (20) students and ten (10) teachers. The feedback from the pre-testing exercise was used to validate the research instruments in readiness for the study. Findings from the pre-test were used to improve questionnaires regarding clarity and collecting relevant information.

The pilot study was conducted to test the tools' feasibility, appropriateness and effectiveness before conducting the main study. The pilot study aimed to validate the data collected and ensure consistency through methodological triangulation involving qualitative and quantitative data collection techniques, including interviews, observation and questionnaires. The pilot study served several important purposes.

First, it helped the researcher to identify potential problems and make necessary adjustments to the research design and procedures, ensuring a smooth and efficient data collection process for the main study. Second, the pilot study allowed the researcher to estimate the appropriate sample size required for the large study. Third, it helped refine the research questions, ensuring that the study focused on the most relevant and significant aspects of educational stakeholders' perception of the feasibility of using mobile phones in teaching and learning in piloted public secondary schools.

The findings from the pilot study contributed to improving the accuracy and quality of data collection and analysis. After conducting the pilot study, the researcher examined the data and addressed any issues or challenges encountered during the

pilot phase. This involved revising and refining the research instruments, making necessary modifications to the research design and enhancing the overall research methodology. Based on the pilot study's findings, the researcher made informed decisions and adjustments to optimise the research design and procedures for the main study. The pilot study served as a valuable preparatory phase, providing valuable insights that strengthened the subsequent data collection and analysis processes. It contributed to developing a robust research plan and enhanced the researcher's confidence in the validity and reliability of the study findings.

Reliability was ensured through Cronbach's alpha test. According to Remenyi et al. (1998), data are said to be reliable if the value of Cronbach's alpha test is more than 0.7. This means that data with a value less than 0.7 were to be rejected and could not allow the researcher to proceed with further analysis. However, data with Cronbach's alpha test value greater or equal to 0.7 was accepted and allowed the researcher to proceed with further analysis. Table 3.3 indicates reliability analysis results.

Table 3.3: Reliability and Test Results

S/N	Objective	No of items	Cronbach's alpha	Decision
1	Stakeholders' knowledge	26	.903	Accepted
2	Stakeholders' attitudes	34	.739	Accepted
3	Stakeholders' practices	31	.886	Accepted

Source: Field Data (2021)

3.12 Ethical Considerations

Babbie and Mouton (2001) posit ethical considerations as the most important principle guiding the relationship between the researcher and respondents. It helps

the researcher maintain objectivity and integrity when conducting a study. This study observed the conventional procedures of ethical research as follows:

3.12.1 Formal Research Permit or Research Clearance

The researcher adhered to all procedures required to conduct research in Tanzania. As Cohen et al. (2000) recommended, the researcher obtained a formal research clearance from the Open University of Tanzania as a permit to conduct the study after completing the research proposal. The research clearance letter was sought from the Dar es Salaam Regional Administrative Secretary (RAS), who formerly introduced the study to lower administrative levels, including the District Administrative Secretary (DAS), the District Executive Director (DED), and the District Education Officer (DEO) and to heads of schools where the study was conducted.

3.12.2 Informed Consent

According to Leedy and Ormrod (2015), informed consent is a process of making the respondents aware of the purpose of the study, the way it will be conducted, its dangers and the researcher's credentials. After getting the research permit from the respective authorities, the researcher met with the prospective respondents and provided them with detailed clarification of the purpose of the study. They were also informed about the way the study would be conducted and the use of the information that would be generated. The researcher told them that they were free to decide whether or not to participate in the study or withdraw from the study at any time they wished. Hence, every respondent in this study participated willingly and without being forced.

3.12.3 Confidentiality and Anonymity

The research team assured anonymity and confidentiality in creating, storing, transferring, and disseminating information under their control (Magwa & Magwa, 2015). In this study, the researcher was keen on issues of privacy and confidentiality of the information provided by the respondents in several ways. First, the research team conducted the interviews in private places free from interruptions and where no one could hear the conversations. The researcher ensured that the transcripts were stored in a place accessible only to the researcher so they remained confidential between the two.

Second, the respondents were not required to mention their names, the names of other people or those of their schools during the interviews. Third, the study used pseudonyms during transcription and when reporting the findings. For instance, in reporting the findings, schools were identified as school "A", school "B", school "C", school "D", and school "E", whereas respondents were given pseudonyms according to their schools. For instance, "SB" represents for school B; "SA" represents for school A, in order researcher to ensure that the identities of the study respondents and their respective schools would remain confidential.

CHAPTER FOUR

PRESENTATION OF THE FINDINGS

4.1 Introduction

This chapter presents findings on stakeholder knowledge of mobile phone use in teaching and learning, stakeholder attitudes towards the use of mobile phones in teaching and learning, and stakeholder practices regarding the use of mobile phones in teaching and learning consent to the objectives of this study.

4.2 Knowledge of Mobile Phones Use for Teaching and Learning

Table 4.1 displays the descriptive statistics based on the questions responded to by 380 students. In the results, we see that most of the students, i.e., 46%, strongly agreed that the knowledge of using mobile phones enhances learning in secondary schools. Zero percent strongly disagreed. Out of a total mean of 5.00, the grand average is 3.94, equivalent to 78.00%, showing that this percentage of those who responded believe that knowledge is adequate in learning. While the average standard deviation was about 0.59 for the results of the students who responded to questionnaires, the results show that for those who use mobile phones in studying, the data points mainly were clustered with the slightest standard deviation of 0.42. This further indicates that many students provided the same answer, agreeing to use the mobile phone in their studies. They see the value of technology and use it to enhance their learning.

Table 4.1: Descriptive Statistics of the Effect of Students' Knowledge on Learning

ITEM N=380	Strongly Agree		Agree		Normal		Disagree		Strongly Disagree		Mean	S.D
	N	P	N	P	N	P	N	P	N	P		
Know how to use education apps in mobile phone	202	53%	123	32%	40	11%	13	3%	2	1%	4.43	0.45
Mobile phones improved my studies	117	31%	208	55%	44	12%	10	3%	1	0%	4.58	0.56
Use mobile phone in studying	212	56%	78	21%	84	22%	6	2%	0	0%	3.66	0.42
Use internet access to search the study materials	119	31%	200	53%	39	10%	22	6%	0	0%	3.98	0.57
Save important information relevant to schoolwork on mobile phones	145	38%	150	39%	75	20%	10	3%	0	0%	4.12	0.66
Read online materials through smartphones	167	44%	158	42%	42	11%	11	3%	2	1%	4.08	0.56
Use google dictionary	154	41%	147	39%	67	18%	9	2%	3	1%	4.98	0.72
Understand the teacher when the teacher uses educational APPs in teaching	200	53%	118	31%	54	14%	7	2%	1	0%	3.99	0.58
Saves information on mobile phones	167	44%	142	37%	60	16%	9	2%	2	1%	4.02	0.49
Read online teaching materials on Google Classroom software	278	73%	62	16%	30	8%	10	3%	0	0%	4.21	0.43
Use mobile phone internet to improve language skills	189	50%	131	34%	48	13%	12	3%	0	0%	3.89	0.56
Knowledge of mobile phone software application	198	52%	107	28%	71	19%	4	1%	0	0%	3.22	0.44
Use the Khan Academy app to access learning materials	147	39%	167	44%	55	14%	6	2%	5	1%	2.99	0.65
Understand very fast when a teacher uses educational APPs for teaching	165	43%	126	33%	78	21%	9	2%	2	1%	3.34	0.78
I get what I want in learning when I know mobile educational apps.	172	45%	123	32%	71	19%	11	3%	3	1%	3.56	0.56
Overall	175.47	46%	136.00	36%	57.20	15%	9.93	3%	1.40	0%	3.94	0.59

Source: Field data analysis

For the teachers in Table 4.2, the results show that 70% of the respondents agreed that the knowledge of mobile phones effectively improves teaching. In this scenario of findings, only 1% strongly disagreed with the proposition that knowledge of mobile phones affected teaching performance. However, the mean value shows that 4.01 out of 5.00 agree that the knowledge of using mobile phones in teaching impacted the improvement of teaching. The highest standard deviation for the teacher's responses was for those who responded to nonvoting mobile phone teaching.

This implies that enormous variability (highest standard deviation) was for the least number of teachers who responded to the question of using mobile phones in teaching at an equal weight (scattered). On the other hand, teachers who mainly responded the same way were those who had prior knowledge of mobile phones before they learned to use them during the project. These had the smallest standard deviation of 0.34 (against the average of 4.58). The results confirm that the teachers mostly responded positively to mobile phones before they learned to use them for teaching. Their prior knowledge had an impact on their effectiveness in teaching.

Table 4.2: Descriptive Statistics of the Effect of Teachers' Knowledge on Teaching

ITEM N=271	Strongly Agree		Agree		Normal		Disagree		Strongly Disagree		Mean	S.D
	N	P	N	P	N	p	N	P	N	P		
Know how to impart knowledge of using mobile phones to the students.	205	76%	40	15%	8	3%	11	4%	6	2%	4.43	0.65
Has prior knowledge of mobile phones before they learn to use them.	203	75%	54	20%	5	2%	8	3%	1	0%	4.58	0.34
Teachers know how to use mobile phones for teaching	122	45%	78	29%	65	24%	5	2%	1	0%	3.66	0.76
Teachers know how to use mobile phones in teaching	213	79%	45	16%	3	1%	10	4%	0	0%	3.98	0.44
Knowing how to use mobile phones has simplified teaching	198	73%	65	24%	5	2%	3	1%	0	0%	4.12	0.45
Use mobile phone to search for study materials	197	73%	56	21%	9	3%	8	3%	1	0%	4.08	0.54
Prepare the student's tests and examinations using mobile phones	185	68%	72	27%	11	4%	3	1%	0	0%	4.98	0.66
Know how to deliver the lesson using screen and mobile phone	208	76%	56	21%	7	3%	0	0%	0	0%	3.99	0.65
It is better to use mobile phone than using chalks and board	181	66%	45	17%	34	13%	9	3%	2	1%	4.02	0.56
Know how to use mobile phone for sending learning materials	215	79%	56	21%	0	0%	0	0%	0	0%	4.21	0.65
Use mobile phone tool to search for solution of complex questions	140	52%	121	45%	9	3%	1	0%	0	0%	3.89	0.49
Uses mobile phone educational APPs to teach simple arithmetic	208	77%	44	16%	11	4%	5	2%	3	1%	3.22	0.54
Know how to use at least one mobile phone educational APP to share resources/assignments	197	72%	54	20%	8	3%	7	3%	5	2%	2.99	0.65

Overall	**190. 54**	**70%**	**60. 46**	**22%**	**13. 46**	**5%**	**5. 38**	**2%**	**1.4 6**	**1 %**	**4.01**	**0.57**

Source: Field data analysis

To support the quantitative findings on knowledge, the study composed a question to gather respondents' knowledge. The type of knowledge measured was about how to use the technology and the perceived value of using the technology. Qualitative responses indicated that students knew how to use mobile phones in learning, as shown in the following utterances:

> *"...Yes, I can use my mobile phone to access various study materials. When the teacher assigns us a specific topic, we search and read independently. We review notes and solve model questions..." (*Interviewed head girl SA 0n 10.3.2021*).*

More responses gave the same impression. Some of the responses included the fact that students learned from their teachers on how to use mobile phones in the process of learning. This is indicated in the caption below:

> *"...We know how to use them because our teachers taught us how to use mobile phones in the ICT room. Each time the teacher wants to use mobile phones in teaching, we go to the ICT room, and the teacher guides us on how to use them in access materials..." (*Interviewed head girl SA *10.3.2021.*

Not only students but responses from teachers also showed that they knew how to use mobile phones in teaching, as indicated in the quotations below:

> *"...Yes, teachers know how to use mobile phones in teaching. Donors brought mobile phones installed with Education Applications and taught all the teachers how to use them..."* (Interviewed Head teacher SA on 10.3.2 021)

In addition to knowledge on how to use the devices, the teachers and students showed that they were well aware of the benefits or usefulness of mobile phones in the teaching process. One of the respondents said:

> *"…Mobile phones are crucial for teaching and learning because they help students see reality. For example, in Geography, we can see pictures and videos of reality using a mobile phone connected to a widescreen, and it becomes easier to understand and remember. An example is when we were learning about internal forces radial/vertical movement, the teacher used a video showing vertical movement and demonstrated the upward and downward movements of the earth…"* (interviewed head girl SB 11.03.2021*).*

As quoted above, one of the interviewed head boys held the same view as the head girl from school B.

> *"…Teaching through mobile phones makes lessons interactive. For example, our biology teacher, when teaching about cell structure and cell functions, used animated videos to demonstrate how these structures function, making the lesson more vivid. This enabled us to understand the lesson more easily…" (*interviewed head boy SD 13.03.2021).

The responses from teachers and students, as reported above, clearly show that the use of mobile phones is possible. The users themselves are already knowledgeable on both how to use the technology and the benefits associated with using the technology. All the respondents have positive knowledge and associate this knowledge with improvement in teaching and learning. More insight into the perceived usefulness of mobile phones in teaching and learning was gained from questions assessing the respondents' attitudes towards using mobile phones in teaching. As indicated in the KAP Model, attitude is measured by what respondents believe about the technology.

4.2.1 Stakeholder Attitudes towards Using Mobile Phones for T/L

In Table 4.3, the empirical outcomes show how students' attitudes influenced their secondary school learning. The results further unveil that 52.00% of the respondents believed using mobile phones improves learning in secondary schools. On the mean level, the results show that 4.31 out of 5.00 (equivalent to 86.20%) thought the use of mobile phones enhances the improvement in learning, while the smallest standard deviation was for those who responded that using mobile phones improves creativity among students. This indicates that most students responded with the same weighted answer (densely clustered response). At the same time, there was the highest heterogeneity (the most clustered points) in responding to the question that using mobile phones in learning allows flexibility, with the largest standard deviation of 0.57.

Table 4.3: Descriptive Statistics of the Effect of Students' Attitude on Learning

ITEM N=380	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Mean	S. D
	N	P	N	P	N	p	N	P	N	P		
I like to use a mobile phone when I learnt my lesson	257	68%	109	29%	11	3%	3	0%	0	0%	3.6	0.44
The mobile phone has made a vital contribution to my learning	221	58%	122	32%	32	8%	5	0%	0	0%	4.44	0.56
Is it suitable for students to use mobile phones for learning	219	58%	135	36%	23	6%	3	0%	0	0%	4.54	0.55
Mobile phone is an effective tool in enhancing learning	227	60%	106	28%	43	11%	4	0%	0	0%	4.65	0.48
Feel comfortable to use the mobile phone to learn	180	47%	176	46%	22	6%	2	1%	0	0%	4.12	0.42
Using mobile phones improves creativity among students	200	53%	144	38%	33	9%	3	0%	0	0%	4.89	0.23
The use of mobile phones can trigger creativity	218	57%	132	35%	24	6%	5	0%	1	0%	4.12	0.39
Mobile phone simplifies communication	231	61%	109	29%	34	9%	6	0%	0	0%	3.99	0.44
Many students like to use mobile tools nowadays	194	51%	145	38%	34	9%	7	0%	0	0%	4.89	0.43
Through my mobile phone, I learn a lot from various search engine	205	1%	128	34%	43	11%	4	0%	0	0%	4.22	0.44
It is easier to learn using a mobile phone than printed materials	135	36%	208	55%	34	9%	3	0%	0	0%	4.54	0.54
Using the mobile phone in learning allows for flexibility	219	58%	111	29%	44	12%	6	0%	0	0%	4.34	0.56

ITEM N=380	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Mean	S. D
	N	P	N	P	N	p	N	P	N	P		
Optimal learning is facilitated through mobile phone	240	63%	98	26%	34	9%	8	0%	0	0%	4.65	0.44
Using a mobile phone simplifies the facilitation of the lesson	241	63%	89	23%	44	12%	6	0%	0	0%	3.34	0.55
Overall	**213.36**	**52%**	**129.43**	**34%**	**32.50**	**9%**	**4.64**	**0%**	**0.00**	**0%**	**4.31**	**0.46**

Source: Field data analysis

Table 4.4 also displays the role of teachers' attitudes in enhancing teaching. Most teachers believe using mobile phones strengthens the preparation of teaching material, thereby improving classroom learning. From the findings, we see that 70% of the participants strongly believed the use of mobile phones influenced teaching, while only 1% strongly disagreed. On average, we see that 4.08 out of 5.00 (equivalent to 81.6%) believed that using mobile phones plays a vital role in improving the imparting of the intended knowledge and skills to the students. Regarding the teachers' variability in response, we see that the slightest standard deviation was for those who responded to whether it is suitable for teachers to prepare for the students' tests using mobile phones. This had the slightest standard deviation of 0.38 against the mean standard deviation of 0.43.

Table 4.4: Descriptive Statistics of the Effect of teachers' Attitude on teaching

ITEM N=271	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree		Mean	S.D
	N	P	N	P	N	p	N	P	N	P		
I like to use a mobile phone when I deliver my lesson	206	76%	40	15%	8	3%	11	4%	6	2%	4	0.45
The mobile phone has a vital contribution to teaching carrier	204	75%	54	20%	5	2%	8	3%	1	0%	4.66	0.44
Is it good for teachers to use mobile phones for teaching	112	41%	88	33%	65	24%	5	2%	1	0%	4.54	0.65
Mobile phone is an effective tool for enhancing teaching in secondary education	243	90%	15	5%	3	1%	10	4%	0	0%	4.34	0.44
Feel comfortable using mobile phone to teach and prepare the teaching materials	198	73%	65	24%	5	2%	3	1%	0	0%	3.54	0.65
Using mobile phone improves creativity among teachers	197	73%	56	21%	9	3%	8	3%	1	0%	3.44	0.61
The use of mobile phones can trigger creativity in teaching very challenging subjects like mathematics	185	68%	72	27%	11	4%	3	1%	0	0%	4.43	0.38
The use of mobile phones has simplified communication among teachers and students	208	76%	56	21%	7	3%	0	0%	0	0%	4.23	0.44
Many teachers like to use mobile tools nowadays	181	67%	45	17%	34	13%	9	3%	2	1%	4.33	0.54
Through mobile phones, learn a lot from various search engines and use searched materials for teaching	215	77%	56	23%	0	0%	0	0%	0	0%	4.23	0.56
It is easier to teach using a mobile phone than reading printed materials	140	52%	121	45%	9	3%	1	0%	0	0%	3.45	0.56
Using mobile phones in teaching allows for flexibility	208	77%	44	16%	11	4%	5	2%	3	1%	4.43	0.66

Lesson be interactively when I use the mobile phone in teaching	197	72%	54	20%	8	3%	7	3%	5	2%	3.44	0.54
Overall	**190.54**	**70%**	**60.46**	**22%**	**13.46**	**5%**	**5.38**	**2%**	**1.46**	**1%**	**4.08**	**0.53**

Source: Field data analysis

Qualitative data from interviews also showed respondents' views that supported quantitative findings on attitude. For example, concerning their attitude towards using mobile phones, students were asked to comment on their teachers' attitude towards using mobile phones. One of the interviewed academic teachers had the following to say:

> *".... Teachers prefer using mobile phones. I believe teaching and learning using mobile phones as a tool is outstanding. The student participation in learning and teaching is improved..."* (Interviewed academic teachers, SD *16.3.2021).*

A similar question was directed at the head teachers. One of them had the following to say about the attitude of the teachers:

> *"......Teachers believe mobile phones make learning more interactive, engaging, and appealing to students, especially for digital natives, because they can use educational apps, games, and online resources to spark student interest..."* (Interviewed Head teacher SB on 14.3.2021).

To capture what the respondents believed about using mobile phones in class presentations, this study designed a question on attitudes towards the application and reception of technology in the class environment. This question was directed at head teachers. Respondents' views showed their attitude towards the application of the devices in the following manner:

> *"...Students and teachers can quickly search for supplementary information or clarification of concepts during lessons, enhancing their understanding. Mobile phone device presentations can incorporate videos, images, and audio,*

making learning more engaging, active, and accommodating different learning styles…" (Interviewed Head teacher SB on 14.3.2021).

Another one responded as follows:

"…Learning using mobile phones promotes student-centred learning, where students actively participate in their learning process. This interactive learning environment engages them more deeply …" (Interviewed Head teacher SA on 10.3.2021).

However, another head teacher was of the same view:

"…Mobile phone devices allow students immediate access to vast amounts of information, which can promote critical thinking and enable self-directed learning..." (Interviewed Head teacher SC 20.3.2024)

These responses show that teachers were very positive about applying the technology. In addition, not only did teachers and students have a positive attitude towards using mobile phones in teaching and learning, but government officials involved in the study also agreed. For example, when asked about their attitude towards the use of mobile phones in teaching, a Quality Assurance Officer said:

"…Teaching and learning using mobile phones encourages students to engage in the process thoroughly. Seeing pictures and videos makes the students enjoy learning and builds enduring memories, which leads to better performance …" (Interviewed QAO, 4.4.2021).

A District Education Officer said:

"…The use of mobile phones sophisticates' dates teaching and learning. It is important to keep pace with available technology

to produce students who can solve real-life problems. Teachers must move from the old teacher-centred method, which made students passive learner. Using mobile phones makes students active in learning…" (Interviewed DEO 5.4.2021)

4.2.2 Stakeholder Practices on the Use of Mobile Phones in T/L

Practical usage of mobile phones in teaching and learning in secondary school plays an important role. On both participants (teachers and students), it was found to have an effect when they practised using mobile phones in teaching and learning. Table 4.5 shows the outcomes of students' practice of using mobile phones and the corresponding impact on improving learning. The results reveal that 29% did not experience using mobile phones as a learning tool, whereas 18% had an experience that helped improve their learning.

In this table, the outcomes show that many students responded positively to the question of searching learning materials using mobile phones, with a mean value of 2.31, corresponding to the variability value (standard deviation) of 0.33. The smallest value (0.11) of standard deviation was for those who responded positively to the question of experiencing the use of mobile phones, which improved learning. This indicates that students mostly believed using mobile phones positively impacted their learning.

Table 4.5: Descriptive Statistics of the Effect of Students' Practice on Learning

ITEM N=380	Strongly Agree		Agree		Normal		Disagree		Strongly Disagree		Mean		S. D
	N	P	N	P	N	p	N	P	N	P			
Experience in using mobile phones improves learning	71	19%	88	23%	55	14%	110	29%	56	15%	2.31		0.11
Use mobile phone devices to browse the internet	64	17%	102	27%	67	18%	102	27%	45	12%	3.33		0.13
Saves information relevant to school work on mobile phone	4	1%	111	29%	89	23%	109	29%	67	18%	2.89		0.54
Use online dictionary	36	9%	103	27%	56	15%	98	26%	87	23%	2.66		0.23
Access online libraries through mobile education APPs	49	13%	49	13%	87	23%	97	26%	98	26%	2.19		0.25
Use emails in communication	125	33%	88	23%	54	14%	102	27%	11	3%	1.98		0.33
Experienced in using mobile phones' APPs in attempting arithmetic	79	21%	98	26%	68	18%	99	26%	36	9%	1.88		0.42
Type the document using a mobile phone	45	12%	78	21%	69	18%	101	27%	87	23%	2.45		0.34
Can do arithmetic calculations using mobile phone	86	23%	79	21%	61	16%	98	26%	56	15%	3.56		0.33
Search for learning materials using the mobile phone.	112	29%	67	18%	66	17%	102	27%	33	9%	3.66		0.43
Use a mobile phone more than twice per week for learning	68	18%	76	20%	78	21%	111	29%	47	12%	2.45		0.34
Mobile phones fostered the search for learning materials	30	8%	101	27%	98	26%	102	27%	49	13%	2.88		0.34

I always use mobile phone apps to learn what I want	3	1%	102	27%	43	11%	178	47%	54	14%	1.22	0.43
Use the internet for sharing learning materials	10	3%	133	35%	67	18%	134	35%	36	9%	1.54	0.21
Overall	**55.86**	**15%**	**91.07**	**24%**	**68.43**	**18%**	**110.21**	**29%**	**54.43**	**14%**	**2.50**	**0.32**

Source: Field data, (2021)

Teachers' practice of mobile phone integration in Secondary school teaching was also explored. Table 4.6 shows the teachers' practice of using mobile phones in teaching. Here, we see that quantitative findings obtained from those piloted schools show that most teachers (38%) have experience using mobile phones during teaching. However, 15% were inexperienced in using mobile phones to deliver knowledge to the students. Moreover, the mean value of 3.9 out of 5.0 (equivalent to 78%) had an experience that improved the teaching. The minor standard deviation was 0.12 against the mean value of 0.44, and it was for those who responded to the question of using the internet for online shopping for teaching books. This implies that most teachers practised using mobile phones to access the internet for books.

Table 4.6: Descriptive Statistics of the Effect of Teachers Practice on Teaching

ITEM N=271	Strongly Agree		Agree		Normal		Disagree		Strongly Disagree		Mean	S.D
	N	P	N	P	N	p	N	P	N	P		
Have enough experience of using mobile phones.	62	23%	55	20%	76	28%	45	17%	33	12%	4.43	0.32
I have experience preparing notes using mobile phones.	73	27%	45	17%	65	24%	56	20%	32	12%	4.58	0.33
Teachers know how to use mobile phones for teaching	85	31%	33	12%	65	24%	43	16%	45	17%	3.66	0.34
Experience using emails in communication.	114	42%	45	17%	33	12%	44	16%	35	13%	3.98	0.33
Use mobile apps for teaching.	74	27%	32	12%	78	29%	54	20%	33	12%	4.12	0.21
Able to type the document using a mobile APP	99	37%	40	15%	44	16%	65	24%	23	8%	4.08	0.34
Able to solve arithmetic calculations on mobile phone	85	31%	45	17%	75	28%	44	16%	22	8%	4.98	0.44
Instruct students to read online using mobile phones.	160	59%	33	12%	45	17%	21	8%	12	4%	3.99	0.65
Instruct students to use phones to share knowledge	152	56%	37	14%	34	13%	34	13%	14	5%	4.02	0.45
Knows to connect WIFI to the mobile phone.	128	47%	38	14%	65	24%	25	9%	15	6%	4.21	0.44
Mobile phone to browse the internet	116	43%	33	12%	44	16%	44	16%	34	13%	3.89	0.24
Use mobile phone to search the knowledge	95	35%	54	20%	67	25%	23	8%	32	12%	3.22	0.22

Use internet for online shopping of teaching books	91	34%	45	17%	45	17%	56	21%	34	13%	2.44	0.12
Use google engine in mobile phone to search for notes	93	34%	56	21%	44	16%	34	13%	44	16%	2.99	0.65
Overall	**101.9**	**38%**	**42.21**	**16%**	**55.71**	**21%**	**42.00**	**15%**	**29.14**	**11%**	**3.90**	**0.36**

Source: Field data analysis

Qualitative data on using mobile phones in teaching and learning was also collected through interviews. Students were asked to report on the frequency of mobile phone usage in their respective schools. Their responses were as follows:

> *"…When the school had enough mobile phones, our teachers used the computer room for our lessons. They taught us Geography, Biology, and English using mobile phones once a day. Nevertheless, now the mobile phones are dysfunctional; only two are working. Our teacher uses them to prepare lessons and then displays pictures and videos on the screens…"* (Interviewed head girl, SC 20.3.2014).

Another student said:

> *"…Teachers use mobile phones in teaching. We students cannot have access to mobile phones because most of them are broken. Even in the ICT room, the teachers use mobile phones to teach. A teacher connects a mobile phone to the screen by Bluetooth so that students can see reality through pictures and videos. For example, the language teacher shows us videos on how words are pronounced…"* (Interviewed student SC on 20/3.2021).

As indicated in these responses, using mobile phones in teaching and learning is there, although a lack of necessary facilities challenges it. In order to inform students further about the practice, the head of the school was asked about the usefulness of educational apps installed on mobile phones experience using mobile phones in the teaching and learning process, a question was designed, and the head of school was asked on the usefulness of educational apps installed in the mobile phone. They responded as follows:

> *"…Installed educational apps on mobile phones to enable teachers to create visuals like posters, presentations, and*

infographics. It is a creative tool that encourages students to express their ideas in a visual format…" (Interviewed Head of school SD 16/3.2021).

When asked about the availability of devices, the academic master had the following

to say:

> *"...Donors have stopped providing services to the project. They no longer provide phones, and many existing ones are broken. They also no longer provide internet service, so the few remaining phones are insufficient for teaching and learning in a classroom environment. Therefore, teachers use their phones to search for supplementary material because the school provides WIFI service using internal revenue..."* (Interviewed academic master SB, 14.3.2021)

Another academic master reported as follows:

> *"...Since the school has WIFI through its internal revenue, this has motivated teachers to use their mobile phones to search for various teaching materials and tools to help students learn and understand easily…"* (Interviewed Academic Master SE on 17/3/2024)

Another student reported as follows:

> *"...Because all the phones are broken, we are no longer taught to use the phone because there is no phone and no internet, but there is WiFi that the school pays for, and teachers use it through their phones to search for additional teaching material..."* (Interviewed head girl SA, 10.3.2021).

These quotations help to shed more light on the practice of using mobile phones in

teaching and learning. Students were able to identify even the types of applications

that they used. This shows that the practice was shallow and deep enough so that

students knew even the technology description. Finally, the researcher asked the students to report whether the teachers used the technology in class confidently. The response was also positive, as shown in the following quotation:

> *"...Yes, teachers rarely use mobile phones in teaching because of the shortage of phones. When teachers intend to integrate mobile phones into teaching, they must inform the ICT lab coordinator for proper arrangements..."* (Interviewed Head teacher SC 20.3.2021).

Table 4.7 indicates the observation checklist and results for mobile phones and infrastructure supporting the use of mobile phones in teaching and learning. Among the five schools under this study, school B had one mobile phone, school A had no mobile phones, School C had one mobile phone, and schools D and E had two mobile phones each. Each of the five schools had one display screen and electricity. Four schools used their funds to pay for Wi-Fi internet services, while one used government capitation funds.

Table 4.7: Observation of Facilities Results

No	Observation items	What to be observed	Comments
1.	Mobile phone	Existence and operation Provision of Educational Apps used	Mostly dysfunctional. Teachers were using their smartphones and connecting them to screens.
2	Screen for displaying Materials learned	Existence and operation	Screens available and working
3	Electricity	Flow and availability	Available
4	Pedagogical Skills	Interaction with facilities by teachers and students	Mobile phone usage is very minimal
5	Computer lab	Existence and operation Provision of facilities used	Labs are available and equipped with Wi-Fi and display screens.

Source: Field data (2021)

4.2.3 Observation of Teaching and Learning at ICT Laboratory

Researcher observed the process of teaching and learning in ICT laboratory, geography teacher was taught form three students, topic structure of the earth, sub topic layers of the earth by using mobile phone which connected with screen. Teacher used video that show how each layers are formed, students understood easier abstract concepts which form earth layers like the crust, mantle, outer core and inner core, this made students to visualize internal layers that cannot seen in real life. Also this was increase engagement and understanding by providing visual and auditory learning experiences, they were grasp attention with motion, music, narration, and making learning more enjoyable. Thus make students to remember better when they see and hear the content learned.

Also researcher observed another teacher taught form three biology topic on physiological, anatomical and ecological processes of living organisms sub topic the mechanism of excretion in the human body (systems: organs, products). Teacher started to introduce the excretory system and its goals (waste removal, homeostasis). And then Show the video that covers the full urinary system; kidneys, nephrons, ureters, bladder, urethra and explains urine formation step-by-step. In-depth video show a nephron mechanics that walks through glomerular filtration, reabsorption, secretion, and how hormones (like ADH) control urine concentration.

Researcher saw that this teaching through video students were increased motivational and engagement in learning because it combines audio, visual which improves attention and retention. Also improved understanding of complex processes because

breaks down complicated steps (e.g. urine formation: filtration → reabsorption → secretion) in a step-by-step visual flow thus showed a real-life effects (e.g., dehydration's impact on urine concentration). Thus was making learning enjoyable and memorable.

4.2.4 Student Knowledge, Attitude, Practice and Learning Improvement

This study investigated the role of knowledge, attitude, and practice of using mobile phones in enhancing teaching and learning in secondary schools by conducting a case study of piloted secondary schools in Kinondoni Municipal, Dar es Salaam. From the simulation using SPSS, we obtained the two regression models (for students and teachers) that exhibit the significance of the relationship between the dependent variables (performance in learning and teaching) and independent variables (knowledge, attitude and practice of the use of mobile phones).

Both models were predictive since the coefficient of determination. (R^2) at each equation was $R^2 > 0$. The results from Table 4.8 that show the simulated regression model reveal a significant relationship between knowledge, attitude and practice and improvement in learning $(p = 0.00 < 0.05)$. (Table 4.8) This implies that knowledge, attitude, and practice of using mobile phones affect the degree of improvement in students' learning. Moreover, the value of model regression is

$R = 0.42 > 0$. This indicates that learning performance is positively related to

knowledge, attitude, and practice.

Table 4.8: Regression model of the relationship between Students' Knowledge,

Attitude and Practice and Improvement in Learning

				Std.	Change Statistics				
				Error of	R				
		R	Adjuste	the	Square	F			Sig. F
Mode		Squar	d R	Estimat	Chang	Chang	df		Chang
l	R	e	Square	e	e	e	1	df2	e
1	.425 a	.181	.174	.524	.181	27.630	3	37 6	.000

a. Predictors: (Constant), Practise, Knowledge, Attitude
b. Dependent Variable: Performance
Source: Filed data (2021)

Table 4.9 shows the simulated regression model for teachers' knowledge of mobile

phone use. The results show that the model is predictive with a coefficient of

determination. $R^2 = 6.5\% > 0$ Thus, it can be applied to forecast the dynamic

change between the variables under study. However, there was a significant

relationship between teachers' knowledge, attitude and practice and improvement in

classroom teaching with the p-value of $p = 0.00 < 0.005$ (Table 4.9). Similar to the

student regression model, this equation also shows that teaching performance is

positively related to knowledge, attitude and practice with the value of the

correlation coefficient of $R = 0.25 > 0$

Table 4.9: Regression Model of the Relationship between Teachers' Knowledge, Attitude and Practice and Improvement on Teaching

<div align="center">Model Summary^b</div>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.254^a	.065	.054	.555	.065	6.160	3	267	.000

a. Predictors: (Constant), Practise, Knowledge, Attitude
b. Dependent Variable: Performance
Source: Filed data (2021)

4.2.5 Regression Coefficients

Table 4.10-4.11 presents the results for all required coefficients for the statistically significant related factors included in the optimal regression model. Table 4.9 reveals the regression coefficients simulated from the questions responded to by the students. As shown in the table, the knowledge, attitude, and practice on the use of mobile phones were positively associated with student' e in learning with the values of $(\beta = 0.21, SE = 0.05, p = 0.00), (\beta = 0.28, SE = 0.50, p = 0.00)$ and

$(\beta = 0.01, SE = 0.30, \ p = 0.87)$, respectively.

From the model coefficients, it is revealed that attitude towards the use of mobile phones exhibited the largest value of correlation coefficient (beta equals 0.28), which implies that the variable is the greatest contributing factor to the improvement of

learning followed by knowledge. However, knowledge has the smallest standard error with value $SE = 0.05$, indicting that its results were the least fitting on the regression line followed by practice with the value of $SE = 0.30$. Both knowledge and attitude were predictors of the improvement in learning with a p-value of, p equals 0.00 less than 0.05 each while practising on the use of mobile phones insignificantly related to the learning performance with a p-value of, use of $p = 0.87 > 0.05$.

Table 4.10: Regression Coefficients for Students

Coefficients[a]

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.153	.206		10.450	.000	1.748	2.559
	Knowledge	.206	.054	.207	3.811	.000	.100	.312
	Attitude	.259	.050	.281	5.177	.000	.160	.357
	Practise	.005	.030	.008	.167	.868	-.054	.064

a. Dependent Variable: Performance

Source: Filed data (2021)

Similarly, table 4.10 shows the regression model coefficients for teachers. The values describe the relationship between knowledge, attitude and practise and the improvement in teaching in secondary schools.

As shown, the results were $(\beta = 0.13, SE = 0.05, p = 0.03)$ for knowledge

$(\beta = 0.18, SE = 0.04, p = 0.00)$ for attitude and $(\beta = 0.16, SE = 0.01, p = 0.01)$

for the practice of the use of mobile phones. The results confirm that all the independent variables (knowledge, attitude and practice) positively affect teaching performance. We further see that teachers' perception towards the use of mobile phones was the most effective factor to enhance teaching with the highest value of regression coefficient of $\beta = 0.18$ followed by the practice of using mobile phones

with the value of $\beta = 0.16$. Here, we confirm that knowledge is the least

contributing factor $(\beta = 0.13)$) for teaching improvement for the teachers. On the

other hand, the data from practice on the use of mobile phones has the smallest value of random error $(SE = 0.01)$ to indicate the best estimation compared to the rest of

the variables, such as knowledge $(SE = 0.05)$ and attitude $(SE = 0.04)$. On the

significance of the relationship perspective, we see that all the factors, such as knowledge, attitude, and practice, were significantly related to teaching improvement with the p-values of $p = 0.03 < 0.05$, $p = 0.00 < 0.05$ and $p = 0.01 < 0.05$,

respectively.

Table 4.11: Regression Coefficients for Teachers

Coefficients[a]

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	3.627	.253		14.343	.000	3.129	4.124
	Knowledge	-.103	.048	.127	-2.149	.032	-.198	-.009
	Attitude	.123	.041	.182	3.030	.003	.043	.203
	Practise	.030	.011	.161	2.673	.008	.008	.052

a. Dependent Variable: Performance

Source: Field Data, (2021)

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

5.1 Introduction

This chapter discusses the findings based on interpreting the results presented in the previous chapter. These results are consistent with the study objectives and the theoretical frameworks: Social Constructivist Theory and the Technology Acceptance Model (TAM).

5.2 Knowledge of Mobile Phones in Teaching and Learning

The study indicates that 70% of teachers agree that mobile phone knowledge enhances teaching, with a mean score of 4.01/5. The regression analysis further supports this, showing that knowledge significantly impacts teaching performance ($\beta=0.13$, $p=0.03$). Teachers reported that mobile phones helped prepare teaching materials and improve lesson delivery. Gibbons et al. (2018) and Kafyulilo (2014) emphasise that mobile phones improve teaching preparation and learning engagement. Similarly, Dong, Chiu, Zhou, and Zhang (2024) demonstrated that mobile phone integration positively impacts students' academic performance. Studies in Kenya (Nyaga, 2021) and India (Chandrasekar & Subramaniam, 2019) observed that teachers with better knowledge of mobile technology integrated it more effectively into their teaching practices.

In this study, learners have experienced the developing educational trend as end users of knowledge. They have also experienced the expansion of mobile technology, which attracts teachers and tutors to integrate technology in teaching and

learning. Integrating mobile phone technology in teaching and learning is mainly intended to support the learning process. This will be done by enhancing learners' mobility, portability, and personalised learning (Naismith *et al*., 2004; Begum, 2011).

Rapid advancements in ICT have made mobile phones critical tools for enhancing teaching and learning, enabling mobility, portability, and personalisation (Mtega et al., 2014; Kihwele & Bali, 2013). Indeed, Mobile phones are significantly associated with student achievement, provided the cognitive load is managed (Little, 2014). Smartphones facilitate higher education through internet access, cost efficiency, and academic networking, such as using eBooks (Sumathi, Lakshmi, & Kundhawai, 2018). Results from this study have shown that mobile phones are effective for transferring course materials, conducting research, and supporting other studies (Enayati, Yazdanpanah, & Behnamfar, 2014). Challenges include high data costs, operational difficulties, lack of technical expertise, and device fragility (Sumathi et al., 2018; Mtega, 2012).

Studies on mobile phone usage in teaching highlight benefits and limitations and propose best practices for mitigating challenges (Little, 2014). The lack of awareness of mobile phone pedagogical capabilities is among such limitations (Msuya, 2015; Mtega, 2012). However, while existing studies focus on general knowledge, this study examines the nuanced relationship between knowledge, attitudes, and practices, offering a more comprehensive understanding of their interplay in piloted Tanzanian schools. The study adds to the limited body of research in sub-Saharan

Africa, particularly in the Tanzanian context, where mobile phone use in education is nascent. Policies can ensure that knowledge enhancement programs are prioritised in professional development initiatives and can also incorporate mobile phone literacy as part of teacher training curricula.

5.3 Attitude towards Mobile Phones in Teaching and Learning

Attitude was the most significant predictor for students and teachers, with regression coefficients (β=0.28, p=0.00 for students; β=0.18, p=0.00 for teachers). Positive attitudes correlated strongly with improved teaching and learning outcomes. This result was supported by respondents who emphasised that mobile phones make learning more engaging and student-centred. Results confirm that stakeholders' attitudes are critical in driving the acceptance and utilisation of mobile phones, reinforcing the objective of assessing their influence on educational outcomes. Kang (2024) highlighted the importance of positive attitudes among teachers and students for successful technology adoption. Ekanayake and Wishart (2014) found that teachers' attitudes towards mobile technology significantly influenced their engagement in interactive teaching methods. A study in South Africa by Chigona et al. (2020) showed that positive attitudes among teachers and students drive mobile phone adoption despite infrastructural challenges.

Teachers acknowledge mobile phones' relevance for teaching but resist allowing students to use them in classrooms due to concerns over misuse (Msuya, 2015). Parents and teachers are encouraged to use platforms like Facebook for pedagogical interactions instead of condemning those (Kyalo & Munuki, 2018). Community

discussions on the benefits and effects of mobile phone use in learning are crucial for successful integration (Gibbons et al., 2018). While acknowledging mobile phones' benefits, some educators remain cautious about their misuse in educational settings (Mtega, 2012; Msuya, 2015). Such studies conducted elsewhere are supported by results in this study, which reinforces the role of attitude as the most significant determinant of mobile phone integration, particularly in contexts with restrictive policies, adding a novel dimension to the discussion. By quantifying attitudes' impact (e.g., $\beta=0.28$ for students), the study provides actionable insights for policymakers and educators.

Educating stakeholders about the benefits of mobile phones in education can foster positive perceptions. Policies prohibiting mobile phone use can be revisited to align with modern pedagogical approaches. Zimbabwean stakeholders emphasised the potential for mobile phones to improve exam results and instructional quality while advocating for preserving cultural and social values (Farai, 2018).

5.4 Practice in Mobile Phone Use

Mobile phones are acknowledged in the existing literature for use in teaching and learning, particularly for text messaging and calls (Mtega, 2012). Students use smartphones for academic purposes, such as accessing eBooks and other learning materials, rather than social networking (Sumathi et al., 2018). Mobile phones serve as research tools in classrooms, providing internet access for retrieving reputable information (Enayati et al., 2014). Facebook fosters virtual learning communities, enabling pedagogical interactions among students and teachers (Kyalo & Munuki,

2018). Proposed measures for effective use include managing cognitive load, regulating content access, and providing pedagogical resources to support mobile technology integration (Little, 2014; Gibbons et al., 2018). Some educators use mobile phones to create, download, and share academic resources, though their capacities are often underutilised (Mtega, 2012; Msuya, 2015).

This study supports other studies' results by showing that practice was a significant predictor for teachers ($\beta=0.16$, $p=0.01$) but not for students ($p=0.87$). This discrepancy was attributed to students' limited access to mobile phones due to resource constraints. Teachers and students highlighted various practical uses of mobile phones, such as lesson preparation, searching for materials, and fostering student engagement. These findings underscore the importance of hands-on experience and practice, particularly for teachers, in realising the potential of mobile phones in education.

Adning (2022) and Kafyulilo (2014) found that teachers' hands-on experience with mobile phones increases their engagement in innovative teaching practices. Ankomah-Asare et al. (2019) reported that mobile phones enhance student collaborative learning in Ghana. Unlike previous studies, this research explores the discrepancy between students' and teachers' practice, revealing challenges posed by resource constraints in Tanzanian schools. It highlights the indirect influence of practice on learning performance, emphasising the need for hands-on experience. Policies can ensure equitable distribution of mobile phones in schools to enhance student practice and provide digital resources and technical support to facilitate

practical usage. The Bridge-IT project and collaborations with telecommunication companies demonstrated how mobile phones could transform education delivery (UNESCO, 2012; Mfaume & Bilinga, 2017). The need for guidelines and policies to manage mobile phone use and address constraints was emphasised across studies (Matimbwa & Anney, 2016; Kihwele & Bali, 2013). Training and stakeholder collaboration are critical for scaling successful pilot projects and ensuring broader adoption (Gibbons et al., 2018).

5.5 Alignment with Social Constructivist Theory

The findings align with the Social Constructivist emphasis on interaction and collaboration. Mobile phones facilitate group discussions, resource sharing, and problem-solving among students, promoting a collaborative learning environment. The theory emphasises the role of tools (in this case, mobile phones) and social interactions. Teachers and students used mobile phones as mediating tools to construct knowledge, enhancing both teaching and learning experiences. The significant role of attitude and practice, particularly for teachers, reflects the ZPD concept, where stakeholders improve their skills and knowledge through guided practice and interaction with peers and technology.

5.6 Alignment with Technology Acceptance Model (TAM)

Qualitative and quantitative findings reveal that stakeholders believe mobile phones improve teaching and learning performance. This aligns with TAM's emphasis on PU as a determinant of technology acceptance. Teachers' knowledge and experience with mobile phones suggest that ease of use contributes to their positive attitudes and

practices, reinforcing TAM's second key determinant. The significant impact of attitude and practice on performance indicates a strong relationship between stakeholders' intentions to use mobile phones and their actual usage, consistent with TAM.

5.7 Study Implications on Use of Mobile Phones in Teaching and Learning

The finding that attitude is the most significant predictor ($\beta=0.28$ for students; $\beta=0.18$ for teachers) underscores the importance of fostering positive perceptions of mobile phone use. Stakeholders' attitudes significantly influence the success of mobile phone projects. This can be achieved through awareness programs and professional development initiatives. Positive perceptions among teachers and students are crucial for successful adoption. Training and awareness programs are essential to foster favourable attitudes and develop stakeholders' knowledge and confidence in using mobile phones for educational purposes.

While knowledge and practice are critical, their impact varies between teachers and students due to differing access and exposure levels. This calls for targeted interventions, such as providing adequate resources and training to ensure equitable opportunities for all stakeholders. The study suggests a need to address disparities in access to mobile technology between urban and rural schools. Efforts should be made to ensure equitable distribution of resources and support to avoid widening the digital divide in education. The limited access to mobile phones among students highlights the need for policy-level interventions to address resource constraints and promote technology integration in underserved schools. A lack of functional devices,

internet connectivity, and technical support emerged as significant barriers. These findings imply that sustainable financing mechanisms and proper maintenance systems must be established to ensure the availability and reliability of mobile phone infrastructure in schools.

The regression models (R^2=0.18 for students; R^2=0.07 for teachers) indicate that the study variables partially explain performance improvements. The positive impact of mobile phones on teaching and learning suggests a shift towards more interactive and student-centred educational approaches. Teachers can enhance their lesson delivery with mobile technology, while students benefit from increased engagement and improved academic performance. Institutions must invest in training programs to equip educators with the skills to use mobile phones effectively in the classroom. Future studies could explore additional factors, such as institutional support and external policy influences.

The study underscores the need for governments and educational institutions to develop comprehensive policies that guide using mobile phones in education. Policies should address infrastructure support, guidelines for usage, and measures to prevent misuse. Schools can ensure consistency and sustainability by embedding mobile phone integration into the national education framework.

The findings emphasise the importance of monitoring and evaluation to assess mobile phone project effectiveness and identify areas for improvement. Regular feedback mechanisms can help refine strategies and ensure the long-term success of

such initiatives. The study raises concerns about device misuse and damage. Schools must implement strict usage guidelines, provide ongoing training on device care, and establish accountability systems to ensure proper resource handling. This will help maintain the functionality and longevity of devices.

The study suggests a need to address disparities in access to mobile technology between urban and rural schools. Efforts should be made to ensure equitable distribution of resources and support to avoid widening the digital divide in education. The study reveals that mobile phone projects depend on external funding and are vulnerable to resource constraints. To address this, policymakers and stakeholders must explore sustainable financing models, such as partnerships with private sectors and government budget allocations, to ensure the continuity of mobile phone use in education.

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CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This study was guided by one main objective and three specific objectives. The study's main goal was to investigate educational stakeholders' perceptions of the feasibility of using mobile phones in teaching and learning in secondary schools in Tanzania. In order to achieve this primary objective, the study sought to assess stakeholders' knowledge on the use of mobile phones for teaching and learning in piloted public secondary schools to assess stakeholders' attitudes towards the use of mobile phones for teaching and learning in piloted public secondary schools and evaluate stakeholders' practices on the use of the mobile phone in piloted public secondary schools. The study employed a mixture of quantitative and qualitative approaches to collect and analyse data.

6.2 Summary

Findings Obtained

Knowledge of mobile phones for teaching and learning

Results from this study show that 70% of teachers agreed that knowledge of mobile phones improves teaching, with a mean score of 4.01/5.00. Quantitative analysis confirmed a significant positive relationship ($\beta=0.13$, SE=0.05, p=0.03) between teachers' knowledge and teaching performance.

Teachers utilise mobile phones to prepare lessons, search for content, and enhance teaching material preparation, improving classroom outcomes. Knowledge was

significantly related to student performance (β=0.21, SE=0.05, p=0.00). Mobile phones facilitated online searches, material sharing, and storage, improving understanding and memory retention.

Attitudes toward using mobile phones for teaching and learning

Attitude was the most significant predictor of teaching and learning improvement for teachers (β=0.18, SE=0.04, p=0.00) and students (β=0.28, SE=0.50, p=0.00). Teachers and students displayed positive perceptions of mobile phone integration, emphasizing their potential to boost engagement and understanding. Teachers and students were ready and skilled to adopt mobile phones, showing acceptance of the technology. The controlled use of mobile phones in ICT rooms mitigated fears of disciplinary or moral issues.

Practices on the use of mobile phones in piloted public secondary schools

Practices significantly contributed to teaching performance (β=0.16, SE=0.01, p=0.01). 38% of teachers reported regular use of mobile phones, with a mean score of 3.9/5.00 (78%). No significant relationship (p=0.87>0.05) was found between students' practice of using mobile phones and learning improvement, attributed to limited access to functioning devices. Limited availability of functional devices and inadequate internet services hampered practice. Sustainability of the project relied on alternative funding (school committees, government capitation funds), with recommendations for integrating mobile phone needs into the national education budget. Generally, mobile phone integration boosted student engagement and transformed the learning process into a more interactive, student-centred approach.

Regression analysis revealed significant positive relationships between knowledge, attitudes, practices, and performance (R=0.42 for students; R=0.25 for teachers). Stakeholders agreed on the feasibility of mobile phones in education, emphasising their ability to enhance preparation, understanding, and skills. Dysfunctional devices and reliance on donor funding posed sustainability risks. Integration into government policy and budget is crucial for long-term success. These results underscore the importance of fostering positive attitudes, increasing knowledge, and enhancing practices among teachers and students to optimise the use of mobile phones in teaching and learning.

6.3 Conclusion

The study demonstrates that integrating mobile phones into teaching and learning can enhance educational outcomes when approached through the Knowledge, Attitude, and Practice (KAP) model.

Knowledge of mobile phones emerged as a vital factor for both teachers and students, providing them with the technical skills necessary for effective utilization. Teachers leveraged mobile phones for lesson preparation, content delivery, and educational applications, which significantly improved teaching performance. Similarly, students utilized mobile phones for research, collaboration, and content storage, although their limited access to devices impeded broader practice and outcomes.

Attitude was the most influential determinant of mobile phone integration's success. Teachers and students exhibited overwhelmingly positive perceptions of mobile

phone use, believing it enhances engagement, fosters student-centred learning, and improves academic performance. These findings underscore the importance of fostering an environment that encourages the adoption of mobile technology with minimal apprehension about potential misuse.

The practice of mobile phone usage varied between teachers and students. While teachers innovatively adapted to challenges, such as using personal smartphones in classrooms, students faced limitations due to device shortages and inadequate infrastructure. The study found that teachers' practice significantly enhanced teaching quality, but students' practice showed an insignificant impact on performance, highlighting a gap in resource availability and usage opportunities. Among challenges encountered when planning the use of mobile phones for teaching and learning include the lack of mobile phones and infrastructure for supporting its use including the Internet.

In conclusion, integrating mobile phones into teaching and learning processes holds great promise. However, its success depends on addressing critical challenges, such as ensuring the availability of functional devices, providing consistent training, and sustaining financial and infrastructural support. Promoting positive attitudes and improving knowledge and practice will be pivotal for maximising the impact of mobile phone integration in education.

6.4 Recommendations

Based on the research findings, the following recommendations are made:

1. The ministry responsible for education should work with the ministry responsible for technology and communication to develop policy guidelines for the use of mobile phones in schools.

2. Mobile phone instructional processes should be made open, accessible and interactive to both teachers and students, so as to improve teachers and learners' use of mobile phone and enable their capability towards achieving instructional objectives.

3. Institutions of learning should make mobile phones available to their academic community. This should be a pursuit towards achieving institutional goals.

4. The use of mobile phones should be encouraged among teachers and students. This will provide avenue for both teachers and students to have a better perception towards mobile phone use for subject instruction.

5. The government and school administrators should work together to provide mobile phone resources to secondary schools. Such provision will enhance the use of mobile phones in teaching and learning as the National ICT Policy has declared that Tanzania cannot afford to overlook the opportunity. It will also be an opportunity to foster equality of access to quality education as is the aim of the Fee Free Basic Education Project. Children from poor families may not be able to afford expensive technology in their learning but if the mobile phones are in school, each student is equally able to access the service.

6. Provide comprehensive and continuous training programs for teachers and students on how to effectively use mobile phones in teaching and learning. Training should focus on integrating mobile phone applications into lessons, classroom management during phone use, and leveraging educational tools.

7. Schools should establish clear policies for the controlled use of mobile phones in classrooms. These policies should include guidelines for monitoring and limiting access to non-educational content while promoting their use for learning purposes

8. The government should improve infrastructure:
– Ensure the availability of functional mobile devices in schools by investing in robust hardware.
– Improve internet connectivity and provide stable electricity to support the use of mobile phones in teaching and learning.

9. Conduct awareness campaigns to address misconceptions and promote positive attitudes toward mobile phone use in education among teachers, students, and parents. Highlight the benefits of mobile phones in improving learning outcomes.

10.   Provide schools with technical support teams to maintain devices, address software issues, and ensure continuous operation of mobile phone-based learning systems.

11.   The government nod other stakeholders can provide schools with technical support teams to maintain devices, address software issues, and ensure continuous operation of mobile phone-based learning systems

12.   Government and Stakeholder Investment:

– Secure sustained funding from the government, private sector, and NGOs to ensure the continuity of mobile phone projects.

– Include mobile phone integration in the national education budget for broader school implementation.

6.5 Areas for Further Studies

Future studies can be commissioned to;

▪ There is a need to study best practices for financing mobile phone projects in education to ensure financial sustainability. Researchers are encouraged to investigate lessons from pilot projects in Tanzania and draw insights from countries like Kenya, Zimbabwe, India, and Indonesia, where mobile phones are already used in teaching. These studies aim to inform education policymaking and promote sustainable integration of mobile technology in teaching and learning.

▪ Focus on the sustainability and maintenance of mobile phone projects in education. It questions why project-owned devices deteriorate rapidly compared to teachers' smartphones and seeks to identify the causes of device breakage and poor maintenance. Researchers are called to explore measures for improving device durability and ensuring effective maintenance to support the long-term use of mobile phones in teaching and learning. Conduct long-term studies to evaluate the sustained impact of mobile phone use on student academic performance and teacher teaching effectiveness

- Compare the impact of mobile phone use on teaching and learning between urban and rural schools to identify context-specific challenges and solutions.

- Investigate the effectiveness of specific educational mobile apps and platforms on student engagement and learning outcomes.

- Analyse the economic feasibility and cost-effectiveness of integrating mobile phones into teaching and learning compared to traditional methods and other digital tools.

- Study the influence of mobile phone use on developing students' critical thinking, problem-solving, and collaboration skills.

- Explore the role of parents in supporting and monitoring mobile phone use for educational purposes.

- Examine ethical concerns, including potential misuse, privacy issues, and the psychological impact of classroom mobile phone use.

- Research how mobile phones can be effectively integrated to support teaching and learning for students with special needs.

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APPENDICES

Appendix I: Structured Questionnaires for Students

Introduction

My name is **Masasi Felister, a** PhD student at the Open University of Tanzania. This questionnaire intends to collect information related to the **Educational Stakeholders on the feasibility of using Mobile Phone in Teaching and learning,** as a requirement for my PhD programme. Please answer all questions by putting a tick (√) against a correct answer in the brackets provided. You are also free to fill in additional information in the provided space. The information that you will provide will remain confidential and will only be used for the purpose of this study.

a) BIOGRAPHIC INFORMATION

1. What is your Sex?

(a) Female   ( )   (b) Male   ( )

2. What is your Age?

 (a)   12-16 years ( )   (c) 22- 26 years ( )

 (b)   17-21 years   ( )

Students' Knowledge on the use of mobile phones in teaching and learning.

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Know how to use mobile phones					
Knowing mobile phone helped to improve my studies					
Use mobile phones in studying					
Use mobile phone on searching for study materials					
Save important information relevant to school works in					

students mobile phones					
Read online materials through mobile phone devices					
Use mobile phone to check for the meaning of difficulty words /concept					
Understand the teacher when the teacher conducts lessons by using mobile phones					
Save important information relevant to subject topics on mobile phones					
Read online teaching materials by using mobile phones					
Knowledge on the use of education software application					
Use mobile phone device to access internet for learning materials					
Understand very fast when teacher uses mobile phone device					

Students' attitudes on the use of mobile phones as a tool for teaching and learning

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
It is good to learn by using mobile phone.					
Mobile phone has a vital contribution to studies.					
The use of mobile phones for learning and should be enhanced to all students.					
It is good for students to use educational APPs for learning.					
It is good to have mobile phones devices at school ICTs laboratory for self-studying					

Mobile phones internet is an effective tool for enhancing learning in secondary education					
It is comfortable to use Khan Academy APP to learn simple arithmetic					
Using mobile phone devices improves learning					
The use of educational APP triggers creativity in learning.					
The use of mobile phone educational videos simply learning					
Many students like to use mobile phone devices in learning nowadays.					
Prefer using network mobile APP as a social network to learn the thing I want					
It is true that the teachers deliver their materials better if they use screen connected to mobile phone devices					
I think the use of educational APPs helped me to grasp subjects effectively.					

Students practices on the use of mobile phones as a tool for teaching and learning

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Experience of using mobile phones devices improves learning					
Use mobile phones devices to browse the internet for necessary information in doing school work					
Saves important information relevant to school work on mobile phone devices					

Use online dictionary to check the meaning of difficult words /concept					
Access online libraries through mobile education APPs for relevant information on schoolwork					
Use emails in communication					
Experienced in using mobile phones' APPs in attempting various arithmetic in learning					
Type the document using mobile phone					
Able to find arithmetic calculations using mobile phone					
Search for learning materials using mobile phone.					
Use mobile phone devices more than twice per week for learning					
Use mobile phones has fostered the search of learning materials					
Always use mobile phone APP for learning what I want					
Use internet for sharing leaning materials					

Appendix II: Structured Questionnaires for Teachers

Introduction

My name is **Masasi Felister,** a PhD student at the Open University of Tanzania. This questionnaire intends to collect information related to the **Perceptions of Stakeholders on the use of Mobile Phone as a Tool for Teaching and learning,** as a requirement for my PhD programme. Please answer all questions by putting a tick (√) against a correct answer in the brackets provided. You are also free to fill in additional information in the provided space. The information that you will provide will remain confidential and will only be used for the purpose of this study.

BIOGRAPHIC INFORMATION

1. What is your Sex?

(a) Female   ( )   (b) Male   (   )

2. What is your Age?

 (a)   12-16 years (   )   (c) 22- 26 years (   )

 (b)   17-21 years   (   )   (d) 27+   ( )

3. For how long have you been as Academic teacher ------------------(years).

Teachers' knowledge on the use of mobile phones as a tool for teaching and learning

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Know how to impart knowledge of using mobile phones to the students.					
Students have prior knowledge of mobile phones before they learn.					

Teachers know how to use mobile phone for teaching					
Students have a knowledge of using mobile phone in teaching					
Know how to use mobile phone has simplified the teaching					
Use mobile phone on searching for study materials to be delivered to students.					
Prepare the students tests and examinations using mobile phones					
Know how to deliver the lesson using screen connected to mobile phone					
It is better to use mobile phone than using chalks and board					
Know how to use mobile phone for sending learning materials to students using internet					
Use mobile phone tool to search for solution of complex question to be delivered to students					
I have the knowledge of using mobile phone educational APPs to teach simple arithmetic					
Know how to use at least one mobile phone APP to share resources, assignments and foster discussion					

Teachers Attitudes on the use of mobile phones in teaching and learning

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Like to use mobile phone when I deliver my lesson					

Mobile phone has a vital contribution on teaching carrier					
Is good for teachers to use mobile phone for teaching					
Mobile phone is an effective tool in enhancing teaching in secondary education					
Feel comfortable to use mobile phone to teach and prepare the teaching materials					
Using mobile phone improves the creativity among teachers					
The use of mobile phone can trigger the creativity on teaching the very challenging subjects like mathematics					
The use of mobile phone has simplified the communication among teachers and students					
Many teachers like to use mobile tools nowadays					
Through mobile phone learn a lot from various search engine and use searched materials for teaching					
It is more easier to teach using mobile phone than reading printed materials					
Using mobile phone in teaching allows flexibility					
Teaching is best facilitated through interaction with mobile phone devices					
Using mobile phone devices simplifying facilitation of the lesson					
Using mobile APPs enhance participating students in the process of teaching and learning					
Integration of mobile phone in teaching and learning leads					

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
teachers to access information easier					
To get a lot of teaching materials using mobile phone					
Teaching with ICT tools help students to grasp the lesson very fast					
Prefer to use projector for teaching effectively					
Lesson can be interactively when I use mobile phone in teaching					

Teachers practice the use of mobile phones in teaching and learning

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Have enough experience on using mobile phone in learning.					
Have experience in preparing teaching notes using mobile phone.					
Always search for teaching materials by using mobile phone devices.					
Experience using emails in sharing materials					
Use mobile phone educational APPs for teaching.					
Able to type the document using mobile phones					
Able to find to find arithmetic calculations using mobile phone					
Instruct students to read online materials through mobile phones.					
Instruct students to use mobile phone to share knowledge learned with others.					
Have experience in connecting the WIFI to the mobile phone.					

Mobile phone to browse the internet for necessary information in preparing assignments.					
Use mobile phone to search the required knowledge to be delivered to students					
Use google engine in mobile phone to search the good teaching notes for students					
Use internet for online shopping of teaching books					
Use EXCEL software in mobile phone to calculate average of students' performance in class					
Use MS Word software in mobile phone to prepare assignments and tests for students					
Use Power Point software in mobile phone to prepare lesson presentation during teaching					

Appendix I1I: Interview Questions for Students

District------------------------------------

Date--------------------------------------

Name of the School--

Sex: Male ( )   Female ( )

1. How often do you use mobile phones in learning?

2. Which educational Apps do your teachers often use in teaching and learning?

3. How useful are mobile phones in teaching and learning?

4. Can you commend anything regarding the need for mobile phone use in teaching and learning?

5. What is your teacher's attitude regarding mobile phone use in teaching and learning?

6. Which types of mobile phones are available in your ICT laboratory?

7. What is your attitude about the use of mobile phones in the teaching and learning process?

8. Do you know how to use mobile phones in your learning?

Appendix IV: Interview Guide Questions for Academic Teachers

Date---------------------------------------

Name of the School---

Sex: Male ( )   Female ( )

  For how long have you been as Academic teacher ------------------(years).

1. How do you attitude about use of mobile phones in teaching and learning in public secondary schools today?

2. What are benefits of using mobile phone in teaching and learning?

3. Your teachers and students use mobile phones devices in teaching and learning?

4. How can stakeholders, including the government, support the use of mobile phones in teaching and learning, especially in secondary schools?

5. How effective do you think is the use of mobile phones in teaching and learning?

6. Can you freely share any suggestions regarding the use of mobile phones in teaching and learning in public secondary schools in Tanzania?

7. How do you interact with different applications software in teaching and learning? Which application often are used.

8. Teachers and students have a knowledge on the use of mobile phones in teaching and learning?

9. Which types of Educational Apps often used in your school?

Appendix V: Interview Guide Questions for Head of Schools

Date--

Name of the School---

Sex: Male ( )   Female ( )

  For how long have you been head teacher? ------------------(years).

1. Do you know how to use mobile phone devices in your teaching?

2. Do you have ICT laboratory with equipped mobile phones in your school?

3. Do your teachers use mobile phone devices in teaching process?

4. Which types of mobile phones devices do the teachers often use in teaching.?

5. Do you think presentation by using mobile phones devices tools improves the teaching and learning.

6. Do teachers use mobile phone devices in classroom environment?

7. Do students use mobile phone devices for learning?

8. What teachers attitudes about the use of mobile phones devices tools in teaching process?

9. What are the students' attitudes towards the use of mobile phone devices as tools in teaching process?

10. Do your teachers have enough practise on using mobile phone devices?

Appendix VI: Interview Guide Questions for School Quality Assurers

Date--

Sex: Male ( )   Female ( )

 For how long have you been as Quality Assurers (years).

1. What is your attitude regarding the use of mobile phones in teaching and learning in secondary schools?

2. What quality issues with respect to the use of mobile phones in teaching and learning do you look at during your routine activities?

3. What is your view on the level of the use of mobile phones in teaching and learning in public secondary schools?

4. What is the policy implication on the use of mobile phones in teaching and learning in secondary schools in Tanzania today?

5. What is your comment with respect to the use of mobile phones in teaching and learning in secondary schools?

6. How effective do you think is the use of mobile phones in teaching and learning?

7. Can you freely share any suggestions regarding the use of mobile phones in teaching and learning in public secondary schools in Tanzania

Appendix VII: Interview Guide for District Education Officers

1. What is your attitude towards the use of mobile phones in teaching and learning in public secondary schools in Tanzania?

2. What is the status of the use of mobile phones in teaching and learning in Kinondoni Municipal secondary schools?

3. How effectively can mobile phone technology be used in the teaching and learning process?

4. Do you have any additional information you would wish to share regarding the use of mobile phones in teaching and learning in Kinondoni Municipality?

5. Can you freely share any suggestions regarding the use of mobile phones in teaching and learning in public secondary schools in Tanzania?

6. How does the presence of piloted project public secondary schools promote the use of mobile phones in teaching and learning?

Appendix VIII: Observation Checklist

No	Observation items	What to be observed	Comments
1.	Mobile phone	Existence and operation Provision of Educational Apps used	
2	Screen for displaying Materials learned	- Existence and operation	
3	Electricity	- Flow and availability	
4	Pedagogical Skills	- Interaction with facilities by teachers and students	
5	Computer lab	Existence and operation Provision of facilities used	

Appendix IX: Research Clearance Letter

THE OPEN UNIVERSITY OF TANZANIA

DIRECTORATE OF POSTGRADUATE STUDIES

P.O. Box 23409
Dar es Salaam, Tanzania
http://www.openuniversity.ac.tz

Tel: 255-22-2668992/2668445
ext.2101
Fax: 255-22-2668759
E-mail: dpgs@out.ac.tz

Our Ref: PG201610076

5th November 2020

Regional Administrative Secretary (RAS),

Dar es salaam Region,

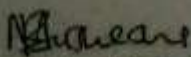P.O.Box 3429,

DAR ES SALAAM.

RE: RESEARCH CLEARANCE
The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you Ms. MASASI, Felister Noah Reg No: PG201610076 pursuing Doctor of Philosophy (PhD).We here by grant this clearance to conduct a research titled "Mobile Phone Use as a Tool for Teaching and Learning in Secondary Schools Dar es salaam; Stakeholders Perception". She will collect her data at your area from 10th November 2020 to 10th December 2020.

In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam.Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours,
THE OPEN UNIVERSITY OF TANZANIA

Prof. Magreth Bushesha
DIRECTOR OF POSTGRADUATE STUDIES.

KINONDONI MUNICIPAL COUNCIL
ALL CORRESPONDENCES TO BE ADDRESSED TO THE MUNICIPAL DIRECTOR

Tel: 2170173
Fax: 2172606

In reply please quote:

Ref. KMC/R.18/1

KINONDONI MUNICIPAL
COUNCIL
P. O. BOX 31902
2MOROGORO ROAD
14883 DAR ES SALAAM

Date 04/02/2021

Afisa Elimu Sekondari
Manispaa ya Kinondoni,
S.I.P. 31902,
DAR ES SALAAM

YAH: UTAFITI WA KUFANYA VITENDO (ELECTIVE PROJECT): MOBILE PHONE USE AS A TOOL FOR TEACHING LEARNING IN SECONDARY SCHOOLS DAR ES SALAAM STAKEHOLDER PERCEPLUM

Kichwa cha habari hapo juu chahusika.

2. Ofisi imepokea barua yako yenye **Kumb.Na.320/378/01B** ya tarehe **01/02/2021** inayohusu kuomba kufanya utafiti Ndugu, **Felister Noah Masasi**

3. Kibali kimetolewa cha kufanya utafiti *"Mobile phone use as a tools for teaching and learning in secondary schools Dar es salaam stakeholder perceplum.*

4. Utafiti huu unaanza tarehe 4 Februari 2021 hadi 28 April 2021.

5. Kwa barua hii naomba mpatie ushirikiano

Maria Masimbusi
Kny: **MKURUGENZI WA MANISPAA**
KINONDONI

For MUNICIPAL DIRECTOR
KINONDONI MUNICIPAL COUNCIL
DAR-ES-SALAAM

Copy;- Naibu Makamu Mkuu wa Chuo,
The Open University Tanzania,
DAR ES SALAAM

Received
03/02/2021

THE UNITED REPUBLIC OF TANZANIA
PRESIDENT OFFICE
MINISTRY OF REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

KINONDONI DISTRICT

Telephone No. 2170169 / 2170183

To reply please quote:

Ref. No. AB.320/378/01B.

THE DISTRICT COMMISSIONER
P.O BOX 9583,
KINONDONI,
DAR ES SALAAM,
TANZANIA.

03rd Feb 2021

Municipal Director,
Kinondoni

RE: RESEARCH PERMIT

Felister Noah Masasi is a Student/researcher from The Open University of Tanzania He/She has been permitted to undertake field work research on "Mobile phone use as a Tool for Teaching and Learning in Secondary Schools Dar-es-salaam' Stakeholders Peraption" From 4th February to 28th April 2021.

I kindly request your good assistance to enable him/her to complete his/her research.

Kny: KATIBU TAWALA
WILAYA YA KINONDONI

For: - District Administrative Secretary
KINONDONI