SIMON DIEDONG DOMBO UNIVERSITY OF BUSINESS AND

INTEGRATED DEVELOPMENT STUDIES

WA

EXPLORING E-LEARNING ADOPTION IN TERTIARY INSTITUTIONS IN THE UPPER WEST REGION, GHANA

FREDRICK KUUPILLE

2024

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Thesis submitted to the Department of Informatics, Faculty of Information and Communication Technology, Simon Diedong Dombo University of Business and Integrated Development Studies, in partial fulfilment of the requirements for the award of Master of Philosophy in Informatics

FEBRUARY, 2024

DECLARATION

STUDENT

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

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SUPERVISORS

I hereby declare that the preparation and presentation of the thesis was supervised in accordance with the guidelines on supervision of thesis laid down by the SIMON DIEDONG DOMBO UNIVERSITY OF BUSINESS AND INTEGRATED DEVELOPMENT STUDIES

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DEDICATION

To my family

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ABSTRACT

E-learning is becoming increasingly prevalent in higher education contexts, allowing institutions to provide high-quality, accessible education to their students. However, tertiary institutions in the Upper West Region often face significant challenges in adopting and utilizing e-learning due to organizational, environmental, and technological barriers. This study therefore aims to examine the current state of e-learning adoption in tertiary institutions in Ghana, identify the factors influencing its adoption and use, and provide recommendations to improve its utilization and effectiveness. To achieve this goal, the researcher employed a qualitative research design. Semi-structured interviews and focus group discussions were conducted with faculty members, students, and IT Officers at four tertiary institutions in the Upper West Region of Ghana. The data were thematically analyzed using NVivo 12. The results of the study revealed that e-learning is poorly developed in the four institutions, as it is plagued with many obstacles. The most prominent barriers identified were the lack of technical capabilities, the lack of faculty and student preparedness, and the lack of technological infrastructure. The findings of this study provide valuable insights into the current state of e-learning adoption in tertiary institutions in the Upper West Region. The study also offers several implications for policymakers and managers in their considerations of implementing and utilizing e-learning in these contexts. Finally, this study provides recommendations for future research to further understand and support the development and effective use of e-learning in tertiary institutions.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The swift progress in Information and Communication Technology (ICT) during the twenty-first century has brought about substantial advancements and has exerted an impact on the evolving needs of contemporary society (Andoh, 2012). The development of ICT has led to transformations in our everyday routines, transitioning from traditional letters to email, in-person market shopping to online shopping, and conventional classroom learning to e-learning, as posited by Bosamia (2013). In the area of education, Ansong et al. (2017) stated that ICT has transformed the conventional in-person interaction between students and teachers within traditional brick-and-mortar classrooms into real-time electronic learning.

Electronic learning (e-learning), which is popularly referred to as online learning, digital learning, or web-based learning, has no single definition as its meaning varies in the context of business, training, and education. In the context of teaching and learning (education), the focus of this study is e-learning, which is defined as any method of learning that utilizes a computer for acquiring a task, skill, or process while the instructor conducts teaching sessions online (Bosamia, 2013). Mahanta & Ahmed (2012) also defined e-learning as any education delivered through the internet, a network, or a single computer. Forms of e-learning include web-based learning, computer-based learning, virtual classrooms, and digital collaboration. Essentially, e-learning depends on electronic technologies such as computers, networks, the internet, smartphones, and iPads as its primary mode of delivery of instructions. Significantly, e-learning encompasses both asynchronous learning, characterized by intermittent interaction and a time delay at the learner's own pace, and synchronous learning, which involves real-time online interaction where learning occurs simultaneously and at a consistent pace. Relying on Moore et al. (2011), e-learning in this study refers to the use of applications, programs, objects, platforms, and websites that can facilitate learning for individuals.

As guided by Mehta et al. (2019), e-learning adoption is the acceptance of technology by an individual for learning purposes. Generally, e-learning adoption offers enormous benefits to the individual learners, the instructors, and collectively to the institution. E-learning empowers individual learners with a range of benefits that cater to diverse

learning styles, schedules, and preferences. Students enjoy the freedom to engage with course materials, attend lectures, and complete assignments at their preferred speed, nurturing a customized learning journey (Al Lily et al., 2020). This flexibility offers notable benefits to individuals outside the traditional student demographic, including working professionals and those facing geographical limitations. E-learning encourages self-directed learning and critical thinking as learners navigate digital resources, engage in interactive activities, and participate in asynchronous discussions (Millimouno et al., 2021). Moreover, incorporating multimedia components like videos, simulations, and interactive quizzes elevates engagement levels and promotes better retention of knowledge (Konstantinidou & Nisiforou, 2022).

For instructors, e-learning offers transformative tools to enhance pedagogical practices and facilitate effective teaching. E-learning platforms provide instructors with the ability to design interactive and multimedia-rich courses, fostering active engagement and learner-centered instruction (Asunka, 2016). The digital environment enables instructors to track learners' progress, identify areas of difficulty, and provide timely feedback, promoting a responsive and personalized teaching approach (Setyaningrum, 2018). Collaboration and communication tools within e-learning platforms facilitate effective interaction between instructors and learners, overcoming barriers of time and distance (Brady et al., 2010). Furthermore, e-learning encourages instructors to innovate, reflect on their teaching methodologies, and adapt to evolving educational technologies, ultimately enhancing their professional growth (Mujiono & Herawati, 2021). Collectively, educational institutions stand to gain manifold benefits from embracing e-learning as a pedagogical strategy. E-learning allows institutions to overcome physical space limitations, offering courses to a global audience without the constraints of classroom capacity (Alouffi et al., 2021). Cost savings are realized through reduced infrastructure requirements, as e-learning minimizes the need for physical facilities and associated resources (Stecuła & Wolniak, 2022). The scalability of e-learning enables institutions to offer a wider array of courses, accommodating diverse disciplines and learner interests. Additionally, the integration of data analytics in e-learning platforms empowers institutions to gather insights into learner behaviors, preferences, and outcomes, facilitating data-driven decision-making for curriculum development and continuous improvement (Namoun & Alshanqiti, 2021).

Globally, e-learning has gained popularity in recent years due to advancements in technology and the widespread availability of digital devices and the internet (Alam et al., 2023). Furthermore, the COVID-19 pandemic necessitated a significant shift in how students and educators across all levels engage with each other and educational resources, leading to the suspension of in-person learning (Toquero, 2020). For instance, as of May 25, 2020, UNESCO projected that 990,324,537 learners, or 56.6% of all enrolled students, had been impacted by COVID-19-related school closures (Toquero, 2020). To continue learning, e-learning and, for that matter, learning management systems (LMSs) were the pivotal points in the interactions between teachers and learners. This is evidence, as students' submissions and activity on e-learning platforms for the period of March to June 2020 alone nearly doubled the pre-pandemic usage levels of it (Prat et al., 2021).

In the Ghanaian context, the need for the adoption of e-learning became evident during the surge of Corona virus disease (COVID-19) cases. During that period, Ghanaian educational institutions, ranging from tertiary to basic schools, were ordered to close except for final-year students (Amanor-Mfoafo et al., 2020). Educational institutions were therefore forced to shift from traditional face-to-face classroom teaching and learning to e-learning using various platforms such as Google Classroom, Telegram, Zoom, and other institutionally built learning management systems.

1.2 Motivation for the Study

E-learning is a crucial part of modern education and provides opportunities for student-tailored learning, among other benefits. In light of the government's commitment to advancing technology in education and bridging the digital divide within the country, there is a significant interest in harnessing its potential to enhance the overall educational experience, increase access to learning opportunities, and improve the quality of education (Ohemeng & Ofosu-Adarkwa, 2014). Unfortunately, the available literature addressing the adoption of e-learning within tertiary institutions, particularly those situated in the Upper West Region of Ghana, has been strikingly deficient. A conspicuous gap exists in the corpus of scholarly work that delves into the intricate realm of e-learning adoption dynamics within this specific geographic and educational context. The scarcity of comprehensive studies focusing on e-learning adoption within these tertiary institutions casts a shadow over our understanding of the multifaceted

factors that influence the integration of technology-mediated learning methods. This glaring void in the scholarly discourse serves as a poignant reminder of the need for rigorous research endeavors that illuminate the adoption landscape within this region, thereby enriching our comprehension of the challenges, opportunities, and dynamics at play.

E-learning has been extensively studied in the context of well-endowed tertiary institutions, often neglecting the specific needs and challenges of emerging tertiary institutions. Much of the research in e-learning has focused on established universities with robust infrastructure and resources, while the unique circumstances and requirements of newly established tertiary institutions have received limited attention. This research gap hinders understanding of how e-learning can be effectively adopted and optimized in these other institutions. For instance, Boateng et al. (2016) studied the determinants of e-learning adoption among students. The study focused on the University of Ghana. Similarly, Tagoe (2012) studied students' perceptions of incorporating e-learning into teaching and learning at the University of Ghana. Also, Marfo & Okine (2016) studied the implementation of e-learning in Ghanaian tertiary institutions focused on KNUST. To address this gap, research is needed to explore the unique dynamics and requirements of tertiary institutions, enabling the development of effective e-learning strategies that cater to their specific contexts.

Furthermore, according to Tornatzky & Fleischer (1990), as cited in Dwivedi et al. (2012), the comprehensive adoption of technological innovations by a company is shaped by technological, organizational, and environmental factors. To this extent, these traditional factors have been extensively studied in the adoption of technology in different organizational contexts, including educational establishments (Motaghian et al., 2013; Czerniewicz & Brown, 2009; and Ansong, 2015). Dwivedi et al. (2012) also affirmed that an organization functions along three dimensions: technology, organization, and environment, which influence its ability to adopt or reject new technology. However, in the context of the study of e-learning adoption in educational settings, Garrison & Kanuka (2004), Swan et al. (2009), Moore et al. (2011), and Editors & Stefani (2013 stated pedagogy as a significant factor in e-learning adoption, emphasizing the need for effective instructional strategies, meaningful learning experiences, multimodal approaches, networked connections, and interaction. Interestingly, while there has been extensive research on technological infrastructure,

learner engagement, and instructional design in e-learning, the pedagogical dimension has often received less attention. Reeves et al. (2002) emphasize that, while there is a significant body of research on the technological aspects of e-learning, such as the use of authentic activities, there is a relative lack of research on how pedagogical strategies can enhance learner engagement and outcomes. Bhuasiri et al. (2012) argued that the pedagogical factors that contribute to the success of e-learning communities have been overlooked in research. Furthermore, Katsarou & Chatzipanagiotou (2021) stress the need for more research on how pedagogical strategies and instructional design can influence learner activity and outcomes in e-learning environments. These indicate a gap in the literature on how to effectively design and implement pedagogical approaches in e-learning contexts. This study, therefore, filled this literature gap by exploring the influence of pedagogy on e-learning adoption.

Additionally, ICT has become pervasive in Ghana, where children typically start primary school around the age of five or six and gain access to and commence using ICT devices and services like computers, mobile phones, and the internet for educational purposes (National Communications Authority and Ghana Statistical Service, 2020). Again, a study by Farouq & Mensah (2017) on Ghanaian tertiary students' use of ICT revealed a high prevalence of ownership or access to laptops and smartphones of 85.1% and 99.5%, respectively. Despite these e-learning enabling devices in the hands of students, the adoption of e-learning in tertiary institutions remains very low in Ghana (Aweso et al., 2020). Meanwhile, Kaisara & Bwalya (2021) reported how some developing countries are leveraging e-learning to address the challenge of the increasing number of applicants to tertiary institutions. It is therefore baffling that tertiary institutions in Ghana are not taking advantage of this new learning paradigm. Hence, there is a need for research in this regard.

However, e-learning appears to be gaining ground in most tertiary institutions, especially after the emergence of COVID-19 (Aweso et al., 2020). According to Govindasamy (2002), the effective adoption of e-learning requires careful consideration of various factors, including instructional design principles and guidelines that are specifically tailored to the context of tertiary education. Despite the proliferation of e-learning initiatives, there are no comprehensive and context-specific design guidelines to support the successful adoption of e-learning in tertiary institutions. Aning & Baharum (2020) contended that e-learning must follow guidelines to be effective. Clark

(2002), drawing from Mayer's research on optimizing learning in multimedia through the integration of audio, text, and graphics, identified six media element principles. These principles include the contiguity principle, the modality principle, the redundancy principle, the coherence principle, and the personalization principle. However, when it comes to e-learning, there is a lack of established guidelines for designing and implementing e-learning solutions that cater to the diverse needs of e-learners. Therefore, there is a compelling need to conduct research to develop evidence-based design guidelines that address the unique challenges and requirements of e-learning in tertiary institutions.

The problem, therefore, is the underexplored landscape of e-learning adoption in tertiary institutions, particularly in the Upper West Region of Ghana. Addressing these gaps requires comprehensive research efforts to inform the development of effective e-learning strategies tailored to the Ghanaian tertiary education context. The study therefore sets out to explore the adoption of e-learning in tertiary institutions to give an up-to-date picture of the adoption prospects and challenges of e-learning in these institutions. This would inform policymakers and the various stakeholders about the state of e-learning adoption in tertiary institutions in the Upper West Region.

1.3 Research Purpose

The main purpose of the study is to explore e-learning adoption in tertiary institutions in the Upper West to provide a better understanding of the status and factors that influence the adoption of e-learning technologies and propose effective guidelines for e-learning adoption in tertiary institutions.

1.4 Research Objectives

In relation to the purpose, this research seeks to:

i. Explore the characteristics of e-learning adoption in tertiary institutions in the Upper West Region.
ii. Examine the factors that facilitate or hinder e-learning adoption in tertiary institutions in the Upper West Region.
iii. Develop effective guidelines for the adoption of e-learning in tertiary institutions.

1.5 Research Questions

To achieve the above objectives, this research explores the following questions:

What is the characterization of e-learning adoption in tertiary institutions in the Upper West Region?

What factors influence the adoption of e-learning in tertiary institutions in the Upper West Region?

What are the guidelines for effective design and adoption of e-learning?

1.6 Significance of the Study

Firstly, the findings of this study can contribute to the advancement of educational practices in tertiary institutions in the Upper West Region. E-learning has the potential to provide greater access to quality education, overcome geographical limitations, and promote lifelong learning. By understanding the current state of e-learning adoption in tertiary institutions, the study can identify areas for improvement and guide the development of strategies and interventions to enhance e-learning adoption. These can ultimately lead to improved educational outcomes and increased opportunities for students.

Secondly, the study can shed light on the factors influencing e-learning adoption in the context of tertiary institutions in the Upper West Region. These tertiary institutions in the Upper West Region have unique organizational, economic, and infrastructural characteristics that impact the adoption and effectiveness of e-learning. By assessing the factors that facilitate or hinder e-learning adoption in these tertiary institutions, the study can provide insights into the tertiary institution's specific challenges and opportunities. This knowledge can inform policy decisions, institutional planning, and resource allocation to address the barriers and leverage the strengths of tertiary institutions in promoting e-learning.

Additionally, the study's focus on tertiary institutions in the Upper West Region is significant because these institutions play a crucial role in shaping individuals' skills, knowledge, and competencies in their regions of establishment; therefore, understanding the nature of e-learning adoption in these institutions can have a ripple effect on the overall educational ecosystem. The findings can shape curriculum design, instructional strategies, faculty development programs, and institutional policies related to e-learning by aligning e-learning practices with the needs and aspirations of these institutions.

Furthermore, the study has the potential to contribute to the existing body of knowledge on e-learning adoption in tertiary institutions. While e-learning has gained prominence worldwide, its implementation in tertiary institutions presents unique challenges and opportunities. By conducting research specific to the context of tertiary institutions in the Upper West Region, the study can add to the limited literature on e-learning adoption in the context of the Upper West Region. The insights gained from this study can benefit similar tertiary institutions facing similar challenges, providing valuable guidance for policymakers, educators, and researchers in other tertiary institution contexts.

1.7 Organization of the Study

This study consists of five chapters. The first chapter introduces the research problem, presents the research questions, justifies the significance of the study, outlines the research objectives, and offers a glimpse into the scope and limitations of the research. The second chapter delves into an extensive review of existing literature relevant to the research topic. It explores key concepts, theories, and frameworks that underpin the study. This chapter critically analyzes past research and identifies gaps that the current study aims to address. The synthesis of literature sets the foundation for the subsequent chapters.

The fourth chapter details the research design, data collection methods, and analytical techniques used in the study. It provides a rationale for the chosen methodology, explains the sampling strategy, describes the data collection instruments, and outlines the steps taken to ensure research rigor. Ethical considerations are also addressed in this chapter. The pivotal chapter presents the results of the data analysis process. It begins with an overview of the participants and the data collected. The chapter then unveils the thematic analysis or interpretation of the data, illustrating key findings through textual descriptions, quotes, and possibly visual aids such as tables or diagrams. The chapter then engages in a comprehensive discussion of the research findings in relation to the research questions and the existing literature. It interprets the findings, draws connections to theoretical concepts, and discusses their implications. This chapter also addresses any contradictions or discrepancies between the current study's results and previous research.

The concluding chapter synthesizes the entire study, summarizing the main findings and their implications. It reflects on how the research objectives were met and offers insights

into potential avenues for further research, such as the need for a study on the participation of special needs learners in e-learning. This chapter concludes with recommendations for practitioners, policymakers, and researchers based on the study's outcomes.

1.8 Summary of the Chapter

The Chapter sets the stage for the study by providing an introductory overview. It outlines the background the study, highlighting the growing importance of e-learning in the field of education. The chapter identifies the motivation of the study, objectives, and research questions, emphasizing the need to investigate the adoption of e-learning in tertiary institutions within the specific geographical context of the Upper West Region. Additionally, it presents the significance of the study, the scope and limitations, and the organization of the subsequent chapters.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The initial chapter commenced the study by delineating the research objectives, the research purpose, the research questions, and the study's Significance. Within this specific chapter, literature review has been into pertinent literature concerning the adoption of e-learning, with the aim of identifying research gaps in prior research and to shape the foundation for the current study.

2.1 Learning with Technology

Technology has transformed the world in unexpected ways. It has undeniably become an integral part of our everyday existence, offering unprecedented access to communication, information, and education. In recent years, technology, especially the internet, has played a greater role in the social and academic lives of students (Gallardo-Echenique & Bullen, 2015). To be successful in the classroom, Jackson et al. (2011) argue that students are urged to blend their technical expertise with an intellectual toolkit that includes valuable attributes like teamwork and knowledge. The recent progress in technology and innovation has led to a transformative shift in the teaching and learning process, giving rise to a new paradigm called e-learning.

2.1.1 The Concept of e-learning

According to Abaidoo & Arkorful (2014), there is no single definition for the term e-learning. Al-Azawei et al. (2016) believe this is the case for other new terminologies, and e-learning is not an exception. For instance, Atari & Outum (2019) explained e-learning as using electronic devices to teach, learn, interact, share ideas, access information, and control educational activities between instructors and students in an online setting. Similarly, Pyochi & Tinu (2018) characterized it as the use of the Internet, intranets and extranets, audio and video recordings, satellite broadcasting, and interactive television, not just for delivering content but also for fostering interaction among participants. According to Aboderin (2015), Hubackova (2015), Kayange (2019), and Mwakyusa et al. (2016), e-learning is the integration and use of information technology resources like computers, software, and the internet in the process of teaching and learning in education. Romanyshyn et al. (2019) also stated that e-learning

is the use of networked computer-based technologies to support the acquisition and development of knowledge and skills. This definition emphasizes the use of digital technologies and the role they play in supporting learning.

Furthermore, Liu & Yu (2022) described e-learning as an educational process that allows the flexible transfer of knowledge and skills to a wide audience, regardless of their locations and schedules. Conversely, according to the American Society for Training and Development (ASTD), e-learning encompasses a wide array of applications and procedures, such as web-based learning, computer-based learning, virtual classrooms, and digital collaboration. A substantial portion of these educational resources is disseminated through channels like the Internet, intranet (LAN/WAN), audio and video recordings, satellite broadcasting, interactive television, and CD-ROM (Hilali et al., 2023). Aboagye et al. (2020) further describe e-learning as a structured learning approach that employs electronic resources. This approach allows for instruction to occur both within and outside traditional classrooms, with computer technology and the Internet serving as its primary components.

Based on the aforementioned, defining e-learning as a concept is not a straightforward task, and the diverse definitions mentioned above underscore the challenge of reaching a consensus. However, the definition of Aboagye et al. (2020), which emphasized the importance of the internet and multimedia technologies in creating an environment that supports learning in a formal system such as a tertiary institution, has been adopted for this study.

2.2.1 Forms of e-learning

There are different forms of e-learning, including online courses, webinars, virtual classrooms, and educational videos. All these forms of e-learning can be delivered through different platforms, such as learning management systems, video conferencing tools, and social media (Zahra et al., 2023). A combination of education and technology provides a new way for people to learn in the era of information and communication technology. This form of learning currently depends on networks and computers but will likely evolve into systems consisting of a variety of channels (e.g., wireless, satellite) and technologies (e.g., cellular phones, PDAs) as they are developed and adopted. E-learning can take the form of courses as well as modules and smaller learning objects. E-learning may incorporate synchronous or asynchronous access and may be distributed geographically with varied limits of time.

2.3.2 The Evolution of e-learning

In the realm of e-learning, there is no solitary evolutionary path. Nonetheless, the pioneering efforts of individuals such as Suppes (1971) at Stanford and Don Bitzer at the University of Illinois are often recognized as the cornerstones of contemporary e-learning practices in business and higher education. Additionally, figures like Porter and Uttal have made valuable contributions in this field (Tagoe, 2012). In 1966, it was contended that in the future, students would potentially have access to a personal tutor service akin to the historical practice of individual tutors serving ancient royalty. These modern-day personal tutors, he envisioned, would manifest in the form of computers (Suppes, 1971).

During the early 1960s, Don Bitzer, while at the University of Illinois, pioneered the development of a timeshared computer system called Programmed Logic for Automatic Teaching Operations (PLATO), which found applications in literacy programs. PLATO allowed students and educators to utilize graphics terminals and TUTOR, an educational programming language, to engage in electronic communication and interaction with fellow users through electronic notes (Suppes, 1971). The predecessor to modern conferencing systems is PLATO. The revolutionary communication capabilities of PLATO laid the groundwork for today's modern conference and messaging systems. While Suppes and Bitzer initially designed this technology as a tool, their visionary approach enabled its diverse applications. Consequently, Blackboard and ANGEL, two widely used e-learning platforms today, can be seen as the successors to PLATO (Suppes, 1971).

Currently, e-learning is changing along with the World Wide Web as a whole, and this change is big enough to merit a new moniker, namely e-learning 2.0 (Pelet et al., n.d.). The new e-learning paradigms are motivated by the rise of Web 2.0. The traditional e-learning platforms relied on Internet technologies to distribute content to students. In the past, the student's role involved absorbing information from readings and generating assignments and coursework for evaluation by the teacher. However, the contemporary e-learning landscape places a strong emphasis on social learning and the utilization of social tools such as blogs, wikis, podcasts, and virtual worlds. Long-tail learning is another name for this phenomenon, which is gaining more and more acclaim (John et al., 2008). Nicholson & Nicholson (2007) argued that conducting a comparative analysis of e-learning practices across different time periods is challenging and comes with

numerous methodological complexities. Nevertheless, they distilled the historical context of e-learning by focusing on its macro-level characteristics, as outlined in Table 2-1.

Table 2-1: The changing focus of educational technology over the past 30 years (after Charp, 1997; Herrington, Reeves et al., 2005; Leinonen, 2005; Mortera-Gutiérrez, 2006; Nicholson & McDougall, 2005; Pilla, Nakayama et al., 2006; THOMSON, 2005

Era	Focus	Educational Characteristics
1975-1985	Programming; Drill and practice; Computer-assisted learning – CAL	Learning and instructional methods rooted in behaviorism, the development of tools and problem-solving through programming, and interactive user-computer interactions at the local level.
1983-1990	Computer-Based Training; Multimedia;	The utilization of traditional CAL models in conjunction with interactive multimedia courseware, a prevalence of passive learner models, and the emergence of constructivist principles in the design and utilization of educational software.
1990-1995	Web-based Training	Content delivery via the internet, the development of active learner models, widespread adoption of constructivist viewpoints, and relatively restricted end-user interactions.
1995-2005	E-Learning	Delivery of flexible courseware through the internet, heightened interactivity, the use of online multimedia courseware, prevalent utilization of distributed constructivist and cognitivist models, and remote user-to-user interactions.

Source: Adapted from (Nicholson & Nicholson, 2007)

Initially, educational technology has undergone significant changes in terms of its focus and applications over the past 30 years. Educational technology was primarily focused on improving the efficiency and effectiveness of teaching and learning through the use of technology. However, in recent years, there has been a shift towards a more student-

centered approach, with the emphasis on creating meaningful and engaging learning experiences that meet the needs and preferences of individual learners (Sabagh et al., 2021).

In the 1980s and 1990s, educational technology was mainly focused on the use of computer-based instructional programs, such as drill and practice and tutorial systems, to support teaching and learning (An & A, 2021). The focus was on the use of technology as a means of increasing the efficiency and effectiveness of instruction. In the 2000s, the focus of educational technology shifted towards the use of multimedia and interactive technologies to create engaging and meaningful learning experiences (Lauria, 2017). This shift was accompanied by the emergence of new pedagogical approaches, such as constructivism and project-based learning, which placed greater emphasis on student-centered learning and the use of technology as a tool for collaboration and knowledge creation (Sabagh et al., 2021).

Recently, there has been a burgeoning fascination with harnessing emerging technologies like mobile devices, virtual reality, and artificial intelligence to craft inventive and tailored learning encounters. These technologies have the potential to transform the way we teach and learn by providing learners with greater flexibility, choice, and control over their learning (Paper, 2018).

2.3.3 Features of e-learning

To further expatiate what constituents' e-learning is and what does not, after a working definition has been established for this study Highlighting the characteristics of e-learning is crucial, as emphasized by Lowenthal et al. (2009), as cited in Ansong et al. (2016). They argued that issues arise among researchers, practitioners, and students when e-learning is not properly contextualized. Ansong et al. (2016) therefore presented the following distinctive characteristics of e-learning to help the understanding of the different elements in e-learning technology:.

Synchronous and Asynchronous: One of the earliest differentiations in e-learning was based on whether it was synchronous or asynchronous. It is considered synchronous when both the instructor and the learner are online simultaneously, engaging in communication and instructional activities. Conversely, it is categorized as asynchronous when it permits instructors and learners to be online at different times or

to progress entirely at their own self-paced speed without the constant presence of an instructor (Mehri & Uplane, 2015).

Instructor-led and learner-led: instructor-led and learner-led classification is another frequently used criterion for differentiating e-learning. When a single instructor is the only one facilitating a course, it is referred to as instructor-led e-learning. This content is often custom-created with a specific group of students in mind. Instructor-led courses of this kind generally adhere to the traditional semester schedule within an asynchronous framework. Conversely, learner-led e-learning refers to a scenario in which the learner has the freedom to progress at their individual speed. This form of e-learning is more common in professional settings as opposed to higher education institutions, which are guided by syllabi and academic calendars.

Harasim's Topology: According to Harasim (2006), e-learning can be categorized into three main types: Online Collaborative Learning: This approach brings students and a teacher together using asynchronous, synchronous, or a combination of both forms of communication. Online Distance Education: This method is primarily self-paced and relies on technology (such as email) for students to access course materials and submit assignments. Online Computer-Based Training: In this type, the web is utilized to access online courseware or individualized learning modules.

Models of Sharma & Mishra (2007): As cited in Sharma & Mishra (2014), this model puts e-learning into four (4) major categories. Web-based learning encompasses various forms of media, including digital audio and video, delivered and utilized over the internet. It encompasses both synchronous and asynchronous interaction. On the other hand, internet-based learning incorporates digital audio and video media primarily delivered and used over the internet, often in an asynchronous manner. Computer-based learning, however, encompasses all media types, including digital audio and video, and is used on standalone computers, including those not connected to the internet. This category also encompasses learning via CD-ROMs and floppy disks.

2.4 Empirical Review of e-learning Research

Having explained the various concepts in the study, it is now appropriate to contextualize the study in the available literature in information systems (IS) by reviewing available resources and materials that have a strong relation to the topic under study. Onwuegbuzie et al. (2012) stated that a thorough literature review is the basis for

substantial research. Similarly, Fraenkel & Wallen (2006), as cited in Uzunboylu & Ozdamli (2011), also indicated that a literature review helps the researcher get an idea of what others have done in relation to the topic under study. Adoption in the context of this study is based on the definition of Ansong et al. (2016), who characterized e-learning as the utilization of e-learning systems for academic and educational objectives.

2.4.1 Classification of e-learning literature

To structure the literature review, research on e-learning was scrutinized through the following thematic lenses: geographical context, issues, methodological approaches, and conceptual approaches. As with the approach taken by Ansong et al. (2017) in their reviews, this study was carried out in four distinct phases: classification of literature, methodological review, presentation of findings, and summarization of the outcomes. This review contributed to an enhanced comprehension of the e-learning literature, facilitating the identification of novel research directions and furnishing a robust theoretical basis for the proposed study.

2.4.2 Methodology of the Literature Review

The methodology employed for the literature review is depicted in Figure 2-1. The initial step involved searching for and retrieving current articles from prominent information systems journals within selected academic databases, notably Emerald Insight, ScienceDirect, EBSCOHOST, and JSTOR. To ensure the freshness of the articles, those published between 2012 and 2022 were selected for inclusion in the review. The subsequent step was the categorization of these articles into relevant and less relevant ones. Furthermore, a thorough examination was conducted to ascertain the scholarly nature of the articles, with a preference for those incorporating theories. The exclusion criteria for the articles selected included articles earlier than 2012, articles that are not relevant to the study, and non-theory articles. The final step entailed reviewing the articles according to the identified thematic areas. In total, 160 research papers were subjected to review, of which 15 were used in the research.

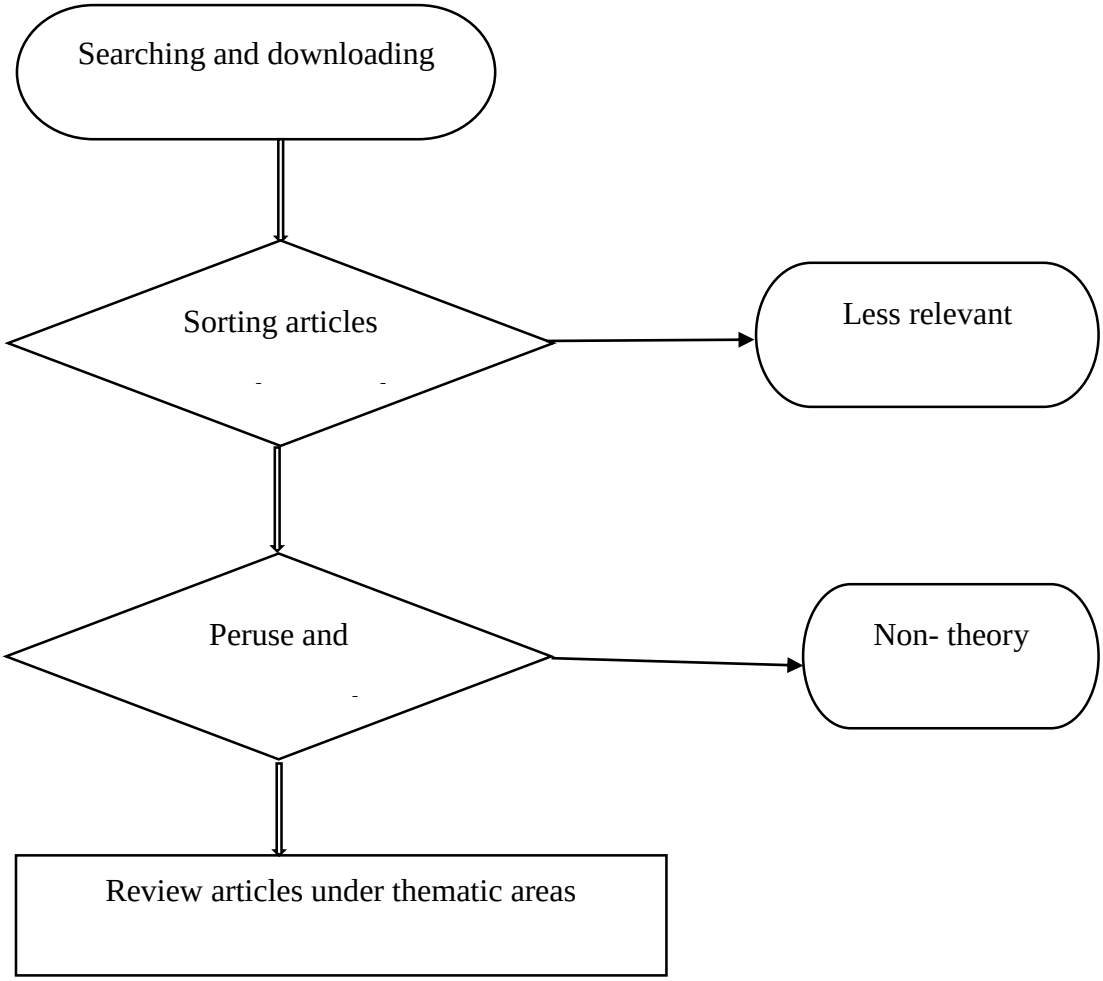

Figure 2-1: Flow chart of the Methodology of Literature Review

Source: Author's construction

2.4.3 Mapping e-learning research: Issue and evidence

This section presents the organization of the articles utilized in the review across different themes, with a particular focus on research related to the adoption of e-learning. Table 2-1 depicts a selection of the articles employed in the review.

Table 2-2: Literature Review issues and gaps

Research	The aim of the Research	Theoretical Model / Research Method	Key Research Findings	Research Gap/Further Research
Tagoe (2012)	examine students' perceptions on incorporating e-learning into teaching and learning at the University of Ghana	Technology Acceptance Model (TAM) Quantitative Ghana	Male students exhibited a higher tendency to utilize the internet compared to their female counterparts. Furthermore, there existed a correlation between the duration of students' internet usage and the frequency with which they accessed the internet.	This study was a single-case investigation conducted at a single university, involving a sample of just 600 students out of a total population of 15,762. This sample size falls short of meeting the sample parameters as per the guidelines outlined by (Krejcie & Morgan, 1970; Israel 2012). Hence, there is the need for conducting multiple case research studies with a larger sample size. Alternatively, future research could consider employing a qualitative approach to validate the obtained findings.
Oye, Iahad, Rahim & Zairah (2012)	The paper examined the intention to accept and use ICT among university academic staff of Adamawa	Unified Theory of Acceptance and Use of	The research validates that the UTAUT model effectively predicts the successful acceptance of ICT usage in both universities.	According to Krejcie & Morgan (1970) and Israel (2012) criterion of sample size determination, the sample of 100 for each university appeared not statistically representative. Further research is

	State University (ADSU) and Lagos state University (LASU).	Technology (UTAUT) Quantitative Nigeria	In the context of ADSU, the most influential predictor of academic staff's intention to accept and use ICT is Effort Expectancy (EE), whereas in LASU, it is Performance Expectancy (PE). Additionally, the study affirms that in both institutions, some educators still harbor apprehensions about incorporating ICT into their teaching and learning practices. Beyond the UTAUT model, the most influential factor influencing the behavioral intention of academic staff to embrace and employ ICT in both ADSU and LASU is their attitudes towards the use of technology.	required with large sample or future research could use qualitative for detail understanding of the phenomena
Punnoose (2012)	This study was to find some of the predominant factors	TAM Quantitative	The key determinants of the intention to participate in e-	It is imperative to conduct cross-cultural comparisons and longitudinal studies to explore

	that determine the intention of students to use eLearning.	Thailand	learning were found to be Perceived Usefulness (PU), Subjective Norms (SN), and Perceived Ease of Use.	potential shifts over time and the cultural influences on the significance of factors affecting eLearning adoption. This is particularly relevant as a majority of the respondents were based in Thailand during their eLearning courses.
(Purnomo & Lee, 2013)	The objective was to assess the potential expansion of the Technology Acceptance Model (TAM) to incorporate external variables such as computer self-efficacy, prior experience, computer anxiety, management support, and compatibility.	TAM Quantitative Indonesia	Management support, prior experience, computer anxiety, and compatibility have demonstrated predictive capability regarding the intention to utilize e-learning systems.	The survey utilized a non-random convenience sample of responses from participants. Future research should adopt a more systematic and representative sampling approach to encompass a broader and more diverse sample. Additionally, it is worth noting that certain significant variables, including both individual and organizational factors that influence technology acceptance, were not included in this study. Therefore, there is a need for larger-scale research that incorporates a wider range of external variables in future investigations.
Mtebe & Raisamo (2014)	The study investigated students' behavioural intention to adopt and use e-learning	UTAUT Quantitative Tanzania	Performance expectancy, effort expectancy, social influence, and facilitating conditions had positive effects on students' e-learning acceptance with performance	The study was constrained by its focus on just five institutions in East African countries (Tanzania and Kenya), which were chosen for convenience. It is imperative for future research to broaden the scope by including additional East African nations in the

			expectancy being the strongest predictor.	sample population. Moreover, there is a potential for enhancing the UTAUT model by introducing new factors, such as perceived enjoyment and perceived mobility value Lu et al., (2017), self-management of learning, perceived playfulness and attitude, given that the current study was limited to only four variables.
Aydin et al. (2015)	The study investigated vocational school students' practices and perceptions of online learning based.	Conceptual framework Qualitative Turkey	The interaction between students and teachers plays a role in shaping students' perceptions and approaches to online learning. Additionally, it was observed that the respondents held certain negative perceptions regarding the utilization and integration of technology in lectures.	Evaluating the interplay between perception, approach, and outcome within the model could offer valuable insights into optimizing the design of online education. This study primarily explored the connection between perception and outcome, without delving deeply into their relationship. Future research would benefit from examining additional factors, such as the role of online learning within universities and the standards for teaching and learning in online education.
Bauk (2015)	The study analyzed students' level of satisfaction with the available e-learning	Conceptual model Quantitative	Incorporating technical reliability within the system and including self-evaluation features are essential categories that should be	For future research, a larger number of researchers, teachers, and students should be involved in redesigning the questionnaires to evaluate the performances of e-learning systems.

	resources in a blended environment.	Montenegro	integrated into the e-learning system.	
(Ngampornchai, 2016)	The study explored student readiness for online learning in the Northeast of Thailand.	UTAUT Quantitative Thailand	Students generally hold a somewhat favorable view of e-learning. They extensively utilize mobile technologies and have experience with social media; however, they lack familiarity with other collaborative e-learning tools.	Some items in this set were not clear and needed further clarification.
(Tarhini et al., 2016)	The study examines the effects of individual-level culture on the adoption and acceptance of e-learning tools by students in Lebanon .	Technology Acceptance Model (TAM). Lebanon	Perceived usefulness (PU), perceived ease of use (PEOU), subjective norms (SN), and the quality of work life are identified as significant factors influencing students' behavioral intention (BI) toward e-learning.	The sample consisted of students from two private universities, and it's important to acknowledge that their perspectives may vary from those attending public universities. This raises the question of whether the findings can be extrapolated to other public universities in Lebanon.
(Ansong et al., 2016)	The study explored the determinants of e-learning	TOE framework Quantitative	The combined factors of IT infrastructure, perceived ease of use, organizational compatibility, expected benefits, educational	The study was limited to the University of Ghana, hence, making it difficult to generalize the findings to other developing countries. As such, future studies can be carried out using more than one

	adoption in universities in developing countries.	Ghana	partnerships, competitive advantage, e-learning course content, and e-learning curriculum collectively influence the adoption of e-learning.	university in different developing countries, to provide for comparison and validation of findings.
(Mehta et al., 2019)	The study investigate the influence of individual-level values on the adoption of e-learning	UTAUT, Schwartz's Theory of Human Values, Values-Enhanced Technology Adoption (VETA) model Gambia and the UK.	The impact of self-improvement values within the model is mediated through social influence, price value, and performance expectancy..	It is crucial to explore the diverse contextual perspectives of UTAUT2 variables. Hence, conducting a qualitative study would be advantageous in unpacking these variables. While the VETA model has been developed and validated in this research, additional efforts are needed to extend the findings to different contexts and ascertain the model's broader applicability.
(Salloum et al., 2019)	To study the factors that affect university students' acceptance of E-learning systems	Structural Equation Modelling (SEM), self-	Knowledge sharing and educational quality within universities positively impact students' acceptance of e-learning. However, innovativeness and trust	Future studies should be carried out involving more universities in the UAE. Furthermore, a total of just 251 students participated in the study, the sample size should be increased. Future research

		developed Model Quantitative UAE	were not observed to have a significant effect on the acceptance of the e-learning system. These factors can be categorized as 'drivers for e-learning adoption' and 'inhibitors that impede e-learning adoption	could employ data collection tools through interviews and focus groups as well.
(Phutela & Dwivedi, 2020)	To uncover how e-learning is giving a new shape to the education industry	Interpretative Phenomenological Analysis (IPA) Qualitative India	Drivers for e-learning adoption" and "inhibitors which restrict the adoption of e-learning	The study has been conducted only for college-going students; hence, the results cannot be generalized to the e-learning adoption by school-going students or working professionals.
(Karkar et al., 2020)	To identify and evaluate the challenges of adoption of e-learning	TAM Quantitative Iraq	The belief that social media is more user-friendly in comparison to a specialized e-learning platform like Moodle can dissuade both educators and learners from embracing the provided e-learning platform, irrespective of its actual	Future work include further studies to confirm the variables and validate the findings through a student survey and implementation of the proposed solution.

			utility, motivation, and training initiatives.	
(Amankwa & Asiedu, 2022)	To investigate the determinants that will influence students' acceptance of the electronic learning (e-learning) system of education after the COVID-19 emergency	Health belief Model and TAM Quantitative Ghana	Student attitude is strongly shaped by the perceived usefulness and moderately influenced by the perceived severity. Meanwhile, students' intention to use e-learning is moderately influenced by the perceived severity of the ongoing COVID-19 pandemic but significantly affected by their attitude towards usage.	The utilization of convenient sampling to select the cases for the study could introduce a potential bias. Furthermore, data collection was confined to students from just three second-cycle institutions, which may restrict the applicability of the results. Future research endeavors should consider expanding the scope to include a broader selection of second-cycle institutions, facilitating a larger sample size and increased statistical power.

2.4.4 Discussion of issues and evidence

The review encompassed an examination of the study's objectives, the employed theoretical framework, the principal discoveries, and potential areas warranting further investigation. Within the literature, a multitude of methodological approaches and diverse research models were employed, unveiling an array of hypotheses regarding the factors influencing or impeding the adoption of e-learning in higher education institutions. The main outcomes of this review are summarized in Table 2.2. This section consequently delves into an exploration of the pivotal findings derived from the study.

In the Ghanaian context, Tagoe (2012) examined students' perceptions of incorporating e-learning into teaching and learning using the Technology Acceptance Model (TAM) and discovered that length of time and frequency of internet usage are functions of e-learning adoption. The findings of Tagoe (2012) of students' experience in the use of ICT tools were not significantly different from the findings of Ngampornchai (2016), when he found that students have a slightly positive perception toward e-learning. They use mobile technologies extensively and have experience. Though the two studies offered such great insight into the readiness of students to adopt e-learning, they fell short in terms of sample size and the utilization of a single case study, which could potentially affect generalization (Lee et al., 2003).

According to Ansong et al. (2016), e-learning adoption is influenced collectively by IT infrastructure, perceived ease of use, organizational compatibility, anticipated benefits, educational partnerships, competitive advantages, e-learning course content, and the e-learning curriculum. The study's key participants were university students, lecturers, and e-learning administrators at the University of Ghana. The study expanded previous studies, which focused on a single stakeholder's approach, to a multi-stakeholder's approach, validating the findings from different perspectives. The study was, however, limited in terms of its utilization of only the University of Ghana as the study institution. Moreover, limiting the study to the University of Ghana, which is a developed university in Ghana with all the materials required for academic work, the findings of this study may not be applicable to emerging tertiary institutions. Tarhini et al. (2016) shared some of the findings with Ansong et al. (2016), as their study reported perceived usefulness (PU), perceived ease of use (PEOU), and quality of work life to be significant determinants of students' behavioural intention (BI) towards e-learning. Similarly,

Amankwa & Asiedu (2022) further confirmed perceived ease of use and intention to use as determinants of e-learning adoption.

Furthermore, from the literature review, the dominant methodological approach to the study of e-learning has been quantitative study. Examples include Amankwa & Asiedu (2022); Ansong et al. (2016); and Tarhini et al. (2016). Meanwhile, Eze et al. (2013) argued that when a phenomenon is reduced to figures, it does not accurately paint the picture required. This therefore calls for the need to employ a qualitative approach to examine the phenomenon.

Additionally, Mtebe & Raisamo (2014) examined the intentions of students in Tanzania to adopt and utilize e-learning. They found that factors such as performance expectancy, effort expectancy, social influence, and facilitating conditions positively influenced students' acceptance of e-learning, with performance expectancy emerging as the most influential predictor. Performance expectancy and effort expectancy were found to be the most significant predictors of intention to use the system in a study conducted by Oye et al. (2012), who examined the effects of the UTAUT model and the ICT theoretical framework on some academicians at a university. The use of convenient sampling in selecting the cases for study may be a subject of bias. The data collection involved students from only three second-cycle institutions, thereby limiting the generalizability of the findings.

In terms of methodological approach from the literature review, almost all the studies utilized quantitative methods of research (Tagoe, 2012; Oye, Iahad, Rahim & Zairah, 2012; Punnoose, 2012; Purnomo & Lee, 2013; Khechine et al., 2014; Mtebe & Raisamo, 2014; Aydin et al., 2015; Bauk, 2015; Tarhini et al., 2016; Abdullah & Ward, 2016; Ansong et al., 2016; and son), with only Phutela & Dwivedi (2019) using qualitative method of research, while Eze et al. (2013) postulated that qualitative method offers deep insight into any phenomenon of study. Also, all these studies, as part of their recommendations for future research, recommended the use of qualitative research to validate the findings of the quantitative results.

Second, the studies in Ghana focused primarily on institutions with existing e-learning systems. For instance, the studies of Ansong et al. (2016), Azumah (2011), and Marfo & Okine (2016) all turn to assessing internal factors such as perceived usefulness, ease

of use, and satisfaction rather than external factors such as the influence of the organization, the environment, and the availability of the technology for e-learning.

2.4.5 Barriers to e-learning Adoption

The review of the literature revealed some factors that militate against the adoption of e-learning. These factors have been grouped under the following thematic areas: High cost, poor infrastructure, low ICT skills, unwillingness to accept e-learning, poor internet connections, and lack of access to electricity. These barriers to e-learning are summarized and presented in Table 2-3.

Table 2-3: Barriers of e-learning adoption

Barrier	Explanation/Evidence of barrier
High cost	The initial cost of e-learning uptake may be expensive (Gama et al., 2022). This is because the technology needed for effective e-learning may not be cheap thereby affecting the e-learning negatively. For instance, Sinha & Bagarukayo (2019) stated that the high cost of purchasing ICT equipment affect the adoption of online learning. This Turk & Cherney (2016) believe can make e-learning costly than face-to-face.
Poor infrastructure	A study by Mtebe & Raisamo (2014) to investigate factors that contribute towards students' adoption and use of mobile learning in East African revealed that in Tanzania, 68% of teachers indicated they have no access to computer, while 73% reported they experienced low internet bandwidth. This support the claim that inadequate access to technology such as studying materials and computers can leave students marginalized and anxious (Queiros & de Villiers, 2016).
Low ICT skills	E-learning is generally limited by inadequate background experience and a lack of technology abilities by students and teachers (Basar et al., 2021). It required advanced technology abilities so occasionally schools must engage tutors from outside. Low technology skills have therefore become an obstacle to setting up online education (Luongo & Brien, 2018). According to Mtebe & Raisamo (2014), a significant 63% of teachers participating in online learning in Tanzania were

	found to be deficient in the requisite skills for developing or utilizing online educational resources.
Unwillingness to accept e-learning	The majority of academics are wary about and reject internet education (Bowen et al., 2012). In comparison to conventional teaching methods, some academics also believe that creating online courses takes more time (Teaching, 2016) .Online learning is said to be hindered by faculty members who are reluctant to offer online courses and who do not accept online education (Turk et al., 2016).
Poor internet connections and lack of constant supply of electricity	E-learning is negatively impacted by slow and unstable network connections (Tarus et al., 2015). Institutions are discouraged from pursuing online education because of limited internet access, which includes slow internet connections and low speed (Maatuk et al., 2022). E-learning in rural regions might be challenging due to the absence of computers and internet connection in rural houses (Tarus et al., 2015). They further found that lack of constant supply of electricity and internet access is hampering e-learning in rural communities.

Hence, there arises a necessity for a comprehensive framework that can integrate these factors to investigate the adoption of e-learning in tertiary institutions in the Upper West Region.

2.4.5 Voluntary Usage of E-learning

In spite of the barriers discussed, e-learning has become an integral part of tertiary education, offering students flexibility and convenience in accessing educational materials. The voluntary usage of e-learning platforms in tertiary institutions has seen a significant surge in recent years, indicating a growing acceptance and adoption among students. A study by Siemens and Gasevic (2012) found that students appreciate the autonomy e-learning provides, allowing them to tailor their learning experience to suit their individual preferences and schedules. This voluntary engagement underscores the value students place on the benefits offered by e-learning platforms, such as accessibility to resources anytime, anywhere, and the opportunity for self-paced learning.

Moreover, the voluntary usage of e-learning in tertiary institutions has been associated with enhanced student engagement and motivation. Research by Means et al. (2013)

highlights how interactive features and multimedia content incorporated into e-learning modules can captivate students' interest and foster deeper engagement with course materials. By offering interactive quizzes, discussion forums, and multimedia resources, e-learning platforms create an immersive learning environment that encourages active participation and collaboration among students. This heightened level of engagement not only enriches the learning experience but also contributes to improved academic performance and retention rates.

Furthermore, the voluntary adoption of e-learning in tertiary institutions has been instrumental in promoting inclusivity and widening access to education. According to Allen and Seaman (2017), e-learning initiatives have facilitated greater participation among non-traditional students, such as working professionals and individuals with familial responsibilities, who may otherwise be unable to attend traditional on-campus classes. The flexibility afforded by e-learning enables students to balance their academic pursuits with other commitments, thereby democratizing access to higher education and fostering lifelong learning opportunities for diverse learner demographics.

The voluntary usage of e-learning in tertiary institutions reflects a paradigm shift in the way students engage with educational content. With its inherent flexibility, interactivity, and inclusivity, e-learning has emerged as a preferred mode of learning for many students, offering a dynamic and personalized approach to education. As evidenced by empirical research, the voluntary adoption of e-learning platforms not only enhances student autonomy and engagement but also promotes access to education for a broader spectrum of learners. Moving forward, continued investment in e-learning infrastructure and pedagogical innovation will be essential to maximize its potential in facilitating meaningful learning experiences in tertiary education.

2.5 Theoretical Review of Technology Adoption

In this segment of the review, the study's theoretical foundation is established by examining the relevant and up-to-date literature regarding the adoption of e-learning, as discussed in the preceding section. As Swanson & Chermack (2013) suggest, theories are constructed to elucidate, predict, and comprehend phenomena within the confines of critical foundational assumptions. They further contend that a theoretical framework serves as the structure capable of underpinning a research study's theory. Additionally, Creswell & Poth (2016) emphasize that the theory chosen for a study serves as a guiding

force for the entire research endeavor, functioning as an organizing model for framing research questions and shaping the data collection process.

To set the stage for choosing or developing an appropriate research framework for this study, this section discusses a few of the research theories in relation to technology adoption as available in the information systems (IS) literature. The models covered included the Unified Theory of Acceptance and Use of Technology (UTAUT), the Technology, Organization, and Environment (TOE) model, and the Technology Adoption Model (TAM), which were applied to technology adoption at various levels in previous studies.

2.5.1 Technology Acceptance Model (TAM)

The adoption of technology has been extensively studied using the Technology Acceptance Model (TAM). It is the most widely used model in information systems research in respect of technology acceptance and use (Punnoose, 2012; Tagoe, 2012). Davis originally proposed this model in 1986. Since then, the model has proven to be a useful theoretical tool for explaining and predicting how users will adopt and use technology. Ajzen & Fishbein (1980), as cited in Alshurafat et al. (2021), believe that TAM is an extension of the theory of reasoned action (TRA). The Theory of Reasoned Action (TRA) posits that an individual's behavior can predominantly be predicted through the mediating influence of behavioral intention, which is largely shaped by their attitudes toward engaging in the relevant behavior (Wedari et al., 2022). However, TAM offers a strong foundation for tracing how outside factors affect a person's belief, attitude, and intention to use a technology (Davis, 1993).

Additionally, TAM, being an adaptation of the theory of reasoned action, is specifically formulated for modeling user acceptance of technology. According to the theory of reasoned action, beliefs influence attitudes, which lead to intentions, which then form the behavior of a user. TAM therefore adopted this relationship of belief, attitude, intention-behaviour to model users' acceptance of technology (Liu et al., 2010). TAM therefore posits that there are two factors that are very important in influencing technology acceptance: perceived usefulness and perceived ease of use. Davis (1989) contends that the connection between perceived usefulness and perceived ease of use involves perceived usefulness serving as a mediator, influencing the effect of perceived ease of use on the user's attitudes and intentions to use.

The self-reporting issue with the TAM has drawn criticism (Woosley, 2011). As a result, the model frequently measures changes in self-reported use, which is not always accurate. Once more, TAM does not take into account variables that are also impacted by organizational dynamics (Legris et al., 2003).Despite being a very helpful model, TAM has only been shown to explain about 40% of information technology usage in existing studies on adoption, so it is advised that it be expanded to include some social factors and human factors (Legris et al., 2003). In this regard, the use of TAM for this study will not adequately explain the findings of this study.

2.5.2 The Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) is a comprehensive theoretical framework developed by Venkatesh et al. (2016) that aims to explain and predict individuals' acceptance and adoption of technology. UTAUT integrates and extends several existing technology acceptance models, including the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), and the Innovation Diffusion Theory (IDT).

The UTAUT model delineates four primary constructs that impact technology adoption: performance expectancy, effort expectancy, social influence, and facilitating conditions. Performance expectancy encompasses the user's perception of the technology's effectiveness and utility, whereas effort expectancy pertains to the ease of use perception. Social influence encapsulates the influence of social factors on adoption decisions, and facilitating conditions encompass the availability of resources and support (Venkatesh et al., 2016).

The UTAUT model has been widely used in various domains and contexts to study technology acceptance. For example, in a study by Alturki (2022), the UTAUT model was applied to examine the factors influencing the acceptance and use of e-learning systems in Saudi Arabian universities. The study found that performance expectancy, effort expectancy, and facilitating conditions significantly influenced students' intentions to use e-learning systems.

The Unified Theory of Acceptance and Use of Technology (UTAUT) is a popular model for studying technology adoption, including e-learning adoption in tertiary institutions. However, several weaknesses are associated with its use in this context. These include a limited focus on individual factors, neglect of contextual factors, a limited scope of

the model, and inadequate measurement of constructs. (Preston et al., 2010; Venkatesh et al., 2016). These limitations made the UTAUT framework fall short of meeting the objectives of this study.

2.5.3 The Technology Organization and Environment (TOE) Framework

The Technology, Organization, and Environment (TOE) framework is a popular framework for technology adoption developed by Tornatzky and Fleischer (1990). The main constructs identified describe business decision-making behavior in connection with technological advancements. In the TOE framework, firms use both internal and external technology, which together make up the technological context. Organizational context, on the other hand, refers to the descriptive qualities of the organization, such as the size and scope of the firm, the complexity of its managerial structure, and the caliber and extent of its human resources. Finally, environmental context refers to the institution and its dealings with other educational partners, competitors, and the government. The Technology Organization Environment (TOE) framework is a key model for examining institutional contexts that have an impact on how technological innovations are adopted, implemented, and disseminated (Raouf & Naser, 2012).

However, it should be emphasized that the TOE framework resembles previous information system adoption theories in some ways. One such theory that has some similarities to the TOE framework is Roger's Diffusion of Innovation theory. The unique traits of individuals (workers), along with the internal and external qualities of the institution, were given additional weight in Rogers' (1995) theory as the driving forces behind adoption. The TOE framework, on the other hand, integrates the organizational setting with both the traits of the individual and the institution. Figure 3-1 illustrates the elements of the TOE framework and their interplay with technological innovations within organizations.

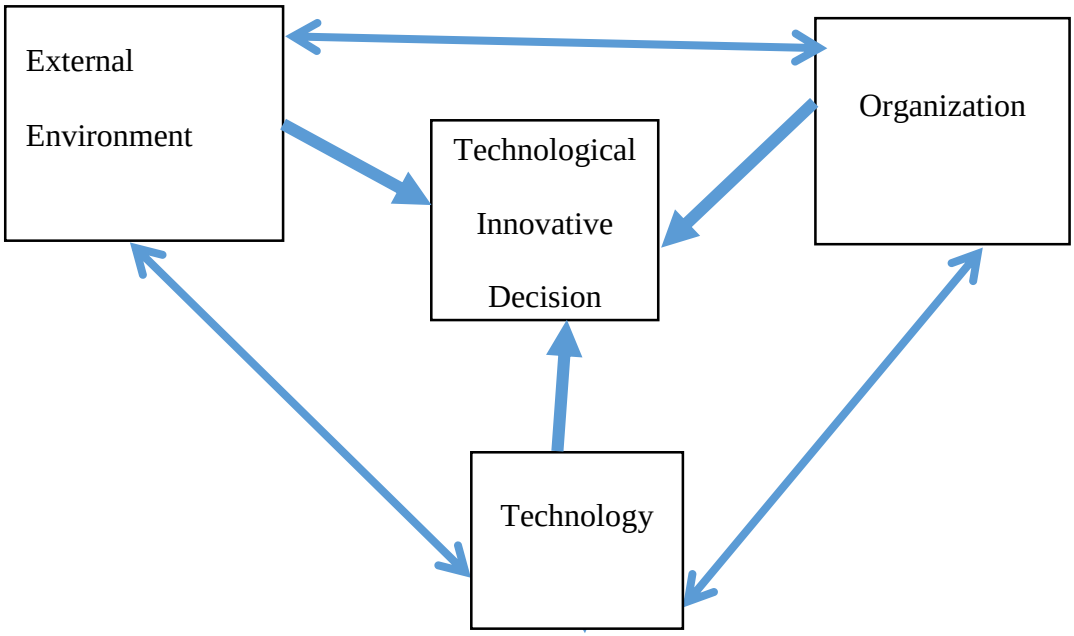

Figure 3-1: Technology, Organization and Environment Framework

Source: Tornatzky & Fleischer (1990)

2.5.4 The Research Model

Upon reviewing various models for the adoption of innovative technology, this study opted for the TOE framework to comprehensively examine the adoption of e-learning. The model has been widely employed in information systems research to investigate various technological innovations (Kayali & Mukhtar, 2016; Kimwise, 2017; Ansong & Boteng, 2017), e-banking (Daka & Phiri, 2019; Kimiagari & Baei, 2021), and 3G mobile communication (Opoku & Adu, 2016; Mardikyan & Uzmaya, 2012). Additionally, the TOE model stands out as the primary framework that places greater emphasis on a variety of individual factors to underscore the unique characteristics of decision-makers. Simultaneously, it acknowledges the impact of technological advancements and the organizational context, encompassing essential business and organizational adjustments driven by industry-specific conditions (Azumah, 2011).

One compelling aspect behind the selection of the TOE framework for adoption is its flexibility. This framework can be effectively employed across a broad spectrum of technologies and contexts, rendering it a versatile instrument for both researchers and practitioners. As noted by Zhu & Kraemer (2005), "the TOE framework is flexible in that it can be used to examine the adoption of different types of technologies across different organizational contexts." Also, the framework considers three primary factors

that influence technology adoption: technological factors, organizational factors, and environmental factors. By considering these factors together, the TOE framework provides a holistic perspective on technology adoption that accounts for a wide range of factors that can impact adoption and assimilation. In addition to the above, the TOE framework has been shown to be effective in predicting and explaining technology adoption in a variety of contexts. For example, a study by Low et al. (2011) found that the TOE framework was effective in explaining the adoption of cloud computing technologies in Taiwanese firms.

However, the TOE framework is typically a workplace model. It had been modified to reflect the context of e-learning adoption in tertiary institutions. The conceptual framework adopted in the study comprises five (5) major components, of which four (4) are independent constructs, namely technology, organization, environment, and pedagogy, and one (1) dependent construct, namely the adoption of e-learning. (see Fig.3-2).

It also highlights the relationship between all variables in this study. The technology component consists of IT infrastructure, complexity, quality information, compatibility, and system quality. The organization component consists of top management support, financial resources, training, relative advantage, and change management to assess the enabling factors and constraints under the organizational construct. The environment component uses government policies, government and external support, and competitive pressure to assess the positivity or negativity of the construct. Also, pedagogical factors refer to the pedagogical considerations associated with the adoption and use of e-learning, including its alignment with learning goals and objectives, pedagogical approaches and strategies, learner characteristics, teacher and instructor characteristics, instructional design and development, technical support and infrastructure, and evaluation and assessment. The study therefore examined the influence of these independent variables on the dependent variable, the adoption of e-learning. (see Fig.3-2).

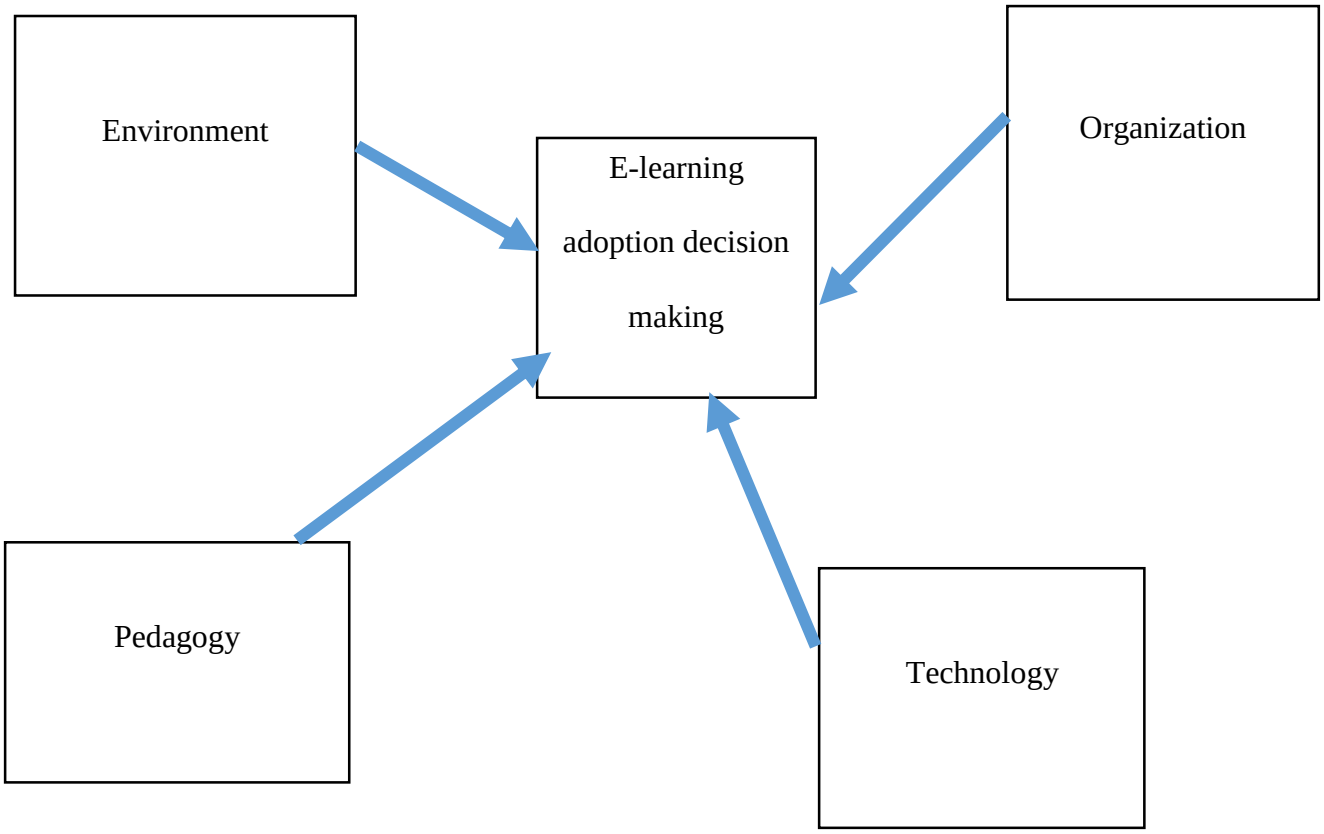

Figure 3-2: Modified TOE Framework

Source: Author construction: Modified TOE Model for E-learning

As shown in Figure 3-2, this current study sought to establish how these constructs are influencing the adoption of e-learning in tertiary institutions. The constructs therefore helped the formulation of interviews and focus group discussions guide.

2.6 Summary of the Chapter

This chapter reviewed relevant literature, which highlighted methodological and practical gaps in the previous studies. Subsequently reviewed relevant theories and expanded TOE framework to pedagogy, which was adopted for this study. The next chapter will discuss the methodology to employ for this study.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

Having reviewed the relevant literature and discussed the theoretical foundation of the study in the previous chapter, this chapter therefore discusses the methodology for conducting the study. According to Kothari (2004), methodology is a way to systematically solve a research problem. The author notes that a well-designed methodology should provide a clear roadmap for the researcher to follow and ensure that the research is conducted in a systematic and structured manner. With this objective in mind, the methodology chapter of this study delves into a comprehensive exploration of philosophical perspectives, research approach, design, purpose, data collection, and data analysis methods.

3.2 The Philosophical Perspective of the Study

The scientific research paradigm encompasses a wide-ranging framework encompassing perceptions, beliefs, and understandings of various ideas and methodologies employed in scientific inquiry (Cohen et al., 2007; Žukauskas et al., 2018). Research paradigms serve as philosophical underpinnings that influence the conduct of research by shaping several key aspects: ontology (pertaining to how reality is perceived), epistemology (concerning the nature of knowledge), axiology (related to the purpose and values inherent in the research process), methodology (outlining the procedures involved in conducting scientific inquiry within the paradigm), and rigor (establishing criteria for maintaining research quality within the paradigm) (Bunniss & Kelly, 2010; Park et al., 2020). Additionally, Ryan (2018) identifies three prominent philosophical research paradigms—positivism, interpretivism, and critical theory—that provide the foundation for research techniques and analysis, each guiding studies towards distinct objectives. Interpretivism, for instance, posits that reality is subjective and can vary depending on the individual (Alharahsheh & Pius, 2020).

This study, however, was conducted in line with the interpretivism paradigm. It is a philosophical perspective that emphasizes the subjective and interpretive nature of human experience. In information system (IS) research, interpretivism has been used to explore the social and cultural aspects of technology use, including issues related to

power, identity, and gender (Orlikowski & Baroudi, 1991). Generally, interpretivist approaches are used when attempting to understand a phenomenon from the perspective of individuals directly involved (Levy, 2015). Relying on Walsham (1995), this study was therefore undertaken from the perspective of the interpretivist paradigm, as it attempts to understand phenomena through the meanings that people assign to the adoption of e-learning in their own context. Also, the selection of the paradigm for this study was made according to the research questions formulated for the study. The interpretivism paradigm is thus adopted for addressing these questions.

3.3 Study Context

The study was carried out at four (4) tertiary institutions in the Upper West Region (UWR) of Ghana. It was not possible to involve all the tertiary institutions in the region because of resource constraints. Four (4) out of the five (5) public degree-awarding tertiary institutions were purposefully selected across the region, taking into consideration old and new institutions, as well as those located in the municipal capital and those in the district capital. This was done to give a very good overview of e-learning adoption across the region. To this extent, the following institutions were therefore selected: Simon Diedong University of Business and Integrated Development Studies (UBIDS), Dr. Hilla Limann Technical University (DHLTU), Nusrat Jahan Ahmadiyya College of Education (NJA CoE), and McCoy College of Education (McCoy CoE). This sample represents one (1) traditional university, one (1) technical university, and two (2) colleges of education in the region (one in a municipal capital and the other in a district capital). The ensuing subsections discussed the selected tertiary institutions in order to contextualize the study.

3.3.1 Simon Diedong University of Business and Integrated Development Studies (UBIDS)

Simon Diedong University of Business and Integrated Development Studies (UBIDS) is the only traditional university in the region producing academic graduates. This institution originated from the former University for Development Studies (UDS) Wa campus. The Simon Diedong Dombo University of Business and Integrated Development Studies (UBIDS) was founded in 2019 through an Act of Parliament (Act 1001) and officially commenced operations in May 2020. Its primary campus is situated in Bamahu, Wa, with the digital address XW-1147-8901.

The legislation (Act 1001, 2019) that establishes the Simon Diedong Dombo University of Business and Integrated Development Studies defines its core mission as being a globally recognized institution specializing in applied research and hands-on education in the fields of business and integrated development studies, along with related disciplines. Within four (4) years of establishment, the university has eight (8) faculties: the Faculty of Planning and Land Management, the School of Business, the Faculty of Integrated Development Studies, the Faculty of Education, the Faculty of Social Science, the Faculty of Law, the Faculty of ICT, and the Faculty of Education. Each of these faculties runs a number of academic programmes and courses as mandated by the Act that established the university (www.ubids.edu.gh).

3.3.2 Dr. Hilla Limann Technical University (DHLTU)

Dr. Hilla Limann Technical University (DHLTU), located in Wa (digital address: XW-0547-6594) started in September 1999 as the then Wa Polytechnic. The first batch of tertiary students were enrolled in 2003 to undertake Higher National Diploma (HND) programs in Agricultural Engineering and Secretaryship and Management Studies. Subsequently, with the enactment of the Technical Universities Act, 2016 (Act 922), the Technical Universities (Amendment) Act 2018 (Act 974), and the Technical Universities (Amendment) Act 2020 (Act 1016), the institution underwent a transformation into a technical university. The university currently has four faculties: the Faculty of Applied Science and Technology, the Faculty of Engineering, the Faculty of Applied Art, Design, and General Studies, and the School of Business (www.dhltu.edu.gh). It is the only technical university in the region.

3.3.3 Nusrat Jahan Ahmadiyya College of Education (NJA CoE)

Nusrat Jahan Ahmadiyya College of Education (NJA CoE) is located in Wa, in the Upper Region of Ghana. The NJA CoE was established in 1982. The college's journey began with a four-year Certificate 'A' post-middle program. By 1991, it had evolved into a three-year post-secondary teacher training college. In 2004, the college introduced the Diploma in Basic Education program. Furthermore, in October 2007, the college was selected as one of the 15 institutions to offer a quasi-specialization in science and mathematics. Additionally, the college welcomes visually impaired students who undergo teacher training. Following a thorough assessment by the National Accreditation Board in October 2007, the college received accreditation at the tertiary level of education. The College runs the following Bachelor of Education programs,

specializing in JHS Education, Primary Education, and Early Childhood Education with an emphasis on TVET and Science (www.njacoe.edu.gh).

NJA College of Education was chosen for this study first because it is the only college in the region that runs early grade specialization, primary specialization, and junior high school specialization with a TVET component. Also, it is the only college in the same town as the other tertiary institutions, UBIDS and DHLTU, and therefore has the possibility of producing interesting data for comparison with the traditional and technical universities.

3.3.4 McCoy College of Education (McCoy CoE)

McCoy College of Education (McCoy CoE) is situated in Nadowli, located in the Upper West Region of Ghana. It was founded in 2014 with the primary aim of preparing teachers for elementary schools. This initiative was in response to a social audit conducted by the Catholic Diocese of Wa in 2011. The college's overarching vision is to offer a high-quality Catholic education that fosters transformational leadership. McCoy CoE is affiliated with the University for Development Studies.The college runs a Bachelor of Education in Junior High School and a Primary Education specialism with courses such as Social Studies, Mathematics, Science, ICT, Religious and Moral Education, Geography, and Ghanaian Language (www.mccoycoe.edu.gh).

McCoy College of Education was also selected because it is the youngest in terms of years of establishment and located in a district capital. By virtue of these unique characteristics of the college, it may also generate interesting data for comparison with other institutions.

3.4 The Study Design

Having established the perspectives and context of the study with a background in the study area, it is imperative to choose the appropriate study design that agrees with the doctrines of the paradigm and supports the purpose of this study. This study therefore employed a qualitative research design in order to explore the research problem in its entirety. Myers (2020) stated that if there is one thing that distinguishes humans from the natural world, it is our ability to talk, hence the motivation for utilizing qualitative research as opposed to quantitative research. Qualitative research methods allow researchers to understand people and the social and cultural contexts within which they live by interacting with them (Creswell & Poth, 2016).

Furthermore, Kaplan & Maxwell (1994) argue that the overridden objective of understanding a phenomenon from the point of view of the participants and its particular social and institutional context would be lost if largely textual data were reduced to numbers. More so, the use of the qualitative research method was considered apt for the study of the adoption of e-learning in tertiary institutions by virtue of the very nature and demands of the study. This study aims at getting a deeper understanding of the phenomena than for purposeful generalizability. In support of this, Eze et al. (2013) opined that qualitative research offers deeper insight into any phenomenon of study than quantitative study would.

The study also employs a case study approach in exploring its research questions. The case study research method is particularly suited to a study such as this because the object of the study is the application of information systems in organizations rather than the technical issues of the systems (Benbasat et al., 2013). Also, the choice of a case study research method was influenced by its popularity and strength in qualitative studies used in information systems (Orlikowski & Baroudi, 1991). Additionally, Yin (2014) stated that the case study research method is very useful for answering "how" and "why" types of research questions, hence the choice.

Yin (2014) distinguishes between two types of case study design: single case and multiple case studies. Accordingly, the rationale for using a single-case design is for cases that are critical, unusual, revelatory, or longitudinal (Yin, 2014). E-learning adoption is not an unusual subject, nor can it be said to be revelatory, especially with respect to its adoption in tertiary institutions in the Upper West Region of Ghana. Though the subject has not been investigated in this part of Ghana, issues of e-learning adoption exist here and in other tertiary institutions in the country. This study thus follows a multiple-case design using four institutions to illustrate the phenomenon. Single case designs have their peculiar strengths, and though multiple cases cannot usually satisfy these strengths, when generally compared to single cases, multiple case designs tend to be more robust, with more compelling evidence (Yin, 2014).

3.5 Population

The population of the study comprised all students, IT Officers, and lecturers from the four (4) selected tertiary institutions in the region, that is, all students, IT Officers, and lecturers of Simon Diedong University of Business and Integrated Development Studies

(UBIDS), Dr. Hilla Limann Technical University (DHLTU), Nusrat Jahan Ahmadiyya College of Education (NJA CoE), and McCoy College of Education (McCoy CoE).

3.6. Sampling and Participants Recruitment

The sample for the study was drawn from the population of the four selected institutions using multistage sampling. It is a sampling technique that involves selecting samples in multiple stages, where subsets of the population are sampled successively in a hierarchical manner (Lohr, 2012). This method was particularly useful considering the heterogeneous institutions, faculties, and levels of students involved in the study. In UBIDS, the purposive sampling technique was used to select four (4) faculties out of the seven (7) faculties of the university. The faculties selected were: the faculty of planning and land management; the faculty of integrated development; the school of business; and the faculty of ICT. The faculties selected were representative of both old and new faculties of the university. Participants were then drawn from the various faculties using a stratified purposive sampling technique. This was to ensure that every level of study in the chosen faculties was duly represented in the study.

A similar technique was applied in the selection of the faculties and the participants in the DHLTU. Subsequently, two (2) faculties out of the four (4) faculties were selected. The selected faculties include the faculty of applied science and technology and the school of business. The participants were then drawn from the various faculties using a stratified purposive sampling technique. This was to ensure that every level of study in the chosen faculties was duly represented in the study. For the colleges of education (CoEs), each of them was considered a faculty, and the participants were drawn from the various levels of studies (Levels 200–Level 400) using purposive sampling. Table 3-1 depicts the distribution of participants drawn from the various institutions.

Table 3-1: Distribution of Participants in the Study

Institution	Students (FGD)	Lecturers (Interview)	IT Officers (Interview)	Total
UBIDS	1 (10)	1	1	3
DHLTU	1 (8)	1	1	3
NJA CoE	1 (8)	1	1	3
McCoy CoE	1 (6)	1	1	3
Total	**4 (32)**	**4**	**4**	**12**

Source: Author's Compilation from Field Work (2023)

According to Quick & Hall (2015), the sample size in qualitative research is usually a range (4–50) due to the large volume of data collected. Furthermore, they described the sample to be selected based on appropriateness (participants) and adequacy (data collected). Furthermore, the participants should be well utilized to become the best representatives and have knowledge of the research topic. With regard to data, the data should be adequate and provide a rich description of the phenomenon. To this extent, the participants who were recruited from the various institutions for the study were the right people, as they could answer all questions related to the characteristics and factors that influence the adoption of e-learning, and they were well familiar with all issues related to the e-learning initiative across their respective institutions. In all, there were four (4) focus group discussions, totaling 32 students, and eight (8) in-depth interviews involving four (4) lecturers and four (4) IT officers. This sample size therefore adequately satisfies the requirements of Quick & Hall (2015) for a qualitative study such as this. Furthermore, relying on Guest & Johnson (2006), who emphasized that in qualitative studies, researchers should focus on data saturation rather than a predetermined sample size, to this extent, data saturation was achieved with the four (4) focus group discussions and eight (eight) in-depth interviews of the case under study in the four tertiary institutions.

3.6 Data Collection Instrument

The qualitative approach was employed by the researchers to gain a comprehensive understanding of e-learning adoption, encompassing multiple sources and perspectives, which is challenging to capture through quantitative means (Myers & Avison, 2002). Qualitative methodology proves to be the most suitable for delving deeply into participants' experiences, attitudes, and beliefs, acknowledging the subjective nature of their realities and individual differences (Creswell, 2014). Furthermore, this approach facilitates the smooth attainment of research objectives, as emphasized by Creswell (2014). Notably, one of the strengths of the qualitative method in this study lies in its ability to extract information from participants, enabling the creation of a detailed case study rather than a mere collection of numerical data. Consequently, this approach enabled the researchers to engage with policymakers, IT Officers, and faculty members actively involved in implementing and supporting e-learning systems within their institutions.

3.6.1 In-depth Interview

In-depth interview emerges as an invaluable data collection instrument for this study, with its capabilities of delving into the intricate layers of participants' experiences, emotions, and perspectives, enabling researchers to uncover nuanced insights that illuminate the depth and complexity of their lived realities (Rubin & Rubin, 2011; Seidman, 2013). This method provides a personalized and flexible approach, fostering a deeper rapport between the researcher and participant, thus unveiling hidden narratives that might remain untapped through other research techniques, making it an essential tool for profound qualitative exploration. Denzin & Lincoln (2011) therefore stated that there are three main types of interviews at the disposal of the researcher to use for data collection. These include structured, semi-structured, or unstructured interviews. This study utilized semi-structured interviews in its data collection. Semi-structured interviews require predetermined questions to be asked of all respondents in the same manner and in a sequence, not fully specified in advance, with an open-ended form. Semi-structured interviews were used in order to obtain in-depth and accurate data and also to enable the researcher to delve deeply into the participants' lived experiences and perceptions of e-learning adoption. Moreover, the semi-structured interviews offered the advantage of combining the strengths of both open-ended and structured interviews (Kvale & Brinkmann, 2009).

Development of the Interview Guide

An interview guide was then developed to facilitate the interviews during the data collection process. The conceptual framework and the literature review, as well as the research questions, served as useful references in preparing the initial semi-structured interview guide. The interview guide covered a general understanding of e-learning, the nature of e-learning, the justification for e-learning adoption, the challenges of e-learning, as well as suggestions for the successful adoption of e-learning in tertiary institutions.

The process of instrument development was guided by Kallio et al. (2016), which entails initial instrument development and subsequent refining in order to ensure the reliability and validity of the data obtained. In line with this, the interview guide was developed and further reviewed after pilot interviews with two tutors at McCoy College of Education. This pilot exercise tested the legibility and comprehensibility of the items and also unearthed hidden issues such as time of response. The feedback from the pilot test was substantially reflected in the final interview guide developed.

Administration of the Interview

A total of eight (8) in-depth interviews were carried out with lecturers and the IT Officers of the various institutions, thus UBIDS, DHLTU, NJA CoE, and McCoy CoE. These sessions were recorded, and notes taken from the in-depth interviews were used to elicit more detailed information, personal experiences, and views on the subject under study. The issues discussed focus on the nature of e-learning, the justification for e-learning adoption, the success stories of e-learning, the challenges of e-learning, and their recommendations for successful adoption of e-learning. The lecturers who were interviewed came from the selected faculties where the students were drawn for the FGDs. The IT Officers, who served as key informants by virtue of their technical knowledge in the management of the IT infrastructure of their institutions, were also interviewed for details on the issues. Plate 3-1 shows the researcher engaging with participants in an in-depth interview. From left is an in-depth interview with a participant at NJA COE, and to the right is an interview with a participant at DHLTU.

Plate 3-1: In-depth Interviews being conducted by the Researcher at NJA COE (Left) and DHLTU (Right)

The average time spent per respondent was 30 minutes. In all, a total of 8 respondents, including lecturers and IT Officers, participated in the in-depth interviews from the various study institutions. Table 3-2 shows the distribution of the in-depth interviews conducted at the various institutions.

Table 3-2: In-depth Interview Conducted

Institution	Lecturers	IT Officers	Total
UBIDS	1	1	2
DHLTU	1	1	2
NJA CoE	1	1	2
McCoy CoE	1	1	2
Total	**4**	**4**	**8**

Source: Fredrick Kuupille's Compilation from Field Work (2023)

3.6.2: Focus Group Discussions (FGDs)

Focus group discussions (FGDs) stand as a potent data collection instrument, offering a dynamic platform that allows participants to engage in open dialogue, facilitating the exploration of diverse perspectives, shared experiences, and underlying motivations in a collaborative context (Krueger & Casey, 2015; Morgan, 1997). This approach not only fosters rich, contextually grounded insights but also encourages the emergence of nuanced viewpoints that might remain unexplored through other data collection methods, making it a valuable tool for comprehensive qualitative research. Four Focus Group Discussions (FGDs) were therefore held with students who are the direct beneficiaries of the e-learning adoption of the institutions. The FGDs were used to gather data on the nature of e-learning adoption, the benefits of e-learning adoption, the success and challenges of e-learning adoption in tertiary institutions, and the students'

perspectives on effective e-learning adoption in their institutions. Heterogeneous FGDs were organized involving all the levels, thus second-year students (level 200), third-year students (level 300), and fourth-year students (level 400) for each of the selected institutions. Except DHLTU, which did not have level 400 students because the conversion of the institution into a degree-awarding institution is not up to four years. First-year students (level 100) were deliberately left out because they had just reported to their various institutions and might not have experienced the phenomenon under study. The discussions were facilitated by the researcher himself based on the thematic areas of the study, such as the nature of e-learning, the factors that support e-learning adoption, the challenges of e-learning adoption, and the suggestions for effective adoption of e-learning. The average group size for the FGDs was eight (8), and the average time spent on the discussions was 40 minutes. In all, a total of 32 students participated in the FGDs, consisting of 10 participants in UBIDS, 8 participants in DHLTU, 8 participants in NJA COE, and 6 participants in McCoy COE.

Plate 3-2 depicts the researcher engaging with participants in a FGD. From left is a FGD with participants at UBIDS, and from right is an engagement with participants at McCoy COE.

Plate 3-2: FGDs Conducted by the Researcher at UBIDS (Left) and McCoy COE(Right)

3.7 Data Analysis

To ensure that the data is analysed in a systematic, sequential, verifiable, and continuous manner, the study relies on thematic data analysis based on Braun & Clarke (2006). This

was to harness the strength of thematic analysis's ability to systematically organize and make sense of the qualitative data, uncover patterns, and generate meaningful insights. Also, this analysis allowed the researcher to identify and interpret recurring themes, experiences, and perspectives from the data collected in the interviews and focus group discussions, facilitating a comprehensive understanding of the complex phenomenon of e-learning adoption. Furthermore, the thematic analysis provided a flexible yet rigorous approach to qualitative data analysis, allowing for the exploration of diverse perspectives and the generation of in-depth insights.

3.7.1. Procedure for Data Analysis

The interviews and focus group discussions were recorded using a mobile phone recorder. The audio recordings were then later transferred to a computer. Verbatim transcriptions of all the recordings gathered from the focus group discussions and interviews were done with the help of an online application known as Otranscribe. This was used as it allows users to play back media files while simultaneously typing out the spoken content. It also offers various features to enhance the transcription process, such as keyboard shortcuts for controlling playback, adjustable playback speed, and the ability to insert timestamps.

The transcribed data was then imported into NVivo version 12. NVivo is a robust qualitative data analysis software that facilitates the systematic organization, management, and interpretation of qualitative research data. The NVivo tool was then used to organize the data into manageable segments. This involved creating nodes (categories or themes), cases (individuals or sources), and attributes. The data was reviewed, codes created, and categorized into specific portions of text. Annotations were added to capture the initial interpretations. Relationships between different nodes, cases, and attributes were established, allowing analysis that is more intricate. This aids in the identification of recurring patterns, trends, and relationships within the data. The data was continuously compared with existing codes and themes, refining the analysis as the understanding deepened.

Once the coding was completed, the coded segments were reviewed in order to identify themes from the data. Similarities, differences, or recurring concepts across the focus group discussions and in-depth interviews were also sorted. Related codes were therefore put together to form preliminary themes, which were subsequently examined to determine the relationships and connections between the codes within each theme,

ensuring coherence and meaningfulness. The themes were further reviewed and analyzed to interpret them in light of the research question, drawing connections and providing insights into e-learning adoption in the Upper West Region's tertiary institutions.

3.8 Ethical Consideration

Ethics are the codes and standards that the researcher must establish within the course of the research (Aguinis & Henle, 2004). Each research project entails working with both human and non-human participants, including the researchers themselves. Direct contacts with human subjects and their surroundings play a key role throughout a case study, where research is conducted on a current issue in its actual environmental context. So, in their interactions with study participants, as well as in regards to access to and security of the research data, researchers must uphold appropriate ethical standards.

As a result of this, the researcher received ethical approval from the SD Dombo University of Business and Integrated Development Studies Ethical Committee Board to undertake the study. Permission was then sought from all institutions that were involved in this study. This was done by presenting an introductory letter together with the informed consent statement. Furthermore, informed consent statements were given to participants to read and seek clarification on their participation or otherwise. Participants were then given the consent form to read and then consented to by signing before the start of the interview or the discussions. In both the informed consent statement and the consent form, participants were assured of confidentiality as well as protection of the data collected.

3.9 Summary of the Chapter

This chapter discussed the methodology of the study. It employed interpretivism as the philosophical underpinning with a qualitative method approach using Case study research. The qualitative data was gathered using FGDs and in-depth interviews. Finally, pointed out how the data analysis was done using thematic analysis. The next chapter presents the results of the study.

CHAPTER FOUR

PRESENTATION OF RESULTS

4.0 Introduction

This chapter presents the results in relation to the research questions. First, results on the characterization of e-learning adoption in tertiary institutions in the Upper West Region have been presented, highlighting key interesting findings. Second, the factors that influence e-learning adoption in tertiary institutions in the Upper West Region are also presented. Finally, the guidelines for effective adoption of e-learning in tertiary institutions are presented.

4.1 Profiles of Participants

The study included a diverse group of participants, each offering unique perspectives on the characteristics of e-learning adoption in tertiary institutions in the Upper West Region. The participants encompassed IT officers (Participants 1, 2, 3, and 4), who were responsible for managing e-learning infrastructure and digital tools within their institutions. Lecturers (Participants 5, 6, 7, and 8) actively used various e-learning platforms, especially during the pandemic. Lastly, students (Participants 9, 10, 11, and 12) shared their experiences and perspectives, appreciating the flexibility of e-learning but noting institutional challenges. This diverse group of participants collectively shed light on the various dimensions of e-learning adoption in the region, offering valuable insights into the educational landscape of the Upper West Region.

Table 4-1: Profiles of Participants

Participant	Role	Institution	Instrument	Description
Participant 1	IT Officer	UBIDS	In-depth interview	Involved in e-learning infrastructure management.
Participant 2	IT Officer	McCoy COE	In-depth interview	Engaged in e-learning during the COVID period.
Participant 3	IT Officer	NJA COE	In-depth interview	Developed an e-learning app during COVID.
Participant 4	IT Officer	DHLTU	In-depth interview	Minimal institutional e-learning system use.
Participant 5	Lecturer	UBIDS	In-depth interview	Reflects on e-learning's virtual nature.
Participant 6	Lecturer	DHLTU	In-depth interview	Actively uses various e-learning platforms.
Participant 7	Tutor	NJA CoE	In-depth interview	Previously engaged in e-learning during COVID.
Participant 8	Tutor	McCoy CoE	In-depth interview	Utilizes general online resources for teaching.
Participant 9	Student (10)	UBIDS	Focus Group Discussion	Explains e-learning and its usage by students.
Participant 10	Student (8)	DHLTU	Focus Group Discussion	Highlights students' role in e-learning.
Participant 11	Student (6)	McCoy CoE	Focus Group Discussion	Defines e-learning and its impact on students.
Participant 12	Student (8)	NJA CoE	Focus Group Discussion	Describes e-learning and its institution's use.

4.2 Characterization of e-learning Adoption in Tertiary Institutions in the Upper West Region

The first objective of this study was to explore the characterization of e-learning adoption in tertiary institutions in the Upper West Region. In the analysis of the data on the characteristics of e-learning adoption in the Upper West Region, several themes emerged, which are presented in Table 4-2.

Table 4-2: Themes on the Characteristics of E-learning Adoption in the Upper West Region

Theme	Sub-Themes	Excerpts
Definition of E-learning	Various Definitions	- "e-learning is teaching and learning using electronic medium or media." (Participant 1) - "E-learning is a method of learning which involves the use of electronic materials such as phones, laptops..." (Participant 3)
E-learning Tools and Platforms	- Zoom, Google Meet, Google Classroom	- "We use Moodle e-learning platforms. We also support it with audio visual facilities like Zoom, and Google Meet to be able to do the interaction with the students." (Participant 1) - "We have been using the internet during our lesson delivery, we ask students to Google for information." (Participant 11)
Institutional Infrastructure	-Limited Infrastructure	- "In terms of teaching and learning, our e-learning facilities are poorly developed in this university." (Participant 1) - "The university doesn't have its own e-learning system." (Participant 6)
Impact of COVID-19	- Increased E-learning Adoption	- "The COVID-19 pandemic had a significant impact on e-learning adoption. During the pandemic, many institutions resorted to online teaching and learning..." (Participant 1)
Individual Initiative	- Lecturers and Students Take Initiative	- "In some cases, individual lecturers and students have taken the initiative to use existing platforms and tools for e-learning..." (Participant 5)
Student Perspective	- Positive View of E-learning	- "Students generally view e-learning positively, as it offers flexibility and the ability to access information and lectures from anywhere." (Participant 8)
Institutional Perspective	- Recognition of E-learning's Relevance - Implementation Challenges	- "Some institutions recognize the need for a more comprehensive e-learning system, but there seem to be challenges related to finances, implementation, and policy enforcement." (Participant 9)
Mixed Adoption	-Varied Adoption Across Institutions - Ad Hoc Solutions	- "Overall, the adoption of e-learning appears to be mixed, with some participants expressing a need for more structured e-learning systems and others relying on ad hoc solutions." (Participant 1)

4.2.1 Diverse Definition of E-learning

E-learning in the Upper West Region is defined in various ways, reflecting a diverse understanding of the concept. Participants described it as teaching and learning using electronic media or devices, encompassing a broad range of digital tools and platforms. Some participants perceived e-learning as a) the use of electronic devices and b) virtual learning platforms. Firstly, e-learning is defined as the use of electronic devices for learning purposes. This theme appeared to be the dominant one among all the definitions given by the participants: For instance, in a focus group discussion, participants (Participant 11) stated that **"***e-learning is the act of acquiring knowledge and skills through the use of electronic devices."* E-learning as a virtual learning platform is explained as the use of virtual learning platforms to conduct teaching and learning with no physical contact. Examples of such definitions include: "*e-learning is learning that makes use of the internet, or it is like a virtual learning platform*." (participant 10). These definitions emphasize the role of technology and the internet in facilitating learning.

4.2.2 E-learning Tools and Platforms

The study revealed that the adoption of e-learning in tertiary institutions in the region relies heavily on digital tools and platforms, with Zoom, Google Meet, and Google Classroom being commonly used. These platforms played a significant role during the COVID-19 pandemic, enabling institutions to transition to online teaching and learning. Participants emphasized the importance of digital technologies in facilitating access to educational resources. For instance, one participant noted, "We use Moodle e-learning platforms. We also support it with audiovisual facilities like Zoom and Google Meet to be able to do the interaction with the students" (Participant 1). Plate 4-1 shows one of the e-learning apps that was developed and adopted in the Upper West Region.

Plate 4-1: NJA CoE e-learning App during Covid

Source: downloaded from Google play store (2023)

The NJA learning app is an application that was developed to facilitate teaching and learning during COVID. The app has various features, such as a live classroom, lecture notes, students' questions, storage of lecture videos, and audio recordings for future reference.

4.2.3 Institutional Infrastructure

In terms of institutional infrastructure, the Upper West Region is characterized by limitations in providing robust e-learning support. The study suggests that institutions generally lack comprehensive e-learning systems and face challenges in terms of internet access and connectivity. The availability of public computers, limited Wi-Fi access, and a shortage of LCD projectors impact the readiness of institutions for e-learning. This was described as a major challenge by one participant: "*In terms of teaching and learning, our e-learning facilities are poorly developed at this university*" (Participant 1). Similarly, a participant (11) in FGDs described e-learning as `a baby crawling` when she stated, "*I can just say e-learning in McCoy is like a baby crawling; it is existing, but it has not gained strength due to some challenges*."

4.2.4 Impact of COVID-19

The COVID-19 pandemic had a profound impact on the adoption of e-learning in the region. During the pandemic, institutions and individuals had to adapt quickly to online teaching and learning. While e-learning adoption increased during this period, participants also highlighted various challenges. Limited internet access, intermittent connectivity, and the unavailability of the internet in certain areas posed significant obstacles. This situation led to some students and lecturers being unable to fully participate in online classes. Though there was adoption of e-learning both at the individual and institutional levels during the pandemic, e-learning seems to have taken a low dive following the removal of Corona virus restrictions in Ghana. Some participants in a FGD stated,

"*During the COVID active period, those were the times UBIDS was actively using e-learning, but as of now, only a few departments do e-learning. And they used it basically because when their lecturers were not physically present, they used the virtual platforms, or because of limited structures, sometimes they used e-learning, either Zoom or Google Meet.* In *UBIDS, e-learning is not actively used now as compared to the COVID period. Right now, the use of e-learning is not that active or consistent. Only a*

few people are using e-learning; aside from that, physical learning is what we have here." (Participant 12).

4.2.5 Individual Initiative

Interestingly, individual initiatives played a crucial role in e-learning adoption. Both lecturers and students took it upon themselves to use digital tools and platforms, even in the absence of comprehensive institutional e-learning systems. In an in-depth interview with one of the participants, it was revealed that individual lecturers have to provide their own means of ICT infrastructure to support e-learning. *"So basically, in terms of the infrastructure, the individual lecturers acquire their own internet facility, acquire their own laptops, and acquire their own infrastructure that is supposed to support their activities as far as e-learning is concerned. The institution per se has only provided limited internet access and limited public computers* (Participant 5).

The individuals' initiatives in terms of e-learning adoption were not limited to only the provision of ICT infrastructure by lecturers but also the adoption of various platforms for e-learning. This proactive approach enabled them to continue teaching and learning remotely, using platforms like WhatsApp, Google, and other online resources. These initiatives showcased a willingness to adapt and innovate.

4.2.6 Students' perspective

From a student perspective, e-learning is generally viewed positively. Students appreciate the flexibility and accessibility that e-learning provides. They often use their personal devices, such as smartphones, to access online resources and participate in digital learning. This individualized approach aligns with the modernization and digitalization of education.

4.2.7 Institutional Perspective

Institutionally, some recognize the relevance of e-learning but face challenges related to finances, implementation, and policy enforcement. While there is a need for a more structured e-learning system, institutions lack the resources or policies to fully implement such systems. This reflects a broader institutional perspective on the potential benefits and challenges of e-learning.

4.2.8 Key finding on the characteristics of e-learning adoption in tertiary institutions in the Upper West Region

The adoption of e-learning in tertiary institutions in the Upper West Region is characterized by a significant reliance on individual initiatives and digital tools, particularly during the COVID-19 pandemic. While there is a clear recognition of the importance of technology in education, the infrastructure within these institutions, including limited internet access, public computers, and inadequate e-learning systems, presents substantial challenges. Participants across various roles, including IT officers, lecturers, tutors, and students, emphasized the positive aspects of e-learning, such as flexibility and accessibility, but also highlighted the need for comprehensive institutional support and policy enforcement to enhance the effectiveness of e-learning adoption in the region. Despite these challenges, there is a collective recognition of the potential benefits of e-learning in tertiary education within the Upper West Region.

4.3 Factors that influence the adoption of e-learning in tertiary institutions in the Upper West Region of Ghana

The study also sought to examine factors that influence the adoption of e-learning in tertiary institutions in the Upper West Region of Ghana. The qualitative data obtained from the in-depth interviews and FGDs were subjected to thematic analysis. The analysis revealed that the adoption of e-learning in the Upper West Region is influenced by various factors. The factors are broadly categorized into themes that either support or hinder the widespread adoption of e-learning in tertiary institutions within the region. These themes are presented in Table 4-3.

Table 4-3: Themes on Factors that Influence E-learning Adoption in the Upper West Region

Themes	Sub-Themes	Excerpts from Transcripts
Factors Supporting E-Learning Adoption		
	Accessibility and Convenience	"Well it reduce cost in terms of movement and it also reduce destruction..."
	Skill Development	"It also improve upon our ICT skills as prospective teachers since it exposes us..."
	Flexibility	"E-learning is really needful because, we are not going to remain in only this college..."
	Improving Teacher Training	"Currently the curriculum of the teacher training, they want us to improve on digitization..."
	Network Problems	"I think one major challenge is that we don't have internet connection. Let me say that WIFI..."
	Cost and Financial Constraints	"I think that is not just about having the app or been able to acquire the app..."
	Lack of Technical Skills	"No. Some use them but others too never come to class with any ICT materials..."
	Inadequate Infrastructure	"Inadequate trained personnel or teachers. Though there are a few skilled teachers..."
	Inadequate Training	"One reason is, it is easily accessible because we move with our android and almost all the time it is with you..."

	Resistance from Teachers	"Some tutors do not adopt the use of eLearning because of the nature of the course they handle..."
	Lack of Standardization	"I am not aware of it. Individually you download your own app and use it..."

4.3.1 Factors Supporting E-Learning Adoption in Tertiary Institutions in the Upper West Region

The various sub-themes under the broad headings, thus factors that support the adoption of e-learning in tertiary institutions within the region, have been discussed. The factors include accessibility and convenience, skill development, flexibility and adaptability, improving teacher training and development, and effective learning and resource access.

4.3.1.1 Accessibility and Convenience

Participants in the discussions frequently highlighted the convenience and accessibility of e-learning as a significant factor influencing its adoption. They pointed out that e-learning reduces the costs and challenges associated with physical attendance, making it easier for students to access learning materials and resources. A student who mentioned, “Well, it reduces cost in terms of movement and it also reduces disruption”, exemplified this convenience. The ability to engage in learning from home or remote locations provides a solution to issues like late arrivals and transportation challenges, which are particularly relevant in the context of the Upper West Region.

4.3.1.2 Skill Development

E-learning was also seen as a powerful tool for skill development, particularly in the field of information and communication technology (ICT), and therefore influenced the adoption of e-learning in tertiary institutions in the region. Participants emphasized that e-learning exposes students to digital literacy and various ICT platforms, enhancing their communication skills. This exposure goes beyond academic benefits and includes practical digital skills needed in the modern world. A student noted, "It also improves upon our ICT skills as prospective teachers since it exposes us to the world of digital literacy." The emphasis on skill development suggests that e-learning is not just about academic content but also about preparing students for the digital demands of the future.

4.3.1.2 Flexibility

Flexibility emerged as a crucial factor supporting the adoption of e-learning in tertiary institutions in the region. Participants noted that e-learning allows students to learn at their own pace, addressing the challenges posed by rigid academic calendars. The adaptability of e-learning to different learning styles and needs was emphasized. A student expressed the importance of this adaptability, stating, "E-learning is really needed because we are not going to remain in only this college... It would be very important to be familiar with how it operates." E-learning's ability to accommodate diverse schedules and learning preferences makes it an attractive option, thus accounting for its adoption.

Furthermore, e-learning was perceived as a means to make learning more effective, particularly in the context of changing academic calendars. Participants discussed how e-learning addresses issues related to missed lectures and disruptions. It provides opportunities for remote access to lessons, ensuring that learning continues even when students are not physically present. A student noted, "It also makes learning effective. Lessons are sometimes postponed to the next meeting, which affects teaching and learning." E-learning's capacity to bridge gaps in learning due to interruptions is a compelling factor.

4.3.1.3 Improving Teacher Training

Also, incorporating e-learning into teacher training curricula was highlighted as a key factor influencing its adoption. Participants recognized that this integration aligns with the goals of digitizing the education sector and improving the quality of teacher education. They acknowledged that exposure to e-learning during their training would better prepare them as future educators. A student explained, "Currently, the curriculum of the teacher training... wants to train us on the use of technology." This indicates a deliberate effort to equip teachers with the skills needed to effectively integrate technology into their teaching methods.

4.3.2 Challenges Hindering E-Learning Adoption in Tertiary Institutions in the Upper West Region

Conversely, from the data analysis, several themes emerged that hinder the adoption of e-learning in tertiary institutions within the region. These themes have been discussed and presented at this point.

4.3.2.1 Network Problems

Several challenges hinder the widespread adoption of e-learning. Inadequate internet connectivity, including the lack of Wi-Fi and network issues, is a significant obstacle. Participants expressed concerns about the poor quality of internet access, making it difficult for students and educators to fully utilize e-learning resources. A student pointed out, "One major challenge is that we don't have internet connection. It is a very big challenge." Participant 5 stated, "*The internet facilities are not in place. As I said, individuals will have to provide these facilities. The lecturers, alright, I am able to provide my internet wherever I go, but out of 30 students, you will not have more than 10 that have personnel laptops, left alone talk about internet facilities."*Another participant in a separate, in-depth interview with regard to internet connectivity stated, "*In our part of the country here, the network is not stable. I could remember some time you were in the middle of a meeting or a lecture and your connections went off. At times, you have data all right, which is probably due to network challenges. Depending on the network you are using, sometimes a particular network you bought data to use, and maybe whether you are using Vodafone or MTN, you realize the network is not so good. You have to buy data for another network before you can be able to use it. Or, at times, the network is there alright, but you will log on to a meeting after a while and you will realize that it went off. You will have to log on again*."

4.3.2.2 Cost and Financial Constraints

The cost associated with acquiring the necessary technology and data for e-learning was found to be prohibitive for both institutions and students. Financial limitations, including the expense of data bundles, hinder the widespread adoption of e-learning. A student highlighted this issue: "I think that is not just about having the app or being able to acquire the app; it is about investment." The financial burden of e-learning, both for institutions and students, can limit its accessibility. The cost of subscribing to data for e-learning was a problem, especially on the part of students. On the part of participant students, when they were engaged in different focus group discussions, the challenge of data was echoed loudly in different forms. "*Data is also a challenge; some of us cannot afford the data (*Participant 11). In the same vein, Participant 12 stated, "*The buying of data is something else in e-learning. "There are some students that are on their own and will still have to buy bundles, which will be an extra cost.*" These clearly show the

burden of lecturers and students financially, particularly where there are no data package arrangements for them.

4.3.2.3 Lack of Technical Skills

A lack of technical skills among both students and teachers was found to pose a significant barrier to e-learning adoption in the Upper West Region. Some students admitted that they lacked the requisite skills to operate electronic devices effectively, hindering their ability to access e-learning resources and platforms. In an engagement with some participants in FGDs, it was revealed that the institution does not have adequate trained and skilled ICT personnel for the development and maintenance of e-learning systems. This was stated as: "*In our institution, one of the main problems we face is inadequate skilled personnel for the implementation of e-learning systems. There should be more ICT know-how personnel who would focus on implementing and improving the nature of our learning systems in our institution*." Similarly, in another focus group discussion, a participant stated, "E-learning *has to do with resources, such as even the people with the skills on how to host all these things."* It was observed that the factor of the availability of skilled personnel for the development and deployment of e-learning systems varied from institution to institution.

4.3.2.4 Absence of Essential Infrastructure

The absence of essential infrastructure, including a shortage of projectors and ICT equipment, impacted the successful adoption of e-learning in tertiary institutions in the region. Inadequate physical resources hinder teachers from incorporating technology effectively into their teaching methods. Participants mentioned challenges such as the limited availability of projectors in classrooms. An inadequate number of projectors in educational institutions poses a challenge to teachers who wish to utilize multimedia resources in their teaching methods. Also, the limited availability of projectors can hinder the adoption of e-learning, especially in larger classrooms.

Participants expressed concerns about the lack of training in using e-learning platforms. Students noted that, while e-learning is emphasized, they often receive insufficient training on how to effectively use technology for educational purposes. The study revealed that some students, as well as their teachers, do not have the requisite ICT skills for e-learning. Participant 1 stated that "*I think there has not been sufficient training on the use of this infrastructure*." Also, Participant 12 stated that a lack of computer knowledge and skills for e-learning on the part of both teachers and students poses a

challenge to e-learning adoption. This lack of preparation contributes to the challenges of adopting e-learning.

4.3.2.5 Resistance to e-learning

Resistance to e-learning among teachers and learners, particularly in subjects that require traditional teaching methods, such as mathematics, drawing, and practical nature, was also found to have an influence on the adoption of e-learning. Some participants argued that practical courses such as fashion and design, ceramics, and other practical courses are difficult to undertake on e-learning platforms, especially the practical aspect of the course. "*Let me say that because it is practical, most of the courses are practical, and the lecturers are always there punctually to take us through the practical. So due to that, we are not doing e-learning. If it is e-learning, we will not understand because sometimes the way she will place the pins is like we are looking face-to-face and we are able to do them. But if it is online, we will not be able to understand what they are saying, and you will not see things clearly*." (Participant 10). Participant 5 also stated, "*Methodologically, I don't have any problems. The course is such that, whether online or by whatever method, you can effectively deliver it. Personally, I don't teach any course that is mathematical, but in my department, we have a lot of drawing, and we have some mathematics in there, so the mathematics I can appreciate what they are talking about, but even then, I think e-learning is still possible with mathematics, but for drawing, it will not be convenient to use any of the e-learning for drawing. You can use it to give assignments alright, but where you need to do the practical aspects of the drawing, for me, it is preferable to go face-to-face. When you give students the drawing assignments they are doing, you go around to attend to each student individually; each individual has the individual capability, so you have to go around and attend to them one by one with the e-learning platform. It will be difficult for you to do that."* The unwillingness to fully embrace e-learning in their teaching practices is impacting the overall adoption of this technology in tertiary institutions.

4.3.2.6 Lack of Standardization

Inconsistencies in the adoption of e-learning platforms within institutions were highlighted as a challenge in the adoption of e-learning. Participants stated they do not have an institutional e-learning portal, as individual lecturers adopted Zoom, WhatsApp,

and Google Classrooms for teaching and learning. “At individual levels, so far, some are using electronic platforms to facilitate learning. Some individuals use the Google Meet platform, and some too, in their own ways, have also adopted the WhatsApp platform. They are heavily engaged in teaching and learning, so they may post learning materials, whether they are PPT, PDF, or whatever the nature may be.” (Participant 6). Some participants mentioned that there was no standardized e-learning portal or platform across all departments, leading to a fragmented approach to technology integration in teaching and learning. Another participant explained that, because these platforms are not developed for teaching and learning, they lack some key features of e-learning platforms, such as simulations, interactivity, discussion forums, tracking capabilities, and basic security.

4.3.3 The major finding of the factors that influence e-learning adoption in tertiary institutions in the Upper West Region

The major finding from the analysis regarding the factors that influence e-learning adoption in tertiary institutions in the Upper West Region is that while there is a strong drive for e-learning adoption because of increased accessibility, skill development, flexibility, and improved teacher training, there are significant barriers to its widespread adoption. These barriers include network problems, cost and financial constraints, a lack of technical skills among both students and teachers, inadequate infrastructure and training, resistance from teachers in certain subject areas, and the absence of standardized e-learning platforms.

4.4 Effective Guidelines for E-learning Adoption in Tertiary Institutions

The COVID-19 pandemic had compelled almost all tertiary institutions in Ghana to adopt one form of e-learning or another in order not to forestall academic work amidst the pandemic in 2020. This is evidence, as participants in all the tertiary institutions under this study narrated their experience with e-learning, pointing it back to the COVID era. Unfortunately, there have not been existing guidelines to facilitate e-learning adoption in tertiary institutions. This section, therefore, presents guidelines for effective e-learning adoption in tertiary institutions.

Table 4-4: Themes on Effective Guidelines for E-learning Adoption in Tertiary Institutions

Themes	Sub-themes	Excerpts from Transcripts
Infrastructure	-Internet connectivity	"The internet facility should be wide enough so that anywhere on the campus, you can access the internet via Wi-Fi." - Participant 5
	- Computer labs and devices	"Provide computers and computer laboratories with smart devices where small groups of students can sit in." - Participant 5
	- Projectors and multimedia tools	"Provide sufficient projectors." - Participant 5
Training and Skills	-In-service training for educators and students	"Regular in-service training for lecturers, administrators, and students." - Participant 5
	- Digital literacy and IT skills	"Students should be well-equipped in the aspect of IT. They need to be digitally literate and equipped with IT skills." - Participant 12
	- Workshop and orientation	"There must be a workshop for the teachers and for the students too." - Participant 12
Administrative Support	- Investment in e-learning infrastructure	"The university needs to provide computers, computer laboratories, and internet facilities." - Participant 5
	- Policy development and oversight	"Policies must be drafted around these things because anything that is electronic has some aspects." - Participant 6
	- Funding and resource allocation	"Adequate funding and resources are essential for the successful implementation of e-learning." - Participant 6

Student Readiness	- Education and advocacy for students	"Institutions should educate students about the benefits of e-learning and encourage their active participation." - Participant 9
	- Accessibility and affordability	"E-learning platforms should be accessible to all students... cost-effective access options, such as shared expenses for Wi-Fi or data subscriptions." - Participant 11
Digital Resources	- Availability and organization of digital content	"Availability of digital resources, such as e-books, videos, and online assignments, is crucial to effective e-learning." - Participant 10
	- User-friendly interfaces	"It should be user-friendly, with a well-designed interface." - Participant 10

Effective adoption of e-learning in tertiary institutions hinges on several key guidelines, as discerned from the themes and sub-themes extracted from participants, including IT officers, tutors, and students. These guidelines are paramount for ensuring a smooth transition to digital education in these academic settings.

4.4.1 Investment in technical expertise and infrastructure

Investing in technical expertise and infrastructure is foundational for successful e-learning implementation. As Participant 1, an IT officer, pointed out, having a dedicated technical team with the knowledge to deploy and manage e-learning platforms is crucial. In the case where the institution does not have the technical person to manage the system, Participant 6 suggested outsourcing the development and management of the e-learning platforms to make them effective. This technical support ensures that e-learning resources are accessible and functional for both educators and students.

Moreover, institutions must invest in the necessary infrastructure. This includes acquiring electronic boards, smart devices, computer laboratories, and establishing a reliable internet connection. Participant 2 emphasized the importance of ICT gadgets and strong connectivity. These components are the building blocks for a robust e-learning environment, providing the essential tools for digital education. Participants in a FGD stated:

"One of the challenges is the lack of mobile phones for students and whatever. I think if provisions can be made for such students to benefit, but they are having the e-learning and I am not having the smart phone that I can also use to join them, it will be a problem. But if these things are provided for them, I think it will also enable them to be part of it. In short, they should just make a smart phone part of the tertiary requirement so that it will not be like what the school should provide. Schools too can contact companies to produce these phones for them to sell at an affordable price for their students."

Other participants in different FGDs also echoed that:

"*I think the availability of ICT tools or ICT facilities like ICT labs, ICT projectors, smart boards, and other ICT gadgets will help in the easy delivery and then easy use in the ICT class or in the e-learning process. And then, through the use and manipulation of the ICT tools that are provided, it will help the students and the lecturers as well to increase or improve their skills in the use of ICT tools.*" This was further stated by another group (MFG2): "There *should be a sufficient supply of digital resources, such as computer resources and the internet. I think this may allow effective learning since students would have access to learning at their own pace anytime and anywhere."*

4.4.2 Continuous Training and Orientation

Continuous training and orientation are imperative to keep both educators and students proficient in e-learning. Participant 6 suggested deploying questionnaires to gauge the readiness and IT skills of staff and students. Regular in-service training, as highlighted by several participants, is vital to keeping everyone up-to-date with evolving e-learning technologies. Equally important is prioritizing IT literacy. As Participants 10 and 11 noted, ensuring that all staff and students have the necessary IT knowledge is essential. This helps them navigate e-learning platforms efficiently and enhances their overall digital literacy. To this end, adequate training for both students and teachers is required to ensure the successful adoption of e-learning. The participants observed that most of them did not have the requisite ICT skills for e-learning. The participants therefore suggested that, as part of the guidelines for effective adoption of e-learning, adequate training for the users of the system is required. A participant in FGDs indicated that

"*In service training for the teachers, per say, almost all the teachers, we have not all of them, but most of them have smart phones, and most of them, where they are staying, can access the internet. Should there be a case where they have all the materials but do*

not have the technical know-how on how to use them? All I am saying is that they should train the teachers so they can also train us on how to use them." (JFG1).

Another statement in respect of training for students and teachers was also echoed:

"I *also think a lot of education needs to be done because a lot of our lecturers—about 70% of them—don't know IT. So far, just because you have phones and use them does not mean you are an IT expert. We need to train them. Is this the reason why we have an ICT directory in our school? We need to train and orient them about how to use the app inside and out of it. And moreover, we need to train the students also because, with the WhatsApp we are using, there are some things we don't know unless we go online and see how to use it to do learning. I think if we implement it without training our staff, a lot of things will happen*." (Participant 3).

In respect of training and as a guideline, Participant 1 suggested that there should be e-learning training for new lecturers as part of their orientation program. This should be accompanied by routine training at the beginning of every academic year. The routine training should be modelled for both lecturers and students.

4.4.3 Customization and User-Friendly Design

To cater to the unique needs of each institution, customization of e-learning systems is essential. As Participant 2 emphasized, allowing institutions to customize their e-learning platforms ensures flexibility and adaptability to specific program requirements. This tailored approach enhances the effectiveness of e-learning initiatives.

User friendliness is another pivotal aspect. Creating e-learning platforms that are intuitive and accessible to users with varying levels of IT proficiency is critical. Participant 10 suggested implementing a system that adapts to users' IT skills, providing guidance and support within the platform. This user-centric design simplifies the e-learning experience and encourages its widespread use. A participant in a FGD stated that for an effective e-learning system, then

"I think, first of all, it should be simple to use. The features that are supposed to be used there should be easily accessible. You don't have to go through about two, five, or twenty minutes to reach a particular feature; it should just be simple to access. And also, just like my brother said about the presentation, there should be a portion for the presentation. A place where the lecturer can draw a diagram that the students can view directly. And also, there should be a place for students to ask questions, either by typing

or by speaking. There should be a place where they can submit documents like a PDF, a Word document, or a PowerPoint presentation; that is, students can access it, and the teacher too can access documents that have been sent by the student. It should be secured above all things." (Participant 9).

4.4.4 Clear Communication and Policies

Effective communication and well-defined policies are foundational for e-learning adoption. Institutions must communicate the benefits, conditions, and expectations clearly to both students and staff. This ensures that everyone understands the value and requirements of e-learning, as emphasized by Participant 9.

Additionally, institutions should establish comprehensive policies and guidelines for e-learning. These policies should address security, data management, and user responsibilities. Clear guidelines help maintain a secure and productive e-learning environment and provide a framework for user conduct within digital learning spaces.

E-learning resources should be readily accessible to all students. This requires institutions to provide free Wi-Fi or affordable data plans, as suggested by Participants 10 and 11. Ensuring equal access to online materials is crucial for an inclusive e-learning environment. Furthermore, cost-effectiveness should be a consideration. As noted by Participant 9, the cost of e-learning subscriptions or resources should reflect their effectiveness. Students should perceive the value of their investment in e-learning materials, making them more likely to participate fully.

4.4.5 Collaboration and Partnerships

Collaboration and partnerships can enhance the effectiveness of e-learning adoption. Institutions can collaborate with private institutions or IT experts for cost-effective development and management of e-learning platforms, as proposed by Participant 9. This collaborative approach can optimize resources and expertise. Moreover, promoting collaboration among students and teachers within e-learning environments fosters the sharing of resources and knowledge. As highlighted by Participant 11, an atmosphere of collaboration encourages students to actively engage with e-learning materials and each other, enhancing the overall learning experience.

4.4.6 Evaluation of e-learning initiatives

Finally, institutions must prioritize the evaluation of e-learning initiatives. Regular feedback from students and staff, as advocated by Participant 6, helps identify areas for

improvement. Institutions should be receptive to feedback and actively seek ways to enhance their e-learning strategies. Continuous improvement is key to keeping e-learning relevant and beneficial. As Participant 9 suggested, institutions should be open to adjusting and enhancing their e-learning strategies based on feedback and emerging technologies. This adaptability ensures that e-learning remains a dynamic and effective tool for tertiary education.

4.4.7 The main research finding for effective adoption of e-learning in tertiary institutions

The main research findings for effective adoption of e-learning in tertiary institutions hinge on several critical guidelines. These guidelines encompass investment in technical expertise and infrastructure, ongoing training and orientation, customization and user-friendly design of e-learning platforms, clear communication and policies, accessibility and cost-effectiveness, strategic partnerships and collaboration, as well as a commitment to evaluation and continuous improvement. Adhering to these guidelines is imperative for tertiary institutions seeking to optimize e-learning's potential for enhancing education's quality and accessibility.

4.5 Summary of the Chapter

This chapter presented the results of the study, revealing that e-learning adoption in Upper West Region's tertiary institutions relies heavily on individual initiatives and digital tools, especially during the COVID-19 pandemic. Key drivers like accessibility, skill development, flexibility, and improved teacher training, along with challenges like network issues, cost constraints, technical skill gaps, inadequate infrastructure, teacher resistance in some subjects, and the lack of standardized e-learning platforms, impacted e-learning adoption. Proposed guidelines for effective adoption include investing in technical expertise and infrastructure, ongoing training, user-friendly e-learning platform design, clear policies, accessibility, cost-effectiveness, partnerships, and a commitment to evaluation. The next chapter explores these findings further.

4.6 Discussion of Results

The study's objective was to investigate the adoption of e-learning in tertiary institutions within the Upper West Region. Consequently, the study delved into characterizing e-learning adoption, scrutinizing the factors that impact its adoption, and formulating guidelines for its effective adoption. The ensuing section of this study discusses the

results presented earlier, with the intent of contextualizing them within the realm of information systems (IS) research.

4.6.1 The Characterization of e-learning adoption in tertiary institutions in the Upper West Region

The study reveals that the adoption of e-learning in tertiary institutions in the Upper West Region is characterized by a significant reliance on individual initiatives and digital tools, particularly during the COVID-19 pandemic. While there is a clear recognition of the importance of technology in education, the infrastructure within these institutions, including limited internet access, public computers, and inadequate e-learning systems, presents substantial challenges. Participants across various roles, including IT officers, lecturers, tutors, and students, emphasized the positive aspects of e-learning, such as flexibility and accessibility, but also highlighted the need for comprehensive institutional support and policy enforcement to enhance the effectiveness of e-learning adoption in the region. Despite these challenges, there is a collective recognition of the potential benefits of e-learning in tertiary education within the Upper West Region.

This finding presents an opportunity for tertiary institutions to leverage social media for academic work, even though COVID is over. Other studies also suggest that social media has the potential to enhance learning and teaching practices. Lumby et al. (2014) argue that social media can engage students in active learning, but its effectiveness depends on how educators introduce new tools and what pedagogical work they see these tools as enhancing. Faizi et al. (2013) also highlight the potential benefits of social media in collaborative learning but note that its use needs to be carefully planned and relevant to the needs and trends of the new generation of students. Jamari et al. (2017) found that students in high schools in Malaysia use social media for an average of 2 hours per day and are willing to use it for educational purposes, but feasible pedagogical strategies that are compelling, relevant, and safe for both teachers and students need to be developed. The studies suggest that social media can be a useful tool for learning, but its implementation needs to be carefully planned and relevant to the needs of students. This suggests that tertiary institutions in the Upper West Region can also leverage social media as their e-learning platforms. This, however, would require adequate planning and pedagogy, as discussed in the literature.

4.6.2 Factors that influence the adoption of e-learning in tertiary institutions in the Upper West Region of Ghana

The major finding from the analysis regarding the factors that influence e-learning adoption in tertiary institutions in the Upper West Region is that while there is a strong drive for e-learning adoption because of increased accessibility, skill development, flexibility, and improved teacher training, there are significant barriers to its widespread adoption. These barriers include network problems, cost and financial constraints, a lack of technical skills among both students and teachers, inadequate infrastructure and training, resistance from teachers in certain subject areas, and the absence of standardized e-learning platforms.

Previous studies within the literature regarding e-learning adoption have highlighted the significant influence of technological factors, particularly the presence of IT infrastructure, on the adoption of e-learning (Ansong et al., 2016; Phutela Dwudi, 2020). The IT infrastructure includes all IT-related technology, such as a quick Internet connection, enough modern computers, and reliable computer networks. The accessibility of computers, as noted by Tagoe (2012), constitutes the first of three critical factors influencing e-learning. Furthermore, institutions equipped with cutting-edge proprietary or open-source web applications related to e-learning stand a better chance of successfully implementing e-learning initiatives. Mtebe & Raisamo (2014) conducted a study in Tanzanian universities and identified technological factors, including perceived usefulness, ease of use, and compatibility with existing systems, as pivotal determinants of e-learning adoption. They recommended that universities should ensure the compatibility of e-learning technologies with existing systems and provide faculty members with sufficient training and technical support to enhance usability and adoption. In the present study, factors such as the availability of e-learning platforms and the accessibility of e-learning technological devices were found to exert influence on the adoption of e-learning within the investigated institutions. These findings conform to earlier findings, as in the studies of Ansong et al. (2016), Tagoe (2012), and Mtebe & Raisamo (2014). Though the availability of e-learning platforms has been highlighted as a determinant of e-learning adoption in this study, This implies that for the successful adoption of e-learning in tertiary institutions, the technological factors revealed in this study should be addressed.

Furthermore, in relation to the pivotal aspects that determine the acceptance of e-learning within organizations, a study conducted by Abdullahi et al. (2020) in Nigeria unveiled organizational factors, including leadership endorsement, infrastructure availability, and institutional ethos, as critical elements that significantly influence e-learning adoption in higher education. The researchers suggested that universities should ensure ample technology infrastructure, foster a positive institutional climate that places value on e-learning, and deliver robust leadership backing to amplify the adoption and utilization of e-learning platforms. Similarly, Bhuasiri et al. (2012) conducted a study in Thailand and identified organizational factors such as support from leadership, allocation of resources, and formulation of institutional regulations as pivotal determinants in the uptake of e-learning in higher education. The authors advocated for resource allocation, the development of appropriate policies and guidelines, and the provision of resolute leadership support to augment the integration and usage of e-learning.

In the present study, critical factors were identified, encompassing the availability of internet connectivity, administrative reinforcement for e-learning initiatives, capacity building in e-learning for both faculty and students, and a culture receptive to change. These determinations aligned with the findings of Bhuasiri et al. (2012) and Abdullahi et al. (2020), while placing added emphasis on the competence of teachers and learners in the realm of e-learning. Consequently, this highlights the necessity for tertiary institutions that contemplate the adoption of e-learning to accord special consideration to these organizational factors.

Moreover, Tornatzky & Fleischer (1990) found that environmental factors such as the industry's dimensions and structure, competitors within the industry, macroeconomic circumstances, and the regulatory framework were key determinants of technology adoption. Thus, the environment surrounding the analyzed institutions encompasses rival institutions, non-governmental entities, governmental bodies, and other external elements that can either facilitate or hinder the assimilation of e-learning. In their exploration of determinants influencing e-learning adoption at the University of Ghana, Boateng et al. (2016) found that both educational partners and competitive pressures significantly influence e-learning adoption. These educational partners encompass governmental bodies, non-governmental organizations (NGOs), multinational entities, and others. Hassanzadeh et al. (2012) and Raouf & Naser (2012) had earlier reported

analogous outcomes in their respective investigations. Darko-Adjei & Zewu (2021), Raouf & Naser (2012), and Amirkhanpour et al. (2014) similarly highlighted the substantial role of competitive pressures in the acceptance of e-learning. In this particular study, environmental components such as affiliations with other universities, governmental policies, and the impact of the COVID-19 pandemic were identified as factors influencing the adoption of e-learning in these institutions. For instance, government mandates necessitating the cessation of physical contact and the subsequent closure of educational institutions due to the COVID-19 pandemic (Amanor-Mfoafo et al., 2020) compelled these institutions to embrace e-learning to sustain academic activities amid the crisis. These findings validate previous research, as discussed in the literature. However, a novel insight from this study, which differed substantially from prior research, is the skill development, flexibility, and improved teacher training. This implies that institutions can capitalize on these to fully adopt e-learning within their establishments.

E-learning adoption in tertiary institutions is significantly influenced by various pedagogical factors, as evidenced by the findings of Gachago et al. (2015) in South Africa. Their study underscores the importance of aligning learning outcomes and assessment practices with e-learning initiatives to ensure successful adoption. This alignment ensures that e-learning methods effectively support the intended educational objectives. Gachago et al. recommend that universities carefully ensure that their e-learning initiatives are in harmony with the institution's learning outcomes and assessment practices for optimal adoption and efficacy.

Moreover, resistance to e-learning among teachers and learners, particularly in subjects that require traditional teaching methods, such as mathematics, drawing, and practical subjects, had a profound impact on the decision to adopt e-learning. This perspective gains prominence within the context of e-learning adoption in tertiary institutions. Previous studies, including those by Hassanzadeh et al. (2012), Amirkhanpour et al. (2014), and Boateng et al. (2016), have indicated a significant relationship between the course content and the adoption of e-learning. Notably, a pattern of inverse correlation emerges, suggesting that courses with more complex content tend to exhibit lower rates of e-learning adoption, and conversely, courses with more amenable content are more likely to embrace e-learning.

These findings underscore the intricate interplay between pedagogical factors and the decision to adopt e-learning. Institutions considering e-learning adoption must carefully evaluate the alignment of their educational goals, course content complexity, and the suitability of instructional approaches for online environments. This evaluation should extend to the design of assessment methods and feedback mechanisms that can enhance the overall e-learning experience. By thoughtfully addressing these pedagogical considerations, tertiary institutions can better tailor their e-learning strategies to promote successful adoption and foster effective learning outcomes.

.4.6.3 **Guidelines for Effective Adoption of e-learning in Tertiary Institutions**

For effective adoption of e-learning in tertiary institutions, this study discovers that it hinges on several critical guidelines. These guidelines encompass investment in technical expertise and infrastructure, ongoing training and orientation, customization and user-friendly design of e-learning platforms, clear communication and policies, accessibility and cost-effectiveness, strategic partnerships and collaboration, as well as a commitment to evaluation and continuous improvement. These proposed guidelines for effective adoption of e-learning serve as a direct response to the challenges of e-learning adoption as highlighted in the literature (Ansong et al., 2016; Tagoe, 2012; and Mtebe & Raisamo, 2014). Adhering to these guidelines is imperative for tertiary institutions seeking to optimize e-learning's potential for enhancing education's quality and accessibility.

4.6.4 Summary of the Chapter

This chapter discussed the findings of the study related to the context of IT. The major findings discussed included the individual’s initiatives and reliance on digital platforms and tools, the supportive and inhibiting factors of e-learning adoption, as well as proposed guidelines for effective learning adoption. The succeeding chapter summarizes the entire study.

CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS

5.0 Introduction

This chapter serves as the conclusion of the study, providing a summary of the main research findings in line with the research objectives and questions. It further underscores the significance and contributions of these findings. Additionally, this chapter addresses the study's limitations and makes suggestions for future research.

5.1 Research Overview

This study explored the adoption of e-learning in tertiary institutions, with particular focus on tertiary institutions in the Upper West Region. It specifically examined the nature and factors of e-learning adoption as well as effective guidelines for its adoption. The objectives of the research were: first, to explore the characteristics of e-learning adoption in tertiary institutions in the Upper West Region. Secondly, to explore the factors that influence the adoption of e-learning in tertiary institutions in the region, and finally, to develop effective guidelines for the adoption of e-learning. To achieve these objectives, an extended Technology, Organisation, and Environment (TOE) framework was employed as the fourth construct, and a pedagogical factor was added to serve as the guiding framework to address the multifaceted nature of e-learning adoption. After an extensive review of the literature, the study employed focus groups and interviews to collect data from all three major e-learning stakeholders (students, lecturers, and IT Officers) from the studied institutions. The data was then analysed and themes generated to report the findings of the study.

5.2 Summary of the Research Findings

This study aimed to explore the adoption of e-learning in tertiary institutions so as to provide a better understanding of the current status and factors that influence the adoption of e-learning technologies and propose effective guidelines for e-learning adoption in tertiary institutions.

5.2.1 The Characterization of e-learning adoption in tertiary institutions in the Upper West Region

The results of the study indicate that e-learning adoption in tertiary institutions in the Upper West Region is characterised by a significant reliance on individual initiatives

and digital tools, particularly during the COVID-19 pandemic. While there is a clear recognition of the importance of technology in education, the infrastructure within these institutions, including limited internet access, public computers, and inadequate e-learning systems, presents substantial challenges. Participants emphasized the positive aspects of e-learning, such as flexibility and accessibility, but also highlighted the need for comprehensive institutional support and policy enforcement to enhance the effectiveness of e-learning adoption in the region. Despite these challenges, there is a collective recognition of the potential benefits of e-learning in tertiary education within the Upper West Region.

5.2.2 Factors Influence e-learning Adoption in Tertiary Institutions

The study shows that the factors that influence e-learning adoption in tertiary institutions in the Upper West Region are that while there is a strong drive for e-learning adoption because of increased accessibility, skill development, flexibility, and improved teacher training, there are significant barriers to its widespread adoption. These barriers include network problems, cost and financial constraints, a lack of technical skills among both students and teachers, inadequate infrastructure and training, resistance from teachers in certain subject areas, and the absence of standardized e-learning platforms.

5.2.3 Design guidelines for e-learning adoption in tertiary institutions

The third objective of the study was to develop design guidelines for the effective adoption of e-learning in tertiary institutions. Analyzing the characteristics of e-learning adoption and the factors influencing e-learning adoption in tertiary institutions, the study proposed several critical guidelines for the adoption of e-learning in tertiary institutions. These guidelines encompass investment in technical expertise and infrastructure, ongoing training and orientation, customization and user-friendly design of e-learning platforms, clear communication and policies, accessibility and cost-effectiveness, strategic partnerships and collaboration, as well as a commitment to evaluation and continuous improvement.

5.3 Contributions of the Study and Implications

This study provides valuable insights into the complex landscape of e-learning adoption within tertiary institutions. By exploring various dimensions of this phenomenon, the study contributes significantly to the existing body of knowledge in the fields of

education and technology. This section therefore highlights the key contributions of the study and outlines its implications for educational institutions and stakeholders.

5.3.1 Theoretical contributions

Firstly, this study makes a notable theoretical contribution by enriching the existing body of knowledge concerning e-learning. By conducting a thorough review and expansion of the Technology, Organization, and Environment framework, this study integrates a critical component: pedagogy. This conceptual augmentation, validated through empirical examination within the specific context of tertiary institutions in the Upper West Region, marks a novel advancement in our understanding of the factors that drive e-learning adoption. The incorporation of pedagogy into this established framework offers a more comprehensive lens through which to view the intricate dynamics shaping the integration of technology-mediated learning approaches.

Furthermore, the research extends its theoretical contributions through an empirical exploration of e-learning adoption within the context of the study region. This undertaking holds particular significance given the paucity of comprehensive studies focusing on the intricate nuances of e-learning adoption. The dearth of research in this domain underscores the timeliness and significance of the current study, as it addresses an existing gap and responds to the emerging demand for insights into e-learning's adoption dynamics. By meticulously examining the factors influencing e-learning adoption within tertiary institutions, this research contributes empirical evidence that not only substantiates prior theoretical frameworks but also advances our comprehension of how these frameworks manifest in real-world scenarios.

In sum, this study's theoretical contributions are twofold: it extends an established framework to include pedagogy and addresses the dearth of empirical studies in the field of e-learning adoption. These contributions collectively elevate our understanding of the complex interplay between technological, organizational, environmental, and pedagogical factors in shaping the successful integration of e-learning within tertiary institutions.

5.3.2 Contributions to practice and policy

The research makes a valuable practical contribution by directing the focus of tertiary institution managers towards specific factors that can either facilitate or impede the adoption of e-learning. Consequently, tertiary institutions embarking on e-learning

initiatives gain a crucial comprehension of their nature and determinants, which was arguably lacking in their prior knowledge. Therefore, tertiary institutions in the Upper West Region intending to embrace e-learning must prioritize considerations related to technology, organization, environment, and pedagogy.

Again, the study contributes to practice, particularly in the context of tertiary institutions, by proposing guidelines for effective adoption of e-learning in tertiary institutions. Therefore, tertiary institutions embarking on e-learning initiatives would make reference to these guidelines in their e-learning adoption process.

Regarding policy implications, it is widely believed that establishing a favourable ICT environment will have a positive impact on the adoption of e-learning. A supportive environment encompassing legislation and ICT infrastructure will advance the e-learning agenda, thereby fostering economic growth and development. The implementation of an e-learning policy will offer a structured framework for effectively integrating diverse stakeholders into the e-learning platform, thereby encouraging widespread utilization.

5.4 Limitations of the Study

Though it would have very interesting to include all tertiary institutions in the Upper West Region, it was practically impossible within the available resources. This study was therefore narrowed down to degree- awarding public tertiary educational institutions in the Upper West Region. Similarly, the inclusion of every aspect of e-learning would have also made the study more encompassing; this was however practically impossible.

5.5 Suggestion for further Research

This study was conducted with a focus on the nature and factors influencing e-learning adoption in tertiary institutions. It is therefore recommended that further studies consider the cost and source of funding for e-learning implementations in tertiary institutions, as this will provide a feasibility perspective on e-learning adoption in tertiary institutions. Furthermore, future studies could look at the inclusivity of e-learning adoption and e-learning design in general, considering the fact that there are a number of marginalized groups, including persons with disabilities, in our tertiary institutions of learning who need to actively participate in this new paradigm of learning.

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