

UNIVERSITY OF EDUCATION, WINNEBA

**Utilisation of technology in teaching reading in English in four senior high
school in the Offinso-North District**



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**UTILISATION OF TECHNOLOGY IN TEACHING READING IN
ENGLISH IN FOUR SENIOR HIGH SCHOOL IN THE OFFINSO-
NORTH DISTRICT**



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**A thesis in the Department of English Education,
Faculty of Foreign Languages Education, submitted
to the School of Graduate Studies in partial fulfilment of
the requirements for the award of the degree of
Master of Philosophy
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DECLARATION

Candidate's Declaration

I, Gabriel Adu-Mensah, hereby declare that apart from the references to other people's work, which have been duly acknowledged, this dissertation is the result of my own original investigation and that no part of it has been presented for another degree in this University or elsewhere.

Signature:

Date:.....

Supervisor's Declaration

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

Supervisor's Name: Rev. Fr. Anthony Adawu (PhD)

Signature:.....

Date:.....

DEDICATION

This thesis is dedicated to my beloved wife, Rubby, and our children for their love, patience, and unwavering support throughout this journey. I also honour my parents, siblings and mentors whose guidance made this work possible.



ACKNOWLEDGEMENT

I thank God Almighty for his wonderful love, divine protection, and provision throughout this study. I thank him for seeing me through successfully. My special thanks go to my supervisor, Rev. Fr. Dr. Adawu Anthony for his valuable guidance, feedback and constructive advice throughout this study. He was always there to support me, to give me right guidance, and to provide me with brilliant insights.

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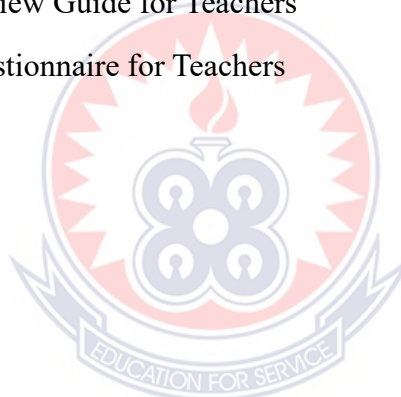
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ABSTRACT

The study investigated the use of technology in teaching reading in English in four selected Senior High Schools in the Offinso-North District. It focused on how language teachers integrate technology into reading lessons, alongside the benefits and challenges of such integration. Guided by Mayer's Cognitive Theory of Multimedia Learning and Schema Theory by Sir Frederick, the study employed a mixed methods approach using an exploratory sequential design. Data were gathered through interviews and questionnaires. The findings revealed that teachers use technology to support pronunciation, decoding, vocabulary development, fluency, and reading comprehension. Benefits identified included increased student engagement, improved pronunciation and comprehension, higher motivation and participation, and enhanced academic performance. However, the study also noted key challenges such as limited access to technology, low digital literacy, unreliable electricity, poor internet connectivity, and decoding difficulties. It recommended training programs to improve teachers' digital literacy and efforts to upgrade ICT infrastructure in schools.



CHAPTER ONE

INTRODUCTION

1.0 Overview

This is an introductory chapter of the study. It consists of the background to the study, statement of the problem, purpose of the study, objectives of the study, research questions, and significance of the study, delimitation and the organisation of the study.

1.1 Background to the Study

English as a Second Language (ESL) education has undergone significant transformations in recent decades, with technology playing an increasingly prominent role in language teaching and learning. Among the various language skills, reading comprehension holds particular importance as it is essential for academic success, social integration, and professional development. The integration of technology in ESL reading instruction has opened up new possibilities for engaging learners, personalising learning experiences, and facilitating language acquisition (Lee et al., 2020). English as a Second Language (ESL) learners face unique challenges in acquiring reading skills due to linguistic and cultural differences. Traditional teaching methods may not always cater to the diverse learning needs of ESL students. In recent years, the integration of technology into ESL instruction has emerged as a promising approach to enhance reading proficiency (Jin, Chen, & Wang, 2019).

The integration of technology in ESL education can be traced back to the emergence of multimedia resources, such as CD-ROMs and audio tapes, in the late 20th century. These resources provided learners with interactive and visually engaging materials to supplement traditional instruction. With the advent of the internet and digital technologies, ESL educators began exploring online platforms and computer-assisted

language learning (CALL) programs to enhance language instruction further. In recent years, the proliferation of mobile devices and applications has revolutionised ESL education, allowing learners to access learning materials anytime, anywhere. The evolution of technology has expanded the repertoire of tools available to ESL educators, enabling them to cater for diverse learning styles and preferences.

Technology encompasses a broad spectrum of resources utilised for communication, content creation, distribution, data storage, organisation, and information retrieval (Nordin, Embi & Yunus, 2010; Thierer, 2001). Wang and Vásquez (2020) highlight the various forms of technology in ESL reading instruction which includes; multimedia resources such as e-books, digital libraries, and interactive videos, which provide learners with access to authentic texts and multimedia content that cater for different interests and proficiency levels, online platforms such as learning management systems (LMS) and virtual classrooms, which also facilitate collaborative reading activities, peer feedback, and teacher-student interactions in a digital environment, and finally mobile applications such as language learning apps and electronic dictionaries, offer learners the opportunities for self-directed reading practice, word decoding, vocabulary acquisition. By leveraging these technology-enhanced resources, ESL educators can create dynamic and interactive reading experiences that engage and empower learners.

Wernet, Olliges and Delicatch (2000) postulate that technology makes the learner autonomous since it presents to the learner wide range of information, which the teacher may not have control over. This means that with the use of technology as a resource the learner does not necessarily need to be in the classroom or in the hands of the teacher as learning can occur anywhere and anytime. These technologies also offer

the learner the opportunity to have a full control the learning process. Technology is a valuable tool that enhances teaching and learning. It is a professional resource for the teachers, a mobile classroom for the student, and a source of valid and valuable text types for both the teacher and the student (Nordin et al., 2010). Technology plays vital role in assisting language learners find reading materials such as articles, digital text from original sources to engage or interact with. They can do this just by sitting in front of their computers or any technological tool connected to the internet. With technology in education, learner-centered approach is enhanced as the learner can access and learn using these technologies at their pace and convenience, thereby developing learner's autonomy in the learning process (Maduabuchi, 2007). Technology-enhanced reading activities offer interactive and adaptive feedback mechanisms, promoting learner autonomy and self-regulated learning (Chapelle, 2003). Educational software, mobile applications, and online platforms often incorporate features such as immediate feedback, progress tracking, and personalised recommendations, enabling ESL students to monitor their own progress and identify areas for improvement (Stockwell, 2010). According to González-Lloret and Ortega (2014) technology facilitates differentiated instruction and personalised learning experiences, accommodating the diverse needs and abilities of ESL learners.

On the other hand, reading is the basis for the effective learning of other subjects. In the consideration of a field or an aspect of life, it becomes evidently clear that the ability to read efficiently enhances individual's ability to function in an effective and efficient manner. Reading is one of the skills in English as a second language. Maduabuchi (2007) opines that reading is an interaction between the reader and the text which results in comprehension. Reading is a receptive language process. In other words, in the process of reading, there is an interaction between language and

thought as the writer encodes thought as language and the reader decodes language as thought. Recent models conceptualize reading as a communicative process in which the reader reconstructs the writer's intended message, with meaning shaped by both parties' experiences and potential noise (Frean, 2022). In the act of reading, the reader has the opportunity to see, hear, and converse with the originator of the text who may or may not be familiar to him/her. Reading is a multifaceted process that develops only with practice. There are certain aspects of reading, such as fluency and word recognition, which can be learned with time.

These basics must be mastered but at the same time reading comprehension should be emphasised in the process (Brown & Smith, 2020). Reading plays a major role in making one a functional individual in the society. In a meta-analysis of the benefit of reading to the reader, Filderman, Austin, Boucher, O'Donnell, and Swanson (2022) concluded that, the cognitive benefits of reading include mental stimulation, stress reduction, knowledge acquisition, vocabulary development, entertainment value, and enhancement of analytical thinking skills. Stanovich (2016) establishes that regular engagement with text enhances cognitive functioning, including attention, memory, and problem-solving skills. It also stimulates neural connections in the brain, leading to improved cognitive abilities. Krashen (2009) discusses how reading can positively impact mathematics achievement. The research suggested that extensive reading enhances cognitive abilities such as problem-solving, logical reasoning, and abstract thinking, which are transferable skills beneficial for mathematical tasks. Reading comprehension skills are essential for science literacy. The importance of teaching disciplinary literacy, including the ability to read, understand and interpret scientific texts, serves as a means to enhance students' comprehension and engagement with science content.

The use of technology in teaching reading in English as a second language is one of the most topical issues in the field of education (Yunus & Salehi, 2012). Several researchers have claimed that the use of technology in teaching reading in English as a second language improves education and provides more teaching and learning supports for second language teachers and learners (Salehi & Salehi, 2012; Young et al, 2003; Yunus, Salehi & Chenzi, 2012;). Undoubtedly the effective use of technology in education improves teachers' instructional process and facilitates students' learning process.

Several challenges have been identified to be affecting the integration of technology in the teaching of reading in Ghanaian secondary school. Boakye and Banini (2008) classified these factors into three namely; teacher-level, school-level and system-level of challenge. Warschauer (2010) highlighted digital divide, infrastructure limitations, teacher training and professional development, resistance to change, cost and sustainability, privacy and security concerns, pedagogical integration and digital literacy and equity as the most prevalent challenges of technology integration into reading instructions. Adu-Gyamfi, Abukari, and Ayamba (2020) critically reviewed the challenges and prospects of technology integration in education in Ghana. They identified issues such as inadequate ICT infrastructure, limited teacher training, and digital divide disparities as barriers to effective implementation. Sarpong, Bonsu, and Adu-Poku (2023) revealed that, the education system of Ghana is faced with challenges such as insufficient ICT resources, ICT policy jettisoned by successive governments, lack of guidance on how best to address new affordances in educational technology and low priority on the use of advanced technologies. These factors seem to have constituted enough stumbling blocks to the use of technology in the teaching of reading comprehension in an ESL

classroom at the secondary school level in Ghana, hence the justification for this research to explore the utilisation of technology in teaching reading in English as a second language in the Offinso-North District in the Republic of Ghana.

1.2 Statement of the Problem

Technology empowers learners in the digital setting to be confident in learning autonomously with digital devices. Various innovations in the digital age point towards new educational pathways which require adequate preparation and new ways of engaging learners. Equipping English as Second Language (ESL) learners and teachers with digital literacy skills and familiarity with technology-enhanced reading environments prepares them for the demands of the digital age and the globalised workforce. Proficiency in navigating digital texts, evaluating online information, and using digital tools for communication and collaboration has become increasingly essential for academic and professional success (Avvisati, 2023; Guichon & McLornan 2017; OECD PISA, 2022).

The essence of technology usage as a resource to aid the teaching of reading in English as a second language (L2 reading) hinges on the fact that it provides access to a wide range of reading materials, including digital books, articles, and multimedia resources, which may not be readily available in traditional classroom settings. This access expands learners' exposure to authentic English texts and diverse content, fostering reading comprehension and vocabulary development. Multimodal learning opportunities in the use of technology enables the integration of various media formats, including text, audio, video, and interactive elements, which offers multiple pathways for understanding and comprehension. This technology-supported

multimodal approach can benefit the ESL learners' various learning preferences (Kost et al., 2020).

Furthermore, interactive digital tools, such as educational apps, online games, and multimedia platforms, engage ESL learners in reading activities by making the learning process more interactive, enjoyable, and relevant to their interests and learning styles. This increased engagement can enhance motivation and persistence in reading practice (Heift & Vyatkina, 2019; Reinders & Pegrum, 2017).

Despite the enormous benefits derived from the use of technology in language learning, it has not received much research attention in the Ghanaian context, particularly regarding its use in teaching reading in English. In the Ghanaian context, studies on technology utilisation have largely focused on policies on technology as part of educational curriculum and its integration, assessing the readiness of teachers and their perceptions, the impact of technology on English, learners' writing and factors affecting its integration with a very minimal or no focus on its usage to teach reading in English.

Owusu-Acheaw (2016) investigated the use of social media (technology) by students of Koforidua Polytechnic and its impact on the reading habit of the students. While the study established a relationship between time spent on social media and reading habits and that the constant use of social media leads to low reading habits among students, it only focused on tertiary students and limited its technology to only social media.

Asafo-Adjei, Mensah, Klu, and Swanzy-Impraim (2023) delved into the connection between social media and English language writing performances of a Ghanaian ESL classroom. Their study mainly focused on the impact of technology (social media) on

the academic writings of ESL learners. It does not, however, address the usage in teaching of ESL reading in the Ghanaian context.

Norman (2023) conducted a systematic literature review on the impact of educational technology for reading instruction in developing countries. The study sought to understand how educational technology improves reading outcomes for children in kindergarten to grade three (five- to nine-year-olds), the types of educational technology that have been found to lead to a significant improvement in reading outcomes, as well as the ways these forms of educational technology are effective in improving reading outcomes in developing countries. The review provides a broad overview of technology utilization in developing reading skills among early grade learners. However, it focused on developing countries in general, it does not place emphasis on the Ghanaian context. The review also focused on learners in kindergarten to grade three and not at the senior high school level.

With the growing interest in technology integration in second language instruction at the senior high school (SHS) level, other existing research in the Ghanaian context has largely concentrated on specific language skills, thereby creating a gap in the literature on reading instruction. For instance, Duniya (2024) explored the use of digital tools in teaching writing, revealing how word processors and online editing platforms enhance students' drafting and revision skills. Similarly, Fokuoh (2024) examined technology's role in improving speaking skills, emphasizing the use of mobile apps and interactive audio-visual content to develop pronunciation and oral fluency. In a related study, Peprah (2024) focused on the integration of technology in teaching literature, particularly through the use of e-books, digital storytelling, and video dramatizations to improve literary appreciation and critical thinking.

While these studies demonstrate the positive impact of technology on various aspects of English language instruction, they do not adequately address its application in teaching reading, which is a foundational skill in language acquisition. This narrow focus has left a gap in understanding how technological tools can be effectively employed to enhance reading comprehension, decoding, vocabulary development, and engagement among SHS learners. Addressing this gap is essential, especially in the context of increasing digitalisation of education and the urgent need to prepare students for 21st-century literacy demands.

In short, while Owusu-Acheaw (2016), Asafo-Adjei, et al (2023) and Norman (2023) have significantly explored, described and explained the integration of technology into education, focusing especially on the lower and the tertiary levels, and studies at the SHS level focused on the use of technology in teaching language skills such as writing (Duniya, 2024), speaking (Fokuoh, 2024) and literature (Peprah, 2024), the integration of technology in teaching reading in English the senior high school, has not gained much attention. This leaves gaps in theory and practice that needs to be addressed. The current research addresses this gap in by examining how teachers use technology to teach reading in English in four selected senior high schools in the Offinso-North District of the Ashanti Region. Addressing this focus will contribute to our understanding of the potentials of using technology to teach reading, help prepare students for language learning in the digital age, assist in the development of evidenced-based practices in technology-enhanced reading instruction as well as gain deeper insights into the challenges encountered in integrating technology in reading education.

1.3 Purpose of the Study

The purpose of this study is to investigate how technology is integrated into the teaching of reading in English in selected senior high schools in Ghana. It examines how teachers apply technological tools in reading lessons, the benefits of such integration, and the challenges they face. Using an exploratory sequential mixed methods design, the study first collects qualitative data from a purposively selected group of teachers, which then informs the development of a quantitative instrument for broader data collection. By combining both qualitative and quantitative insights, the study aims to provide context-specific recommendations to enhance teacher training, curriculum planning, and policy development in technology-based ESL reading instruction.

1.4 Research objectives

The objectives of the study were to:

1. explore how teachers use technology to teach reading in English in four senior high schools in Offinso-North District.
2. analyse the teachers' perceived benefits of using technology in teaching reading in English.
3. examine the challenges teachers face in using technology to teach reading in English.

1.5 Research Questions

The study sought to answer the following questions:

1. how do teachers in the four senior high schools in the Offinso-North District use technology to teach reading in English?
2. what benefits do the teachers associate with the use of technology in teaching reading in English?
3. what challenges do the teachers face in using technology to teach reading in English?

1.6 Significance of the Study

The significance of this study hinges on its potential to transform ESL education in Ghana by leveraging technology to enhance reading skills. By exploring the use of technological tools, the study will provide insights into how digital resources can improve reading proficiency among ESL students. Highlighting the benefits derived from the use of technology in teaching reading will encourage ESL teachers and learners to fully embrace its utilisation in language instructions and learning. Understanding the challenges faced by educators in implementing these technologies will highlight areas that needs support, guiding policymakers in making informed decisions to strengthen the educational infrastructure. Ultimately, the study aims to contribute to the broader goal of improving literacy rates and educational outcomes in Ghana

1.7 Delimitations

This study is delimited to the Offinso-North District in the Ashanti Region of the Republic of Ghana to provide a more localised perspective on the usage, benefits and challenges of integrating technology into ESL reading instruction, considering

potential variations in infrastructure and resources. It also focuses exclusively on pre-tertiary institutions in the Republic of Ghana to ensure a more in-depth analysis of technology integration in reading instruction within that academic setting. Additionally, this work primarily explore the perspectives and experiences of English as a second language teachers regarding the use of technology in teaching reading, with minimal or no emphasis on other stakeholders such as students or parents, to maintain coherence and depth in the analysis of teacher practices and challenges. Again it concentrates on the impact of technology on specific reading skills, such as decoding, vocabulary development, fluency, scanning and skimming, active reading, critical reading, comprehension, while excluding other language skills to ensure a more targeted examination of technology's influence on reading proficiency among ESL learners with regard to the specific skills.

1.8 Operational Definition of Terms

The following are definitions of some operational terms included in this study:

Technology: The use of digital or electronic tool such as educational software, digital platforms, multimedia resources, mobile and tablet applications and internet resources to support and enhance the teaching and learning of reading in English as a Second Language (ESL) classrooms.

English as a Second Language (ESL): The educational practice of teaching English to individuals whose first language is not English with the aims to develop proficiency in reading, writing, speaking, and listening in English.

Comprehension: The process of simultaneously constructing and extracting meaning through interaction and engagement with text.

Schema: One of the most common terms used for classifying and constructing knowledge. It contains social information and is used to represent chain of events, perceptions, situations, relationships and even objects.

Reading: The process of engaging, interpreting, and understanding a texts through the acquisition and improvement of reading skills in English as a Second Language (ESL).

1.9. Organisation of the Study

The study is organised into five (5) chapters. Chapter one contains the introduction which dilates on the background to the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, delimitation, definition of terms and organisation of the study. Chapter two reviews related literature which include theoretical framework and the review on major themes highlighted in the research questions. Chapter three takes a look at the methodology of the study which comprises research paradigm, approach, research design, population, sample and sampling techniques and procedure for collection of data, reliability, validity and trustworthiness of data, the techniques used in analysing the data and limitations of the study. Chapter four presents the results and discussion of the findings. Chapter five focuses on the summary of the study, conclusions, recommendations and suggestions for further study.

1.10 Chapter Summary

This chapter presented a discussion of the background to the study which highlighted the increasing integration of technology in language classroom to enhance reading comprehension, as well as barriers impacting the effective implementation of technology in teaching reading in English, statement of the problem which has to do

with the gaps in theory and practice that needed to be addressed, the purpose of the study which is to address that lack of focus on the usage of technology in teaching reading in English in the senior high school level. The chapter presented three research objectives and questions to guide the researcher in the conduct of the study, the significance of the study, delimitation and concluded with the definition of operational terms and an insight into the how the entire study is structured.



CHAPTER TWO

LITERATURE REVIEW

2.0 Overview

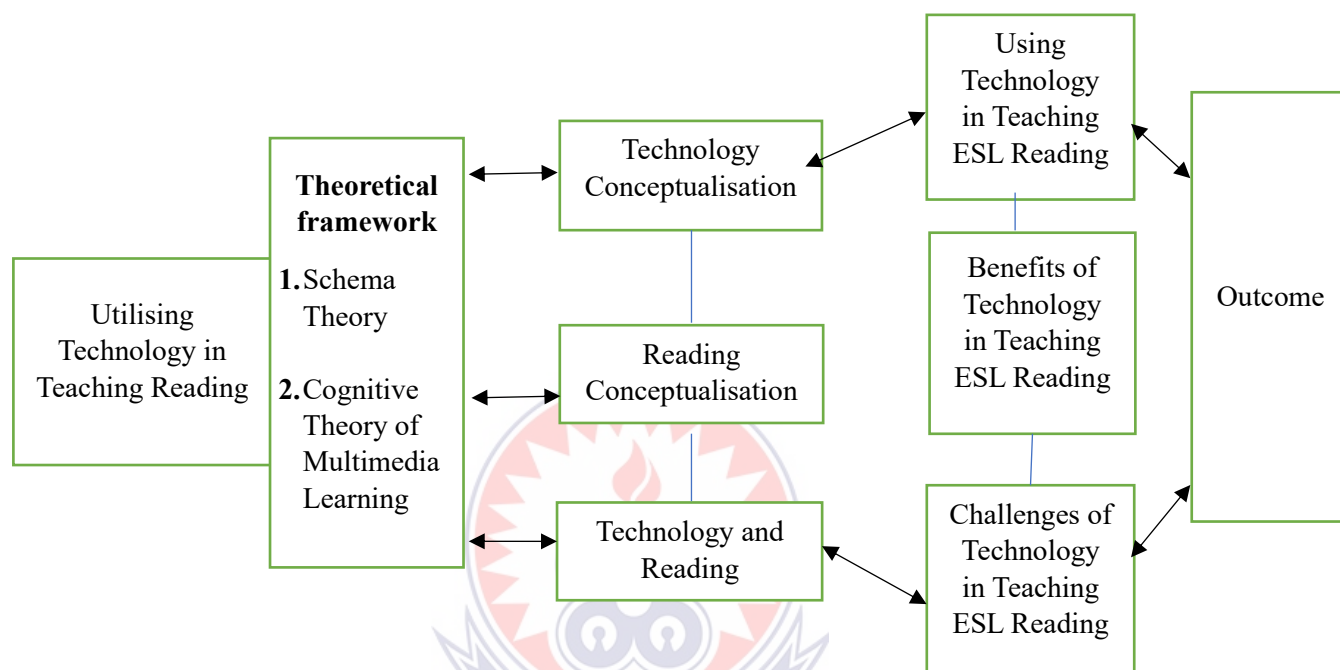
In this chapter, scientific literature is reviewed to increase the understanding of the problem being studied; the theoretical foundation includes theories, key concepts, empirical studies, themes and the conceptual framework.

2.1 Conceptual Framework

The conceptual framework for technology utilisation in teaching ESL reading in this study emphasises the role of technology in enhancing reading comprehension through multimedia resources, online platforms, and mobile applications. Technology facilitates personalised learning experiences, accommodates diverse learning styles, and promotes learner autonomy. Reading in the context of technology represents a dynamic and interactive process that integrates various digital tools and resources to enhance the traditional reading experience. This evolution underscores the need for educators to incorporate digital literacy skills into their reading instructions to prepare learners for the reading environment (Leu et al., 2014). The transformative potentials that are offered by the integration of technology in English reading instruction enhances the reading skills and clearly underscore the relationship that exists between technology and its usage in teaching reading (Lin et al., 2015). The framework aims to explore how technology is used in teaching reading, the benefits and challenges in order to optimise reading instruction, particularly in contexts of Offinso-North District in Ghana, where access to advanced educational technologies may be limited but increasingly essential for enhancing literacy outcomes.

As demonstrated below in the table the conceptual framework of the study outlines the key components that come together to enhance the exploration of the phenomenon, the rationale as well as the outcome.

Figure 1: Conceptual Framework



2.2 Theoretical Framework

The theories that underpin the study were Mayer's Cognitive Theory of Multimedia Learning (CTML) and schema theory.

2.2.1 Mayer's Cognitive Theory of Multimedia Learning (CTML)

Mayer's Cognitive Theory of Multimedia Learning (CTML) has been instrumental in shaping the understanding of how multimedia tools can enhance learning. According to Mayer (1997) meaningful learning occurs when students select suitable words and pictures, organise them into coherent pictorial and verbal models, and integrate these models with each other and with appropriate prior knowledge. This theory is grounded in three core cognitive science principles: the dual-channel assumption, the limited capacity assumption, and the active processing assumption. Over the years,

CTML has been widely applied in various educational contexts, including second language (L2) reading studies, to develop effective multimedia texts for L2 learners (Mayer & Moreno, 1998).

2.2.1.1 Core Principles of CTML

Dual-Channel Assumption

The dual-channel assumption posits that humans have separate channels for processing visual and auditory information. This principle suggests that learners can process visual and verbal information simultaneously without overloading a single cognitive channel. When learners process the visual images through the visual channel and the spoken words through the auditory channel simultaneously it can lead to more efficient and effective learning (Mayer & Moreno, 2003).

Limited Capacity Assumption

The limited capacity assumption states that each cognitive channel has a limited capacity for processing information at any given time. This means that overloading one channel with too much information can hinder learning. It further argues if learners are bombarded with too much text or too many images simultaneously, they may struggle to process and integrate the information, leading to cognitive overload. Therefore, multimedia instructional design must be carefully planned to avoid overwhelming the learner and to ensure that information is presented in manageable chunks (Sweller, 2010).

Active Processing Assumption

The active processing assumption emphasises that learners must engage in active cognitive processes to construct meaningful learning. This involves selecting relevant information, organising it into coherent structures, and integrating it with existing knowledge. Active processing is facilitated by interactive elements in multimedia, such as clickable links, quizzes, and drag-and-drop activities, which prompt learners to actively engage with the material rather than passively receive information (Mayer, 2009).

2.2.1.2 Application of CTML in Second Language Reading

CTML has significant implications for second language (L2) reading instruction, particularly in the context of multimedia learning environments. Research has demonstrated that multimedia tools can support L2 reading comprehension by providing multiple representations of information, which cater to different learning styles and help bridge language gaps (Plass, Moreno, & Brünken, 2010). Multimedia resources, such as e-books, reading apps, and online platforms, provide L2 learners with access to a wide range of reading materials accompanied by supportive multimedia elements. Digital texts that include audio narration, help learners associate written words with their correct pronunciations. Visual aids, such as pictures and animations, also provide contextual clues that aid understanding of unfamiliar vocabulary and complex sentences (Chun & Plass, 1996).

Adaptive learning technologies, which are based on CTML principles, tailor reading activities to the individual needs and proficiency levels of L2 learners. These technologies analyse learners' reading patterns and performance to provide customised reading passages and exercises that are appropriately challenging. This

personalised approach not only enhances engagement but also ensures that learners receive the right level of support to advance their reading skills (Kalyuga, 2009). Multimedia learning environments accommodate diverse learning styles by offering various ways to interact with content. Visual learners benefit from images, diagrams, and videos, while auditory learners benefit from audio narration and sound effects. Kinesthetic learners can engage with interactive elements, such as clickable links and drag-and-drop activities, which involve physical interaction with the learning material. This multimodal approach ensures that all learners can access and engage with the content in a way that suits their learning preferences (Felder & Silverman, 1988).

Mayer's Cognitive Theory of Multimedia Learning (CTML) provides a robust framework for understanding how multimedia tools can enhance L2 reading instruction. By leveraging the dual-channel, limited capacity, and active processing principles, educators can design effective multimedia learning environments that support comprehension, personalise learning experiences, and accommodate diverse learning styles, hence the relevance its adoption in this present study.

2.2.2 Schema theory

Schema theory is a cognitive framework that asserts that comprehension of a text is an interactive process between the reader's background knowledge and the text. According to Bartlett (1932), every act of comprehension involves one's existing knowledge of the world, known as schemata. In this context, a text does not inherently carry meaning on its own. Instead, the reader brings their information, knowledge, emotion, and cultural background to the interpretation of the printed

word. Comprehending a text thus requires the ability to relate the textual material to one's own knowledge (Pappas, 2014).

2.2.2.1 Components of Schema Theory

Content Schemata

Content schemata encompass the reader's knowledge about people, the world, culture, and the universe. This includes familiarity with the subject matter of the text. Reading a story set in a hospital, the readers' prior knowledge about hospitals, medical procedures, and healthcare personnel can better understand and relate to the content.

Formal Schemata

Formal schemata refer to the reader's knowledge about discourse structures and conventions of different types of texts. This includes understanding how narratives, expository texts, and other genres are typically organised. Readers knowledge of the structure of a scientific paper can help anticipate the organisation and flow of information within such a text.

2.2.2.2 Application of Schema Theory in Language Learning

Schema theory has profound implications for second language (L2) reading instruction. It suggests that teachers should activate students' prior knowledge before introducing new texts, helping them connect new information with what they already know. This activation of prior knowledge can significantly enhance comprehension and retention of new material (Pappas, 2014).

One effective strategy to activate prior knowledge is through pre-reading activities, such as discussions, brainstorming sessions, or using visual aids like pictures and videos. These activities can help students recall relevant information and set a purpose for reading, making the text more accessible (Grabe & Stoller, 2019).

Teachers can provide contextual support by offering background information about the text. This might include explaining cultural references, historical contexts, or unfamiliar concepts that could be barriers to comprehension. Providing glossaries or footnotes with explanations can also aid understanding (Grabe, 2009).

2.2.2.3 Integration of Technology in Schema Activation and Development

The integration of technology in language learning offers innovative ways to apply schema theory and enhance reading comprehension. Digital tools can provide rich, interactive experiences that activate and build upon students' existing schemata.

Multimedia resources, such as videos, audio recordings, and interactive simulations, can provide visual and auditory contexts that help students activate their prior knowledge. In a reading classroom a video about a cultural festival can introduce vocabulary and concepts that will appear in a reading passage about the same festival (Mayer, 2009).

Digital storytelling platforms allow students to create their own stories, integrating text, images, and audio. This process helps students organise their thoughts and connect new information with their existing knowledge. Creating digital stories can also help students practice structuring narratives, enhancing their formal schemata (Robin, 2008).

This present study adopts schema theory because it provides a valuable framework for understanding how background knowledge influences reading comprehension, and by extension the integration of technology into language learning environment can enhance the activation and development of students' schemata, leading to improved comprehension and retention.

2.3 Review of Key Concepts

2.3.1 Reading Comprehension

The concept of reading has evolved significantly over time, reflecting shifts in educational theories, cognitive psychology, and pedagogical practices. This section expands on historical and contemporary perspectives on reading comprehension, highlighting key theoretical models and recent developments that underscore the complex nature of reading as both a cognitive and interactive process.

2.3.1.1 Historical Perspectives on Reading Comprehension

Historically, reading comprehension was often defined narrowly as the ability to understand and interpret written text. Early models of reading comprehension were heavily influenced by behaviourist psychology, which emphasised observable responses to stimuli (Grabe, 2009).

Early Definitions of Reading

Early definitions of reading focused on the reader's ability to appreciate and understand the author's message. According to Urquhart and Weir (1998) reading was seen as a product of the reader's effort to grasp the meaning intended by the author. This perspective aligns with the behaviourist view, where reading was largely viewed as a passive process of decoding and receiving information.

Behaviourist Models

In the mid-20th century, behaviourist psychology dominated educational theories, leading to models of reading that focused primarily on word recognition and decoding. The bottom-up model, as described by Pardede (2013), posits that reading begins with the recognition of individual letters and words, which are then pieced together to form sentences and paragraphs. This approach views reading

comprehension as a linear process where meaning is derived from the sequential processing of textual elements.

The behaviourist perspective had its strengths in explaining basic decoding processes but was criticised for oversimplifying the complexities of reading comprehension. Critics argued that this model failed to account for the reader's active role in interpreting and integrating information (Pardede, 2013).

Bottom-Up Models

Bottom-up models, such as those proposed by Gough (1972) describe reading as a process that starts with the recognition of individual letters and words. According to Gough, these basic units are combined to form higher-level structures like sentences and paragraphs, leading to the construction of meaning. While bottom-up models provide valuable insights into the mechanics of decoding, they have been criticised for overlooking the role of the reader's prior knowledge and cognitive strategies in comprehension (Gough, 1972). These models are effective in explaining basic text processing but may not fully capture the complexities of higher-level comprehension.

Top-Down Models

In response to the limitations of bottom-up models, top-down approaches emerged, emphasising the reader's cognitive engagement with the text. Goodman (1967) introduced the concept of reading as a "psycholinguistic guessing game," where readers use their background knowledge and context to predict and infer meanings. This model highlighted the interactive nature of reading, where comprehension involves both decoding skills and cognitive strategies (Goodman, 1967).

Top-down models shifted the focus from decoding to the reader's active role in constructing meaning, recognising that readers use their prior knowledge and

expectations to make sense of text (Smith, 1971). This approach marked a significant departure from the behaviourist perspective by acknowledging the importance of cognitive processes in reading comprehension.

Theoretical Models of Reading Comprehension

Theoretical models of reading provide frameworks for understanding how readers process and comprehend text. These models have evolved from linear, behaviourist approaches to more interactive and integrative perspectives.

Interactive Models

Interactive models offer a more comprehensive view of reading by integrating elements of both bottom-up and top-down approaches. Rumelhart (1980) proposed that reading comprehension involves simultaneous processing at multiple levels, including word recognition, syntactic parsing, and semantic integration. This model recognises that comprehension is a dynamic process influenced by both textual elements and the reader's cognitive processes.

Interactive models account for the interplay between decoding skills and higher-level cognitive strategies, providing a more holistic understanding of how readers construct meaning from text (Rumelhart, 1980). This approach aligns with the view that reading comprehension involves both bottom-up and top-down processes.

Cognitive Theories of Reading Comprehension

Cognitive theories of reading comprehension explore the mental processes involved in understanding text. These theories emphasise the role of background knowledge, cognitive strategies, and mental representations in reading.

Schema Theory

Schema theory, introduced by Bartlett (1932) posits that comprehension involves the interaction between new information and existing cognitive structures known as schemata. According to Bartlett, readers use their background knowledge and experiences to interpret and integrate new information, making it more meaningful and easier to remember. Grabe, Stoller, Anderson, and Komiyama (2013) argue that schema theory has significant implications for reading instruction, as it suggests that activating students' prior knowledge can enhance comprehension by providing a relevant context for new information. This approach highlights the importance of connecting new content with existing cognitive frameworks.

Cognitive Load Theory

Cognitive load theory, proposed by Sweller (1988) focuses on the limitations of working memory in processing information. According to this theory, effective reading instruction should aim to minimise extraneous cognitive load and optimise germane cognitive load to support learning and comprehension.

Paas, Renkl, and Sweller (2003) emphasise that cognitive load theory has practical implications for reading instruction, suggesting that information should be presented in a way that reduces cognitive overload and enhances students' ability to process and understand text. This approach involves breaking down complex texts into manageable segments and providing appropriate scaffolding.

Interactive Approaches to Reading Comprehension

Recent approaches to reading comprehension emphasise the interactive nature of the process, highlighting the role of both the reader and the text in constructing meaning.

The Role of Prior Knowledge

Prior knowledge plays a crucial role in reading comprehension. Anderson and Pearson (1984) demonstrated that readers with relevant background knowledge are better able to understand and retain new information. Prior knowledge provides a framework for interpreting and organising new content, making it more meaningful and easier to remember.

Teachers can activate students' prior knowledge through pre-reading activities such as discussions, brainstorming sessions, and visual aids. These strategies help students connect new information with what they already know, enhancing their ability to comprehend and engage with the text (Grabe et al., 2013).

Cognitive Strategies

Cognitive strategies are mental processes that readers use to enhance their understanding and retention of text. These strategies include summarising, predicting, questioning, and visualising. Duke and Pearson (2002) found that teaching students to use these strategies can significantly improve their reading comprehension.

The concept of reading has evolved from a simplistic view of decoding text to a complex, interactive process involving both cognitive and contextual factors. Historical perspectives, theoretical models, and recent advancements in technology all contribute to a richer understanding of reading comprehension (Snow, 2002; Afflerbach, Pearson, & Paris, 2008).

2.3.2 The Concept of Technology

Several researchers have studied in to the dynamic nature of technology and have brought to the fore various definition due to its dynamic nature. Understanding the nature of technology contributes greatly to defining what it is as well as what it is

made up of. Studies have shown that an attempt to define the concept of technology has not been an easy task for researchers (Reddy & Zhao, 1990): resulting in researchers defining what technology is according to the study area they find themselves.

Blomstrom and Kokko (1998) argue that the term “technology” is an abstract concept. This makes it difficult to observe, interpret and evaluate. Admitting the fact that there has been an extensive study of the concept of technology many of these literatures are divided according to the disciplines the researcher found themselves, therefore, there is no generally accepted paradigm with regard to the concept of technology (Reddy & Zhao, 1990): because of this, the concepts, variables and measures relevant to the study are different from one study to another (Kumar et. al., 1999).

In the field of education, according to Seels and Richey (1994) technology can be defined as the theory and practice of design, development, utilisation, management and evaluation of processes and resources for learning. Undoubtedly one of the best ways to learn is to create an interactive learning environment with technological tools and resources. The teacher has a job which is to teach learners a language foreign to them referred to as second language. The rules of the language are taught and sometimes the cultural norms. With the infusion of technology into the learning process, the outcome becomes enormous.

2.3.3 Integrating Technology into Language Learning

One of the effective means available for learners in the learning process is technology. It is an effective tool for learners. To achieve positive learning outcomes, it is incumbent on learners to use technology as an integral part of their learning process (Costley, 2014). In a similar vein, instructors and teachers must demonstrate the use of

these technological tools as a supplement to the curriculum which will equally serve as a model to the learners for them to increase their engagement with these technological tools in their language learning process (Murphy et al., 2003).

According to Susikaran (2013) the classroom has seen some basic transformation since the teaching and learning methods through the chalk and talking is insufficient and non-effective means to teach English language. Raihan and Lock (2012) asserts that when a classroom setting is well-planned it affords learners the opportunity to learn effectively and efficiently. Furthermore, a classroom teaching and learning environment which is technologically enhanced is more efficient and effective in learning as compared to the lecture-based classroom. Some learners may not be able to operate the computer as an expert in their learning process, notwithstanding, it is incumbent on teachers to look for ways they can usefully apply technology as a learning tool for their learners.

According to Patel (2013) the teaching of English language has transformed over the years with the introduction of technology as a method of teaching. The teaching and learning process has become more productive and interesting through the use of technological tools because it has become an alternative means to efficiently and effectively teach and learn English language.

When one considers the traditional method of teaching, where the teacher stands in front of the learners and through the use of the blackboard and or the whiteboard to provides lecture, explains a concept as well as give instructions to them, and the technologically enhanced classroom which uses multimedia texts in the class to assist learners in become familiar with vocabulary and language structures the latter is efficient in enhancing reading comprehension. These multimedia tools when applied

to the teaching and learning of English Language enhances the linguistic competence of the learners. These affordances offer learners the opportunity to gather more information to undertake an effective interpretation of the text from the linguistic and the contextual points of view (Arifah, 2014).

The learning environment becomes learner centred when technology is used as a means of teaching and learning instead of the teacher becoming the pivot of education in the classroom (Dawson et al., 2008; Pourhosein-Gilakjani, 2014). Dawson et al. (2008) and Pourhosein-Gilakjani (2014) further argued that when a computer is used in the teaching and learning process, the learning environment becomes active place full of meaningful tasks since learners become responsible for the knowledge acquisition. Drayton et al. (2010) maintained that learners' responsibilities are adequately enhanced through the use of technology since it provides a true learning experience for them. Learners are encouraged to learn independently with technology through which they acquire a responsible learning behavior and direction.

According to a study carried out by Peregoy and Boyle (2012) on the use of technology to improve learners' reading and writing skills, technological tools enhance learners' reading and writing skills since they are user friendly and helps learners to learn faster and effectively. Furthermore, the study revealed that the use of technological tools instead of the traditional method of teaching afford learners the opportunity to learn in a more effective manner because the tools including the internet and the multimodal provides a conducive learning environment for learners in their learning process.

3.3.4 The Importance of Technology in Reading in English

A robust global literature underscores the transformative potential of technology in reading instruction, especially for English. Digital platforms ranging from adaptive e-books to mobile-based reading apps promote personalized learning by allowing learners to engage at their own pace and receive immediate feedback (BMC Psychology, 2025). Among the most notable findings, a UNESCO and Worldreader study surveying over 4,000 users in countries including Ghana revealed that 62% of respondents read more due to mobile access, driven by affordability and lack of other reading resources (UNESCO & Worldreader, 2014). This global trend demonstrates that digital tools can significantly improve literacy access and engagement, particularly in low-resource settings.

In Ghana, empirical research validates promise of technology in English reading instruction. The iREAD Ghana pilot study (2010–2011) provided e-readers to primary school students; findings included increased access to books, heightened enthusiasm for reading, greater teacher tech proficiency, and improved standardized reading and English test scores—especially in schools that combined e-readers with mentoring and extracurricular reading support (Worldreader, 2012). Meanwhile, the iREAD 2 follow-up study (2012–2014) reaffirmed that e-reader interventions, when paired with curricular tools and teacher support, significantly boosted early-grade literacy, highlighting the importance of integrated implementation (Worldreader, 2014).

Equally important are the motivational benefits associated with technology-enhanced reading in Ghana. Studies have shown that children are often more eager to engage with digital books than with print, partly because of the interactive features, variety of content, and sense of ownership that digital libraries provide (Worldreader, 2014).

The iREAD Ghana evaluation found that students reported higher enjoyment and increased voluntary reading when using e-readers compared to traditional textbooks (Worldreader, 2012). Moreover, mobile reading initiatives have been linked to stronger family and peer engagement, as children often share stories with siblings and parents—creating a culture of reading beyond the classroom (UNESCO & Worldreader, 2014). This suggests that digital tools not only improve literacy skills but also foster intrinsic motivation, a critical factor for sustaining lifelong reading habits in English.

2.4. Review of Empirical Studies

2.4.1 How Teachers Use technology in teaching reading of Second Language (L2)

Abbasian and Azeez (2021) conducted a study with elementary and intermediate second-stage Arabic and Kurdish students at Cihan University, Erbil, to explore the impact of flipped teaching on L2 reading comprehension. The study included a control group and an experimental group. In the control group, students received reading texts in class without prior knowledge, while the experimental group received texts via email and had access to online resources. The experimental group also had online meetings for prior knowledge building. They found that implementing flipped teaching and utilising technology, such as email and online resources, benefitted L2 students' reading abilities. The experimental group, which received instructions, prior knowledge, and engaged in online discussions, showed improved reading comprehension compared to the control group.

Ahmed (2019) investigated the effects of using WhatsApp to improve students' L2 reading and writing skills. The participants in the study were 20 English as a foreign language (EFL) undergraduate student in the English language department in

University of Aden. First, he gave them a pre-test to assess their reading and writing abilities. Next, they received daily articles and were required to read them, write comments, and paraphrase them. The researcher continued to send questions and articles via WhatsApp to motivate students to chat and discuss topics related to the reading materials. It was found that, tasks that they received through WhatsApp had a highly significant impact on developing their L2 reading and writing abilities.

Assaf et al. (2020) did semi-experimental research and examined the effect of incorporating mobile-assisted language learning (MALL) presented via an electronic collocation-based instructional program (mobile app) on improving Jordanian students' reading comprehension. The researchers designed an electronic instructional program that focused on electronically familiarising students with collocations presented in their textbook. To achieve this, collocations were collected by conducting a content analysis and were identified, grouped and fed into Quizlet (a flashcard mobile application). Fifty male Jordanian students studying English as a foreign language participated in the study. The study found that an electronic collocation-based instructional program is a useful tool for improving L2 reading comprehension. The study concluded that incorporating MALL, such as via Quizlet, is beneficial in enhancing students' L2 reading comprehension.

KhuramShahzad et al. (2021) also did quasi-experimental study aimed to investigate the effect of using Computer Mediated Instruction (CMI) on Pakistani EFL students' achievement in reading comprehension at the secondary level. Participants were divided into two groups; one was taught through traditional methods, and the other was taught via CMI presented through immersive reading software that enables students to write anything and have it read by the software. It also provides the

meaning of words and increases students' reading fluency. The teacher gave students different tasks and assignments based on reading texts, all of which the students completed through the immersive reader program. Results of pre-tests and post-tests indicated that students' reading comprehension improved significantly, when compared to that of the control group, by applying CMI-based teaching methods.

Ali (2021) did a qualitative study conducted on intermediate English as a second language (ESL) students aimed to investigate the value of using digital devices in teaching L2 reading skill. The researcher observed students and their teacher while they used digitalised language input through gadgets such as laptops, notepads and smartphones in Larkana's context, in Pakistan. The study also revealed that by using technological devices, students' immersion in reading L2 texts increased. In addition, students' phonic awareness and fluency increased when they used smartphones to listen to native speakers through authentic dialogue and/or videos, enhancing their L2 assimilation, vocabulary and elision. The study also revealed that students' critical, inferential and literal reading skills could be enhanced through technology.

Bahari et al. (2021) investigated the effect of computer-assisted language learning (CALL) on developing Iranian students' L2 reading performance and enabling them to apply reading strategies in an automatic, unconscious way. The researchers applied the computer-assisted interactive reading model (CAIRM) at three levels, which were applied in three experimental groups: bottom-up, top-down and interactive-approach. The results indicated that the interactive approach was the most influential level of CAIRM implementation. Tools and strategies of CALL had a positive impact on students' reading proficiency. The study also supports updated teaching styles and students' various learning styles. In addition, the data showed that students had

positive perceptions of the applied model in both distance and blended learning environments.

Bao (2017) aimed to explore the effect of applying multimodality in teaching reading for college English majors in an intensive reading course at a university in Mongolia. The participants in the study were 110 students studying in two parallel classes: an experimental group and a control group. The researcher taught reading through multimodal reading in the experimental classroom and used ordinary multimedia teaching methods with the control group. The multimodalities included several modes of meaning; specifically, these were visual, audio, gestural and spatial. The results of the study indicated that students' scores were similar on the pre-test, whilst the experimental group's scores improved on the post-test. Thus, the author concluded that the application of multimodality had the positive impact of improving students' L2 reading comprehension.

In addition, Chen et al. (2019) did a quasi-experimental study and investigated the impact of applying a web-based collaborative reading annotation system (WCRAS) with gamification mechanisms on improving Taiwanese students' L2 digital reading comprehension. With the experimental group, the researchers employed WCRAS with gamification mechanisms, whilst only WCRAS was used with the control group. First, it motivated students to make annotations and engage in collaborative annotations. Second, the results indicated that students who had the gamified WCRAS generated higher quality annotations than those without it.

Erya and Pustika (2021) also conducted a descriptive qualitative research study and investigated Indonesian students' perceptions of the use of the new comic platform Webtoon to improve reading skill. Webtoon is a website and a cartoon and presents

digital comics. Fifty students enrolled in a university's English education program participated in this study. The data also showed that most students found using Webtoon motivated them to read texts and improve their comprehension. Moreover, the study revealed that the special features of Webtoon, such as the availability of comics, audio and video files, and stories, encouraged students to download and use it in their L2 reading comprehension lessons.

2.4.2 Benefits Associated with the Use of Technology in Teaching Reading of L2

Technology should be adapted to the ongoing changes in education to be used extensively in the learning process since it creates opportunities for students to learn and collaborate with one another through the exchange of ideas and experiences and joint problem solving. Moreover, there is a need to have computer literacy to manage to create, and thus organise good learning situations that help pupils in these settings (Shatri, 2020).

Integration of technology is typically defined as purposeful use in language pedagogy of some kind of modern technology. Even though there is often a distinction between technology integration and technology use (Qin & Shuo, 2011; Stockwell & Hubbard, 2013). Technology provides so many options as making teaching interesting and also making teaching more productive in terms of improvements. Technology is one of the most significant drivers of both social and linguistic change. Rahmat (2011) suggested that the instant worldwide connections enabled by the Internet have changed the way teachers and learners work in their teaching and learning of second/foreign language.

Indeed, the use of the Internet and the World Wide Web in second/foreign language instruction has been increasingly recognised. A number of applications of computer network technology have been utilised such as multimedia, email, electronic journals,

databases, World Wide Web, chat, audio and video conferencing etc. The Synchronous communication enables language learners to communicate rapidly and inexpensively with other language learners or speakers of the target language around the world (Warschauer & Healy, 1998). The use of technology in foreign language learning also appears to influence the development of communicative skills. In fact, computers can offer foreign language learners more than drills; they can be a medium of real communication in the target language, including composing and exchanging messages with other students in the classroom or around the world (Handa, 1990).

Tsitouridou et al. (2004) studied two hundred seventy-eight early childhood teachers in Greece using an open-ended questionnaire. The authors noted that teachers' attitudes are far more positive when they have previous experience with technology and that the more teachers use technology the more confident they became integrating it into their classrooms. Indeed, their study found that teachers who have extensive prior experience are more positive and enthusiastic about technology and more easily recognise the educational benefits. Conversely, they found that teachers without prior technology experience have negative attitudes about the computer in general and about technology's effect on young children's intellectual and emotional development. Bransford, Brophy, and Williams (2000) surveyed over one thousand teachers in Moscow schools finding similar results. Specifically, among teachers who use technology, seventy-seven percent views it positively and claim it can be effectively used in school. Among teachers who do not use technology, only thirty-eight percent find pedagogical value. Interestingly, Bransford et al. (2000) also noted that only a very small percentage of teachers prefer to interact with a computer in their free time.

Bransford et al. (2000) states the roles of technology is in five ways: being able to bring the real-world experiences into the classroom, providing scaffolding that allows learners to participate in complex cognitive tasks, increasing opportunities to receive sophisticated and individualised feedback, building communities of interaction between teachers, students, parents, and other interested and expanding opportunities for teacher development. Yaverbaum, Kulkarni, and Wood (1997) added that the impacts of technology on students' achievement are: mastering fundamental skills, becoming proficient users of technology, preparing students with 21st century skills, and motivating students to higher level of achievement. From above statement, we can see how important the roles and contribution of technology in term of teaching and learning process.

According to Albirini (2006) integrating multimedia with the traditional learning environment not only enriches the styles of presentation, but also has the advantage of increasing language retention. Learners have to have the right disposition and attitudes towards the use of e-learning or any online sources. However, research has found that the use of technology in language instruction appealing to students as they are digital natives. Because technology use reduces teacher-centeredness, it is capable of reducing student language learning anxiety as it gives them the chance to practice language comfortably without being embarrassed of making mistakes, which would reduce their "affective filter" (Motteram, 2013). The use of technology in language learning to read second language can improve the learning enthusiasm of students and enhance the learning of students. Research shows that the learning enthusiasm and attitude of learners appear to be better if they have influence over their learning (Patel, 2014).

According to Carr (2011) the technology integration in second language learning is learning flexibility. Technology provides even more flexibility which accommodates students' with different learning styles and needs. Technology can be used in isolated ways or alongside textbooks for a far more in-depth learning experience. Students can learn anywhere. Teachers can also track and evaluate the work of students, not just when they are in the classroom, but also outside the classroom.

Chirimbu et al. (2013) suggested that by integrating technology into language teaching, students can choose the order in which material is presented to them. The learning material introduced to them can also be tracked by students and the learning speed can also be controlled. Integration of technology in the classroom will improve students' learning involvement and learning motivation, strengthen their attitudes towards learning, promote communication, reduce anxiety, promote oral communication, provide opportunities for meaningful interaction, and develop various language skills. Students can also extend their international perspectives, learn different kinds of data, understand and accept different cultures, increase genuine input, learn how to display, manipulate, alter, store and retrieve information. Finally, integrating technology into language teaching enables students to have authentic language learning experiences (Dale, 2014). Instructions on how to use technology are normally provided in the target language, which aids in the development of vocabulary, comprehension, spelling, and even pronunciation. As a result, it would be a wonderful opportunity for teachers to strategically use them in their language classrooms to develop students' language skills and have more authentic resources (Wilkinson, Renandya, & Widodo, 2016).

Warschauer (2000) states that the use of technology in teaching English as a second language empowers students' creativity. Thus the development of technology and the availability of different educational resources, such as the data show, online educational sites, forums, social media, books, articles, etc., provided students with the ability to innovate and excel, develop self-abilities, and seek educational resources. The use of word processing programs in writing, which gives the learner the freedom to process text such as immediate correction, spelling, and the possibility of editing words, and control the paragraphs and the leading between the lines and the number of lines in the paper. All of these improves the student's performance in expression and construction, and makes it more accurate in spelling, writing and language and it feels interesting. Learner can repeat the attempt again and again without exceeding the time of others, and without fear or shame of slow or wrong (Stockwell, 2007). Cooper (2010) reported that there are computer programs in language labs that allow the learner to recognise sounds and then practice the pronunciation and toning through special exercises of listening and repetition using digital speech technology, where the pronunciation is heard through the microphone and convert the sound to a digital format and stored. In the process of training, toning allows the learner to say a phrase through the microphone and the computer draws a diagram of them and compare them with a diagram stored for this phrase and the learner sees the difference between the two schemes.

Hennessey (2005) noted the introduction of ICTs could act as a catalyst in stimulating teachers and pupils to work in new ways. Teacher-pupil and peer discussion, exploration, analysis and reflection, probing, assistance, and feedback characterise these. Hennessey noted that as students become more autonomous, teachers feel that they should encourage and support pupils in acting and thinking independently.

Warschauer (2000) described that the cognitive learners get the opportunity to maximise their exposure to language in a meaningful context and construct their own individual knowledge. Examples of these types of technologies include text-reconstruction software and multimedia simulation software. Multimedia simulation software allows learners to enter into computerised micro worlds with exposure to language and culture in a meaningful audio-visual context. The best of these programs allows learners a good deal of control and interactivity so they can better manipulate their linguistic input.

Zhao (2013) stated that pronunciation is a fundamental element of second language learning. However providing useful feedback is difficult. In traditional instructional settings, an instructor, who may or may not be good at judging the student pronunciation in the first place, often provides feedback and modeling. Typical ways to provide feedback include having students repeat the pronunciation or explaining how the sound should be produced in an abstract fashion. With the advancement of speech recognition technology, the student can receive feedback in more effective and efficient ways. It has been noted that interactive materials in the classrooms have followed the trend of instructional support. Eaton (2010) found that computer-based communication is a beneficial feature for language learning. Computer-assisted discussions tend to feature more equal participation than face to-face discussion. Teachers or a few outspoken students are less likely to dominate the floor, resulting in class discussions that are more collaborative. Zhao (2013) supported this view by stating that access and exposure to engaging, authentic, and comprehensible yet demanding materials in the target language is essential for successful language learning.

Yüzlü and Derin (2020) examined the impact of the use of L1 on learners' L2 reading skills as well as their perceptions of L1 use in fostering oral production in L2. Qing (2011) stated that role play is a very valuable method to help learners to interact and provide them an opportunity to practice in the target language context. The researcher further suggested that the application of technologies increase student's intercultural awareness and to help them develop overall communicative competence. Aliakbari and Jamalvandi (2010) stated that role play is a praised technique in task-based language teaching which has a positive effect on students' reading skills. Besides, utilising technology in teaching methods is a fundamental practice in teaching second language, where it is available and accessible. Suggestions to incorporate the use of technology in teaching reading have been stated. The use of CMC (computer-mediated communication) in teaching pronunciation and conversation is put forward to improve students' oral skills (Hong, 2006). McDougald (2009) also revealed that ICT is definitely a complement to conventional teaching, especially when developing reading, writing and listening skills in English. The use of technology in teaching reading is one of the changes in how languages are taught in school which focuses on the use of language communication rather than just passing the examination (Thao, 2003). Besides, Bahadorfar and Omidvar (2014) also stated that technological tools like the internet, podcasts, video conferencing, videos, and speech recognition software are considered the best tools for teaching reading skills and using such tools have been regarded as ways of helping students improve language skills.

Moreover, Huang and Hung (2010) also state that an e-portfolio is a technology that allows students to have lexical richness in reading in which learners benefit from their oral performances. Using such technology in teaching reading is immensely acceptable by students. Similarly, the internet, podcasts, video conferencing, videos

and speech recognition software, and blogging are considered to be some of the best tools for teaching reading skills (Parveen, 2016). Using these technologies has become the mode of communication of instructors and students for the present day which implies that technology is needed to get into the modernised world. Technology has become an additional tool for teaching in enhancing their students' reading competence. The utilisation of technology in teaching reading has become an essential practice particularly in teaching English as a foreign language (Hong, 2006).

Computer-mediated communication in teaching pronunciation and conversation was initially focused to improve students' oral performance. Speech laboratory was also of great importance in teaching reading and speech articulation along with many technological tools of today (Margret, 2010). It was suggested that, video applications for conferencing are also considered an essential computer-mediated communication tool in promoting reading fluency and accuracy. It caters to social interaction purposes and it serves as oral reinforcement of language fluency, accuracy and course contents outside of classroom settings (Romaña Correa, 2015). In like manner, digital storytelling is one powerful technology tool for teaching reading. It integrates computer technologies and the art of storytelling in which graphic designs such as texts, images, and audio are combined making it into a creative media of storytelling. Moreover, digital storytelling in the classroom has enhanced and developed students in English reading skills for it allows students to story-tell using their own words and voice (Somdee & Suppasetserree, 2013).

Cartoons on television and other digital platforms also enhance students' reading skill. Cartoons provide audio and visuals, to attract attention, therefore, develop students' motivation towards the learning of reading (Fata & Wahyuni, 2016). Also, using

Information Communication Technology (ICT) enhances reading skill, motivation and oral performances (Idayani & Sailun, 2017). It has a huge and significant impact on students learning effectiveness in which students claim to have their reading ability, knowledge and creativity enhanced. The use of multimedia as learning material as one of the ICT technologies was recorded as significantly effective in honing student's ability to speak in English (Ampa et al., 2013). Video blogging is effective as it promotes students' learning motivation (Rakhmanina, 2017).

Further, Akkara et al. (2020) stated that, there is a significant difference in the reading ability of students when taught reading using technology such as WhatsApp interaction. Using technology in teaching reading with the experimental group has a larger significance in English fluency compared to the other group taught to speak in English using the traditional method. In addition, Rodrigues and Vethamani (2015) observed that online learning environments can reduce learners' anxiety levels by providing a less threatening and more flexible platform for practice. Their study revealed that students who engaged in technology-mediated speaking tasks demonstrated greater self-confidence and improved language proficiency compared to those in traditional classroom settings. While their research was centred on speaking skills, the findings highlight a broader implication: technology, when integrated into language instruction, creates opportunities for learners to engage with content at their own pace, receive timely feedback, and build confidence in using the target language. By extension, similar benefits can be expected when technology is applied to reading instruction, as the same features personalisation, immediate feedback, and accessible resources can enhance learners' reading proficiency while also fostering a stronger sense of self-efficacy. Goh (2016) stated that technology in teaching reading develops language fluency, accuracy and complexity. As well, Akkara et al. (2020) stated that

using technology in teaching reading improves students' reading fluency and coherence, lexical resource, grammatical range and accuracy and pronunciation. Moreover, technology in teaching reading improves students' reading skills and employing such has a positive impact on learners reading skills, fluency, and pronunciation. It also overcomes students' reading difficulty (Hamad et al., 2019).

The digital technologies are powerful educational tools; and their use has a significant role in the transfiguration of the pedagogy of teaching and learning (Ludvigsen & Morch, 2010). Angeli et al. (2015) are of the view that, a good combination of technology and pedagogy is very important to ensure that the learners are able to take advantage of technology inclusion for the opportunities of learning integrated skills of language. According to Davis (2012), the incorporation of the technologies into English classroom can help achieve: cognitive gain by providing visual images, motivational gain by providing fun, and interactional gain by providing convenience sharing.

ICTs provide opportunities for exploring the communicative power of the English learner by engaging them in exploring literary texts and several other interactive activities in exciting ways (Richards, 2007). Likewise, computer-based activities enhance interaction and collaboration and provide unique opportunities for the development of the learners' spoken and written language capabilities (Andrew, 2007). A variety of technology-enhanced gadgets can create an interactive learning environment to develop learners' autonomy and meaningful learning, which provides a huge amount of exposure to language (Acevedo, 2016).

Genç İlter (2015) investigated perceptions of both language teacher candidates and young learners about the use of technology in the language teaching and learning

process. Twelve (12) language teachers and ten (10) young learners took part in her study. Data were gathered through two structured questionnaires. Results revealed that according to the teachers, the use of technology increased students' both language and cultural awareness and affected them positively since English language classes were more enjoyable and took their interest easily. On the other hand, students preferred playing games and communication with their teachers in the classroom. In other words, they preferred using technology not in the classroom but outside in order to complete their homework. This study suggests that teachers should plan their classes and activities based on the students' needs, age and interests. Similarly Chen and Kent (2020) conducted a study with students learning English as a second language in an English Support Program of the public research university in Australia. They aimed to find out whether 3D virtual learning had an effect on students' productive skills and their language learning motivation. Findings demonstrated that this type of learning made the students more motivated and it provided much more opportunities to develop their written and spoken language skills.

Gill (2006) investigated the use of technology in the foreign language classrooms and its impacts on second language learning (Spanish). In this study, a language attitude questionnaire was administered to two groups (Technology-Enhanced Syllabus class and Non-technology enhanced syllabus classes) as a pre-test and post-test before the term started and after the term ended in order to reveal students' language learning motivation and particularly their writing motivation in the second language. The results indicated that technology develops both receptive and productive language skills of learners and creates opportunity to think critically.

Cutter also explains the increase in engagement of technology, students are motivated more while they are working on computers and use modern devices than they are working with textbooks (Cutter, 2015). The use of new-generation technology gives students a natural context for learner autonomy, context for the identity of learner, new ways of language use, and motivation for students to create new collaborative and interaction opportunities between teachers and students under these forms (Murray, 2005). Technology plays an important role in promoting learners' activities and has a substantial impact on teaching methods. If teachers do not integrate technology into their teaching, they risk falling behind in the fast-paced digital age. Therefore, it is essential for teachers to develop comprehensive expertise in applying technology to the teaching of language skills (Pourhosein Gilakjani, 2017; Solanki & Shyamlee, 2012).

The use of film in education helps students to understand and develop their knowledge with enthusiasm. Students can use technology in their learning processes via computer and the internet to learn effectively. It helps students develop their higher level of thinking skills when they are learning with technology. In conclusion, it is very important to draw the attention of learners to English languages, the true combination of the multimedia and teaching methodology (Arifah, 2014). However, technology is not enough to teach reading of second language alone. It needs a teacher with clear targets, who knows the curriculum and effective education strategies and can provide children with learning experiences to increase and encounter with previous knowledge (Schwartz & Pollishuke, 2013).

According to Borysiuk (2013) technologies that are used in teaching benefits the learners to; increased interest in and overall motivation for education;

individualisation of education; objectivity of control; activation of education through the use of attractive and rapidly changing forms of information presentation; formation abilities and skills for the creative activities; training of information culture; mastering the skills of operational decision-making in a complex situation; students' access to databases of information that enable them to quickly obtain information; intensification of self-student work; increase in the volume of completed tasks; increased motivation and cognitive activity due to the diversity of exercises, including the possibility of game time; online education offer new opportunities for more active involvement of students in the educational process; it helps build necessary skills for the future; it saves precious resources and it instantly updates information. Gaille (2018) also supported that technologies offers other educational advantages such as: 1) increased credibility for the teacher, 2) instant access to numerous resources, 3) the automation of dull material, 4) the creation of a collaborative learning approach, 5) teaching core vocational skills with more ease, 6) the modernisation of classrooms, 7) the centralisation of needed data, 8) enabling students to work at their own pace, 9) the opportunity to learn in different ways, 10) increased motivation of them, 11) and affordability (Gaille, 2018).

2.4.3 Challenges associated with the use of technology in teaching reading of L2

According to Ertmer et al. (2012) there are numerous reasons a teacher might shy away from new technology in the classroom, but once teachers decide to further incorporate technology into lesson plans, they must first choose what technologies to use. There are thousands of internet technologies, tutoring systems and learning environments for teachers to choose from, so deciding which ones will enhance the student learning experience and align with curricula is a daunting task. Even if teachers find a technology they believe will help their students, it is not always clear if

these programs are actually effective. Many technologies claim to improve the academic and cognitive abilities of students, but claims can be false and are often only created as advertisement. Having to verify the truthfulness of these claims is an additional burden placed on the educator, who may not have time to search for classroom technologies in the first place.

Wellinsky (2005) sought to examine pre-service teachers' attitudes toward the teachers' role in classrooms with technology. Seventy-eight pre-service teachers were surveyed at a postsecondary school in Guam. When these teachers were placed in a classroom without technology, they perceived their role as teacher-centered. However, when placed in a classroom with technology, they perceived their role as neither teacher-centered nor student-centered. Therefore, Wellinsky concluded that technology affected teachers' perception of a teachers' role in the classroom.

Cleaver (2014) suggested that browsing online teacher forums makes it clear that implementing new technologies into lesson plans can be a difficult task. Perhaps the most common reason mentioned by teachers for not actively integrating new technologies is that many teachers are satisfied with their current lesson plans. When adopting new classroom technologies, educators face the problem known online as the "double innovation" problem. Double innovation essentially adds an additional layer of preparation teachers must work through. The teacher must first learn the technology well enough to utilise it in a classroom setting before deciding how to integrate the technology with classroom objectives and curriculum. While educational technologies are becoming easier to learn, the double innovation problem still results in additional preparation time. Data collected from teacher interviews conducted by Ertmer et al. (2012) shows that time as being the most influential barrier to integrating

new classroom technologies. A teacher's time is extremely valuable, and it should come as no surprise that time is one of the most commonly cited barriers to integrating new technologies in the classroom.

Lai et al. (2006) stated suggested that before using emerging technology in language teaching and learning, it is important that both teachers and students have basic technical skills. If the teachers or students have ideas on how to use the technology tools, they will have a lot of problems during the process. Although there are various resources available on the internet, some teachers can find it challenging to incorporate them into the language curriculum. Otherwise, Patel (2014) opine that technologies integration may be a waste of time if the learning experiences are not based on the language curriculum. Furthermore, in many cases, students were more concerned with the technological tools rather than with the learning materials.

Hughes (2005) suggests that even if there were abundance of available educational technology, it is essential that teachers feel comfortable and confident about their ability to use them effectively. Many current teachers grew up without access to technologies like the personal computer and the internet, but students today are raised in an environment saturated by computer technology. These "digital natives" can intimidate teachers, especially teachers with little technological experience. If teachers feel they do not have the necessary competencies when using technology, they may feel less in control of the class, use less technology, and be unlikely to explore new possibilities that utilise technology when designing their classes (Hughes, 2005; Rakes & Casey, 2002). Rakes and Casey (2002) concluded that these resulted by sticking to traditional teaching methods; teachers who are less fluent with

technology maintain a feeling of control in the classroom and will not have to prepare to face the challenges of instructing digital natives in a digital environment.

Romano (2003) found clearly that access to technology does not improve learning unless teachers are empowered to adopt technology as an educational tool. Baylor and Ritchie (2002) also argue that technology would remain unused if faculty members do not develop the appropriate skills, knowledge and attitude for incorporating it into the curriculum.

Fang and Warschauer (2004) reported that traditional teachers were afraid of authority loss. Some scholars agreed that context could be a big barrier to deterring teachers from adopting the use of technology (Becta 2004). Teachers' lack of confidence was rooted in their fear of failure or lack of technology knowledge, which made them feel anxious (Balanskat et al. 2006). Becta (2004) study, reported that they felt frightened to use technology in the classroom if they could not trust their knowledge. Ismail, Almekhlafi and Almeqdadi (2010) reported teachers' lack of time for preparation and technology implementation as the most important barriers.

Similarly, ChanLin et al. (2006) reported that the integration of technology in their classes required much more time and effort compared to regular classes which do not use technology. Borysiuk (2013) opines that technology may present problems for the preparation and delivery of classes. It can be a distraction, provide inappropriate access, and offer false information, make cheating easier, be expensive to maintain, and hinder basic. Galle states that, it may be distracting to students, it may disconnect students from face-to-face relationships, it may make cheating easier, it may disadvantage certain students, it may cause students to use unreliable resources for learning, it may make curriculum planning more difficult or expensive, it may

replace the teacher, it may create privacy issues, it may create medical issues, it may cause children to lose track of time, it is often limited, and it may create dependence (Gaille, 2018).

In another recent study, Izquierdo et al. (2017) examined high school English as second language teachers' perceptions of technology and the factors that might influence their use of technology in public high schools in Mexico. The results of this study showed that teachers used multimedia resources such as mobile testing to complement traditional classroom materials, and laptops for instant messaging and networking. However, these resources were only employed to complement students' work at home. This was due to the lack of Internet connection at the schools, which resulted in teachers' limited use of computer technology in the classroom.

Another interesting finding was the remarkable divide between the younger and older teachers. This study found that the younger teachers had personal laptops, portable speakers, or tablets in order to use media files in their lessons; however, the older teachers were observed using CD players only. The study concluded that teachers' behavior toward technology in the L2 classroom was mostly negative, "because of the regulations and limited access to the facilities, technical support, time investment, and training" (Izquierdo et al., 2017, p. 41). The overall results of this study coincide with the previously discussed studies in that L2 instructors' negative attitudes toward the use of technology and/or the lack of resources, administrative support, and adequate training can affect the use of technology in high school English as a second language classes.

Nagel (2019) reported on a more recent study on newer-tech based teaching practices that was based on surveys collected from 33,000 educators around the world, as well

as over 400,000 K-12 student parents from over 10,000 schools and 3,300 districts, for a period of four months, from October 2017 to January 2018. The results from this study showed that 78% of the participating teachers were still not comfortable facilitating student collaboration with digital devices, and that the number one factor for not using technology in the classroom was the lack of training and support for the application of new technologies. However, Nagel also pointed out that many districts were already trying to respond to these challenges by providing the kind of training needed. Nevertheless, the investigator also suggested that lack of time, money, and manpower sometimes hindered the provision of training or it made it very difficult, if not impossible, to achieve. Even though this study provided valuable, up-to-date information on instructors' use of technology, it was not focused specifically on the L2 Spanish classroom.

In a case study conducted by Celik et al. (2014) involving the participation of six teachers of English as a second language elementary and high school Turkish teachers. The study focused on instructors' perceptions concerning their own knowledge, confidence, and competency, and how they affected the way in which technology was implemented in their classrooms. The results showed the participants felt competent about their level of digital literacy and knowledge. However, they did not widely use technology because they felt they lacked resources and access to computers and Internet connections, even though they strongly believed in the need for technology in the L2 classroom. The researchers concluded that the participants' lack of integration of technology in the classroom was based on institutional, rather than personal factors. This study provided us with valuable information regarding high school teachers' use of technology in the classroom; however, it was limited by its small number of participants in a very specific setting. Another important flaw was

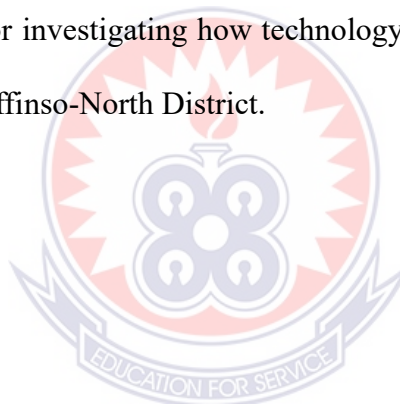
the absence of information about how technology was incorporated into the curriculum. According to Pearson (2015), infrastructure can affect Wi-Fi connection and limit internet access to technology devices. Especially, in rural schools and older building without proper power voltage to support multiple tech devices.

2.5 Connection between Reviewed Works and the Present Study

In reviewing the empirical studies it was clearly noted that in the context of this study, Assaf et al. (2020) argued that electronic collocation-based instructional program and other technology affordances when integrated into the language classroom is a useful tool for improving L2 reading comprehension and therefore makes a case for the full integration of technology into language learning to enhance reading comprehension. Additionally, Hennessy (2005) noted that the integration of ICT and its tools act as a catalyst in stimulating teachers and pupils to work in new ways. The effective integration of technology affords the learner numerous benefits. Technology in teaching reading improves students' reading skills and integrating it has a positive impact on learners' reading skills, fluency, and pronunciation, as well as increase learners' engagement, motivation to (Akkara et al., 2020; Goh, 2016; Hamad et al., 2019). Notwithstanding the numerous benefits as identified in the studies some challenges that have been researched by scholars were also reviewed which has connection to this present study. The study of Celik et al. (2014) reported that teachers shy away from the use technology because they felt they lacked resources and access to computers and internet connections, even though they strongly believed in the need for technology in the L2 classroom.

2.6 Chapter Summary

Chapter Two outlined the study's conceptual and theoretical foundations, focusing on the role of technology in teaching reading in English. It was guided by Mayer's Cognitive Theory of Multimedia Learning and Schema Theory, which explain how learners process information and use prior knowledge to comprehend texts. The chapter reviewed key concepts like reading comprehension and technology integration, showing how digital tools can enhance vocabulary, fluency, and engagement. Additionally empirical review of key variables such as technology integration, benefits and challenges associated with its integration as well as the connections between the reviewed literature and the present study. This chapter established the basis for investigating how technology supports reading instruction in selected SHSs in the Offinso-North District.



CHAPTER THREE

METHODOLOGY

3.0 Overview

This chapter primarily focuses on how the study was conducted in order to achieve its purpose. The chapter discusses the study area, philosophical paradigm, research approach, research design, and population of the study, sample and sampling techniques as well as data collection instruments. The chapter further delves into the validity and reliability of instrument, procedure for data collection, trustworthiness, data analysis, ethical considerations, and limitation of the study.

3.1 Philosophical Paradigm

The study was conducted within the context of the pragmatic philosophical paradigm. The choice of the pragmatic philosophical paradigm for this study is justified by the complex and practical nature of the research problem. Pragmatism, as defined by Creswell (2014), emphasizes the importance of focusing on the problem being studied and using all available approaches to understand it. Pragmatic researchers are more concerned with the "what" and "how" of research, seeking solutions that work in a settings. This makes pragmatism particularly relevant for educational research where classroom practices, teacher experiences, and contextual challenges must be understood in a comprehensive manner. In this study, which explores the integration of technology in teaching reading in English in Ghanaian senior high schools, the pragmatic paradigm supports the use of an exploratory sequential mixed methods design to gather rich qualitative insights and validate them quantitatively. As Guba and Lincoln (1994) also assert, paradigms guide researchers' actions and belief systems. By drawing from both qualitative and quantitative traditions, the pragmatic

worldview enables a broader understanding of the benefits and challenges teachers face in technology integration. It also supports the development of context-specific, practical recommendations to enhance reading instruction. This philosophical stance therefore aligns with the study's aim to generate actionable findings that can inform teacher practice, training, and policy formulation.

3.2 Research Approach

The approach adopted for this study was the mixed methods approach. Creswell (2014) postulated that research approaches are plans and the procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis and interpretation. Mixed-method research approach involves the collection and “mixing” or integration of both quantitative and qualitative data in a study (Creswell, 2014). Thus, the mixed methods approach in research entails gathering, analysing and fusing both quantitative and qualitative data from respondents or participants for an in-depth investigation into a phenomenon. Therefore, considering the nature of the issue under study, that is, technology utilisation in teaching reading in English as a second language, it was needful employing mixed- methods to get in-depth understanding and appreciation of the phenomenon.

3.3 Research Design

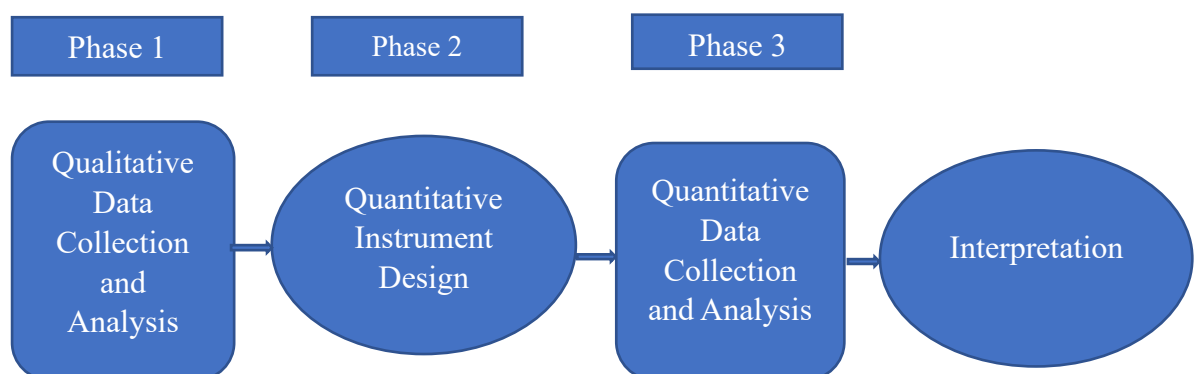
The study adopted the exploratory sequential design. Burns and Grove (2017) opined that a research design is the overall plan for obtaining answers to research questions. Similarly, Adzahlie-Mensah, Agordah and Gyamfuaa-Abrefa (2017) also posited that research design refers to the overall strategy that a researcher chooses to integrate the different components of the study in a coherent and logical way thereby ensuring the researcher will effectively address the research problem. They further stated that

research design constitutes the blueprint for the collection, measurement and analysis of data. According to Creswell and Creswell (2023) exploratory sequential mixed methods design is a three-phase exploratory design of which the results of the qualitative phase are built into the quantitative data (Creswell & Creswell, 2023). They further asserted that the basic rationale of the exploratory sequential mixed methods design is to explore the extent to which the qualitative data can improve quantitative measures, scales, or instruments.

In this three-phase design the researcher begins with the qualitative phase (Qualitative Data Collection and Analysis), followed by a design phase for modifying a quantitative assessment (Quantitative Instrument Design), and then by a quantitative phase for testing the newly designed quantitative feature (Quantitative Data Collection and Analysis) (Creswell & Creswell, 2023).

The final stage in this design is where the researcher conducts an integrative data analysis by first of all analysing the two databases distinctly and using the findings from the initial exploratory database to build into a feature for quantitative analysis and interpretation of both analysed results.

Figure 2: Three-phase exploratory sequential mixed methods design



(Gogo & Musonda, 2022).

This design has been adopted to allow for a comprehensive understanding of the research problem by integrating qualitative and quantitative data. By conducting a qualitative phase first, the researcher can gain in-depth insights into the phenomenon of technology utilisation in teaching reading in English as a second language. This qualitative data can then inform the development of quantitative measures for further investigation. Moreover, the sequential exploratory mixed methods design facilitates the triangulation of data, which strengthens the overall validity and reliability of the study. By combining qualitative and quantitative data, the researcher can compare and contrast, and draw conclusion from the findings in both phases of the research.

3.4 Study Area

The selection of a study area is a critical component in the design and execution of any research project. This decision profoundly impacts the relevance, applicability, and overall success of the study. The Offinso-North District was purposefully selected for this study due to its mix of rural and peri-urban educational settings, which reflect the broader challenges faced in integrating technology in second language instruction across similar contexts in Ghana. The district's limited access to educational technology, varying levels of teacher digital literacy make it a suitable location for investigating both the potential and constraints of using technology in teaching reading in English. The four senior high schools were chosen based on their accessibility, willingness to participate, and representation of different resource levels allowing for a more balanced and comprehensive understanding of the phenomenon under investigation (Yankson et al. 2017).

Offinso North District is one of the 261 Metropolitan, Municipal and District Assemblies (MMDAs) in Ghana, and forms part of the 43 of MMDAs in the Ashanti

Region and has its administrative capital as Akomadan. Offinso-North District was established by Legislative Instrument (L.I.) 1909 of 2007. It was carved out of the then Offinso Municipal and split into Offinso Municipal and the Offinso North District. The population of Offinso North District, according to the 2010 Population and Housing Census, is 56,881 representing 1.2 percent of the region's total population. Males constitute 49.8 percent and females represent 50.2 percent. Fifty nine percent of the population is rural. The District has a sex ratio of 99. The population of the District is youthful (44.0%) depicting a broad base population pyramid which tapers off with a small number of elderly persons (3.9%). The total age dependency ratio for the District is 92.5, the age dependency ratio for males is higher (97.4) than that of females (87.9).

Of the population 11 years and above, 61.6 percent are literate and 38.4 percent are non-literate. The proportion of literate males is higher (53.6 %) than that of females (46.4%). A little over six out of ten people (64.3%) indicated they could speak and write both English and Ghanaian languages. With reference to school attendance, of the population aged 3 years and above (20, 257) in the District, 34.1 percent has never attended school, 39.6 percent are currently attending and 26.3 percent have attended in the past (Ghana Statistical Service 2013). The study was conducted in 4 Senior High Schools namely: Akomadan Senior High School, Wiafe Akenten Senior High, Nkenkaasu Senior High and Asuoso Senior High, all in the Offinso North District.

3.5 Population of the Study

The target population of the study comprised of all Senior High School teachers who teach English language within the Offinso North District. The district has a total of 64 English teachers. The accessible population comprised of all 64 teachers; Akomadan

Senior High teachers (32), Nkenkaasu Senior High teachers (18), Wiafe Akenten Senior High teachers (7), and Asuoso Senior High teachers (7)

3.6 Sample and Sampling Techniques

In mixed-methods research, the determination of sample size is guided by the distinct purposes of the qualitative and quantitative strands, but must also be strategically aligned to support integration of findings (Creswell & Plano Clark, 2018; Tashakkori & Teddlie, 2010). For this study, the qualitative phase emphasized depth of understanding while the quantitative phase emphasized representativeness and generalizability. Accordingly, the researcher employed different sampling strategies for each phase, with the overall design ensuring complementarity between the two approaches.

For the qualitative phase, the central consideration was not statistical adequacy but the attainment of a satiated point of sufficiency. This refers to the stage in data collection where the information gathered adequately answers the research questions and provides comprehensive insights, such that further interviews would add little or no new value. Unlike saturation, which is often framed as the absence of new themes, the notion of satiation reflects the researcher's judgment that the data collected are sufficiently rich, diverse, and detailed to satisfy the study's interpretive aims. To achieve this, the researcher used purposeful sampling, a strategy designed to select participants who possess relevant knowledge, expertise, or experience related to the phenomenon under investigation. As Patton (2002) notes, purposeful sampling allows the deliberate identification of "information-rich cases" that maximize the potential for learning. Guided by this principle, twelve (12) English language teachers were interviewed from the four senior high school, Akumadan, Wiafe Akenten Presby,

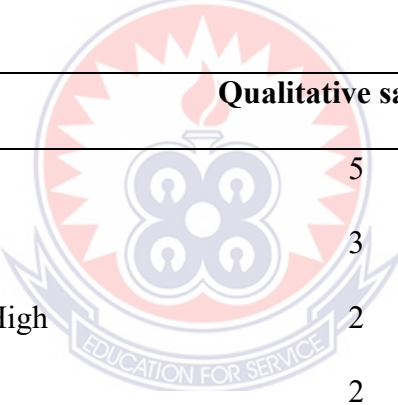
Nkenkaasu and Asuoso Community Day Senior High Schools. Their responses provided the necessary variety and depth to address the qualitative research objectives. At the point where the data sufficiently captured recurring insights and no major gaps remained in understanding, the sample was considered satiated. This ensured that the qualitative strand provided a nuanced and balanced account of the research problem, suitable for complementing the quantitative findings.

For the quantitative phase, however, the logic of sampling was different. Since the goal was to capture the full range of perspectives from the population of interest, the researcher adopted a census sampling technique. Census sampling entails including all individuals within the defined population, rather than a subset, thereby reducing sampling error and maximizing accuracy (Kish, 1965). In this study, the entire population of sixty-four (64) English language teachers across the four senior high schools in the Offinso-North District, Akumadan, Wiafe Akenten Presby, Nkenkaasu and Asuoso Community Day Senior High Schools was surveyed. This approach ensured that the quantitative results reflected the views of all relevant stakeholders, leaving no room for omission or bias in representativeness.

The combination of these two approaches illustrates the strength of the mixed-methods design. The qualitative phase, by relying on purposeful sampling and stopping at a satiated point, provided rich, interpretive insights into the lived experiences and perspectives of teachers. The quantitative phase, through census sampling, captured the broader patterns and trends across the whole population. When brought together, these strands offered both depth and breadth of understanding, addressing the research problem comprehensively. As Creswell and Plano Clark (2018) argue, the integration of qualitative depth with quantitative generalizability

enhances the overall validity and robustness of mixed-methods studies. Similarly, Tashakkori and Teddlie (2010) emphasize that the value of mixed methods lies in the way different sampling logics can be combined to answer complex research questions more fully than either approach alone.

By adopting a purposeful, satiation-driven strategy for the qualitative phase and a census approach for the quantitative phase, the present study ensured methodological rigor, comprehensive coverage, and strong integration between strands. This alignment between sampling strategies across phases enhances the credibility of the findings and underscores the appropriateness of a mixed-methods approach for the study. The table below provided the summary of the sample size.



Unit of Sampling	Qualitative sample	Quantitative sample
Akomadan Senior High	5	32
Nkenkaasu Senior High	3	18
Wiafe Akenten Senior High	2	7
Asuoso Senior High	2	7
Total	12	64

3.7 Data Collection Procedure

The researcher began the study by visiting the schools involved for informal observation familiarity. This was facilitated by the use of an introductory letter from the Department of English Language Education to seek consent from the head of the schools. The data for the study was gathered within a period of thirteen weeks for both phases with multiple visits to the schools. The initial stage of the exploratory sequential mixed methods design interviewed twelve English language teachers purposefully sampled from Akumadan Senior High School (AKUSS), Nkenkaasu

Senior High School (NKSHS), Asuoso Senior High School (ASSHS) and Wiafe Akenten Presby Senior High School (WAPSHS). To ensure confidentiality and anonymity, each teacher was assigned a code name ranging from Participating Teacher one to twelve (PT 1 - 12) attached to the initials of their respective schools, as in AKUSS PT1,2,3 or 4, NKSHS PT1,2,3, ASSHS PT1,2,3 and WAPSHS PT1,2,3 in order of their interview sessions in their schools. These codes were used throughout the analysis and reporting of the interview data. The face-to-face interviews were done in a very quiet environment to avoid noise or any form of disturbance that may interfere in the recording of data. Each interview lasted between 18 to 27 minutes. This was done single-handedly by the researcher. Fraenkel et al. (2012) has identified certain data collection methods with regards to qualitative researches which include: interview transcripts, field notes, photographs, audio recordings, videotapes, diaries, personal comments, memos, official records, textbook pages, and anything else that can convey the actual words or actions of people. In the entire phase of my data collection, the researcher used interview transcripts, field notes and audio recordings. The insights gathered from these interviews informed the development of the questionnaire used in the subsequent quantitative phase.

The second phase of this study was conducted by distributing questionnaires to schools within the framework of an exploratory sequential mixed method research design. Initially, the study utilised purposive sampling to interview twelve English language teachers, aiming to gather qualitative insights into their experiences and practices regarding technology use in teaching reading. Following the thematic analysis of these interviews, the study proceeded to the quantitative phase, employing a census sampling technique to involve sixty-four respondents. These respondents completed detailed questionnaires designed to quantify the initial qualitative findings.

This mixed methods approach allowed for a comprehensive understanding of the research problem by integrating qualitative and quantitative data (Creswell & Plano Clark, 2018). Specifically, the exploratory sequential design ensured that the qualitative data gathered in the first phase informed the development of the quantitative instruments used in the second phase, thereby enhancing the reliability and validity of the findings.

3.8 Data Collection Instruments

In this study, interview and questionnaire were used for data collection sequentially.

3.8.1 Interview guide

The researcher in this current study employed semi-structured interviews to gather data in the qualitative phase of the research. This instrument was guided by open-ended questions as well as probes that will bring out an in-depth perspective views of the participants on the topic of study (Creswell, 2012). The interview guide became the blueprint for the interviews which enabled a cordial conversation between the interviewer and the interviewee that elicited flexible responses and an in-depth perspective of the participants (Creswell, 2014). The semi-structured interview guide contained questions that explore teacher's use of technology in enhancing the teaching of reading in English as a second language in the Offinso-North District through to the associated benefits and challenges. The interview guide had a total of twelve (12) questions. (Appendix B, page 127).

3.8.2 Questionnaire

The structured questionnaire with fourteen closed-ended items were divided into four sections. Section A dealt with English Language teachers' use of technology in the teaching of reading in English as a second language. Section B, sought to find out

from teachers the benefit associated with the use of technology in the teaching of reading in English as a second language. Furthermore, section C explored the challenges that comes with the use of technology in teaching of reading in English as a second language. Finally, section D enquired if the demographic characteristics of the respondents including their age, gender and educational level.

3.9 Validity and Reliability

Patton (2002) defines a valid instrument as one that properly measures what it is supposed to measure and fulfils the objective for which it was developed. The trustworthiness of the data from the interviews was strengthened by thorough piloting of the interview guides after peer and supervisor review. The interview guide was piloted with three participants from Offinso Municipality. The piloting allowed the researcher to ensure that all questions and instructions were clear, and that items that did not provide useful data were removed. It also allowed the researcher to ensure that the interview method was sufficiently open and inviting to elicit rich responses. Further, piloting the interview guide enabled the researcher to restructure the questions by adjusting to the verbal styles of the participants as suggested by Lindlof and Taylor (2002). After piloting the interview guide, the main qualitative data was collected and transcribed.

In the quest to find out how reliable the questionnaire items were, a pre-test reliability mission was undertaken by piloting the questionnaire to 15 teachers in Offinso Municipality. The reliability analysis was employed to check if items are internally consistent (Kuranchie, 2008). Offinso Municipality was selected for the pilot study because of its similar characteristics and proximity to the Offinso North District. Using the SPSS version 20 programme, a Cronbach Alpha internal reliability score

was calculated based on the number of questionnaire questions administered. (Ritter, 2010). This view of internal consistency supports Creswell's (2008) contention that for consistency to exist, the alpha must be greater than 0.70. The quantitative phase of field data gathering began following the second pilot exercise.

3.10 Dependability

Dependability is an assessment of the quality of the integrated processes of data collection, data analysis and theory generation (Lincoln & Guba, 2016). Berg and Lune (2014) states that dependability within qualitative research indicates the extent to which a researcher would be convinced that the findings occurred as proposed. The researcher achieved this by providing rich, detailed descriptions of the process of data collection to the participants during the data collection process. Further, the researcher ensured that the process of data collection, the analysis and reporting of the findings were described in as much detail as possible.

3.11 Confirmability

Another aspect used to ensure that the research study was worthy, was that of Confirmability. Berg (2014) explains that Confirmability looks at the degree to which the results of one study could be confirmed and corroborated by other researchers. Confirmability is further explained as a measure of how well the findings are supported by the data collected (Lincoln & Guba, 2016). To ensure that the aspect of confirmability was maintained, the researcher ensured that checking and rechecking of the data was done throughout the study. The themes and categories identified from the personal narrative diary entries and the transcripts of the interviews were checked and the changes were documented in the form of a data audit which was done by a fellow researcher. The data analysis process was further guided by an audit trial.

3.12 Method of Data Analysis

The thematic qualitative data analysis method was used to analyse the data. Thematic analysis, according to Braun and Clarke (2013), is “a method for identifying, analysing, and reporting patterns (themes) within data by describing the data in rich detail” (p. 6). Simon (2011) asserts that qualitative data could be analysed using perspective codes that reflect the participants’ shared ways of thinking and their points of view on a phenomenon being studied. In answering the entire research questions, the analysis began with transcribing and reading through the data gathered to obtain a general idea from the varied perspectives of the participants.

Using Miles and Huberman’s (1994) ideas for coding qualitative data, the analysis in this step identified and classified all process that the participants explained or referred to in the interviews. This process was accomplished in several iterations; first, the transcriptions were read to attain an overall idea of the interviewees’ responses. Next to each line or paragraph, labels were produced to return initial coding. From these labels, a general category scheme was developed from the participant response.

Second, themes were recognised by arranging the initial scheme into main categories and subcategories. The categorisation reflected similarity of responses. Next, the transcripts were reread, in particular looking for repeatedly occurring terms and unpredicted material that supplied unusual evidence of participant experience. The responses were categorised according to several initial themes.

Third, the themes were reviewed to determine how they might contribute to an understanding of the subject under study. Finally, the responses were reread and categorised into dimensions of the subject under study. A coding book was created

into which preliminary coding schemes and coding sheets that were crafted around specific passages from the transcripts were entered.

Quantitative data (second phase) collected from the field were entered, coded and presented using descriptive statistics such as, frequency, percentages, mean and standard deviation with the aid of the Statistical Package for Service Solution (SPSS) version 20 software. The two data were combined, interpreted and discussed with literature at the interpretation phase of the analysis.

3.13 Ethical Considerations

Halai (2006) opined that there are laid down principles and guidelines for conducting studies in an ethically appropriate manner which require researchers to obtain approval from gatekeepers and from the participants. To this end, the study was guided by research code of ethics such as access, informed consent, confidentiality and anonymity of the respondents during data collection.

Regarding access, the researcher initially requested for permission or an introductory letter from the Department of English language Education, University of Education, Winneba before proceeding to the field for data collection. Subsequently, permission was also sought from the head masters of the schools involved regarding my intention to collect data from the teachers. This involved giving them information about the purpose of the study, how it would be carried out, the nature of their involvement, the duration for engagement, the kind of data to be collected from them and how it would be used and reported. On this premise, the respondents were able to make a decision whether to voluntarily participate in the study or not.

To guarantee the ethic of confidentiality during the field data collection, I made sure that all identifiable personal information such as names and addresses obtained from teachers and head masters respondents involved in the study were deleted from the final report. Also, after audio recordings had been obtained from the participants interviewed, the audio files were saved as password-protected files on the researcher's laptop which prevented intruders from getting access to either read or edit the transcribed data. Moreover, coding was done to protect the anonymity of the informants who were interviewed. Furthermore, secondary information from books, journals, newspapers and online thesis which provided relevant literature on the study was duly acknowledged to avoid plagiarism.

3.14 Limitations

The integration of technology in teaching ESL reading faces significant limitations. The digital divide creates disparities in access to technological resources, affecting equitable learning opportunities (Van Dijk, 2006). Technical issues, including frequent glitches and maintenance challenges, disrupt the learning process (Kay, 2011). Additionally, educators often lack adequate training to effectively incorporate technology, leading to suboptimal usage (Ertmer & Ottenbreit-Leftwich, 2010). Over-reliance on technology can overshadow traditional methods, and digital distractions can impede student focus (Rosen, Carrier, & Cheever, 2013). Financial constraints further limit the implementation and maintenance of necessary technological tools (Parks, 2016). In this present study the researcher used observation at the initial stages to familiarise himself with the schools and the teachers of English language however, it was not used as a data collection instrument per se. Doing so would have added additional data set to enrich the finding of the study.

3.15 Chapter Summary

Chapter Three outlines the research methodology employed in the study, which was guided by the pragmatic philosophical paradigm due to the practical and complex nature of the research problem. A sequential exploratory mixed methods approach was adopted, starting with qualitative interviews followed by a quantitative survey. The study was conducted in four senior high schools within the Offinso North District, selected for their representation of both rural and peri-urban educational settings. Twelve English teachers were purposefully sampled for interviews, and all 64 English teachers in the four senior high schools participated in the quantitative phase through census sampling. Data collection spanned thirteen weeks and involved semi-structured interviews and questionnaires. Qualitative data were thematically analysed, while quantitative data were analysed using descriptive statistics via SPSS. Validity and reliability were ensured through pilot testing and expert review, while ethical standards such as informed consent, confidentiality, and data protection were upheld. Although the study benefited from rich data sources, the lack of formal classroom observation was noted as a limitation.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.0 Overview

This chapter is structured into three main sections. The first section presents the demographic profile of the respondents, followed by a detailed analysis of both qualitative and quantitative data, highlighting key findings through a systematic examination of emerging themes and statistical results. The second section provides an interpretation and integration of these findings in relation to the reviewed literature and the study's theoretical framework.

4.1 Demographic of Respondents

This section focuses on the background of the respondents. The background information collected include; gender, age, educational level and duration of teaching English Language. These background data are represented in Table 4.1

Table 4.1: Demographics of Respondents

Variable	Category	Frequency	Percent
Age Group	20-25 years	2	3.1
	26-30 years	13	20.3
	31-35 years	33	51.6
	36 years or more	16	25.0
Gender	Male	37	57.8
	Female	27	42.2
Educational Level	Diploma	4	6.3
	Degree (BA)	55	85.9
	MPhil, M. A, M. Ed	5	7.8
Duration of teaching English Language	1-5 years	29	45.3
	6-10 years	14	21.9
	11-15 years	13	20.3
	16-20 years	6	9.4
	21 years and above	2	3.1

Total	64	100.0
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From Table 4.1, examining the age distribution, the majority of respondents fall within the age group of 31-35 years, comprising 33 individuals (51.6%). The age groups of 26-30 years and 36 years or more also show notable representation with 13 individuals (20.3%) and 16 individuals (25.0%) respectively. The youngest age group, 20-25 years, has the smallest representation, consisting of only 2 individuals (3.1%).

In terms of gender representation, the data indicates that there is a higher participation of male respondents, constituting 37 (57.8%) of the total, compared to female respondents who make up 27 (42.2%). This gender distribution provides insight into the composition of educators engaged in teaching English as a second language in Offinso North District.

Educational qualifications play a significant role in understanding the expertise of the educators involved. The majority of respondents hold a degree (BA), representing 55 individuals (85.9%). Additionally, 5 individuals (7.8%) possess advanced degrees such as MPhil, M.A, or M.Ed, while 4 individuals (6.3%) have a diploma. This educational background suggests a predominantly well-educated group of educators participating in the study.

Regarding the duration of teaching English as a second language, majority of respondents, 29 individuals (45.3%), have been teaching for 1-5 years. Other significant categories include 6-10 years (21.9%) and 11-15 years (20.3%). The distribution also includes 6 individuals (9.4%) with 16-20 years of experience and 2 individuals (3.1%) with 21 years and above. This diverse range of teaching experience among respondents indicates a mix of both early-career educators and those with more extensive teaching backgrounds.

4.2 Analysis of Qualitative Data

The qualitative data was analysed using thematic analysis, which identifies and reports patterns within the data (Braun & Clarke, 2006). The process began with detailed transcription of interviews to capture both verbal and non-verbal cues (Duranti, 2007; Saldaña, 2016; Riessman, 2008), followed by thorough verification against the recordings. A two-cycle coding approach was used, structural coding to organise data using research questions and pattern coding to develop major themes from recurring insights and trends (Namey et al., 2008; MacQueen et al., 2008, Saldaña, 2016).

4.2.1 Structural Coding in line with Research Questions

Table 4.2: Developed Structural Coding

Research Questions and Structural Codes	Excerpt Data from Interviews
Research Question 1: How do teachers use technology to teach reading in English as a second language in Offinso North District? Structural Code: Using Technology to Teach Reading	Excerpt 1: <i>I put the printed materials in front of the students and with audio. If a student can't follow the audio as read side by side, it indicates that such student reading level is likely low and to prepare myself for word pronunciation, I also use tape and MP3. They accurately pronounce words when I utilise MP3s because they can hear the sounds of homophones and homonyms. The pronunciations may vary slightly even when the spellings are the same. (WAPSHS PT1)</i> Excerpt 2: <i>To teach reading comprehension, I employ technology. I show the material on the laptop screen, and one of the students reads aloud to the class so they can hear it. They then take notes and I ask them to subsequently decode the points, looking at the comprehension in the process. They give excellent performances. (NKSHS PT3)</i> Excerpt 3: <i>I normally use technology in my classes to promote critical reading. Whenever, I use technology I see that it helps them to easily understand and retain the information. (ASSHS PT 2)</i>
Research Question 2:	Excerpt 4: <i>For the past three years of teaching, I've seen</i>

What benefits are associated with the use of technology in teaching reading in English as a second language in Offinso North District?

some massive improvement through their engagement in our lessons. With inclusion of technology in some of our lessons, they become active in class and now speak with confidence. (WAPSHS PT2)

Structural Code:
Benefits of Technology Utilisation in Teaching Reading

Excerpt 5 *Yes, I have seen some incredibly beneficial results from using technology to teach reading. Some attempt to imitate the sounds they are hearing by singing along with it. In addition, they can understand both the sounds and the letters when reading, and they pay close attention to the words spoken by the actors or characters in movies. Even when you are teaching reading, they will attempt to correct each other. (ASSHS PT1)*

Excerpt 6 *Technology use has helped students because I've observed improvements in their ability to pronounce some difficult words correctly when speaking and in how they can use specific words in their writing. (ASSHS PT3)*

Excerpt 7 *When any of these technologies are used, I've noticed that it motivates students and makes them desire to participate in the activity. Fosters perseverance and a receptive memory. (NKSHS PT3)*

Excerpt 8 *The students are coping very well. Their academic performance has increased since I taught them how to use the phone. They also learned how to look up words they don't understand on their phone and look up reading passages using the ICT lab. (NKSHS PT1)*

Excerpt 9 *Technology use has helped students because I've observed improvements in their academic performance and in how they can use specific words in their writing. (ASSHS PT3)*

Research Question 3:
What challenges are associated with the use of technology in teaching reading in English as a second language in Offinso North District?

Excerpt 10 *Most of our students are not able to get access to smartphones to go online. (AKUSS PT1)*

Structural Code:
Challenges in technology usage in teaching reading

Excerpt 10 *These technologies at times do disappoint, I prepared a lesson with inclusion sound with intention of using an MP3 player. When I sent it to class, and the class was set, I decided to play it and it was not forthcoming. I said to myself, wow, what is really happening in fact, half of my lesson was gone before I think and I didn't know where this*

fault too was coming from. (WAPSHS PT1)

Excerpt 11 *The main issue is electricity. The school does not have electricity in the classrooms, so sometimes unless you charge your phone and MP3 elsewhere. If gadgets go off, that leads to the end of the lesson. (NKSHS PT1)*

Excerpt 12 *We have inconsistent power supply. It is a big problem. (ASSHS PT3)*

Excerpt 13 *The bigger challenge is internet connectivity. It is difficult accessing materials online. For example, if in the course of teaching you want to quickly find something online and show to the students, it takes time to load. By implication, the lesson period is affected to some extent. (AKUSS PT1)*

Excerpt 14 *Decoding some of the words is so technical, and the audio and the videos we download are foreign and the accents are different from the local ones.*

(ASSHS PT1)

Table 4.2 illustrates the utilisation of research questions as codes for structuring research data. It delineates three primary codes originating from the study's three research questions. Subsequently, excerpts from participants' responses were categorised base on these codes for the next coding stage which provides for more detailed coding through Pattern Coding.

4.2.2 Pattern Coding developed in Line with Responses from Research Questions

Table 4.3: Developed Pattern Coding

Research Question and Structural Codes	Pattern Codes and Excerpts	Merging Codes into Themes
Research Question 1: How do teachers use technology to teach reading in English as a second language in Offinso North District?	1. Pronunciation and Decoding <i>Excerpt 1</i> "I put the printed materials in front of the students with audio" (WAPSHS PT1) <i>Excerpt 2</i> "I tried to use my phone and connect to Bluetooth" (NKSHS	Theme 1: Integration of Multimedia Resources Theme 2: Utilisation of Digital Platforms for Active Engagement Explanation: Teachers in Offinso North

Structural Code: Using Technology to Teach Reading	P T1) <i>Excerpt 3 “I utilise phones for decoding to obtain accurate pronunciations” (AKUSS PT1)</i> <i>Excerpt 4 “We download phonics apps that work with an MP3 player and play them for them in class” (ASSH PT1).</i>	District utilise various technologies to enhance ESL reading instruction comprehensively. Technology is integrated into pronunciation and decoding activities, reading comprehension lessons, vocabulary development, fluency improvement, and supplementation of classroom resources. This finding highlights the multifaceted role of technology in facilitating diverse aspects of ESL reading instruction.
	2. Enhancing Reading Comprehension <i>Excerpt 5 “I show the material on the laptop screen, and one of the students reads aloud to the class so they can hear it” (NKSHS PT3).</i> <i>Excerpt 6 “I use technology to look up the meanings of terms during reading comprehension” (ASSHS PT3).</i> <i>Excerpt 7 “I display the information on the laptop screen and one of the students reads aloud for them to listen” (NKSHS PT3).</i>	
	3. Active and Critical Reading <i>Excerpt 8 “I use technology to help them be active in reading, remember what they read and make their own notes” (NKSHS PT1).</i> <i>Excerpt 9 “I see that it helps them to easily understand and retain the</i>	

information” (ASSHS PT2).

4. Vocabulary development

Excerpt 10 “I utilise an e-dictionary and other phone apps that deal with sound in vocabulary development to help them with the proper sound and vocabulary acquisition” (AKUSS PT1).

Excerpt 11 “I use mobile phone to build my students vocabulary” (NKSHS PT1).

5. Improving Fluency

Excerpt 12 “I use technology to improve their fluency by focusing on their listening and speaking” (ASSHS PT2).

Excerpt 13 “I use audio-books and podcasts to improve students’ fluency” (WAPSHS PT2).

Excerpt 14 “I record a native speaker's audio of the sound I want to teach and allow my students to pronounce before I add my African accent” (NKSHS PT2).

6. Supplementing classroom resources

Excerpt 15 “We download audiobooks from the Play Store” (ASSH PT1).

Excerpt 16 “We search Google for an image or video of the subject and present it to the class” (NKSHS PT2).

Research Question 2:
What benefits are
associated with the

7. Increased Students Engagement

Excerpt 17 “They become active in

Theme 3: Enhanced
Learning Outcomes and

use of technology in teaching reading in English as a second language in Offinso North District?	<i>class and now speak with confidence” (WAPSHS PT2).</i>	Engagement
Structural Code: Benefits of Technology Utilisation in Teaching Reading	<i>Excerpt 18 “They are able to remember easily when I do lesson closure” (AKUSS PT1).</i>	Theme 4: Improved Pronunciation and Comprehension Skills
	8. Enhanced Pronunciation and decoding skills	Explanation: The use of technology in ESL reading instruction yields significant benefits, including enhanced pronunciation and decoding skills, improved reading comprehension, increased engagement, and motivation among students. Students demonstrate improved academic performance, active participation, and deeper comprehension when technology is incorporated into reading lessons. This finding underscores the positive impact of technology on ESL reading outcomes and student engagement in the learning process.
	<i>Excerpt 19 “They can pronounce the term according to dictionary transcriptions as a result” (WAPSHS PT1).</i>	
	<i>Excerpt 20 “They will attempt to correct each other” (ASSH PT1).</i>	
	<i>Excerpt 21 “I’ve observed improvements in their ability to pronounce some difficult words correctly”</i> (ASSHS PT3).	
	9. Increased Motivation and participation	
	<i>Excerpt 22 “It Fosters perseverance and a receptive memory” (NKSHS PT3).</i>	
	<i>Excerpt 23 “Students feel motivated to learn and their enthusiasm goes up” (ASSHS PT2).</i>	
	10. Enhanced Reading Comprehension skills	
	<i>Excerpt 24 “They can go online, listen to word pronunciations, practice speaking, and even understand the meaning of words”</i> (AKUSS PT1).	
	<i>Excerpt 25 “students have gained a deeper comprehension than they would have with abstract</i>	

instruction” (NKSHS PT2).

11. Increased Academic Performance

Excerpt 26 “They also learned how to look up words they don't understand on their phone and look up reading passages using the ICT lab” (NKSHS PT1).

Excerpt 27 “They can use specific words in their writing” (ASSHS PT3)

Research Question 3:
What challenges are associated with the use of technology in teaching reading in English as a second language in Offinso North District?

12. Limited access to technology

Excerpt 28 “The school is not having laptops and projector” (ASSHS PT1).

Excerpt 29 “Most of our students are not able to get access to smartphones to go online” (AKUSS PT1).

Theme 5: Infrastructure and Access Limitations

Theme 6: Technical and Connectivity Issues

Structural Code:
Challenges in technology usage in teaching reading

Excerpt 30 “We don't have enough computers for students to study with” (NKSHSPT1).

13. Limited digital literacy skills

Excerpt 31 “These technologies at times do disappoint” (WAPSHS PT1).

Excerpt 32 “Some of the students are not willing to change to the new ways of using technology” (AKUSS PT1).

Excerpt 33 “Some of them do not know how to use these devices” (NKSHS PT2).

Explanation:

Despite the benefits, several challenges impede the seamless integration of technology into ESL reading instruction in Offinso North District. These challenges include limited access to technology due to infrastructure constraints, inadequate digital literacy skills among students, technical issues, unreliable electricity supply, poor internet connectivity, and difficulties in decoding foreign accents. Addressing these challenges is crucial to fully harnessing the potential of technology in enhancing ESL reading instruction and improving student outcomes in the district.

14. Electricity problems

Excerpt 34 “At times while you're presenting, the light will unexpectedly go out”

(NKSHS PT3).

Excerpt 35 “The school does not have electricity in the classrooms”
(NKSHS PT1).

Excerpt 36 “We have inconsistent power supply” (ASSHS PT3).

15. Limited internet connectivity

Excerpt 37 “The biggest challenge is the network” (ASSHS PT2).

Excerpt 38 “The bigger challenge is internet connectivity” (AKUSS PT1).

Excerpt 39 “Sometimes too, the Wi-Fi will be off for some time”
(ASSHSPT1).

16. Difficulty in decoding

Excerpt 40 “Decoding some of the words is so technical” (ASSHS PT1).

Excerpt 41 “I rather spent so much time explaining what the whole thing is all about” (NKSHS PT3).

Table 4.3 presents a developed Pattern Coding for this study detailing how themes were generated from the Pattern Codes. The Table has three columns. Column 1 presents the research questions and structural codes. The rationale for the first column is to bring into focus the structural codes generated through first cycle coding. This allows the Pattern Codes to be directly related to the specific research questions.

Column 2 shows the Pattern Codes and related excerpts. Column 3 indicates merging codes into themes. The Pattern Codes were generated through a careful reading of the data to present a valuable insight into how teachers use technology to teach reading, the benefits associated with the use of technology as well as the challenges associated with the use of technology in teaching reading in English as a second language.

4.2.3 Summary of Qualitative Findings

A total of seventeen (16) Pattern Codes were generated with forty-nine (41) supporting excerpts. As indicated in Table 4.3, six Pattern Codes were generated for research question one with sixteen supporting excerpts. Five codes with eleven excerpts were generated for question two. Research questions three had five Pattern Codes and fourteen excerpts. The 16 Pattern Codes were then merged into six themes as the major findings from the qualitative analysis, as shown in Table 3 above. The six theme-based findings, which address the three research questions, are the following:

Research Question 1:

Theme 1: Integration of Multimedia Resources

Theme 2: Utilisation of Digital Platforms for Active Engagement

Research Question 2:

Theme 3: Enhanced Learning Outcomes and Engagement

Theme 4: Improved Pronunciation and Comprehension Skills

Research Question 3:

Theme 5: Infrastructure and Access Limitations

Theme 6: Technical and Connectivity Issues

4.4 Analysis of Quantitative Data

Quantitative data collected during the second phase of the study were entered, coded, and analysed using the Statistical Package for Social Sciences (SPSS) version 20. The analysis employed descriptive statistical tools such as frequencies, percentages, means, and standard deviations to present and interpret the findings. Frequency analysis was used to determine how often specific responses or values occurred, helping to identify patterns and trends within the dataset. Percentages were calculated to provide a relative understanding of these frequencies, allowing for easier comparison across different categories and sample sizes (Gravetter & Wallnau, 2016). The mean was used to determine the average or central value of the data, offering a general sense of the typical response, while the standard deviation measured how spread out the data points were around the mean, indicating the degree of variation within the responses (Field, 2018). These statistical measures provided a comprehensive view of the data, helping to uncover key insights and detect any irregularities. The results of this analysis are presented according to the three research questions that guided the study, ensuring that the findings are systematically aligned with the overall research objectives.

4.4.1 Teachers use of technology in teaching reading in English as a second language in Offinso North District

Respondents were asked on their duration and frequency of technology use, their extent of technology utilisation in teaching reading, how teachers use technology to assist learners in developing reading skills as well as their implementation strategies in teaching reading. Their responses are captured in Tables 4, 5, 6 and 7 below.

Table 4.4: Duration and Frequency of Technology Use

Variable	Category	Frequency	Percent
Duration of Using Technology	About a year	9	14.1
	For the past 2 years	8	12.5
	For the past 3 years	6	9.4
	For the past 4 years	23	35.9
	5 years or more	18	28.1
Frequency of Use of Technology in Teaching Reading	Never	7	10.9
	Sometimes	21	32.8
	Often	32	50.0
	Always	4	6.3
Total		64	100.0

Item 1 in Table 4.4 shows the duration of using technology by teachers, the data reveals a varied engagement among educators. 23 (35.9%) of the respondents have been using technology for the past 4 years, indicating a substantial portion with a relatively long history of incorporating technology into their teaching practices. Additionally, 18 (28.1%) of respondents reported using technology for 5 years or more, suggesting a significant group of educators with extensive experience in integrating technology into their pedagogy.

Item 2 in Table 4.4 shows the frequency of technology use in teaching reading, the majority of respondents constituting 32 (50.0%) responded using technology "Often." This suggests a considerable level of regularity and comfort in incorporating technological tools in the teaching of reading. Furthermore, 32.8% of respondents reported using technology "Sometimes," indicating a moderate level of engagement. Meanwhile, a smaller percentage reported more extreme positions, with 10.9% stating they "Never" use technology and 6.3% claiming they use it "Always".

Table 4.5: Extent of Technology Utilisation in Teaching Reading

Technology	Category	Frequency	Percent	Mean	SD	SD²
Computer/Laptops	Never	5	7.8	2.97	0.975	0.951
	Sometimes (Once a semester)	16	25.0			
	Often (2X a month)	19	29.7			
	Always (Full usage)	24	37.5			
Tablets	Never	44	68.8	1.41	0.660	0.436
	Sometimes (Once a semester)	14	21.9			
	Often (2X a month)	6	9.4			
	Always (Full usage)	0	0.0			
Interactive Whiteboards	Never	34	53.1	1.69	0.924	0.854
	Sometimes (Once a semester)	22	34.4			
	Often (2X a month)	2	3.1			
	Always (Full usage)	6	9.4			
	Never	0	0.0			
E-readers/e-books	Never	26	40.6	1.78	0.786	0.618
	Sometimes (Once a semester)	28	43.8			
	Often (2X a month)	8	12.5			
	Always (Full usage)	2	3.1			
	Never	0	0.0			
Language Learning Apps/Software	Never	9	14.1	2.50	0.854	0.729
	Sometimes	20	31.3			

(Once a semester)					
Often (2X a month)	29	45.3			
Always (Full usage)	6	9.4			
Total	64	100.0	$\mu\bar{x}$	4.199	S²
			2.016		1.894

With the use of computer/laptops, the data indicates a diverse range of engagement. Majority of respondents, 24 (37.5%), reported using computers/laptops "Always (Full usage)," showcasing a substantial group that fully integrates these devices into their teaching of reading. Additionally, 19 (29.7%) reported using them "Often (2X a month)," while 16 (25.0%) reported using them "Sometimes (Once a semester)." Only a small percentage, 5 (7.8%), indicated they "Never" use computers/laptops for teaching reading. The results on the use of computer/laptops recorded a mean of 2.97 and a standard deviation of 0.975.

On the use of tablets, the data reveals a notable preference for less frequent use. The majority of respondents, 44 (68.8%), reported "Never" using tablets, suggesting a limited adoption of this technology in teaching reading. However, 14 (21.9%) reported using tablets "Sometimes (Once a semester)," and 6 (9.4%) reported using them "Often (2X a month)." The results on the use of tablets recorded a mean of 1.41 and a standard deviation of 0.660.

Considering interactive whiteboards, the data indicates a varied degree of utilisation. Majority 34 (53.1%), reported "Never" using interactive whiteboards, while 22 (34.4%) reported using them "Sometimes (Once a semester)." A smaller but noteworthy percentage, 6 (9.4%), reported using them "Always (Full usage)," indicating a group of educators who fully integrate interactive whiteboards into their

teaching practices. The results on the use of interactive whiteboards recorded a mean of 1.69 and a standard deviation of 0.924.

Regarding the utilisation of e-readers/e-books, the data shows a diverse pattern. Majority, 28 (43.8%), reported using them "Sometimes (Once a semester)," while 26 (40.6%) reported "Never" using e-readers/e-books. Only a small percentage, 2 (3.1%), reported using them "Always (Full usage)," indicating a limited number of educators who fully integrate e-readers/e-books into their teaching of reading. The results on the use of e-readers/e-books recorded a mean of 1.78 and a standard deviation of 0.786.

Finally, examining language learning apps/software, the data illustrates a considerable level of engagement. Majority, 29 (45.3%), reported using them "Often (2X a month)," and 20 (31.3%) reported using them "Sometimes (Once a semester)." A smaller percentage, 6 (9.4%), reported using them "Always (Full usage)," while 9 (14.1%) reported "Never" using language learning apps/software. The results on the use of language learning apps/software recorded a mean of 2.50 and a standard deviation of 0.854.

Table 4.6: Technology Use to Assist Learners in Developing Reading Skills

Reading Skill	Category	Frequency	Percent	Mean	SD	SD ²
Decoding	Never	27	42.2	1.86	0.906	0.821
	Sometimes (Once a semester)	23	35.9			
	Often (2X a month)	10	15.6			
	Always (Full usage)	4	6.3			
Vocabulary	Never	2	3.1	2.83	0.767	0.588
	Sometimes (Once a semester)	19	29.7			
	Often (2X a month)	31	48.4			
	Always (Full usage)	12	18.8			
Fluency	Never	4	6.3	2.80	0.780	0.608
	Sometimes (Once a semester)	15	23.4			
	Often (2X a month)	35	54.7			
	Always (Full usage)	10	15.6			
Skimming and Scanning	Never	10	15.6	2.45	0.890	0.792
	Sometimes (Once a semester)	22	34.4			
	Often (2X a month)	25	39.1			
	Always (Full usage)	7	10.9			

Active Reading	Never	13	20.3	2.77	1.165	1.357
	Sometimes (Once a semester)	13	20.3			
	Often (2X a month)	14	21.9			
	Always (Full usage)	24	37.5			
Critical Reading	Never	15	23.4	2.23	0.904	0.817
	Sometimes (Once a semester)	24	37.5			
	Often (2X a month)	20	31.3			
	Always (Full usage)	5	7.8			
Comprehension	Never	3	4.7	3.32	0.858	0.858
	Sometimes (Once a semester)	7	10.9			
	Often (2X a month)	21	32.8			
	Always (Full usage)	33	51.6			
Total		64	100.0	$\mu\bar{x}$ 2.608	6.27	S^2 2.391

In Table 4.6, regarding the use of technology to assist learners in developing reading skill of decoding, the data reveals a diverse range of technology utilisation. The majority of respondents, 27 (42.2%), reported "Never" using technology to assist learners in developing decoding skills. Additionally, 23 (35.9%) reported using technology "Sometimes (Once a semester)," 10 (15.6%) "Often (2X a month)," and 4 (6.3%) "Always (Full usage)." This suggests varying degrees of integration of technology to support decoding skills development. The results on the reading skill of decoding recorded a mean of 1.86 and a standard deviation of 0.906.

On vocabulary, the data indicates a significant usage of technology. The majority, 31 (48.4%), reported using technology "Often (2X a month)," and 19 (29.7%) reported using it "Sometimes (Once a semester)." A notable portion, 12 (18.8%), reported using technology "Always (Full usage)." Only a small percentage, 2 (3.1%), reported "Never" using technology for vocabulary development. The results on the reading skill of vocabulary recorded a mean of 2.83 and a standard deviation of 0.767.

Concerning fluency, a considerable number of respondents reported using technology to assist learners. The majority, 35 (54.7%), reported using technology "Often (2X a month)," while 15 (23.4%) reported "Sometimes (Once a semester)." Additionally, 10 (15.6%) reported using it "Always (Full usage)." Only 4 (6.3%) respondents indicated "Never" using technology for fluency development. The results on the reading skill of fluency recorded a mean of 2.80 and a standard deviation of 0.780.

Examining skimming and scanning skills, the data shows diverse engagement levels. Majority, 25 (39.1%), reported using technology "Often (2X a month)," while 22 (34.4%) reported using it "Sometimes (Once a semester)." Smaller percentages reported "Always (Full usage)" (10.9%) and "Never" (15.6%) using technology for these skills. The results on the reading skill of skimming and scanning recorded a mean of 2.45 and a standard deviation of 0.890.

For active reading, a diverse pattern emerges. The highest reported frequency is "Always (Full usage)," with 24 (37.5%) respondents, followed by "Often (2X a month)" with 14 (21.9%) respondents. Additionally, 13 (20.3%) and 13 (20.3%) respondents reported "Never" and "Sometimes (Once a semester)," respectively, using technology for active reading. The results on the reading skill of active reading recorded a mean of 2.77 and a standard deviation of 1.165.

Moving to critical reading, the data indicates varying levels of engagement. Majority, 24 (37.5%), reported "Sometimes (Once a semester)," while 20 (31.3%) reported "Often (2X a month)." Smaller percentages reported "Always (Full usage)" (7.8%) and "Never" (23.4%) using technology for critical reading. The results on the reading skill of critical reading recorded a mean of 2.23 and a standard deviation of 0.904.

Finally, regarding comprehension, a majority of respondents, 33 (51.6%), reported "Always (Full usage)" of technology to assist learners in developing comprehension skills. Additionally, 21 (32.8%) reported using technology "Often (2X a month)," 7 (10.9%) "Sometimes (Once a semester)," and 3 (4.7%) "Never." The results on the reading skill of comprehension recorded a mean of 3.32 and a standard deviation of 0.858.

Table 4.7: Implementation Strategies in Teaching Reading

Strategy	Category	Frequency	Percent	Mean	SD	SD ²
Using E-Books with the whole class to help learners develop vocabulary	Never	18	28.1	2.09	0.830	0.689
	Sometimes (Once a semester)	23	35.9			
	Often (2X a month)	22	34.4			
	Always (Full usage)	1	1.6			
Using Digital Annotations to foster Active Reading Skills	Never	33	51.6	1.64	0.743	0.552
	Sometimes (Once a semester)	21	32.8			
	Often (2X a month)	10	15.6			

Guiding learners to use Digital Text highlighting tools to develop skimming and Scanning	Never	22	34.4	2.08	0.965	0.931
	Sometimes (Once a semester)	20	31.3			
	Often (2X a month)	17	26.6			
	Always (Full usage)	5	7.8			
Using Virtual Libraries to allow learners to decode written words into spoken language	Never	13	20.3	2.08	0.741	0.741
	Sometimes (Once a semester)	35	54.7			
	Often (2X a month)	14	21.9			
	Always (Full usage)	2	3.1			
Facilitating learners' comprehension through the use of interactive quizzes and assessments	Never	10	15.6	2.39	0.866	0.750
	Sometimes (Once a semester)	25	39.1			
	Often (2X a month)	23	35.9			
	Always (Full usage)	6	9.4			
Enhancing learners' critical reading skills through the use of digital text tickets to summarising critical insights	Never	11	17.2	2.13	0.724	0.524
	Sometimes (Once a semester)	36	56.3			

	Often (2X a month)	15	23.4			
	Always (Full usage)	2	3.1			
Improving learners' fluency through audiobooks and podcasts	Never	5	7.8	2.52	0.713	0.508
	Sometimes (Once a semester)	24	37.5			
	Often (2X a month)	32	50.0			
	Always (Full usage)	3	4.7			
	Total	64	100.0	$\mu\bar{x}$	5.582	S^2
				2.094		2.122

Table 4.7 shows implementation strategies in teaching reading. With the strategy of using e-books with the whole class to help learners develop vocabulary, the data indicates varied implementation frequencies. Majority of respondents, 23 (35.9%), reported using this strategy "Sometimes (Once a semester)," while 22 (34.4%) reported using it "Often (2X a month)." Additionally, 18 (28.1%) reported "Never" using this strategy, and a small percentage, 1 (1.6%), reported using it "Always (Full usage)." The results on the strategy of using e-books with the whole class to help learners develop vocabulary show a mean of 2.09 and a standard deviation of 0.830.

Moving to using digital annotations to foster active reading skills, the data shows diverse engagement levels. The majority, 33 (51.6%), reported "Never" using this strategy, while 21 (32.8%) reported using it "Sometimes (Once a semester)," and 10 (15.6%) reported using it "Often (2X a month)." The results on the strategy of using digital annotations to foster active reading skills show a mean of 1.64 and a standard deviation of 0.743.

Considering the strategy of guiding learners to use digital text highlighting tools to develop skimming and scanning, the data reveals a varied degree of utilisation. Majority, 20 (31.3%), reported using this strategy "Sometimes (Once a semester)," while 17 (26.6%) reported using it "Often (2X a month)." Additionally, 22 (34.4%) reported "Never" using this strategy, and a small percentage, 5 (7.8%), reported using it "Always (Full usage)." The results on the strategy of using guiding learners to use digital text highlighting tools to develop skimming and scanning show a mean of 2.08 and a standard deviation of 0.965.

Moving on to using virtual libraries to allow learners to decode written words into spoken language, the data indicates diverse engagement levels. A majority of respondents, 35 (54.7%), reported using this strategy "Sometimes (Once a semester)," while 14 (21.9%) reported using it "Often (2X a month)." Additionally, 13 (20.3%) reported "Never" using this strategy, and a small percentage, 2 (3.1%), reported using it "Always (Full usage)." The results on the strategy of using virtual libraries to allow learners to decode written words into spoken language show a mean of 2.08 and a standard deviation of 0.741.

For facilitating learners' comprehension through the use of interactive quizzes and assessments, the data illustrates varied utilisation patterns. A notable portion, 25 (39.1%), reported using this strategy "Sometimes (Once a semester)," while 23 (35.9%) reported using it "Often (2X a month)." Additionally, 10 (15.6%) reported "Never" using this strategy, and a small percentage, 6 (9.4%), reported using it "Always (Full usage)." The results on the strategy of facilitating learners' comprehension through the use of interactive quizzes and assessments show a mean of 2.39 and a standard deviation of 0.866.

Examining the strategy of enhancing learners' critical reading skills through the use of digital text tickets to summarising critical insights, the data shows diverse engagement levels. Majority, 36 (56.3%), reported using this strategy "Sometimes (Once a semester)," while 15 (23.4%) reported using it "Often (2X a month)." Additionally, 11 (17.2%) reported "Never" using this strategy, and a small percentage, 2 (3.1%), reported using it "Always (Full usage)." The results on the strategy of enhancing learners' critical reading skills through the use of digital text tickets to summarising critical insights show a mean of 2.13 and a standard deviation of 0.724.

Finally, considering the strategy of improving learners' fluency through audiobooks and podcasts, the data indicates varied implementation frequencies. A majority of respondents, 32 (50.0%), reported using this strategy "Often (2X a month)," while 24 (37.5%) reported using it "Sometimes (Once a semester)." Additionally, 5 (7.8%) reported "Never" using this strategy, and a small percentage, 3 (4.7%), reported using it "Always (Full usage)." The results on the strategy of improving learners' fluency through audiobooks and podcasts show a mean of 2.52 and a standard deviation of 0.713.

4.4.2 Benefits associated with the use of technology in teaching reading in English as a second language in Offinso North District

Respondents were asked on the benefits of using technology in teaching reading. Their responses are captured in Table 8 below:

Table 4.8: Benefits of Using Technology in Teaching Reading

Benefits of Using Technology in Teaching Reading	Category	Frequency	Percent	Mean	SD	SD ²
Increased Student Engagement	Strongly disagree	10	15.6	2.97	1.023	1.047
	Disagree	4	6.3			
	Agree	28	43.8			
	Strongly agree	22	34.4			
Improved Student Motivation	Strongly disagree	4	6.3	3.36	0.824	0.679
	Disagree	2	3.1			
	Agree	25	39.1			
	Strongly agree	33	51.6			
Enhanced Reading Comprehension	Strongly disagree	9	14.1	2.89	0.945	0.893
	Disagree	5	7.8			
	Agree	34	53.1			
	Strongly agree	16	25.0			
Led to Greater Enjoyment of the Reading Process	Strongly disagree	5	7.8	3.33	0.909	0.826
	Disagree	4	6.3			
	Agree	20	31.3			
	Strongly agree	35	54.7			
Total		64	100.0	$\mu\bar{x}$	3.701	S²
				3.137		1.856

With the benefit of increased student engagement, the data indicates a diverse range of responses. While 22 (34.4%) strongly agree that using technology increases student engagement, 28 (43.8%) agree with this statement. Additionally, 4 (6.3%) disagree, and 10 (15.6%) strongly disagree with the idea that technology enhances student engagement. This reveals a mix of perspectives, with a significant majority expressing

agreement or strong agreement. The results on the benefit of increased student engagement recorded a mean of 2.97 and a standard deviation of 1.023.

Regarding the benefit of improved student motivation, the data suggests positive sentiments. A substantial majority, 33 (51.6%), strongly agree that using technology improves student motivation, while 25 (39.1%) agree with this statement. Only a small percentage, 2 (3.1%), disagree, and 4 (6.3%) strongly disagree with the notion that technology enhances student motivation. The results on the benefit of improved student motivation recorded a mean of 3.36 and a standard deviation of 0.824.

Considering the benefit of enhanced reading comprehension, the data indicates a positive trend. A majority, 34 (53.1%), agree that using technology enhances reading comprehension skills, while 16 (25.0%) strongly agree with this statement. A smaller percentage, 5 (7.8%), disagrees, and 9 (14.1%) strongly disagree with the idea that technology contributes to improved reading comprehension skills. The results on the benefit of enhanced reading comprehension recorded a mean of 2.89 and a standard deviation of 0.945.

On to the benefit of leading to greater enjoyment of the reading process, the data reflects positive sentiments. The majority, 35 (54.7%), strongly agree that using technology leads to greater enjoyment of the reading process, while 20 (31.3%) agree with this statement. Only a small percentage, 4 (6.3%), disagrees, and 5 (7.8%) strongly disagree with the idea that technology enhances the enjoyment of the reading process. The results on the benefit of enhanced reading comprehension recorded a mean of 3.33 and a standard deviation of 0.909.

4.4.3 Challenges associated with the use of technology in teaching reading in

English as a second language Offinso North District

Respondents in second phase of the study, were asked on the challenges they encounter in using technology for teaching reading and the difficulty in using technology for teaching reading skills. The results are highlighted in Tables 9 and 10.

Table 4.9: Challenges in Using Technology for Teaching Reading

Challenge	Category	Frequency	Percent	Mean	SD	SD ²
Limited access to technology	Never	7	10.9	2.87	1.016	1.032
	Sometimes (Once a semester)	16	25.0			
	Often (2X a month)	19	29.7			
	Always (Full usage)	22	34.4			
Limited digital literacy skills	Never	5	7.8	2.56	0.833	0.694
	Sometimes (Once a semester)	27	42.2			
	Often (2X a month)	23	35.9			
	Always (Full usage)	9	14.1			
Lack of professional development opportunities	Never	8	12.5	2.70	1.079	0.164
	Sometimes (Once a semester)	25	39.1			
	Often (2X a month)	9	14.1			
	Always (Full usage)	22	34.4			
Limited access to	Never	5	7.8	2.77	0.831	0.691

digital reading materials	Sometimes (Once a semester)	16	25.0			
	Often (2X a month)	32	50.0			
	Always (Full usage)	11	17.2			
Adapting to appropriate instructional strategies	Never	6	9.4	2.34	0.781	0.610
	Sometimes (Once a semester)	36	56.3			
	Often (2X a month)	16	25.0			
	Always (Full usage)	6	9.4			
Privacy and security concerns	Never	6	9.4	2.55	0.754	0.569
	Sometimes (Once a semester)	21	32.8			
	Often (2X a month)	33	51.6			
	Always (Full usage)	4	6.3			
Limited internet connectivity	Never	7	10.9	2.77	0.988	0.976
	Sometimes (Once a semester)	19	29.7			
	Often (2X a month)	20	31.3			
	Always (Full usage)	18	28.1			
Limited access to software or apps for reading	Never	5	7.8	2.53	0.816	0.666
	Sometimes (Once a semester)	28	43.8			
	Often (2X a month)	23	35.9			

	Always (Full usage)	8	12.5			
Teacher workload	Never	4	6.3	2.69	0.732	0.356
	Sometimes (Once a semester)	18	28.1			
	Often (2X a month)	36	56.3			
	Always (Full usage)	6	9.4			
	Total	64	100.0	$\mu\bar{x}$	7.83	S^2
				2.642		2.634

With the challenge of limited access to technology, the data indicates diverse levels of difficulty. While 22 (34.4%) always face limited access, 19 (29.7%) often experience this challenge. Additionally, 16 (25.0%) sometimes face limited access, and a smaller percentage, 7 (10.9%), never experience this challenge. The results on the challenge of limited access to technology revealed a mean of 2.87 and a standard deviation of 1.016.

Regarding the challenge of limited digital literacy skills, the data suggests varied levels of difficulty. The majority, 27 (42.2%), sometimes face limited digital literacy skills, while 23 (35.9%) often experience this challenge. Additionally, 9 (14.1%) always face limited digital literacy skills, and a smaller percentage, 5 (7.8%), never experience this challenge. The results on the challenge of limited digital literacy skills revealed a mean of 2.56 and a standard deviation of 0.833.

Considering the challenge of lack of professional development opportunities, the data indicates diverse levels of difficulty. While 22 (34.4%) always face a lack of professional development opportunities, 25 (39.1%) sometimes experience this challenge. Additionally, 9 (14.1%) often face this challenge, and a smaller percentage,

8 (12.5%), never experience it. The results on the challenge of lack of professional development opportunities revealed a mean of 2.70 and a standard deviation of 1.079.

On to the challenge of limited access to digital reading materials, the data reflects diverse levels of difficulty. While 32 (50.0%) often face limited access, 16 (25.0%) sometimes experience this challenge. Additionally, 11 (17.2%) always face limited access, and a smaller percentage, 5 (7.8%), never experience this challenge. The results on the challenge of lack of limited access to digital reading materials revealed a mean of 2.77 and a standard deviation of 0.831.

For the challenge of adapting to appropriate instructional strategies, the data shows varied levels of difficulty. The majority, 36 (56.3%), sometimes face challenges in adapting instructional strategies, while 16 (25.0%) often experience this difficulty. Additionally, 6 (9.4%) always face challenges, and a smaller percentage, 6 (9.4%), never experience this difficulty. The results on the challenge of adapting to appropriate instructional strategies revealed a mean of 2.34 and a standard deviation of 0.781.

Regarding privacy and security concerns, the data suggests varied levels of difficulty. While 33 (51.6%) often face privacy and security concerns, 21 (32.8%) sometimes experience this challenge. Additionally, 4 (6.3%) always face privacy and security concerns, and a smaller percentage, 6 (9.4%), never experience this challenge. The results on the challenge of privacy and security concerns revealed a mean of 2.55 and a standard deviation of 0.754.

With the challenge of limited internet connectivity, the data indicates diverse levels of difficulty. While 20 (31.3%) often face limited internet connectivity, 19 (29.7%) sometimes experience this challenge. Additionally, 18 (28.1%) always face limited internet connectivity, and a smaller percentage, 7 (10.9%), never experience this challenge. The results on the challenge of limited access to internet connectivity revealed a mean of 2.77 and a standard deviation of 0.988.

Considering the challenge of limited access to software or apps for reading, the data reflects diverse levels of difficulty. While 28 (43.8%) sometimes face limited access, 23 (35.9%) often experience this challenge. Additionally, 8 (12.5%) always face limited access, and a smaller percentage, 5 (7.8%), never experience this challenge. The results on the challenge of limited access to software or apps for reading revealed a mean of 2.53 and a standard deviation of 0.816.

Moving on to the challenge of teacher workload, the data suggests varied levels of difficulty. The majority, 36 (56.3%), sometimes face challenges related to teacher workload, while 18 (28.1%) often experience this difficulty. Additionally, 6 (9.4%) always face challenges, and a smaller percentage, 4 (6.3%), never experience this difficulty. The results on the challenge of teacher workload revealed a mean of 2.69 and a standard deviation of 0.732.

Table 4.10: Difficulty in Using Technology for Teaching Reading Skills

Skill	Category	Frequency	Percent	Mean	SD	SD ²
Decoding	Strongly Disagree	10	15.6	2.17	0.747	0.558
	Disagree	36	56.3			
	Agree	15	23.4			
	Strongly agree	3	4.7			
Fluency	Strongly Disagree	26	40.6	1.81	0.833	0.694
	Disagree	27	42.2			
	Agree	8	12.5			
	Strongly agree	3	4.7			
Vocabulary	Strongly Disagree	26	40.6	1.86	0.906	0.821
	Disagree	26	40.6			
	Agree	7	10.9			
	Strongly agree	5	7.8			
Active Reading	Strongly Disagree	19	29.7	2.13	0.968	0.937
	Disagree	25	39.1			
	Agree	13	20.3			
	Strongly agree	7	10.9			
Critical Reading	Strongly Disagree	10	15.6	2.28	0.826	0.682
	Disagree	31	48.4			
	Agree	18	28.1			
	Strongly agree	5	7.8			
Skimming and Scanning	Strongly Disagree	9	14.1	2.09	0.729	0.531
	Disagree	45	70.3			
	Agree	5	7.8			
	Strongly agree	5	7.8			
Comprehension	Strongly Disagree	22	34.4	1.95	0.933	0.870
	Disagree	30	46.9			
	Agree	5	7.8			
	Strongly agree	7	10.9			
Total		64	100.0	$\mu\bar{x}$	5.948	S²
				2.041		2.257

Table 4.10 indicates teachers' difficulty in using technology for teaching reading skills. With the skill of decoding, the data indicates varied levels of difficulty. While thirty six (56.3%) disagree that using technology is difficult for teaching decoding skills, fifteen (23.4%) agree with this statement. Additionally, 10 (15.6%) strongly

disagree, and 3 (4.7%) strongly agree with the idea that using technology is difficult for teaching decoding skills. The results on teachers' difficulty in using technology for teaching reading skills of decoding indicate a mean of 2.17 and a standard deviation of 0.747.

Moving to the skill of fluency, the data suggests diverse perceptions of difficulty. While 27 (42.2%) disagree that using technology is challenging for teaching fluency, 8 (12.5%) agree with this statement. Additionally, 26 (40.6%) strongly disagree, and 3 (4.7%) strongly agree with the idea that using technology is difficult for teaching fluency. The results on teachers' difficulty in using technology for teaching reading skills of fluency indicate a mean of 1.81 and a standard deviation of 0.833.

Considering the skill of vocabulary, the data indicates varied perceptions of difficulty. While 26 (40.6%) strongly disagree that using technology is difficult for teaching vocabulary, 26 (40.6%) disagree with this statement. Additionally, 7 (10.9%) agree, and 5 (7.8%) strongly agree with the idea that using technology is challenging for teaching vocabulary. The results on teachers' difficulty in using technology for teaching reading skills of vocabulary indicate a mean of 1.86 and a standard deviation of 0.906

Moving on to the skill of active reading, the data reflects diverse perceptions of difficulty. While 25 (39.1%) disagree that using technology is challenging for teaching active reading, 13 (20.3%) agree with this statement. Additionally, 19 (29.7%) strongly disagree, and 7 (10.9%) strongly agree with the idea that using technology is difficult for teaching active reading. The results on teachers' difficulty in using technology for teaching reading skills of active reading indicate a mean of 2.13 and a standard deviation of 0.968.

Regarding the skill of critical reading, the data suggests varied perceptions of difficulty. While 31 (48.4%) disagree that using technology is challenging for teaching critical reading, 18 (28.1%) agree with this statement. Additionally, 10 (15.6%) strongly disagree, and 5 (7.8%) strongly agree with the idea that using technology is difficult for teaching critical reading. The results on teachers' difficulty in using technology for teaching reading skills of critical reading indicate a mean of 2.28 and a standard deviation of 0.826.

Considering the skill of skimming and scanning, the data indicates diverse perceptions of difficulty. While 45 (70.3%) disagree that using technology is challenging for teaching skimming and scanning, 5 (7.8%) agree with this statement. Additionally, 9 (14.1%) strongly disagree, and 5 (7.8%) strongly agree with the idea that using technology is difficult for teaching skimming and scanning. The results on teachers' difficulty in using technology for teaching reading skills of skimming and scanning indicate a mean of 2.09 and a standard deviation of 0.729.

On the skill of comprehension, the data reflects varied perceptions of difficulty. While 30 (46.9%) disagree that using technology is challenging for teaching comprehension, 5 (7.8%) agree with this statement. Additionally, 22 (34.4%) strongly disagree, and 7 (10.9%) strongly agree with the idea that using technology is difficult for teaching comprehension. The results on teachers' difficulty in using technology for teaching reading skills of comprehension indicate a mean of 1.95 and a standard deviation of 0.933.

4.5 Discussion of Integrated Qualitative and Quantitative Findings

This section discusses both qualitative and quantitative data by integrating the findings. This was done in line with the three research questions crafted for the study.

4.5.1 Teachers' Use of Technology in Teaching Reading in English as a Second Language in Offinso North District

The first research question sought to explore teachers' use of technology in teaching reading in English as a second language in Offinso North District. The findings show that teachers use technology for pronunciation and decoding, enhancing reading comprehension, active and critical reading, vocabulary development, and improving fluency.

Pronunciation and Decoding

The study found that teachers use technology to teach pronunciation and decoding. The qualitative insights highlighted that teachers employ technology, such as audio materials, MP3s, Bluetooth-enabled phones, and phonics applications, to assess and improve students' phonology and decoding skills.

Excerpts 1 to 4 provide evidence for the utilisation of technology in teaching pronunciation and decoding.

Excerpt 1: "I put the printed materials in front of the students with audio" (WAPSHS PT1)

Excerpt 2: "I tried to use my phone and connect to Bluetooth" (NKSHS P T1)

Excerpt 3: "I utilise phones for decoding to obtain accurate pronunciations" (AKUSS PT1)

Excerpt 4: "We download phonics apps that work with an MP3 player and play them for them in class" (ASSH PT1).

The quantitative data affirms the finding from the qualitative results as 57.8% respondents responded as having “sometimes 35.9%, often 15.6% and always 6.3%” used technology to teach decoding skills. This finding confirms studies by Akkara et al. (2020) and Hamad et al. (2019) who found that teachers used technology in teaching reading to improve students’ reading pronunciation and decoding abilities.

Enhancing Reading Comprehension

Concerning enhancing reading comprehension, the qualitative data emphasised the use of technology to display materials on laptop screens and engage students in reading activities. Excerpts 5 to 7 of the pattern codes proved these as shown below;

Excerpt 5 “I show the material on the laptop screen, and one of the students reads aloud to the class so they can hear it” (NKSHS PT3).

Excerpt 6 “I use technology to look up the meanings of terms during reading comprehension” (ASSHS PT3).

Excerpt 7 “I display the information on the laptop screen and one of the students reads aloud for them to listen” (NKSHS PT3).

This is confirmed by the quantitative findings. The majority (51.6%) of respondents reported always using technology to assist learners in developing comprehension skills, indicating a consistent integration of technology to enhance reading comprehension. Furthermore, the frequency of technology use in teaching reading aligns with the qualitative insights, with a substantial proportion reporting often incorporating technology into reading instruction. This finding aligns with Khuram Shahzad et al. (2021), who found that students’ reading comprehension improved significantly using computer mediated instruction (CMI).

Active and Critical Reading

Active and critical reading, as highlighted in the qualitative phase, involves teachers intentionally using technology to promote engaged and critical reading skills among students. Excerpts 8 and 9 proved this as shown below:

Excerpt 8 “I use technology to help them be active in reading, remember what they read and make their own notes” (NKSHS PT1).

Excerpt 9 “I see that it helps them to easily understand and retain the information” (ASSHS PT2).

The quantitative results reinforce this alignment, as a significant number of teachers reported using technology always (37.5%) and often (31.3%) to assist learners in developing active and critical reading skills respectively. Similarly, for critical reading, the quantitative data corresponds with the qualitative findings, with a substantial portion of teachers reporting often and sometimes using technology for this purpose. This finding resonates with Abbasian and Azeez (2021) who used technology, such as online resources to improve L2 students' reading abilities. The result was positive.

Vocabulary development

There was integration of technology for vocabulary development. Excerpt 10 and 11 showed this;

Excerpt 10 “I utilise an e-dictionary and other phone apps that deal with sound in vocabulary development to help them with the proper sound and vocabulary acquisition” (AKUSS PT1).

Excerpt 11 “I use mobile phone to build my students vocabulary” (NKSHS PT1).

This finds support in the quantitative results. The data indicates that a considerable number of teachers (48.4%) reported often using technology to assist learners in developing vocabulary. This resonates with the qualitative insights, where teachers highlighted the deliberate use of technology, such as electronic dictionaries and mobile phone applications, for vocabulary enhancement. This finding confirmed Pahamzah et al. (2022) who examined the effectiveness of utilising the software Kahoot in improving students and found that students' vocabulary learning improved as a result of having used technology.

Improving Fluency

For improving fluency, the qualitative data emphasised the intentional use of technology in reading lessons, incorporating audiobooks, podcasts, and native speaker recordings. Excerpts 12 to 14 proved this;

Excerpt 12 “I use technology to improve their fluency by focusing on their listening and speaking” (ASSHS PT2).

Excerpt 13 “I use audio-books and podcasts to improve students’ fluency” (WAPSHS PT2).

Excerpt 14 “I record a native speaker's audio of the sound I want to teach and allow my students to pronounce before I add my African accent” (NKSHS PT2).

The quantitative findings substantiate this alignment, with a majority (54.7%) of teachers reporting often using technology to assist learners in developing fluency. The use of audiobooks and podcasts is explicitly mentioned in the qualitative phase and is reflected in the quantitative data. This finding approves Ali (2021) who found that students' phonic awareness and fluency increased when they used smartphones to listen to native speakers.

The results of the study align with the theoretical framework that guided it. In the context of this work the study employed the theories of Mayer's Cognitive Theory of Multimedia Learning (CTML) and schema theory as the framework. In the context of pronunciation and decoding skills, the emphasis on using technology, including audio materials and phonics applications, resonates with Mayer's CTML, which posits that meaningful learning occurs when students integrate words and pictures with appropriate prior knowledge. The incorporation of technology for reading comprehension aligns with schema theory, emphasising the interactive process between the reader's background knowledge and the text. Teachers' intentional use of technology to display materials and engage students in reading activities reflects the application of both content schemata (knowledge about the world, culture) and formal schemata (knowledge about discourse structure). Moreover, the focus on active and critical reading, facilitated by technology, corresponds with the idea that comprehension involves one's knowledge of the world, as proposed by schema theory. The deliberate use of technology for vocabulary development and fluency enhancement is also in line with Mayer's CTML, as it seeks to optimise information presentation similar to learners' cognitive processes, promoting better retention and application of language skills (Mayer, 2009; Verhoeven & Perfetti, 2008; Warschauer & Matuchniak, 2010).

4.5.2 Benefits associated with the use of technology in teaching reading in English as a second language in Offinso North District

The second research question sought to analyse the benefits associated with the use of technology in teaching reading in English as a second language in Offinso North District. The findings show that the benefits associated with the use of technology in teaching reading in English as a second language in Offinso North District includes

increased students' engagement, enhanced pronunciation and decoding skills, increased motivation and participation, enhanced reading comprehension skills, and increased academic performance.

Increased Students' Engagement

The study found increased students' engagement as a benefit of using technology in L2 classrooms, both qualitative and quantitative data converge on the positive impact of technology on students' engagement. The qualitative insights from teachers' interviews emphasise the noticeable rise in students' commitment to learning when technology is incorporated into reading lessons. Excerpts 17 and 18 proved this;

Excerpt 17 “They become active in class and now speak with confidence” (WAPSHS PT2).

Excerpt 18 “They are able to remember easily when I do lesson closure” (AKUSS PT1).

This is supported by the quantitative data, where a majority of respondents either agree or strongly agree (78.2%) that technology increases student engagement. Teachers in the interviews highlighted that students become more active, confident, and participative when technology is used in lessons. This alignment suggests a consistent positive perception regarding the role of technology in fostering student engagement. This finding confirms Murphy et al. (2003) whose study showed that the use of technological tools as a supplement to the curriculum increased the learners' engagement in L2.

Increased Motivation and Participation

Moreover, increased motivation and participation was another benefit of using technology in L2 classrooms. The qualitative interviews consistently highlight that the use of technology in teaching reading contributes to increased student motivation and

active participation. Teachers noted that technology fosters enthusiasm, a desire for learning, and perseverance among students. Excerpts 22 and 23 evidenced this;

Excerpt 22 “It Fosters perseverance and a receptive memory” (NKSHS PT3).

Excerpt 23 “Students feel motivated to learn and their enthusiasm goes up” (ASSHS PT2).

The quantitative data further supports these qualitative insights, with an overwhelming majority (90.7%) of respondents either agreeing or strongly agreeing that technology improves student motivation. This alignment emphasises the positive impact of technology on creating a conducive learning environment, fostering students' eagerness to participate actively in reading-related activities. The findings support the results of Cutter (2015) who found that students were motivated more while they are working on computers and use modern devices than they are working with textbooks.

Enhanced Reading Comprehension Skills.

Furthermore, the study showed that enhanced reading comprehension skills was a benefit of using technology in second language classrooms. Both qualitative and quantitative data indicate positive outcomes related to enhanced reading comprehension skills through the use of technology. In the interviews, teachers reported improvements in students' understanding of reading, fluency, and the ability to distinguish between sounds and spellings. Excerpts 24 and 25 proved this;

Excerpt 24 “They can go online, listen to word pronunciations, practice speaking, and even understand the meaning of words” (AKUSS PT1).

Excerpt 25 “students have gained a deeper comprehension than they would have with abstract instruction” (NKSHS PT2).

The quantitative results reflect this, with a substantial majority (78.1%) of respondents either agreeing or strongly agreeing that technology contributes to improved reading comprehension skills. The alignment between qualitative emphasis on online resources, word pronunciations, and practicing speaking, and quantitative affirmation underscores the multifaceted role of technology in advancing students' comprehension abilities. This supports the findings of Kuo et al. (2022) who found that using technology platform enriched students' English language learning experience and enhanced their reading comprehension.

Lastly, both data showed increased academic performance or greater enjoyment of the reading process. The qualitative interviews shed light on the positive impact of technology on academic performance, with teachers reporting improved grades and students' ability to use phones and ICT labs for language skills. Excerpts 26 and 27 support this;

Increased Academic Performance

Excerpt 26 “They also learned how to look up words they don't understand on their phone and look up reading passages using the ICT lab” (NKSHS PT1).

Excerpt 27 “They can use specific words in their writing” (ASSHS PT3)

The quantitative findings support this, as a majority (86.0%) of respondents either agree or strongly agree that technology leads to greater enjoyment of the reading process. This alignment highlights that technology not only contributes to academic success but also enhances students' overall enjoyment of the reading experience. This results confirms Aziz (2022) who found that the use of technology in learning English as a second language has positive impacts on academic performance by providing innovative and convenient tools for instruction.

The results based on increased students' engagement, enhanced pronunciation and decoding skills, increased motivation and participation, enhanced reading comprehension skills, and increased academic performance or greater enjoyment of the reading process reveal a consistent alignment between qualitative and quantitative findings. Both research approaches underscore the positive influence of technology on various aspects of teaching and learning reading in English as a second language in the Offinso North District, reinforcing the multifaceted benefits associated with the integration of technology into language education

The findings of the study on the benefits associated with the use of technology in teaching reading in English as a second language in the Offinso North District align with the theoretical frameworks of Mayer's Cognitive Theory of Multimedia Learning (CTML) and schema theory. In the context of increased students' engagement, the positive impact of technology resonates with CTML's principles of meaningful learning through the integration of words and pictures, fostering better retention and comprehension. The enhanced pronunciation and decoding skills, as highlighted in both qualitative and quantitative data, align with CTML's emphasis on optimising information presentation similar to learners' cognitive processes. The increased motivation and participation, identified as a benefit, correspond with schema theory, emphasising the interactive process between background knowledge and text, as technology serves to activate and enrich students' schemata. The improvement in reading comprehension skills aligns with both theories, emphasising the role of prior knowledge (schema) and the effective integration of multimedia elements to enhance learning. Lastly, the positive impact on academic performance and greater enjoyment of the reading process aligns with CTML's principles of active processing and meaningful learning.

4.5.3 Challenges teachers face using technology in teaching reading in English as a second language in Offinso North District

The third research question sought to examine the challenges associated with the use of technology in teaching reading in English as a second language in Offinso North District. The findings shows that the challenges associated with the use of technology in teaching reading in English as a second language in Offinso North District includes limited access to technology, limited digital literacy skills, electricity problems, limited internet connectivity, and difficulty in decoding.

Limited access to technology

The findings revealed limited access to technology was a challenge. The qualitative phase emphasises that a significant challenge in integrating technology into reading instruction is the limited access to essential tools such as laptops and projectors. Teachers often need to borrow or rent these tools from external sources, indicating financial pressures on schools and teachers. Additionally, students' lack of smartphones further restricts their participation in online activities. This is evidenced in excerpts 28, 29 and 30 below;

Excerpt 28 “The school is not having laptops and projector” (ASSH PT1).

Excerpt 29 “Most of our students are not able to get access to smartphones to go online” (AKUSS PT1).

Excerpt 30 “We don't have enough computers for students to study with” (NKSHS PT1).

The quantitative data aligns with these qualitative insights, showing that a significant proportion (64.1%) of respondents often or always face limited access to technology. This consistency in findings underscores the pervasive nature of the challenge, indicating a digital divide and resource inadequacies within the educational infrastructure. Lack of access to technology resources is a major disadvantage for

those schools which can barely afford or do not have access to a computer (Coghlan 2004). Lai and Kritsonis (2006) opines that the initial startup expenses and the costs of hardware and computer equipment are also an issue for low-budget schools.

Limited digital literacy skills

The findings also revealed limited digital literacy skills as a challenge. Both qualitative and quantitative data reveal challenges related to limited digital literacy skills among teachers and students. Teachers express difficulties in handling technological devices during lessons, leading to disruptions. Students' reluctance to embrace digital methods due to their inability to handle technology is also highlighted. This is highlighted in excerpts 31 to 33 below;

Excerpt 31 “These technologies at times do disappoint” (WAPSHS PT1).

Excerpt 32 “Some of the students are not willing to change to the new ways of using technology” (AKUSS PT1).

Excerpt 33 “Some of them do not know how to use these devices” (NKSHS PT2).

The quantitative data shows that a half (50%) of respondents often or always face limited digital literacy skills. This underscores the need for better training and upskilling programs for educators and students to enhance their proficiency in utilising technology effectively for reading instruction. According to NEA (2008), without the necessary resources to provide continuous technological training to improve digital literacy skills of teachers, schools and districts will continue to experience a major barrier to technology implementation.

Electricity Problems

In addition, the findings revealed electricity problems. The findings shed light on electricity problems as a major hindrance to the effective use of technology in

teaching reading. Frequent power outages and inconsistent power supply disrupt lessons, forcing teachers to resort to alternative plans such as charging devices outside classrooms. Excerpts 34 to 36 depicts this;

Excerpt 34 “At times while you're presenting, the light will unexpectedly go out” (NKSHS PT3).

Excerpt 35 “The school does not have electricity in the classrooms” (NKSHS PT1).

Excerpt 36 “We have inconsistent power supply” (ASSHS PT3).

Thus, they have limited access to software or apps for reading which is confirmed by 48.4% of the respondents in the quantitative data. According to Pearson (2015), this problem can affect internet access to technology devices, especially, in rural schools and older building without proper power voltage to support multiple tech devices. Farrell et al. (2010) opines that the efforts of teachers who integrate technology in teaching have been frustrated by inconsistent electrical supply, and lack of technical support services particularly in rural areas.

Limited Internet Connectivity

Moreover, there was limited internet connectivity revealed in the findings. Limited internet connectivity emerges as a crucial challenge affecting the use of technology in teaching reading. Unreliable Wi-Fi and slow loading of online materials disrupt lessons and hinder the overall effectiveness of technology in the classroom. Excerpts 37 to 39 demonstrate this as below;

Excerpt 37 “The biggest challenge is the network” (ASSHS PT2).

Excerpt 38 “The bigger challenge is internet connectivity” (AKUSS PT1).

Excerpt 39 “Sometimes too, the Wi-Fi will be off for some time” (ASSH PT1).

The quantitative data indicates that a substantial proportion (59.4%) of respondents often or always face limited internet connectivity. This highlights the need for improved infrastructure to ensure seamless internet access for teachers and students during reading instruction. Coghlan (2004) opines that lack of access to technology resources that requires an internet connection is a major disadvantage for schools and individuals.

Difficulty in Decoding

Furthermore, the findings revealed difficulty in decoding. The qualitative phase emphasises challenges related to decoding when utilising technology in reading instruction. Technicalities associated with decoding words, especially when pronounced by foreigners with different accents, pose difficulties for both instructors and learners. Excerpts 40 to 41 depicts this;

Excerpt 40 “Decoding some of the words is so technical” (ASSH PT1).

Excerpt 41 “I rather spent so much time explaining what the whole thing is all about” (NKSHS PT3).

The quantitative data reveals that a majority (71.9%) of respondents disagree or strongly disagree that using technology is challenging for teaching decoding skills. This suggests a nuanced perspective, with some educators perceiving decoding as a less challenging aspect of technology integration. This result is consistent with Büyükahıska and Uyar (2020) who found that students faced difficulties in decoding words, especially when pronounced by foreigners with different accents.

The challenges associated with the use of technology in teaching reading in English as a second language in Offinso North District align with the theoretical frameworks of Mayer's Cognitive Theory of Multimedia Learning (CTML) and schema theory. The

limited access to technology, particularly the scarcity of essential tools, resonates with CTML's principle of the dual-channel assumption, emphasising the importance of aligning information presentation with learners' cognitive processes. The difficulties that come with the use of technology in teaching the reading of English as a second language in the Offinso North District are consistent with Mayer's Cognitive Theory of Multimedia Learning (CTML) and schema theory. As per CTML's two assumptions, which focus on cognitive processing processes in learners, limited access to these tools, including dual channel assumption is talked about by CTML. According to CTML's active processing assumption, it can be seen that digital literacy skills are not enough among teachers as well as students who need more intensive training and retraining programs for them to be proficient in using the technology efficiently. The power failures that affect classes demonstrate consistency between schema theory and a text interactivity approach based on prior knowledge because without constant power supply, it becomes difficult to integrate technology well hence affecting learning environment. In addition, scarcity of internet facilities is a problem which CTML advocates for when optimising information presentation; reliable internet connectivity therefore remains crucial for effective multimedia learning.

4.6 Chapter Summary

This chapter analyzed and discussed data from both qualitative and quantitative sources. Thematic analysis and descriptive statistics revealed that teachers use technology to enhance pronunciation, decoding, comprehension, vocabulary, and fluency in reading English in the four selected SHS in Offinso-North District. While the impact has been largely positive, challenges such as limited access, digital literacy gaps, poor electricity, and internet issues were noted. Participants recommended

improved technological infrastructure to support effective integration of technology in reading instruction.



CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Overview

This chapter presents the concluding aspects of the study, which explored the use of technology in teaching reading in English in selected Senior High Schools in the Offinso North District of Ghana. It begins with a summary of the study's purpose, which was to examine how English Language teachers integrate technology into reading instruction, the benefits they associate with its use, and the challenges they encounter. The chapter also revisits the study's theoretical foundation—Mayer's Cognitive Theory of Multimedia Learning and Schema Theory—and the exploratory sequential mixed-methods design employed. It further discusses the key findings in relation to the research objectives, draws relevant conclusions, and offers actionable recommendations for educational practice and policy. Finally, the chapter outlines limitations of the study and proposes areas for future research to build on these findings.

5.1 Summary

This chapter is presented in four sections. The first section presents an overall overview of the study followed by the chapter summary, then the major findings of the study and their conclusions, further is corresponding recommendations for future research.

5.2 Major findings

The major findings of the study are presented in line with the research objectives/questions spelt out for the study.

- (i) Firstly, research question one was targeted at exploring teacher's use of technology in teaching reading in English in four selected senior high schools in Offinso North District. The findings show that teachers use technology to enhance reading comprehension, vocabulary development, improve fluency, promote active and critical reading, and enhance pronunciation and decoding.
- (ii) Secondly, research question two was targeted at analysing the benefits teachers associated with the use of technology in teaching reading in English in four selected senior high schools in Offinso North District in Offinso North District. The findings showed that the benefits teachers associated with the use of technology in teaching reading in English in four selected senior high schools in Offinso North District includes increased students' engagement, increased motivation and participation, enhanced reading comprehension skills, enhanced pronunciation and decoding skills and increased academic performance.
- (iii) Thirdly, research question three was targeted at examining the challenges teachers face with the use of technology in teaching reading in English as a second language in Offinso North District. The findings show that the challenges teachers faced with the use of technology in teaching reading in English in Offinso North District includes limited access to technology, limited digital literacy skills, electricity problems, limited internet connectivity, and difficulty in decoding.

5.3 Conclusions

Based on the findings of the study, the following conclusions have been drawn in line with the study's objectives/questions:

- i. The emphasis on vocabulary development, enhancing comprehension, fluency improvement, pronunciation and decoding, , promoting active and critical reading, shows a diverse and comprehensive integration of technology into teaching activities in the four senior high school in the Offinso North District. Technology is therefore used as a tool for addressing multiple dimensions of teaching reading in English.
- ii. The outcomes associated with technology use in the teaching of reading in English are positive. This implies that the integration of technology contributes significantly to creating a conducive learning environment and fostering academic success among students in Offinso North District.
- iii. Limited access to technology, insufficient digital literacy skills among both teachers and students, electricity issues, constrained internet connectivity, and difficulties in decoding pose a formidable challenge to the use of technology in teaching reading in English as a second language in Offinso North District.

5.4 Recommendations for Practice

Based on the findings and conclusions of the study, the following recommendations have been made:

- (i) The Ministry of Education should prioritise improving the technological infrastructure in senior high schools within the Offinso North District to support effective reading instruction. This includes ensuring reliable electricity, providing access to essential digital devices such as tablets or computers, and enhancing internet connectivity. Strengthening these infrastructural elements will enable teachers to integrate digital reading tools, multimedia resources, and online texts that can enhance students' reading

comprehension, vocabulary development, and overall engagement with reading activities.

- (ii) The Ministry of Education and Ghana Education Service should invest in training programs specifically aimed at enhancing teachers' digital literacy skills for teaching reading. Continuous professional development workshops should be organised to equip teachers with the knowledge and strategies to effectively integrate digital reading tools, multimedia content, and interactive platforms into reading instruction, thereby improving students' comprehension and engagement.
- (iii) Teachers should actively seek professional development opportunities specifically aimed at enhancing their skills in using technology for teaching reading. They are encouraged to attend workshops, participate in webinars, or pursue further education in educational technology to learn effective strategies for integrating digital tools into reading instruction, such as using e-books, reading apps, and online comprehension platforms.

5.5 Recommendations for Further Studies

The researcher recommends for further research work into the following areas to build on the current research to provide a holistic and a thorough understanding of the role of technology in ESL education in Ghana, ultimately contributing to more effective teaching practices and improved learner outcomes

- (i) For future studies, it is recommended that researchers use observation as a formal data collection instrument in addition to initial familiarisation with schools and English language teachers. Incorporating structured observations can provide a richer and more comprehensive data set by capture real-time

classroom dynamics, teaching practices, and student interactions with digital gadgets, thereby enhancing the findings of the study.

- (ii) Future research should explore the impact of Computer-Assisted Language Learning (CALL) on reading comprehension among Senior High School ESL students. This line of inquiry would examine how CALL tools—such as interactive reading software, digital texts with embedded glossaries, reading comprehension games, and audio-visual supports—affect students' ability to understand, analyse, and engage with texts in English. Such studies could provide valuable insights into best practices for integrating technology into reading instruction, curriculum design, teacher training, and policy decisions regarding the use of educational technology in ESL classrooms.
- (iii) Future research may extend beyond the Offinso-North District to include a broader range of district within Ghana. This will allow for a comparative analysis of how varying levels of infrastructure and resources impact the integration of technology in ESL reading instruction across different contexts.
- (iv) While this study focuses on reading skills, future research should explore the impact of technology on other language skills such as speaking, listening, and writing. This holistic approach can help educators understand how technology can support overall language development in ESL learners, and identify integrated strategies that enhance comprehensive language proficiency.

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APPENDICES

Appendix A

Letter of Introduction



August 09, 2023

TO WHOM IT MAY CONCERN:

Dear Sir/Madam,

**LETTER OF INTRODUCTION:
GABRIEL ADU-MENSAH (202139515)**

Please, we write to introduce the above person who is an M.Phil. student of the Department of English Education, University of Education to you.

He has requested this letter to enable him to collect data at your establishment. His research topic is "*Utilizing Technologies for Teaching L2 reading in Offinso North*". We would therefore be grateful if he is given the necessary assistance he seeks.

Thank you.

Yours faithfully,

A handwritten signature in blue ink, which appears to read "Debrah", is shown within a rectangular box.

**Michelle Debrah (Ms.)
Ag. Head of Department**



Appendix B

Interview Guide for Teachers

UNIVERSITY OF EDUCATION, WINNEBA

DEPARTMENT OF ENGLISH LANGUAGE EDUCATION

TECHNOLOGY UTILISATION IN TEACHING THE READING OF L2 IN

OFFINSO NORTH DISTRICT: AN EXPLORATORY STUDY

INTERVIEW GUIDE FOR TEACHER RESPONDENTS

SCHOOL _____

DATE _____

PARTICIPANT'S CODE NAME _____

My name is Gabriel Adu-Mensah. I am a graduate student of the Department of English Language Education at the University of Education, Winneba. I am conducting a study on technology utilisation in teaching reading in English as a second language (L2) in Offinso North District. You are requested to kindly help by participating in this oral interview as honest as possible. Your responses will be treated confidential. Please, no attempt will be made to disclose any information related to you in my final report. Be as accurate as possible to enable me get valid information.

Thank you for your cooperation

Section A: Teachers' use of technology in teaching reading in English as a second language in Offinso North District

1. How long have you been teaching English Language?
2. How long have you been using technology in your teaching?
3. What motivated you to start using technology in your teaching?
4. How frequently do you incorporate technology in your reading lessons?
5. Which specific technologies do you use to teach reading?
6. Can you describe how you integrate technology into your reading lessons?

7. [Follow-up question] Are there any specific strategies or approaches you employ when using technology to teach reading?
8. Can you please talk about how you use technology to teach any number of the following reading skills: (i) Decoding, (ii) Vocabulary Development, (iii) Fluency, (iv) Skimming and Scanning, (v) Active Reading, (vi) Critical Reading and (vii) Comprehension?

Section B: Benefits associated with the use of technology in teaching reading in English as a second language in Offinso North District

9. In your experience, what positive outcomes have you observed when using technology to teach reading?
10. [Follow up question] Can you please share your thoughts on how the use of technology has positively impacted the development of the following reading skills: (i) Decoding, (ii) Vocabulary Development, (iii) Fluency, (iv) Skimming and Scanning, (v) Active Reading, (vi) Critical Reading and (vii) Comprehension?

Section C: Challenges associated with the use of technology in teaching reading in English as a second language in Offinso North District

11. Can you please talk about the challenges you have encountered while using technology to teach reading?
12. [Follow-up question] Can you please share your insights on the challenges associated with using technology to assist in developing the following reading skills: (i) Decoding, (ii) Vocabulary Development, (iii) Fluency, (iv) Skimming and Scanning, (v) Active Reading, (vi) Critical Reading and (vii) Comprehension?

Appendix C

Questionnaire for Teachers

UNIVERSITY OF EDUCATION, WINNEBA

DEPARTMENT OF ENGLISH LANGUAGE EDUCATION

TECHNOLOGY UTILISATION IN TEACHING THE READING OF L2 IN

OFFINSO NORTH DISTRICT: AN EXPLORATORY STUDY

My name is Gabriel Adu-Mensah. I am a graduate student of the Department of English Language Education at the University of Education, Winneba. I am conducting a study on the use of technology in teaching the reading of L2 in Offinso North District. You are requested to kindly help by responding to few questions as honest as possible. Your responses will be treated confidential. Please, no attempt will be made to disclose any information related to you in my final report. Be as accurate as possible to enable me get valid information. Thank you for your cooperation.

Section A: Teachers' use of technology in teaching reading.

1. How long have you been teaching English Language?
1-5years [] 6-10 years [] 11-15 years [] 16-20 years []
15-20 years [] 20 years and above []
2. How long have you been using technology in your English lessons?
About a year [] for the past 2 years [] for the past 3 years []for
the past 4 years [] Five (5) years or more []
3. Please rate the frequency of your use of technology in teaching reading. Tick [✓] one choice.
1 – Never [] 2- Sometimes [] 4 – Often [] 5 – Always []

4. Please rate the extent to which you utilise the following technologies in teaching reading	Never	Sometimes (Once a semester)	Often (2X a month)	Always (Full usage)
Computers/laptops				
Tablets				
Interactive whiteboards				
E-readers/e-books				
Language learning apps/software				

5. Please rate your use of technology to assist learners develop the following reading skills	Never	Sometimes (Once a semester)	Often (2X a month)	Always (Full usage)
Decoding				
Vocabulary				
Fluency				
Skimming and Scanning				
Active Reading				
Critical Reading				
Comprehension				

6. Please rate your implementation of these technological strategies in the teaching of reading	Never	Sometimes (Once a semester)	Often (2X a month)	Always (Full usage)
Using E-Books with whole class to help learners develop vocabulary				
Using Digital Annotations to foster Active Reading Skills				
Guiding learners to use Digital Text highlighting tools to develop skimming and Scanning				
Using Virtual Libraries to allow learners decode written words into spoken language				

Facilitating learners comprehension through the use of interactive quizzes and assessments				
Enhancing learners critical reading skills through the use of digital text ticket to summarising critical insights				
Improving learners' fluency through audiobooks and podcasts				

Please indicate other strategies you use if not included

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Section B: Benefits associated with the use of technology in teaching reading.

7. Please rate your agreement with the following statements about the benefits of using technology in teaching reading.	Strongly disagree	Disagree	Agree	Strongly agree
Increased student engagement				
Improved student motivation				
Enhanced reading comprehension skills				
Led to greater enjoyment of the reading process				
8. Please rate your use of technology to assist learners develop these reading skills	Never	Sometimes (Once a semester)	Often (2X a month)	Always (Full usage)
Decoding				
Fluency				
Vocabulary Acquisition				
Active Reading				
Critical Reading				
Skimming and Scanning				
Comprehension				

Section C: Challenges associated with the use of technology in teaching reading

9. Please indicate the rate at which you encounter the following challenges in using technology to teach reading.	Never	Sometimes (Once a semester)	Often (2X a month)	Always (Full usage)
Limited access to technology				
Limited digital literacy skills				
Lack of professional development opportunities				
Limited access to digital reading materials				
Adapting to appropriate instructional strategies				
Privacy and security concerns				
Limited internet connectivity				
Limited access to software or apps for reading				
Teacher workload				

10. I find it difficult to use technology to teach the following reading skills	Strongly disagree	Disagree	Agree	Strongly agree
Decoding				
Fluency				
Vocabulary				
Active Reading				
Critical Reading				
Skimming and Scanning				
Comprehension				

Section D: Demographic Data

11. Please indicate your age range?

12. 20-25 [☐] 25- 30 [☐] 30-35 [☐] 35 or older [☐]

13. Gender: Male [☐] Female [☐]

14. What is your educational level?

Diploma [☐] Degree (BA) [☐] MPhil, M.A, M.Ed [☐]

PHD [☐]

