

**EXPLORING DIGITAL LEADERSHIP
ADAPTATIONS IN SECONDARY SCHOOLS
(CASE STUDY OF BWAILA CLUSTER, LILONGWE URBAN)**

By

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DECLARATION

I declare that this thesis titled “*Exploring Digital Leadership Adaptations in Secondary Schools, Malawi*” is my original work. All sources of information, citations, and referenced materials have been duly acknowledged. This work has not been submitted previously, either in whole or in part, for the award of any degree or academic qualification at any other university or institution of higher learning.

This research has been submitted with full knowledge and the approval of my supervisor, Dr. Foster Lungu.



Beatrice Atupele Mpandura
Student

15th April 2024

Date



Dr. Foster Lungu
Research Supervisor

15 April 2025

Date

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DEDICATION

To my family for being there for me in all times and even the time I was pursuing my studies. You are always in my heart.

ABSTRACT

The integration of digital leadership in education is increasingly recognized as a key driver of technology adoption and instructional transformation. This study explores how digital leadership practices are implemented in secondary schools within the Bwaila Cluster, Lilongwe, Malawi, focusing on leadership strategies, challenges, and the effectiveness of digital adoption. Despite efforts through national initiatives like the Digital Malawi Project and MGDS III, progress in digital transformation remains slow, primarily due to limited resources, inadequate ICT infrastructure, and disparities in access between schools.

The study's main objective was to assess how school leadership facilitates the adoption of digital technologies to enhance teaching and learning outcomes. Grounded in Transformational Leadership Theory and Diffusion of Innovation Theory, the study analyzes how school leaders influence digital integration and navigate barriers to technology adoption. A mixed-methods research design was employed, incorporating quantitative surveys and qualitative interviews with school administrators, teachers, and students. Statistical methods were used to identify numerical trends, while thematic analysis provided deeper insights into perceptions of digital leadership in schools.

Findings indicate that 73% of respondents faced challenges in digital learning, citing limited access to devices, poor internet connectivity, and inadequate training. Financial constraints (45%) and insufficient professional development (41%) were identified as major barriers. However, 82% of participants reported positive experiences with digital learning, emphasizing its potential to improve student engagement and academic performance. Transformational leadership was found to be moderately or extensively applied by 56% of respondents, reflecting growing but inconsistent digital leadership practices. Additionally, 50% of participants agreed that digital leadership had a direct impact on student learning outcomes.

The study concludes that while digital leadership is crucial for enhancing education, effective implementation requires greater investment in ICT infrastructure, increased funding, and sustained teacher training programs. Addressing these challenges can accelerate digital transformation in Malawi's secondary schools, ensuring greater accessibility, improved learning experiences, and more equitable education opportunities for students.

LIST OF ABBREVIATIONS

Abbreviation	Full Meaning
AI	Artificial Intelligence
CDSS	Community Day Secondary School
CWED	Central West Education Division
DEM	District Education Manager
DOI	Diffusion of Innovation
EdTech	Educational Technology
FOSS	Free and Open-Source Software
ICT	Information and Communication Technology
IDI	ICT Development Index
LMS	Learning Management System
MGDS III	Malawi Growth and Development Strategy III
MIS	Management Information System
MoEST	Ministry of Education, Science and Technology
MZUNIREC	Mzuzu University Research Ethics Committee
NGO	Non-Governmental Organization
OECD	Organisation for Economic Co-operation and Development
PPP	Public-Private Partnership
SDG	Sustainable Development Goal
STEAM	Science, Technology, Engineering, Arts, and Mathematics
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WFP	World Food Programme
WHO	World Health Organization

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LIST OF ABBREVIATIONS

CDSS	Community Day Secondary School.
HOD	Head of Department.
CWED	Central West Education Division.
DEM	District Education Division Manager.
MOEST	Ministry of Science Education and Technology.
MzuniRec	Mzuzu University Research Ethics Committee.

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CHAPTER 1: INTRODUCTION

This section gives an overview of the changing digital landscape of Malawi and its implications for education. A review of the related literature was done by focusing on some key developments in educational technology, challenges faced by developing countries, the digital divide, and the theoretical framework of educational digital leadership.

1.1. Background

The global education landscape has undergone a profound transformation due to rapid advancements in digital technology. Digital tools are increasingly being integrated into teaching and learning processes, enhancing access to education, instructional delivery, and overall academic performance. While many developed countries have successfully embedded technology-driven education models, the situation in developing countries, including Malawi, remains complex. Although education is a national priority in Malawi, the adoption and effective utilization of digital technologies in secondary schools continue to face significant challenges.

This study explores how digital leadership influences the adoption and integration of digital tools in Malawian secondary schools. Through the examination of the experiences of school leaders, teachers, and students, the study seeks to understand the barriers to digital transformation, the strategies adopted by educational leaders, and the extent to which digital leadership facilitates innovation in resource-constrained environments. The research employs an explanatory sequential mixed-method design that allows for a comprehensive analysis of both quantitative data on digital adoption trends and qualitative insights from key stakeholders.

To provide a theoretical foundation, this study is guided by Transformational Leadership Theory (Bass & Riggio, 2006) and Diffusion of Innovation Theory (Rogers, 2003). Transformational Leadership Theory explains how visionary school leaders inspire educators and students to embrace digital change, while Diffusion of Innovation Theory helps in understanding how new technologies spread within an educational system, who the early adopters are, and what factors influence technology adoption at different levels of the system. These theories offer a conceptual lens for evaluating how leadership strategies impact the diffusion and sustainability of digital technologies in Malawian secondary schools.

1.1.1. Digital Transformation Challenges in Malawi's Education System

Despite the growing awareness of digital learning benefits, several barriers hinder the widespread adoption of technology in Malawi's secondary schools. The country ranks 167 out of 176 countries on

the ICT Development Index (ITU, 2017), reflecting significant challenges in infrastructure, affordability, and digital literacy. Limited access to the internet, inadequate digital devices, a lack of teacher training, and disparities between urban and rural schools continue to pose obstacles to meaningful digital transformation.

One of the most pressing challenges is the limited availability of ICT infrastructure and unreliable electricity supply. Many schools, particularly in rural areas, lack access to stable electricity, with only 18% of Malawian households connected to the national power grid (Government of Malawi, 2019c). The inconsistent power supply affects schools' ability to use computers, projectors, and internet-based learning platforms, making it difficult to integrate digital tools into classroom instruction. Even in schools that have electricity, access to computers, tablets, and the internet is limited, particularly in public and Community Day Secondary Schools (CDSSs). While some urban schools have ICT labs, many rural institutions rely on a few outdated computers that must be shared among large numbers of students. Additionally, high data costs and poor network coverage make online learning impractical for many students, restricting their ability to engage in digital research, e-learning platforms, and collaborative online learning.

Another major challenge is the lack of digital training for teachers, which significantly affects technology adoption in the classroom. Although some professional development programs exist, they are often infrequent, theoretical, and insufficiently tailored to teachers' specific needs. Many educators lack the technical expertise and pedagogical strategies necessary to integrate digital tools effectively into their lesson plans. Consequently, even when schools are equipped with digital tools, many teachers utilize them, preferring traditional teaching methods. Furthermore, the digital divide between urban and rural schools remains a significant issue. While urban schools generally benefit from better ICT infrastructure and internet connectivity, rural schools continue to lag behind due to insufficient investment and geographic barriers. This creates a gap in educational opportunities, with students in technology-rich schools having greater exposure to digital learning than their counterparts in low-resource settings.

1.1.2. National Initiatives and Policy Responses

Recognizing the importance of digital learning, the Malawian government, alongside international development partners, has implemented several initiatives to promote digital education. One of the key policy interventions is the Malawi Growth and Development Strategy (MGDS III 2017–2022), which prioritizes ICT expansion as a driver of economic and educational transformation. The strategy emphasizes the development of affordable and reliable ICT infrastructure, including the establishment of

community ICT access centers, expansion of broadband services, and implementation of stronger ICT regulatory frameworks to ensure secure and equitable digital access.

Another major initiative is the Digital Malawi Project, a World Bank-funded program aimed at enhancing internet connectivity, digital literacy, and e-learning adoption across different sectors, including education. The project focuses on improving school-level internet access, integrating ICT into national education policies, and training educators and students in digital literacy skills. Schools that have benefited from this project have reported some progress in digital adoption, although technical and financial constraints still pose significant challenges.

While these initiatives have helped lay the groundwork for digital transformation, their impact has been limited by funding shortages, inadequate teacher training, and the absence of structured digital policies at the school level. Many schools, especially in rural areas, still struggle to access the resources necessary to fully integrate digital learning into their curriculum. Furthermore, despite the push for e-learning during the COVID-19 pandemic, a lack of infrastructure and connectivity issues prevented many students from accessing digital learning platforms, further exposing the digital divide between urban and rural learners.

1.1.3. The Need for Evidence-Based Digital Leadership Strategies

Despite government efforts to expand digital access, one of the key challenges remains the lack of comprehensive data on ICT adoption in schools. Without clear and reliable information on the availability of digital tools, internet access, and teachers' preparedness for digital learning, it becomes difficult for policymakers and school leaders to make evidence-based decisions. According to UNESCO (2019), education policymakers require detailed data on digital adoption trends to formulate policies that effectively address technological gaps. However, in Malawi, data on digital learning infrastructure, teacher training levels, and student engagement with technology remains fragmented, making it difficult to assess the actual impact of ICT integration in schools.

This gap highlights the need for strong digital leadership in secondary schools to drive technology adoption, policy formulation, and long-term investment in digital infrastructure. Effective digital leadership involves more than just introducing technology into classrooms—it requires strategic planning, training programs, stakeholder collaboration, and continuous assessment of ICT implementation. School leaders must take a proactive approach in:

- Advocating for policy reforms that promote sustainable and equitable digital learning environments.

- Ensuring that technology adoption strategies address disparities between urban and rural schools, ensuring no students are left behind.
- Developing professional development programs for teachers, equipping them with the necessary skills to integrate digital tools into their instructional practices.
- Fostering a school-wide culture of innovation and adaptability, where both teachers and students are encouraged to engage with digital tools in meaningful ways.

This study, therefore, seeks to fill this knowledge gap by examining how digital leadership strategies influence the adoption and sustainability of digital learning in Malawian secondary schools. By understanding the practical experiences of school administrators, teachers, and students, this research will offer insights into how digital leadership can be strengthened to improve technology integration.

1.2. Statement of the Problem

Despite ongoing policy reforms aimed at integrating digital technologies into education, secondary schools in Malawi continue to face significant challenges in implementing and sustaining digital learning. While initiatives such as Digital Malawi and the Malawi Growth and Development Strategy III (MGDS III) have made strides in expanding technology access, progress has been slow and uneven. The persistent barriers include limited resources, inadequate infrastructure, and a widening digital divide that disproportionately affects schools in rural and underprivileged areas.

One of the major obstacles to digital transformation in Malawian secondary schools is the lack of sufficient infrastructure to support ICT integration. According to the 2018 census, only 18% of households in Malawi had access to electricity (Government of Malawi, 2019c), making it extremely difficult for many schools to implement digital learning strategies effectively. Even in schools where electricity is available, access to digital devices such as computers, projectors, and internet connectivity remains inconsistent. Many schools, particularly Community Day Secondary Schools (CDSSs), operate with limited budgets and cannot afford the necessary ICT equipment and maintenance costs.

In addition to infrastructure constraints, there is a notable lack of comprehensive data on how ICT is currently being used in Malawian schools. Without reliable, evidence-based data, policymakers and school leaders struggle to develop targeted interventions that address specific gaps in digital adoption, teacher training, and student engagement. The absence of nationally coordinated digital learning strategies results in fragmented implementation efforts, where some schools make significant progress while others fall further behind.

Another key issue is the need for strong digital leadership in guiding the transition to technology-enhanced education. Many school leaders lack structured training in ICT management and digital transformation strategies, making it difficult to motivate teachers and students to embrace digital tools effectively. Even when technology is introduced, teachers often lack the necessary digital literacy skills to integrate e-learning platforms, online assessments, and digital collaboration tools into their teaching practices.

To address these challenges, this study explores how school leadership can facilitate digital transformation by leveraging Transformational Leadership Theory and Diffusion of Innovation Theory. Transformational Leadership focuses on how visionary leaders inspire, motivate, and support educators in adopting digital tools, while Diffusion of Innovation Theory explains how new technologies spread within an educational system and what factors influence adoption rates. By combining these theoretical perspectives, this study explores how digital leadership can bridge the resource gap, enhance teacher training, and create a more inclusive digital learning environment in Malawian secondary schools.

This research is essential in identifying practical leadership strategies that can help overcome existing barriers and ensure that all students, regardless of their geographic location or socioeconomic background, have access to quality digital education.

1.3. Objectives

The integration of digital leadership in education is increasingly recognized as a key driver of technology adoption and learning transformation. However, as evidenced in this study, secondary schools in Malawi continue to face barriers to effective digital integration, including infrastructure deficits, limited teacher capacity, and financial constraints. This study was designed to investigate how digital leadership influences the adoption and implementation of digital technologies in secondary schools within the Bwaila Cluster, Lilongwe, Malawi. By using a mixed-methods research approach, the study explored the leadership strategies employed, the challenges encountered, and the effectiveness of digital leadership in facilitating digital transformation.

1.3.1. Main Objective

The main objective of this study was to investigate the nature, scope, and dynamics of digital leadership practices as adapted in selected secondary schools within the Bwaila Cluster in Lilongwe, Malawi. The study focused on understanding the role of school leaders in promoting digital learning, examining the

extent of digital technology adoption, and exploring the challenges affecting the sustainability of digital leadership in these educational settings.

1.3.2. Specific Objectives

To achieve the main objective, the study was structured around the following specific objectives, which were aligned with the research findings and methodology:

- **Explore the status of leadership practices in integrating digital technologies in Malawian education to enhance learning outcomes.** This objective aimed to assess how school administrators, teachers, and education stakeholders are implementing digital leadership strategies to foster technology adoption in schools. The study employed quantitative surveys and qualitative interviews to evaluate the extent to which leadership influences digital tool usage, teacher training, and student engagement with technology.
- **Assess challenges in digital technology integration among Malawian secondary school leaders.** This objective was addressed by analyzing survey responses from teachers and administrators, as well as qualitative insights from school leaders on the systemic issues hindering digital transformation.
- **Identify adaptive strategies of Malawian educational leaders amidst challenges in digital integration, identifying barriers to effective leadership.** Given the challenges facing digital education in Malawi, this objective explored how school leaders, teachers, and policymakers are developing innovative solutions to overcome these barriers.
- **Analyze the effectiveness of leadership practices in integrating digital technologies in Malawian education to enhance outcomes.** This objective focuses on evaluating the impact of digital leadership strategies on teaching quality, student engagement, and overall school management. The study used Chi-Square and G-Test statistical analyses to determine whether digital leadership significantly influences student learning outcomes and technology adoption rates.

1.3.3. Research Questions

The study was guided by the following research questions, which align with the objectives and findings of the study:

- What is the status of leadership practices in integrating digital technologies in Malawian secondary schools to enhance learning outcomes?

- What are the key challenges hindering digital technology integration among Malawian secondary school leaders?
- What adaptive strategies are being employed by educational leaders to address barriers in digital integration?
- How effective are leadership practices in integrating digital technologies to improve learning outcomes in Malawian secondary schools?

The study findings provide data-driven insights that contribute to policy recommendations, leadership training initiatives, and infrastructure development strategies aimed at enhancing digital transformation in Malawi's secondary education sector.

1.4. Justification of the Study

This study aligns with Sustainable Development Goal (SDG) 4, which aims to ensure inclusive, equitable, and quality education for all. As global education systems increasingly integrate digital technologies, Malawi must adopt innovative leadership approaches to facilitate the effective implementation of digital learning. The Malawi 2063 Vision prioritizes a transition into a knowledge-driven digital economy, emphasizing that research, innovation, and technology adoption are key drivers of sustainable development and economic transformation. Achieving this vision requires significant investment in ICT infrastructure, teacher capacity-building, and technology-enhanced learning approaches. Strengthening Science, Technology, Engineering, Arts, and Mathematics (STEAM) education, expanding digital access in schools, and fostering research and development (R&D) initiatives are critical steps in equipping students with 21st-century skills. Digital leadership plays a crucial role in ensuring that these transformations are strategically managed, equitably distributed, and sustainably implemented within Malawi's education sector.

Despite ongoing policy efforts, Community Day Secondary Schools (CDSSs) remain underrepresented in digital education research, with limited scholarly work examining inequalities within this system. Many CDSSs face poor ICT infrastructure, a lack of trained educators, and limited access to digital learning resources, exacerbating the digital divide between urban and rural schools. This study contributes to the existing body of knowledge by examining how digital leadership can bridge the technology gap, enhance digital adoption, and foster inclusive education policies. Furthermore, evidence-based decision-

making is essential for education policymakers, school administrators, and stakeholders to develop strategies that support equitable access to digital learning opportunities. The findings from this research will serve as a foundation for future studies on digital leadership, ensuring that policy and practice are informed by empirical data, best practices, and the realities of Malawi's education system. Ultimately, this study aims to support Malawi's broader efforts toward becoming an upper-middle-income economy by strengthening digital capacity, improving educational quality, and fostering technological innovation in secondary schools. By providing data-driven insights into the challenges and opportunities of digital leadership, the study will contribute to policymaking, school administration, and future digital education reforms in Malawi.

1.5. Definition of Operational Terms

This section defines key operational terms used in this study. These definitions are grounded in scholarly literature and contextualized to the study of digital leadership within Malawian secondary schools.

Digital Leadership

Digital leadership refers to the ability of school leaders to strategically guide, implement, and manage digital technologies within an educational setting to enhance teaching, learning, and school operations. It encompasses competencies in vision-setting, change management, and technology integration to foster innovation and collaboration across the school ecosystem (Sheninger, 2019). According to Anderson and Dexter (2005), digital leadership is not just about the use of ICT tools but also about establishing a culture that supports ongoing digital transformation within schools.

Digital Transformation

Digital transformation in education is defined as the comprehensive integration of digital technologies into all aspects of teaching, learning, administration, and educational culture. It involves systemic changes to pedagogical models, infrastructure, and stakeholder engagement, aimed at improving educational outcomes and inclusivity (OECD, 2021). Digital transformation goes beyond digitization—it entails rethinking traditional practices to fully leverage the potential of technology in education (Fullan & Langworthy, 2014).

Digital Technology

Digital technology refers to electronic tools, systems, devices, and resources that generate, store, or process data. In the education sector, this includes computers, tablets, internet connectivity, software

applications, learning management systems (LMS), and communication tools used to support teaching and learning (UNESCO, 2020). These tools are increasingly being used for interactive learning, digital assessments, data tracking, and remote instruction.

Educational Technology

Educational technology, often abbreviated as EdTech, is the combined use of computer hardware, software, and educational theory and practice to facilitate learning and improve performance. It encompasses instructional tools such as interactive whiteboards, online course platforms, digital assessments, and mobile applications aimed at enriching learning experiences (Means et al., 2013). According to Ertmer and Ottenbreit-Leftwich (2013), educational technology is effective only when integrated with sound pedagogical approaches and supported by adequate infrastructure and training.

ICT Integration

ICT integration refers to the effective incorporation of information and communication technologies into the educational process to support the delivery of content and improve learning outcomes. It involves the meaningful use of technology to enhance curriculum delivery, engage students, and enable new forms of instruction (Pelgrum & Law, 2003). In this study, ICT integration is central to digital leadership as it reflects how school leaders enable technology-based learning environments.

Community Day Secondary Schools (CDSSs)

Community Day Secondary Schools are publicly funded day secondary schools in Malawi, often located in underserved and rural communities. These schools typically face challenges such as inadequate infrastructure, limited digital resources, and staffing shortages (MoEST, 2021). The CDSS context is crucial in this study as it reflects the realities of digital inequity and the need for adaptive digital leadership.

1.6. Chapter One summary

Chapter One has provided a comprehensive introduction to the study, outlining the contextual background, research problem, objectives, key questions, and the justification for investigating digital leadership practices in secondary schools within the Bwaila Cluster of Lilongwe, Malawi. It has highlighted the pressing challenges that continue to affect digital transformation in education, most notably limited ICT infrastructure, inadequate teacher training, and persistent financial constraints. While national initiatives such as Digital Malawi and the Malawi Growth and Development Strategy III (MGDS III) demonstrate commitment to technological advancement, the pace of progress remains uneven, particularly in underserved schools.

The chapter also has clarified the study's conceptual underpinnings, drawing on Transformational Leadership Theory and Diffusion of Innovation Theory to explore how school leaders influence the adoption and integration of digital technologies in education. These theoretical perspectives help frame the inquiry into the conditions that support or hinder digital change in learning environments.

In addition, the chapter introduced and clarified key terms such as digital leadership, digital transformation, educational technology, and ICT integration. This was important for ensuring conceptual clarity and consistency across the thesis.

The next chapter will present a review of related literature, examining the global, regional, and local perspectives on digital leadership and technology adoption in education.

CHAPTER 2: LITERATURE REVIEW

The integration of digital technologies in education is increasingly recognized as a key driver of innovation, student engagement, and improved learning outcomes. However, the success of digital transformation in schools largely depends on effective leadership to guide technology adoption, teacher support, and policy implementation. This literature review explores the role of digital leadership in education, focusing on theoretical perspectives, global best practices, and the specific challenges and opportunities within Malawi's education system. It explores Transformational Leadership Theory and Diffusion of Innovation Theory, which provide insights into how school leaders inspire and manage digital change. The review also looks at international experiences in digital learning adoption, the state of ICT infrastructure in Malawi, and the role of school leadership in bridging the digital divide. By analyzing existing research and policy documents, this chapter identifies key lessons, research gaps, and areas for further exploration, helping to frame the study's investigation into how digital leadership is shaping secondary education in the Bwaila Cluster, Lilongwe, Malawi.

2.1. Theoretical Framework

The theoretical framework of this study is anchored in two complementary theories that explain the adoption, integration, and leadership of digital transformation in education: Transformational Leadership Theory (Bass & Riggio, 2006) and Diffusion of Innovation Theory (Rogers, 2003). These theories provide a conceptual foundation for understanding how school leaders drive technological change, how teachers and students respond to digital innovation, and what factors accelerate or hinder digital transformation in schools.

Transformational Leadership Theory is relevant in this study because it explains how visionary school leaders influence, inspire, and empower teachers and students to embrace digital tools, even in challenging environments. By fostering innovation, collaboration, and continuous professional development, transformational leaders help create technology-friendly school cultures where digital learning thrives.

On the other hand, Diffusion of Innovation Theory (Rogers, 2003) helps explain why some schools and educators adopt digital technologies faster than others. This theory provides insights into how new technologies spread within a social system, identifying the categories of adopters (from innovators to laggards) and the role of infrastructure, awareness, and support systems in driving or slowing digital adoption in secondary schools.

2.1.1. Transformational Leadership Theory

Transformational leadership is the kind of leadership where leaders inspire and mobilize followers to do something beyond the ordinary through emphasis on shared vision, values, and personal growth of their members. Idealized influence is one principle wherein the leader acts as a role model, inspirational motivation through building an appealing vision, intellectual stimulation through encouragement of creativity and problem-solving, and lastly, individualized consideration for each member's needs (Bass, 1990).

The Transformational Leadership approach has a high value in education, possibly stimulating innovation and facilitating the adoption of digital tools. It allows for easily inspiring teachers and students to be responsive to the challenges of technologies and developing such an atmosphere of collaborative ongoing learning and openness to innovation. For example, heads who manage to inspire their subordinates with a certain educational vision about the school where information and communication technologies fully integrate the educational process contribute to the creative problem solution and try new approaches to classroom teaching.

This style of leadership has also proved effective in resource-constrained environments. For example, in rural schools with minimal technology, transformational leaders have marshaled resources, built community partnerships, and empowered teachers to innovate with what they have. One example of this was a principal from an area of deprivation who used motivational techniques to ensure staff integrated mobile phones and free online resources into lessons to fill the gap in access to traditional tools for educational purposes.

2.1.2. Diffusion of Innovation Theory

The Diffusion of Innovation theory, developed by Everett Rogers in 1962, was based on how new ideas and technology are diffused across cultures, why that takes place, and at what pace. This theory subsequently found a wide application in the field of adoption studies in many aspects of education, health, technology, and so on. A DOI theory provides a set of principles on how innovations in ideas, products, technology, and programs are communicated through different channels over a period of time among the members of a social system.

2.1.2.1.Key Elements of Diffusion of Innovation Theory

Innovation: The idea, practice, or entity that the individual or some other unit of adoption perceives as new. It may be an innovation in either teaching method, technological tool, or even a type of educational software alone.

Communication Channels: These describe the media through which messages pertaining to the innovation are obtained. They could be from media, internet, word of mouth, or formal training. **Time:** This is highly instrumental in the adoption. It involves the innovation-diffusion process, the time taken to adopt, and even the period taken for innovation to be fully adopted across a social system.

Social System: The population or organizations in which the innovation is diffused. For schools in Malawi, it shall involve teachers, students, school administrators, and the community at large.

Categories of Adopters: Rogers identified five categories of adopters, each representing a group that defines their readiness to accept the innovation. These include :**Innovators:** Those who are the first ones to adopt an innovation, **early Adopters:** Who accept new ideas early but after reasonable consideration, **early Majority:** Those who accept innovations just before the majority of the populace, **late Majority:** These are the people who accept innovations long after the majority of the population has already accepted and implemented innovations, **laggards:** People who do not like change and tend to avoid innovations and only adopt innovations when they are left with no other choice (Rogers, 2003).

2.1.2.2.Diffusion of Innovation and Its Relevance to Technology Adoption in Schools in Malawi

However, the DOI theory does seem particularly useful in the context of the rate of technology diffusion within schools. Because the infrastructure is bad, there is generally low access to digital tools, and even resistance to change in general, technology adoption has been very slow in the case of Malawi schools. Yet again, the COVID-19 pandemic accelerated this particular need of educational technology adoption for continuing education and hence forced the hands of many schools onto applying emergency brakes to go on digital and online means in carrying continuous educations.

Diffusion of Innovation Theory can also help in understanding how technology has been adopted in schools during the pandemic, and how these technologies can further diffuse. Innovators in Malawi could have been the early adopters of technology-for instance, some private schools which quickly installed online learning solutions once schools were closed because of the pandemic. Those urban schools were early adopters, for they had better access to both technology and internet services.

Poor connectivity, a lack of devices, and the urban-rural digital divide make the road ahead pretty bumpy for early majority and late majority adopters. Usually, laggards need the greatest persuasion and perhaps refuse to move forward simply because they either cannot or do not understand.

2.1.2.3. Case Studies on Effective Diffusion of Technology in Education: Covid Era

Response of Malawi towards E-learning: The government of Malawi and other NGOs tried to provide the students with e-learning opportunities during the COVID-19 pandemic. The Ministry of Education in collaboration with various technology firms established a platform such as Radio and Television broadcasts that provided online lessons to students who did not have access to the internet. Lwendo et al., 2021. Further, the Malawi Institute of Education introduced mobile phone and radio distance learning programs for rural students. In this way, the barriers of Internet access and digital literacy were overcome, and wider diffusion in education technology became possible.

Global Examples: Other Countries, such as South Korea, quickly moved to online learning during the pandemic period. The use of Technology in Education in South Korean can be seen as those successful examples of early adopter embracing innovation. In practice, the digital infrastructure well laid in the country then facilitated the rapid movement to online mode of learning, showing an already established technological environment facilitating to diffuse innovation in education is according to Hwang, 2021.

2.2. Malawi's Digital Landscape

Malawi, a country in southeastern Africa, is increasingly aware of the importance of Information and Communication Technology (ICT) for its development. However, the digital landscape in Malawi faces significant challenges, including infrastructure issues, limited internet access, and gaps in data collection. This essay shall analyze the Malawi ICT Development Index, review infrastructure challenges, and review national initiatives such as Digital Malawi and Malawi Growth and Development Strategy-MGDS III, and gaps in data collection and research on the use of technology in schools.

2.2.1. ICT Development Index and Infrastructure Issues

The ICT Development Index is a measure of the level of infrastructure and access to information and communication technologies in various countries. Malawi's ranking on the global IDI represents a country still battling with building a solid digital infrastructure. According to the International Telecommunication Union, Malawi ranks very low in aspects like internet penetration, fixed broadband subscriptions, and mobile network coverage-all important facets of developing a strong digital economy.

These infrastructural issues in electricity and access to the internet further compound the challenges. Electricity remains unreliable, especially in rural areas, which affects the full usefulness of digital technologies. The World Bank (2023) has remarked that only 11 percent of rural areas are accessed with electricity, which is profoundly limiting the use of digital devices. Further, access to the internet in Malawi has been slow and expensive, with prohibitively high data costs for many of its citizens to afford. According to the World Bank, 2023. These are some of the issues that have created a digital divide where many Malawians cannot be full participants in this digital world.

2.2.2. National Initiatives: Digital Malawi and MGDS III

Notwithstanding, Malawi has been undertaking various initiatives at the national level to develop the digital landscape. In 2020, the government of Malawi initiated the Digital Malawi project, aimed at building a modern digital economy with improved access to the internet, support for e-government services, and development of digital skills. This initiative aims at enhancing ICT infrastructure, improving digital literacy, and access to e-government services. If successful, Digital Malawi could greatly enhance the ICT environment of the nation, ensuring economic growth and development.

MGDS III also supports the importance of technology for the fulfillment of the country's long-term development aspirations. This has identified sectors that the nation relies on for development, including education, agriculture, and health, which have to be spearheaded through effective use of ICT (Government of Malawi, 2017). But there are challenges in effective implementation of such initiatives at the grassroots due to gaps in infrastructure, finance, and coordination between public and private sectors.

2.2.3. Gaps in Data Collection and Research on Technology Use in Schools

One gap that can be identified in the current digital landscape of Malawi is a lack of any comprehensive data on the use of technology in schools. Though there is little doubt that digital tools have become increasingly critical in education, especially during the COVID-19 pandemic, little study has been conducted regarding how much technology is used within Malawian schools. The government and educational institutions are experiencing challenges in collecting accurate data on the availability of digital resources, internet access, and the degree of integration of technology into teaching and learning processes.

This becomes a cause for concern because without this information, policy formulation or strategizing on how the use of technology can best be promoted in schools cannot be effectively done. Essentially, not

knowing the challenges faced by teachers and students prohibits one from constructing an effective training program or adequately appropriating resources. Secondly, there is also minimal research on how technology can be used to realize improved educational outcomes, prohibitive to the potential of improving the quality of education in Malawi.

2.3. Digital Technology in Education

The integration of digital technology in education has transformed how students learn and how teachers deliver instruction, making education more accessible, interactive, and personalized. Digital tools such as computers, mobile devices, learning management systems, and online collaboration platforms have enhanced student engagement and improved learning outcomes globally (Clark, 2020). In developed countries, e-learning platforms, digital classrooms, and artificial intelligence-driven educational tools are widely used to facilitate both formal and informal learning (Means et al., 2013). However, in developing countries, including Malawi, the adoption of digital technology in schools remains slow, primarily due to limited ICT infrastructure, high costs of internet access, and a lack of teacher training (UNESCO, 2022). While digital transformation holds immense potential, successful implementation requires strong leadership, policy support, and investment in ICT resources to ensure that students and teachers can effectively leverage digital tools to enhance learning experiences (Ertmer & Ottenbreit-Leftwich, 2013). This section explores the role of digital technology in education, its benefits, global trends in adoption, and the challenges faced by schools in integrating technology into teaching and learning.

2.3.1. Global Perspective on Educational Technology

Educational technology is revolutionizing how we learn and teach worldwide. It involves using digital tools like computers, tablets, and software to support learning and make education more accessible. As technology advances, more schools around the world are adopting these tools to improve the quality of education.

2.3.2. Global Trends in Educational Technology Adoption

E-learning has, day by day, been acquiring greater popularity all over the world. In developed countries, technologies are incorporated into lessons in classrooms right from the earliest schooling to higher education. To illustrate this, almost every school in the United States, Great Britain, and other parts of Europe uses some form of technology application, like interactive whiteboards and learning applications, along with a host of learning platforms such as Google Classroom and Moodle. This caused the learning to be more interactive, individualized, and at any time that a learner might prefer.

In Asia, countries such as Singapore and South Korea lead the pack in technology adoption, including adoption in smart classrooms and digital assessments. In Latin America, in particular, rural schools, the countries of Brazil and Mexico are increasing their digital access to schools. These examples fall under a larger trend of increased blended learning within schools across the globe, incorporating both face-to-face education and online tools.

2.3.3. Successful Digital Leadership Models in Schools Worldwide

Good leadership and proper implementation are keys to effective adaptation of educational technology. Therefore, schools with a clear vision by leaders to assist and encourage the integration of digital transformation will most likely succeed in successfully integrating technology. For example, the "1:1 initiative" in the United States, where each student is provided with a device, has improved learning in many districts (Bill & Melinda Gates Foundation, 2020). In Estonia, for example, investment by the government in digital education made it one of the most advanced countries in Europe with regard to all things digital; as early as elementary grades, coding and digital literacy are taught.

Other digital leadership models focus on teacher training and developing a culture of continuous learning. For instance, teachers in Finland are given autonomy and professional training to use technology competently in their classrooms (Sahlberg, 2021). What this all means is that effective digital leadership is about much more than just providing the tools; it's also about fostering a mindset of innovation among educators.

2.3.4. Educational Technology in Developing Countries

Therefore, technological changes or adoption pose more significant problems among developing nations. Most of their schools are devoid of all basic infrastructural facilities and accessibility to the internet or computer facilities. Therefore, it remains far off to get students benefited from digitally adaptive learning tools. For example, in sub-Saharan Africa, hardly 40% of the schools are reported to get connected with the internet facilities, while a large part of its student population does not possess any learning gadgets whatsoever (World Economic Forum, 2020).

2.4. Leadership Practices in Digital Technology Integration

Digital leadership is increasingly recognized as a key determinant of successful technology integration in education. Far beyond the provision of ICT hardware, effective digital leadership entails creating a compelling vision, mobilizing stakeholders, aligning resources, and fostering a school culture that values innovation and continuous learning. Leaders play a catalytic role in setting direction,

influencing teacher mindsets, and institutionalizing practices that promote meaningful digital transformation. According to Sheninger (2019), digital leaders must not only support infrastructure deployment but also design policies and practices that promote pedagogical use of technology, enable collaboration, and ensure accountability for ICT-related goals.

Empirical evidence reinforces that leadership quality is a more significant factor in digital integration than the mere availability of technological resources. Anderson and Dexter (2005) found that schools led by technology-competent administrators were more likely to use ICT tools in ways that enhance instruction and improve learner outcomes. Similarly, Flanagan and Jacobsen (2003) highlight that digitally literate leaders are instrumental in embedding ICT into the curriculum, supporting professional development, and establishing mechanisms for monitoring and evaluating technology use.

In low-resource environments like Malawi, the role of school leaders becomes even more critical. Transformational leadership—characterized by visionary thinking, individualized support, and intellectual stimulation—enables leaders to compensate for infrastructure deficits by leveraging alternative strategies. Fullan and Langworthy (2014) argue that visionary school heads often navigate systemic limitations by mobilizing community support, building partnerships with NGOs and donors, and championing open-source educational tools tailored to local realities. For example, school leaders who proactively seek out mobile-based solutions or low-cost learning platforms can create inclusive digital environments despite limited resources.

Moreover, leadership practices that empower teachers—through mentorship, shared decision-making, and capacity building—contribute to a sustainable digital culture. Research by Afshari et al. (2009) suggests that when principals model technology use and create conditions for collaborative professional learning, teachers are more likely to integrate digital tools confidently. Such environments foster innovation from the ground up, making technology integration a collective institutional process rather than a top-down mandate.

This section directly supports Objective 1 of the study, which seeks to assess the status and nature of leadership practices that enable or hinder digital technology integration in Malawian secondary schools. By examining how school leaders operationalize vision, mobilize resources, and support teacher engagement, the study highlights the pivotal role of leadership in bridging the policy-practice gap in digital education.

2.5. Challenges Hindering Digital Technology Integration

While digital transformation holds great promise for education, its implementation in many schools is impeded by persistent and interconnected challenges. These barriers range from structural and financial constraints to pedagogical, cultural, and policy-level obstacles. As Ertmer and Ottenbreit-Leftwich (2013) argue, the integration of ICT in education is often hindered by both first-order barriers (external, such as lack of access to infrastructure and funding) and second-order barriers (internal, such as teacher beliefs, skills, and institutional culture).

In the context of Malawi, first-order challenges are particularly acute. Many schools lack reliable electricity, with less than 20% of households connected to the grid (Government of Malawi, 2019). Internet connectivity, where available, is often unstable and prohibitively expensive, disproportionately affecting rural and peri-urban schools. This infrastructural gap reinforces existing inequalities, making digital learning largely inaccessible to students in Community Day Secondary Schools (CDSSs). The World Bank (2023) notes that despite significant investments under the Digital Malawi project, the digital divide between urban and rural schools remains wide, exacerbating educational disparities.

Financial constraints also continue to undermine efforts to scale digital education. Schools operating on limited budgets struggle to procure and maintain ICT equipment, pay for data services, or invest in basic maintenance. Moreover, the lack of dedicated funding streams for school-level ICT planning limits the sustainability of pilot projects introduced by development partners.

Second-order challenges further complicate the integration process. Many teachers lack digital literacy or confidence in using technology for instruction. Even when devices are available, underutilization due to insufficient pedagogical training is widespread (UNESCO, 2020). Teachers often perceive ICT as an add-on rather than an enabler of improved pedagogy, especially in schools where leadership does not actively promote or support professional development in digital competencies (Afshari et al., 2009).

Policy-related constraints also play a role. Although national frameworks such as the Malawi National ICT Policy and MGDS III emphasize digital inclusion, implementation at the school level is inconsistent due to lack of clear guidelines, monitoring tools, and accountability mechanisms (MoEST, 2021). The absence of structured ICT benchmarks for schools leaves many institutions without a roadmap for digital integration, resulting in fragmented and often reactive approaches.

Socio-cultural factors add another layer of complexity. In some communities, there are concerns around screen time, content relevance, or gendered access to technology, which may discourage the adoption of

digital tools in learning settings (UNESCO, 2022). Girls in particular face multiple barriers, including limited access to devices at home and socio-cultural expectations that restrict their engagement with digital platforms.

This section directly supports Objective 2 of the study by unpacking the contextual, structural, and behavioral barriers that Malawian school leaders must navigate in their pursuit of digital transformation. Addressing these challenges requires not only infrastructure and funding but also strategic leadership, inclusive policies, and long-term investment in teacher development and community sensitization.

2.6. Adaptive Strategies of Educational Leaders

In the face of systemic challenges and constrained resources, educational leaders in developing contexts are increasingly turning to adaptive strategies to advance digital transformation in schools. These strategies are not merely reactive but represent intentional, context-sensitive leadership approaches designed to overcome limitations and foster innovation. Adaptive leadership involves interpreting complex challenges, mobilizing people toward shared solutions, and facilitating organizational learning in the midst of uncertainty (Heifetz et al., 2009). In low-resource settings such as Malawi, school leaders have demonstrated resilience and creativity in adopting workable solutions tailored to their local realities. Common adaptive strategies include the use of blended learning models, mobile-based learning solutions, and leveraging low-tech tools that function with minimal infrastructure. Leaders have also formed strategic partnerships with NGOs, private sector actors, and government agencies to acquire hardware, secure internet access, or benefit from digital literacy initiatives (Sinha & Agarwal, 2021).

Studies from sub-Saharan Africa highlight the power of localized leadership in driving ICT integration. Hennessy et al. (2010) report that when national policy support is weak or inconsistent, proactive school leaders fill the gap by initiating small-scale, locally manageable technology programs. These leaders often champion community engagement, resource mobilization, and context-specific digital pedagogy, helping schools adapt in ways that are both sustainable and inclusive. Peer-to-peer professional development is another widely used strategy. Ghamrawi (2013) emphasizes that teacher-to-teacher mentoring and learning circles help build trust and capacity more effectively than one-time workshops. In Malawi, some school leaders have institutionalized ICT champions among staff to guide others, provide troubleshooting support, and model technology use during instruction. This approach not only decentralizes capacity-building but also strengthens collective ownership of digital innovation.

Leadership commitment to cultivating a digital culture within the school is equally important. This involves fostering a climate where experimentation is encouraged, successes are celebrated, and failure is seen as a learning opportunity. Leaders who communicate a clear vision for digital integration and align ICT goals with broader teaching and learning objectives are more likely to see sustained adoption of technology across their institutions (Sheninger, 2019). In some cases, school heads have utilized flexible scheduling or restructured timetables to allow teachers access to limited ICT resources or to rotate device use among students. Others have introduced locally appropriate incentive systems such as recognizing tech-integrating teachers in staff meetings or showcasing innovative lessons during school events to encourage broader participation. The use of offline content platforms such as Kolibri, and digital resources distributed via USB or memory cards, also exemplifies how adaptive strategies address infrastructure constraints. These tools allow students to access digital content without continuous internet connectivity, significantly reducing bandwidth and cost-related barriers (World Bank, 2023).

This section directly addresses Objective 3 of the study by examining how educational leaders creatively navigate their constraints to enable digital integration. It underscores that leadership is not only about vision and direction but also about adaptability, contextual intelligence, and strategic collaboration in overcoming barriers to equitable and effective ICT implementation.

2.7. Effectiveness of Leadership Practices

2.7.1. Measurement of Success in Digital Integration

The success of digital integration is often measured through student engagement, teacher uptake, and improved learning outcomes. According to Zhao and Frank (2003), schools that prioritize leadership involvement in digital planning report stronger outcomes across all indicators. Metrics such as technology use frequency, ICT competency levels, and performance benchmarks are widely used (OECD, 2021).

2.7.2. Metrics and Tools for Evaluating Digital Leadership Effectiveness

In education, digital leadership is the leading of institutions towards adopting and then using digital means effectively (Sheninger, 2019). One of the common measures for success is learning outcomes, meaning enhancement in understanding and skill acquisition because of technology adaptation (Means et al., 2013). The use of online platforms or educational applications may lead to improved engagement by students, enhancing their critical thinking and performance (Fullan & Langworthy, 2014). Other important measures involve teacher adoption rates—that is, the rate of adoption on the part of educators and instructors of new digital tools. A high rate of adoption may indicate both confidence of teachers in

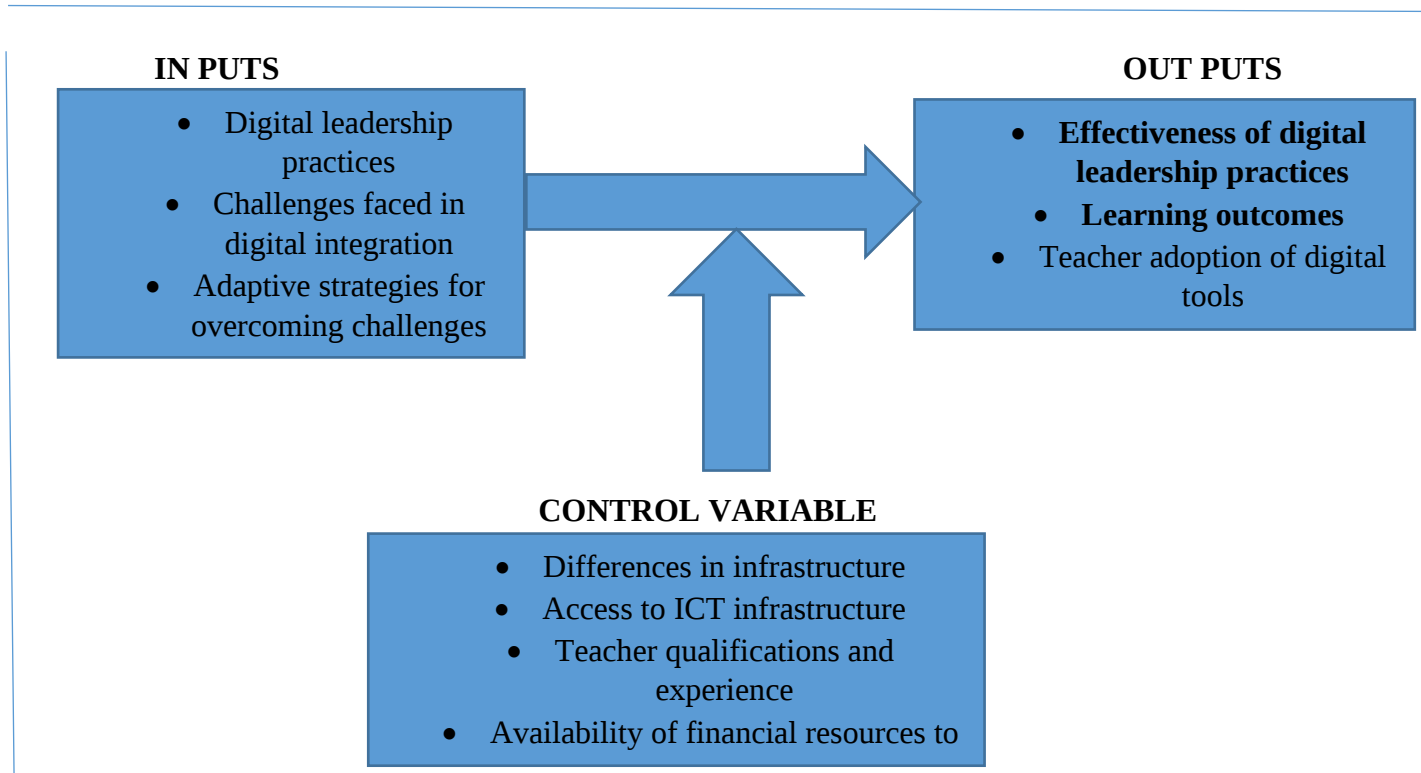
using technology and their belief in its value to enrich learning processes; low adoption might suggest issues with training, support, or resistance to change (Ertmer & Ottenbreit-Leftwich, 2013).

Several tools can track these metrics. For instance, Learning Management Systems (LMS) like Moodle or Google Classroom can provide analytics on student participation, grades, and engagement, serving as indicators of learning outcomes (Watson, 2022). Surveys and feedback tools offer insights into teacher satisfaction and highlight usability issues or challenges. Usage monitoring platforms, integrated into LMS or external analytics tools, also help determine adoption levels and patterns, guiding schools in making informed decisions about digital learning implementation (OECD, 2021).

2.8. Conceptual Framework

The conceptual framework demonstrates the relationship between the study's variables (Johnson & Christensen, 2014). The independent variables for this study are the education resources required to produce output or outcome variable and the dependent variable is the academic performance.

Figure 1 Conceptual Frame Work



The issues of infrastructure, resources, and qualifications are control variables that must be addressed and utilized to good effect to bring in desirable outcomes in the form of increased teacher adoption, better learning outcomes, and effective leading practices. Similarly, the input variables in the form of digital leadership, adaptive strategies, and policies have to be matched by the prevailing conditions. It is only

when the challenges are addressed and optimum utilization of resources is made through strategic leadership and policy support that positive changes in the output can be realized.

2.9. Chapter Two Summary

This chapter discussed how digital leadership can contribute to overcoming educational challenges in Malawi, considering issues of limited resources and access to technology. It explores two leadership models: Transformational Leadership and Diffusion of Innovation, with a view to how these impact on technology adoption. While global trends show successful integration of digital tools into schools, Malawi faces challenges such as poor infrastructure and resistance to change. National initiatives such as Digital Malawi have been established to increase access to ICT.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. Introduction

This chapter describes methods and procedures of the study. The methodology elements that will be presented include; study area, study design, sampling methods, sample size, data collection methods and tools and data analysis.

3.2. Description of the Study Area

The study was conducted in Lilongwe urban. Lilongwe district was chosen because it has the highest number of CDSSs in Malawi (Ministry of Education, Science and Technology, 2021). Lilongwe district, which falls under the Central West Education Division (CWED), is divided into three education districts namely: Lilongwe City, Lilongwe Rural East and Lilongwe

3.3. Research Design

The study focused on the development of digital leadership at school has used a sequential explanatory mixed methods research design to conduct this research into schools' adaptation of digital leadership. Creswell, 2009 and Johnson and Christensen, 2014 described mixed methods research as research which involves the collecting or analyzing data, either quantitatively or qualitatively, mixed methods study designs incorporate elements or procedures from both qualitative and quantitative approaches in a single study. The approach has been used in this study as it maximizes chances of selected quantitative and qualitative-designed strengths' realization, that concurrently gets minimized effects depending on several limitations of an approach developed by Opoku-Asare and Siaw, (2015). About mixed methods study design as noted by Johnson; Christensen, (2014, time order becomes fundamentally significant when conducting research. According to the said authors, events ordering with respect to time has generated three generally accepted classifications of time sequence, simultaneously, sequentially, and transforming.

This study used a sequential time order in which quantitative data collection was followed by qualitative data collection. Creswell, 2009 further emphasizes the role of weighting in mixed methods design, which involves giving greater emphasis to either quantitative or qualitative research.

3.3.1. Sampling Techniques

Since the study adopted the mixed methods design, the sampling techniques covered both the quantitative and qualitative aspects of the study. For the quantitative aspect, the study used the census approach.

Census approach involves studying every unit or everything in a population (Jargons, 2018). This study's population were some in Lilongwe urban secondary schools to have a representative sample of school in the urban. A total of 6 schools were sample out. 100 students and twenty teachers were the ones targeted in this study.

The qualitative aspect used purposive sampling. In purposive sampling, the researcher identifies the characteristics of the population of interest and then locates individuals who possess those characteristics (Johnson & Christensen, 2014). In this study, purposive sampling was used in two ways. Firstly, in selecting schools that are in the city and secondly those that offered computer studies to their students.

3.3.2. Sample Size

Since a census approach was used for quantitative data, the total population of the CDSSs in Lilongwe rural and urban (N=120) was used. But for qualitative data, the sample comprised of six schools. All six schools were from the city, which were purposively selected and also consisted of 20 teachers purposively selected participants from the six selected schools. The participants included the following; the head teacher or deputy head teacher, Head of department, teachers and students.

However, the sample size for the qualitative data was determined by the point of data saturation. Data saturation is the point where enough data has been collected to draw necessary conclusions and any further data collection does not produce value added insights (Glaser and Strauss, (1967) as quoted by Saunders et al. (2018). In this study, data saturation was reached after interviewing 60 students and 15 teachers.

Table 1 Total number of participants interviewed

Participants	Population
Head Teacher	2
Deputy Head Teacher	6
Teacher	10
Head of Department	2
Students	100

3.4. Data Collection Methods and Tools

This section outlines the data collection methods and tools used in this study to investigate digital leadership adaptations in secondary schools within the Bwaila Cluster, Lilongwe, Malawi. The study employed a mixed-methods research approach, integrating both quantitative and qualitative data collection techniques to ensure a comprehensive understanding of digital leadership effectiveness, challenges, and implementation strategies. Data was collected through structured questionnaires, semi-structured interviews, direct observations, and document reviews, allowing for triangulation and validation of findings.

3.4.1. Data Collection Method

The study collected both primary data. Primary data was collected through the administration of questionnaire while secondary data was sourced through document review.

3.4.1.1. Primary Data Collection

Primary data was gathered through structured questionnaires and semi-structured interviews. The use of questionnaires provided statistically measurable data, while interviews allowed for in-depth insights into digital leadership practices, challenges, and strategies employed by school administrators and teachers. Additionally, direct observations were conducted in selected schools to assess the availability and usage of digital tools in learning and teaching environments.

3.4.1.2. Secondary Data Collection

To complement primary data, the study conducted a document review, analyzing school records, digital learning policies, ICT development reports, and teacher training records. This helped in understanding institutional efforts in promoting digital leadership and identifying gaps in policy implementation.

3.4.2. Data Collection Tools

3.4.2.1. Structured Questionnaires

Structured questionnaires were used to gather quantitative data from students and teachers, assessing the extent of digital technology usage, perceived challenges, and leadership effectiveness. The questionnaires included closed-ended and Likert-scale questions, allowing for quantifiable analysis (Creswell, 2014). Respondents provided information on digital leadership effectiveness, access to ICT resources, teacher preparedness, and institutional policies supporting digital learning.

3.4.2.2. Semi-Structured Interviews

Interviews were conducted with school leaders, including headteachers, deputy headteachers, and ICT coordinators, to explore their perspectives on digital transformation, leadership strategies, and the barriers to digital learning implementation. This method enabled follow-up questions for deeper insights, as suggested by Zohrabi (2013), who emphasized that interviews are effective in small sample studies to capture detailed qualitative data.

3.4.2.3. Direct Observations

To validate self-reported data, direct observations were conducted in selected schools. Observations focused on ICT infrastructure availability, student and teacher interactions with digital tools, and the extent to which technology was being used for instructional purposes. This method helped in identifying gaps between policy implementation and actual digital tool usage in classrooms.

3.4.2.4. Document Review

A review of school ICT policies, digital training records, and ICT asset registers provided contextual background on institutional efforts to support digital leadership. This helped assess the sustainability of digital initiatives, the extent of government support, and gaps in digital adoption strategies.

3.4.3. Quantitative Data Analysis

Quantitative data was collected through structured questionnaires and analyzed using descriptive statistics, Chi-Square tests, and G-Test analysis.

3.4.3.1. Descriptive Statistics

Quantitative data was analyzed using descriptive statistics, which helped summarize participant demographics and key trends in digital adoption. This analysis included:

- Frequencies and percentages to represent categorical data such as gender, grade level, and frequency of digital tool usage.
- Weighted index analysis to rank key challenges in digital leadership adoption and infrastructure access.

3.4.3.2. Chi-Square Test for Digital Learning Impact

To assess whether digital leadership practices significantly influence student learning outcomes, a Chi-Square test was conducted. The null hypothesis (H_0) assumed no significant impact of digital leadership on learning outcomes, while the alternative hypothesis (H_1) suggested a meaningful impact.

Chi-Square Formula Used:

$$\chi^2 = \sum \{(O_i - E_i)^2 / E_i\}$$

Where:

- O_i = Observed frequency,
- E_i = Expected frequency.

Results:

- Chi-Square value (χ^2) = 48.87
- Degrees of freedom (df) = 2
- Critical value (at $\alpha = 0.05$) = 5.991

Since $\chi^2 = 48.87 > 5.991$, the null hypothesis is rejected, meaning digital learning significantly impacts student learning outcomes.

Interpretation:

This result indicates that digital learning positively influences students' academic performance, with the majority of participants (82%) reporting improvements due to digital integration.

3.4.3.3. G-Test for Variations in Digital Leadership Impact

A G-Test was performed to determine whether the variations in the perceived impact of digital leadership practices among stakeholders (teachers, administrators, students) were statistically significant.

G-Test Formula Used:

$$G = 2 \sum \{O_i \ln(O_i / E_i)\}$$

Results:

- G-Test Statistic = 35.166
- Degrees of freedom (df) = 2
- Critical value (at $\alpha = 0.05$) = 5.991

Interpretation:

- Administrators and teachers were more likely to perceive digital leadership as effective.
- Students, however, had mixed reactions due to unequal access to digital tools.

This finding suggests that while leaders are driving digital transformation, accessibility challenges still hinder full adoption.

3.4.4. Qualitative Data

Qualitative data derived from questionnaire was analyzed through thematic analysis. The study adopted the six step thematic approach analysis as postulated by Kiger and Varpio(2020) which involves familiarization with the data, coding, theme generation, review and theme naming and final write up . Thematic method of analysis was adopted in this study because it is flexible and robust (Kiger & Varpio, 2020).

3.4.4.1. Thematic Analysis

Qualitative data collected from interviews and open-ended questionnaire responses was analyzed using thematic analysis, following the six-step process outlined by Kiger and Varpio (2020):

- Familiarization with the data – Reading and re-reading transcripts to identify emerging insights.
- Coding – Assigning labels to recurring ideas and concepts.
- Generating themes – Grouping related codes into broader themes.
- Reviewing themes – Refining categories for consistency and relevance.
- Defining and naming themes – Clearly articulating key findings.
- Writing the report – Summarizing findings in relation to the study objectives.

3.5. Ethical Considerations

Ensuring ethical integrity in research is fundamental, particularly when conducting studies involving human participants. This study adhered to strict ethical guidelines to protect the rights, privacy, and well-being of all respondents. Given the sensitivity of information related to school leadership and digital technology adoption, the researcher anticipated that some participants might be hesitant to disclose details about their schools' digital practices and challenges. To mitigate this concern, participants were assured of confidentiality, and it was clearly communicated that all information collected would be used strictly for academic purposes.

All necessary ethical approvals were obtained prior to data collection. The study received ethical clearance from the Mzuzu University Research Ethics Committee (MZUNIREC) and official authorization from both Mzuzu University and the Central West Education Division (CWED). To ensure anonymity and participant protection, no names or personally identifiable information were recorded during one-on-one oral interviews and questionnaire administration. Furthermore, all participants were informed that their

participation was entirely voluntary, and they had the right to withdraw from the study at any point without any consequences. By adhering to these ethical principles, the study maintained high ethical standards, fostering trust, transparency, and integrity throughout the research process.

3.6. Limitation of the study

While this study provides valuable insights into digital leadership adaptations in secondary schools within the Bwaila Cluster, Lilongwe, Malawi, several limitations were encountered that may have influenced the scope and depth of the findings. One of the primary limitations was the geographical focus of the study, which was restricted to secondary schools in the Bwaila Cluster, Lilongwe. As a result, the findings may not be fully generalizable to schools in other regions of Malawi, particularly those in rural areas where digital access and leadership challenges may differ significantly. Future research could expand the geographical scope to ensure a more comprehensive understanding of digital leadership in diverse educational settings.

Another limitation was resource constraints, which affected the sample size and the number of schools included in the study. While efforts were made to capture a representative sample, a larger sample could have provided a more detailed picture of digital leadership practices and challenges across a wider range of schools. Additionally, limited access to reliable internet connectivity and digital tools in some schools may have influenced participants' perceptions and responses, as schools with better ICT infrastructure and digital policies may have different experiences compared to those with fewer resources. The study also faced challenges related to participant availability and response biases. Some school administrators and teachers were reluctant to disclose full details about the challenges faced in digital leadership implementation, possibly due to concerns about institutional reputation. To address this, confidentiality and voluntary participation were emphasized, but the potential for social desirability bias in responses cannot be entirely ruled out.

Furthermore, while the mixed-methods research design allowed for a rich triangulation of data, self-reported data from questionnaires and interviews may have introduced subjectivity. Some participants may have overstated or understated their engagement with digital leadership due to personal perspectives or institutional pressures. Complementary longitudinal studies could provide a more dynamic and evolving picture of digital leadership effectiveness over time.

Despite these limitations, the study provides a strong foundation for understanding digital leadership in secondary schools and offers practical recommendations for enhancing technology integration, leadership capacity, and digital learning environments in Malawi's education sector.

3.7. Chapter Three Summary

This chapter presented the research methodology used to explore digital leadership practices in secondary schools within the Bwaila Cluster, Lilongwe. A sequential explanatory mixed-methods design was employed to capture both statistical trends and in-depth perspectives from school leaders, teachers, and students. Data collection involved structured questionnaires, interviews, observations, and document reviews, allowing for triangulation and richer insights. Quantitative data were analyzed using descriptive statistics, Chi-Square, and G-Test, while qualitative responses were thematically analyzed.

The chapter also addressed ethical considerations, including informed consent and research approvals, and outlined key limitations. Overall, the methodology establishes a solid foundation for presenting the study's findings in the next chapter.

CHAPTER 4: PRESENTATION OF RESULTS

4.1. Demographic Data

Understanding the demographic profile of the study participants is crucial in interpreting how digital leadership is perceived and implemented in secondary schools within the Bwaila Cluster, Lilongwe, Malawi. This section highlights the gender distribution and grade levels of student respondents, providing insights into the diversity of perspectives captured in the study.

4.1.1. Gender Distribution of Participants

In this study, 56% of respondents were male, while 44% were female. This relatively balanced gender representation ensures that insights into digital leadership and technology use are reflective of both male and female experiences in secondary education.

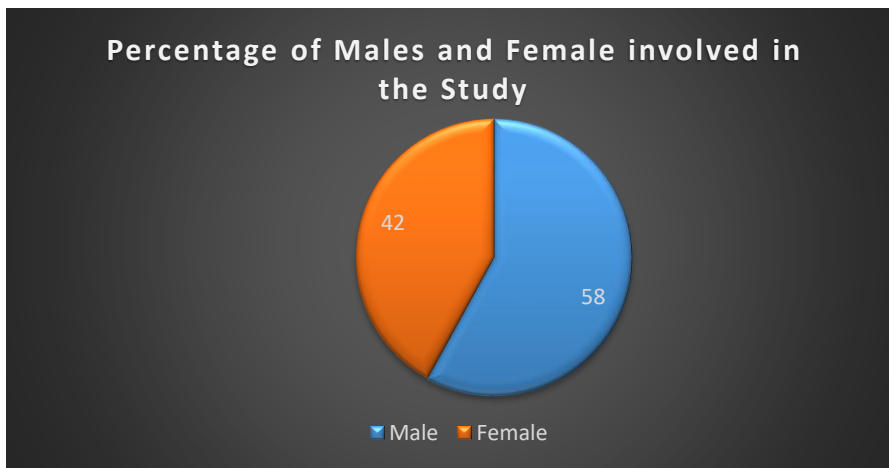


Figure 1 Participants by gender

A balanced gender mix helps uncover any disparities in digital technology access and usage, ensuring that both male and female students have equitable opportunities to engage with digital learning tools. It also promotes inclusive perspectives in assessing how digital leadership influences learning outcomes, providing a more comprehensive understanding of its impact across different groups. While the study did not identify significant gender-based differences in digital tool usage, it is essential to consider how cultural and societal factors may shape access to digital learning opportunities for male and female students differently. The study effectively captures insights from both male and female students, ensuring a gender-inclusive approach to analyzing digital leadership practices.

4.1.2. Grade Levels of Participants

Understanding the distribution of students by grade level provides critical insights into how digital leadership practices impact students at different academic stages. Senior students, particularly those in Form 3 and Form 4, are more likely to engage with digital technologies compared to their junior counterparts. This is largely due to their increased exposure to digital tools over time, as well as the academic demands placed on them as they prepare for national examinations. With higher stakes in their learning journey, these students tend to rely more on digital resources for research, revision, and accessing supplementary materials that enhance their understanding of complex subjects (Ng'ambi & Bozalek, 2021). In contrast, junior students (Form 1 and Form 2) typically have less experience with digital learning tools, as their curriculum places a stronger emphasis on foundational subjects and traditional learning methods. Their lower engagement with digital technologies may also stem from limited access, a lack of confidence, or insufficient training on digital platforms (Mingaine, 2013).

The distribution of students across different grade levels in this study is presented in Table 2 below.

Table 2: Participants by grade level

Grade Level	Frequency	Percentage (%)
Form 1	12	12.36
Form 2	34	32.58
Form 3	21	19.10
Form 4	33	35.96
Total	100	100

4.2. Status of Digital Leadership Practices in Schools

Digital leadership in secondary schools plays a critical role in shaping how technology is integrated into learning and administration. The effectiveness of school leadership in promoting digital adoption can significantly impact students' ability to access digital tools, engage with online resources, and develop essential 21st-century skills (Fullan, 2014). This section presents an overview of how frequently students use digital tools, what types of technologies they rely on, and which subjects benefit the most from digital integration.

4.2.1. Frequency of Digital Device Usage for Learning

The frequency with which students engage with digital devices for educational purposes provides valuable insights into the accessibility, adoption, and effectiveness of digital learning tools in schools. Some students use digital tools regularly, while others engage with them only on occasion or rarely. This variation can be attributed to multiple factors, including availability of resources, teacher encouragement, and individual digital literacy levels (Selwyn, 2017).

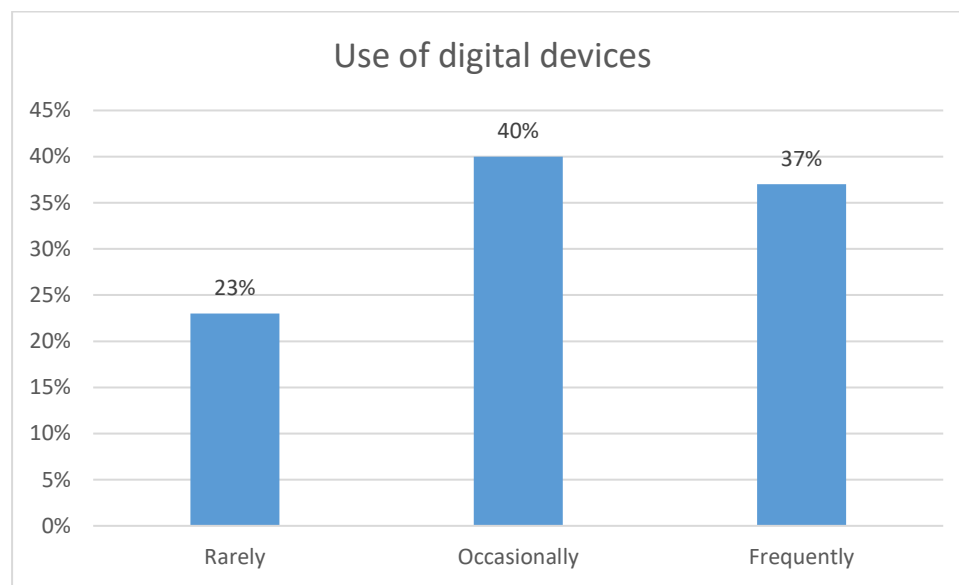


Figure 2: Frequency of using digital devices for educational purposes

As seen in the table above, only 37% of students frequently use digital tools for learning, while a significant proportion (40%) use them only occasionally. Even more concerning, 23% of students rarely use digital tools in their studies, which indicates a digital gap that could hinder their ability to compete in a technology-driven world (UNESCO, 2022).

Some students shared their personal experiences:

- *“I only use digital tools when the school requires us to, but at home, I don’t have access to a computer.”* – **Form 2 Student**
- *“I try to use digital resources for studying, but sometimes the internet connection is too slow, so I give up.”* – **Form 3 Student**

The results suggest that while schools are introducing digital learning, not all students have equal access or the ability to use these tools consistently. Leadership efforts need to focus on bridging this gap by

ensuring that digital tools are more accessible, and that students receive structured guidance on how to integrate them into their daily studies (Harris, 2018).

4.2.2. Types of Digital Tools Used in Learning

Different digital tools offer varied learning experiences, ranging from structured educational platforms to interactive applications that support self-paced learning. The study explored the most commonly used digital tools in secondary schools, highlighting their role in education.

Table 3 Types of digital tools used for learning

Digital tools	Frequency	Percentage (%)
Computers	56	56.00
Tablets	7	7.0
Smart phones	27	27.00
Others	10	10.00
Total	100	100

Computers remain the most commonly used digital tool (56%), which is expected since computer labs are often the primary sources of digital learning in schools (Clark, 2020). However, smartphones account for 27% of digital tool usage, suggesting that students also rely on their personal devices for learning, especially outside school hours.

The limited use of tablets (7%) suggests they are underutilized, despite their potential benefits, such as portability, affordability, and touchscreen interactivity (Ertmer & Ottenbreit-Leftwich, 2013). Some students shared their views on this:

- *"I prefer using a computer because the screen is bigger, and it's easier to type on."* – **Form 4 Student**
- *"I use my phone to search for learning materials, but sometimes I get distracted by social media."* – **Form 3 Student**

While computers remain dominant, smartphones are becoming a key learning tool. However, schools need to explore how tablets and other devices can be better integrated into digital learning strategies to create a more diverse technological learning environment (Means et al., 2013).

4.2.3. Subjects Where Digital Tools Are Used

Not all subjects benefit equally from digital learning. Some subjects naturally integrate technology, while others still rely on traditional methods. The study explored which subjects receive the most digital engagement.

Table 4 Subjects or lessons in which digital devices are used

Subject or lessons	Frequency	Percentage (%)
Mathematics	40	40.08
Science	34	34.00
English	11	11.00
Social studies	0	0.00
Others	15	15.00
Total	100	100

The data reveals a clear trend—STEM subjects (Mathematics and Science) dominate digital learning adoption, with 40% of students using digital tools for Mathematics and 34% for Science. This can be attributed to the availability of interactive simulations, online tutorials, and subject-specific software that make abstract concepts easier to grasp (Jones, 2021).

Conversely, only 11% of students use digital tools for English, and Social Studies has no recorded digital integration. This indicates that some subjects are still being taught with traditional methods, possibly due to:

- A lack of relevant digital resources for subjects like Social Studies.
- A perception that some subjects do not require digital tools as much as STEM fields.
- Teachers' limited training in incorporating digital methods into language-based subjects (Zhao et al., 2002).

Students' experiences also reflect this disparity:

- *“For Mathematics, we use computers for calculations and simulations, which help us understand complex topics.”* – **Form 4 Student**

- *“I have never used digital tools in Social Studies. Our teacher just writes notes on the board, and we copy them.”* – **Form 2 Student**

While digital integration is strong in STEM subjects, non-STEM subjects are lagging behind. Schools should expand digital learning to all subjects, ensuring that humanities and language subjects also benefit from innovative digital tools and interactive learning resources (Trust, 2018).

4.2.4. Summary of Digital Leadership Practices in Schools.

The findings highlight a growing but inconsistent adoption of digital leadership in secondary schools. While students are engaging with digital tools, access is still uneven, and certain subjects are not benefiting fully from technology.

4.3. Challenges in Digital Leadership Implementation

While digital transformation in education offers immense opportunities, its implementation within secondary schools faces several hurdles. School leaders, teachers, and students encounter significant barriers that limit the full integration of digital tools in the learning process. These challenges are not only technical but also institutional, financial, and attitudinal. This section presents the findings from study on the major obstacles hindering digital leadership practices in schools and explores the systemic issues preventing a seamless transition into technology-driven education.

4.3.1. General Challenges Faced in Digital Integration

Despite the potential of digital learning to enhance educational outcomes, most students and educators continue to face difficulties in effectively using digital tools. The study explored the prevalence of challenges encountered by students in secondary schools.

Table 5: Challenges encountered while using digital tools for learning.

Encountered challenges	Frequency	Percentage (%)
Yes	73	73.00
No	27	27.0
Total	100	100

The results indicate that 73% of students reported encountering challenges when using digital tools for learning, whereas 27% did not face any major difficulties. These findings suggest that a majority of

students struggle with digital access or usage, which may affect their ability to fully benefit from technology in education.

To further understand these challenges, students were asked to describe the specific difficulties they face when using digital tools. Common challenges included:

- Limited access to devices due to an insufficient number of computers in schools.
- Poor internet connectivity, making it difficult to access online learning materials.
- Lack of technical support, preventing students from troubleshooting issues with devices or software.

Students Voice:

- *"I want to use computers for studying, but sometimes there are too many students and not enough computers, so I give up."* – **Form 3 Student**
- *"When the school Wi-Fi is down, we can't access online learning platforms. Sometimes it takes days before it's fixed."* – **Form 4 Student**

4.3.2. Key Hindrances to Digital Leadership

The study also explored the specific challenges limiting the effectiveness of digital leadership in schools. School administrators and teachers provided insights into barriers preventing them from fully implementing digital strategies.

Challenges	Percentage	Weight (Based on Significance)	Weighted Index (Percentage *Weight)
Finical Resource Constraint	45%	4	180
Lack of professional Development	41%	3	123
Inadequate infrastructure	10%	2	20
Resistance to change	4%	1	4

The most frequently cited challenge was financial resource constraints, reported by 45% of respondents. Schools struggle to allocate sufficient funds for purchasing computers, projectors, and software licenses. Additionally, 41% of respondents indicated that lack of professional development is a major issue, as many teachers have not received adequate training on digital tool integration.

Further, 10% of respondents highlighted inadequate infrastructure, including unreliable electricity supply and limited internet access. A small proportion (4%) cited resistance to change as a barrier, indicating that while most educators are open to technology, a few remain hesitant to adopt digital learning tools.

4.3.3. Summary of Digital Leadership Challenges

The results reveal that digital leadership implementation in schools is hindered by financial limitations, lack of teacher training, infrastructure challenges, and occasional resistance to change. The majority of students (73%) report difficulties in accessing and using digital tools, while 45% of school leaders cite financial constraints as the main obstacle. Teacher training remains a major concern, with 41% identifying it as a limiting factor in the effective adoption of digital learning strategies. The findings suggest that schools require increased funding, improved professional development opportunities for teachers, and enhanced infrastructure to support the effective integration of digital leadership in education.

4.4. Strategies for Overcoming Digital Leadership Barriers.

Despite the numerous challenges affecting the integration of digital leadership in secondary schools, educators, school leaders, and students have employed various strategies to navigate these difficulties. This section presents the results on the approaches used by schools to overcome barriers related to digital learning implementation. The findings focus on collaborative efforts, capacity-building initiatives, resource mobilization, and the effectiveness of digital leadership strategies in improving education outcomes.

4.4.1. Strategies Used to Overcome Challenges in Digital Integration

To understand how schools are addressing digital learning challenges, respondents were asked to indicate the strategies they have employed to mitigate barriers to digital integration. The results are presented in the table below.

Table 6: Strategies employed to overcome challenges to digital integration.

Strategies employed	Frequency	Percentage (%)
Collaboration with stake holders	50	50.00
Professional development programs	35	35.00
Resource mobilization	15	15.00
Other	0	0.00
Total	100	100

The results indicate that collaboration with stakeholders is the most common strategy used by schools, with 50% of respondents reporting that they have partnered with external organizations, government agencies, or private entities to enhance digital learning. This collaboration has involved efforts such as receiving donated computers, securing internet access, and organizing technology-related training for teachers and students (Harris, 2018). Additionally, 35% of respondents identified professional development programs as a key approach in addressing digital leadership challenges. These training sessions equip educators with skills on how to effectively integrate digital tools into their teaching practices (Ertmer & Ottenbreit-Leftwich, 2013). However, only 15% of respondents reported that resource mobilization such as fundraising, grant applications, or school-level initiatives has been pursued to improve access to technology.

4.4.2. Most Engaging Digital Tools Used in Schools

The study also sought to establish which digital tools are considered most engaging and beneficial for students in their learning experiences. The responses are summarized below.

Table 7: Distribution of Engagement and Helpfulness of Various Digital Learning Tools

Most engaging and helpful digital tools	Frequency	Percentage (%)
Online learning platforms	40	40.00
Educational apps	37	37.00
Interactive videos	7	7.00
Simulations and games	0	0.00%
Others	16	16

Total	100	100
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The findings show that online learning platforms (such as Google Classroom, Moodle, and Microsoft Teams) are the most engaging digital tools, with 40% of respondents reporting their frequent use. These platforms facilitate content sharing, assessments, and collaboration between students and teachers (Clark, 2020). Similarly, 37% of students found educational apps (such as Khan Academy, Duolingo, and subject-specific mobile applications) to be highly engaging. These apps provide interactive learning experiences and enable students to access study materials at their own pace. Interactive videos are used by 7% of respondents, while no respondents reported the use of simulations or educational games. This indicates a limited adoption of game-based learning as a strategy for engaging students.

4.4.3. Primary Goals for Digital Integration in Schools.

To understand the priorities of schools in integrating digital learning, respondents were asked to indicate the primary goals of digital adoption. The results are summarized below.

Table 8: Primary goals for digital integration school

Primary goals for digital integration	Frequency	Percentage (%)
Improved student engagement	35	35.00
Enhanced teaching quality	45	45.00
Increased operational efficiency	20	20.00
Other	0	0.00
Total	100	100

The results indicate that enhancing teaching quality is the most common objective of digital integration, with 45% of respondents prioritizing the use of technology to improve instructional methods. This involves leveraging digital resources to provide better lesson delivery, interactive learning experiences, and student-centered teaching approaches (Means et al., 2013). Additionally, 35% of respondents emphasized the role of digital tools in improving student engagement, particularly by making learning more interactive, accessible, and visually appealing. Meanwhile, 20% of respondents identified increased operational efficiency such as improving school administration, record-keeping, and communication systems, as a key objective of digital integration.

4.4.4. Effectiveness of Digital Leadership in Enhancing Learning

The study also explored how respondents perceive the overall effectiveness of digital leadership in improving student learning outcomes. The results are presented in the table below.

Table 9: Impact of digital learning based on experience

Impact of digital learning	Frequency	Percentage (%)
Positive	61	61.00
Negative	35	35.00
Neutral	4	4.00
Total	100	100

The results indicate that 61% of respondents believe that digital learning has had a positive impact on student learning. This suggests that most students and educators perceive digital tools as beneficial to education, particularly in terms of access to learning materials, flexibility, and engagement (UNESCO, 2022). However, 35% of respondents reported a negative impact, citing challenges such as technological distractions, lack of reliable internet, and difficulties in adapting to digital tools. Meanwhile, 4% of respondents remained neutral, suggesting that they either had limited exposure to digital learning or did not notice a significant difference in learning outcomes.

4.4.5. Statistical Validation: Chi-Square Analysis of Digital Learning Impact

A Chi-Square test was conducted to determine whether there was a significant association between digital learning and perceived learning outcomes.

Chi-Square Formula Used:

$$\chi^2 = \sum \{[(O_i - E_i)^2 / E_i]\}$$

Where:

- O_i = Observed frequency
- E_i = Expected frequency

The results of the analysis are summarized below.

Impact of digital learning	Frequency	Percentage (%)
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Positive	61	61.00
Negative	35	35.00
Neutral	4	4.00

Chi-Square Value (χ^2) = 48.87

Degrees of Freedom (df) = 2

Critical Value at $\alpha = 0.05 = 5.991$

Since $\chi^2 = 48.87$ is greater than the critical value (5.991), the null hypothesis is rejected, indicating that there is a significant association between digital learning and perceived student learning outcomes.

4.4.6. Variations in Digital Leadership Impact Among Stakeholders

The study also explored whether different stakeholder groups including students, teachers, and administrators held differing views on the impact of digital leadership.

Variations in digital leadership impact	Frequency	Percentage (%)
Yes	14	77.78
No	1	5.56
Not sure	3	16.67
Total	18	100

The findings indicate that 77.78% of respondents believe that the impact of digital leadership varies across different stakeholders, suggesting that teachers and administrators may perceive digital integration differently from students.

4.4.7. Summary of Strategies for Overcoming Digital Leadership Barriers

The results reveal that schools are actively employing strategies such as collaboration with stakeholders (50%) and professional development programs (35%) to enhance digital learning. Online learning platforms (40%) and educational apps (37%) are the most engaging digital tools used in schools. The primary goal of digital integration remains enhancing teaching quality (45%), while 61% of respondents perceive digital learning as having a positive impact. Statistical analysis confirms that digital learning has a significant association with student learning outcomes.

These findings provide a foundation for understanding how digital leadership strategies can be improved to maximize learning outcomes and digital adoption in schools.

4.5. Effectiveness of Leadership Practices in Integrating Digital Technologies

The successful integration of digital technologies in secondary schools depends significantly on the effectiveness of leadership practices. Strong leadership can facilitate the adoption of digital tools, create a supportive environment for both teachers and students, and ensure that technology is used to enhance learning outcomes (Fullan, 2014). This section presents the results on how digital leadership has influenced student engagement, learning effectiveness, and institutional digital transformation. The findings are based on participants' perceptions of digital leadership effectiveness and the extent to which transformational leadership principles have been embedded in digital integration efforts.

4.5.1. Perceived Impact of Digital Leadership on Student Learning Outcomes

To assess the effectiveness of digital leadership, respondents were asked to indicate whether they believed digital integration had a positive, neutral, or negative impact on student learning. The results are summarized below:

Table 10: Perception on impact of digital leadership practices on student learning outcomes.

Impact of digital leadership practices	Frequency	Percentage (%)
Very positive	15	20
Positive	3	3
Neutral	2	2
Negative	0	0
Very negative	0	0.00
Total	20	100

The findings indicate that 20% of respondents perceive the impact of digital leadership on learning as very positive, while an additional 3% consider it positive. A small percentage (2%) remained neutral, and no respondents reported negative perceptions. These results suggest that digital leadership is widely recognized as beneficial to learning processes.

4.5.2. Extent of Transformational Leadership in Digital Leadership Practices.

Transformational leadership plays a crucial role in fostering innovation, digital adoption, and adaptive learning approaches (Bass & Riggio, 2006). Respondents were asked to evaluate the extent to which transformational leadership principles are evident in digital leadership practices within their schools. The results are presented below:

Table 11: Extent of embodying transformational leadership principals to digital leadership

Extent	Frequency	Percentage (%)
Not at all	0	0.00
To a small extent	5	5.00
Moderately	3	3.00
To a large extent	9	9.00
Completely	3	3.00
Total		100

The majority of respondents (9%) reported that transformational leadership is present to a large extent, while 3% indicated it is completely embedded in digital leadership strategies. A smaller proportion (5%) noted that transformational leadership is applied to a small extent, and no respondents felt it was entirely absent from digital learning approaches. As also suggested by Ng'ambi & Bozalek, 202, these findings suggest that school leaders are incorporating transformational leadership approaches, but variations exist in how well these practices are implemented.

4.5.3. Statistical Validation: G-Test Analysis of Digital Leadership Impact

A G-Test was conducted to determine whether there was a statistically significant variation in how different stakeholders perceive the impact of digital leadership on learning outcomes.

G-Test Formula Used:

$$G = 2\sum O_i \ln \left(\frac{O_i}{E_i} \right)$$

Where:

- O_i = Observed frequency
- E_i = Expected frequency

The results are summarized in the table below:

Impact of digital leadership practices	Frequency	Percentage (%)
Very positive	15	20
Positive	3	3
Neutral	2	2
Negative	0	0
Very negative	0	0.00

G-Test Statistic = 35.17

Degrees of Freedom (df) = 2

Critical Value at $\alpha = 0.05 = 5.991$

Since $G = 35.17$ is greater than the critical value (5.991), the null hypothesis is rejected. This result suggests that there is a significant difference in how different stakeholders perceive the effectiveness of digital leadership.

4.5.4. Summary of the Effectiveness of Leadership Practices in Digital Integration

The findings indicate that digital leadership has been widely recognized as beneficial, with 20% of respondents perceiving its impact as very positive and 3% as positive. Transformational leadership principles are embedded in digital leadership practices to varying degrees, with 9% of respondents stating they are applied to a large extent and 3% indicating full integration. However, 77.78% of respondents believe that digital leadership affects stakeholders differently, suggesting differences in experiences and perceptions among students, teachers, and administrators. Statistical analysis using the G-Test confirmed that these variations are significant, reinforcing the need for further investigation into how digital leadership strategies can be optimized to ensure a more uniform impact across different groups.

4.6. Chapter Four Summary

CHAPTER 5: INTERPRETATION AND DISCUSSION OF RESULTS

5.1. Chapter Introduction

This chapter provides a detailed discussion of the findings presented in Chapter 4 and interprets them in relation to existing literature, theoretical frameworks, and the broader context of digital leadership in secondary schools. The aim of this discussion is to analyze the significance of the results, highlight patterns and trends, and provide a deeper understanding of how digital leadership influences teaching, learning, and overall educational management in secondary schools within the Bwaila Cluster, Lilongwe, Malawi.

The chapter is structured according to the research objectives, ensuring a logical flow from analyzing the effectiveness of leadership practices in digital integration, to understanding the challenges encountered, and evaluating the strategies employed to address these challenges. By discussing the findings within the context of transformational leadership theory (Bass & Riggio, 2006) and diffusion of innovation theory (Rogers, 2003), this chapter seeks to bridge the gap between empirical evidence and theoretical underpinnings.

The discussion focuses on the following key areas:

- Evaluation of the effectiveness of digital leadership, understanding how school leaders are facilitating the integration of digital tools, their influence on student engagement, and their impact on teaching quality.
- Analysis of challenges in digital adoption, identifying financial, technical, and institutional barriers that limit digital transformation in schools and how these obstacles affect different stakeholders.
- Exploration of strategies used to overcome digital challenges, examining stakeholder collaboration, teacher training, resource mobilization, and digital literacy programs as potential solutions.
- Variations in digital leadership impact among stakeholders, investigating how different groups, teachers, students, and administrators perceive and experience digital leadership differently.

The discussion will also compare the study's findings with previous research, examining whether the challenges, successes, and leadership practices observed align with global and regional trends. By referencing existing studies and policy documents, the chapter will help contextualize Malawi's progress in digital education leadership within the broader educational transformation agenda.

Additionally, the statistical analysis conducted in Chapter 4, including the Chi-Square and G-Test results, will be discussed in-depth to determine the extent to which digital leadership significantly influences educational outcomes. The discussion will also reflect on stakeholder perceptions and lived experiences, integrating qualitative insights from students, teachers, and school leaders to enrich the analysis.

This chapter lays the groundwork for Chapter 6, where the study's findings will be distilled into meaningful conclusions, and practical recommendations will be outlined to strengthen digital leadership in Malawian secondary schools. By taking a deeper look at the results, this discussion aims to paint a clear picture of how digital leadership is influencing education—what's working, where the struggles are, and what opportunities exist for growth. Beyond just highlighting progress, this chapter also sheds light on the areas that still need attention, paving the way for targeted interventions and policy recommendations that can drive meaningful change.

5.2. Effectiveness of Digital Leadership in Enhancing Learning.

Digital leadership plays a transformative role in modern education by influencing teaching methodologies, student engagement, and overall institutional management. Findings from this study suggest that digital leadership is perceived as largely beneficial, with 61% of respondents indicating a positive impact on student learning outcomes, and 20% considering the impact to be very positive. These findings underscore the growing significance of digital leadership in shaping education, particularly in secondary schools within the Bwaila Cluster, Lilongwe, Malawi.

This section discusses the findings on the effectiveness of digital leadership in enhancing teaching quality, improving student engagement, and strengthening school management. The results are interpreted in relation to transformational leadership theory (Bass & Riggio, 2006) and diffusion of innovation theory (Rogers, 2003) to provide a broader theoretical understanding of digital adoption in schools. Additionally, findings are compared with existing global and regional research to contextualize digital leadership in Malawi's educational landscape.

5.2.1. The Role of Digital Leadership in Teaching Quality

The integration of digital tools in classrooms significantly improves teaching effectiveness, allowing educators to deliver lessons more interactively, access a wide range of educational resources, and assess student performance efficiently. Respondents in this study highlighted that digital leadership has led to

improved lesson delivery, particularly through e-learning platforms, digital assessments, and online collaboration tools.

5.2.1.1. Leadership Influence on Teacher Adoption of Digital Tools

School leaders play a critical role in influencing teachers' willingness and ability to integrate technology into their instructional practices. According to Ertmer & Ottenbreit-Leftwich (2013), teachers are more likely to adopt digital tools when they perceive strong leadership support, receive adequate training, and have access to necessary resources.

Findings from this study support this assertion, as schools with proactive digital leadership demonstrated a higher adoption rate of digital learning tools. Teachers in such schools reported greater confidence in using technology, citing leadership-driven training programs, access to digital resources, and institutional policies that encourage digital innovation as key enablers.

However, despite these improvements, some teachers remain hesitant about fully adopting digital teaching methods due to insufficient training, technical challenges, and resistance to change. This aligns with Rogers' (2003) diffusion of innovation theory, which suggests that not all individuals adopt innovations at the same rate, some embrace change quickly (early adopters), while others require more time and convincing (late adopters and laggards).

5.2.1.2. The Shift from Traditional to Digital Teaching Methods

The findings reveal that schools are gradually transitioning from traditional teaching methods to technology-driven instruction, particularly in subjects such as Mathematics and Science, where 40% and 34% of students, respectively, reported frequent use of digital tools. This shift aligns with global trends, where digital learning has enhanced STEM education by providing simulations, virtual experiments, and AI-driven learning support (Means et al., 2013).

However, the study also found that non-STEM subjects, such as Social Studies and English, have not fully embraced digital tools, with only 11% of students reporting digital integration in English, and 0% in Social Studies. This discrepancy suggests that while digital leadership is making strides in certain academic areas, its impact is not yet uniform across all subjects.

5.2.2. Digital Leadership and Student Engagement

A major goal of digital transformation in education is to increase student engagement by making learning more interactive, accessible, and relevant to 21st-century learners. The findings indicate that 35% of

respondents identified student engagement as a primary goal of digital integration, highlighting the importance of technology in fostering active participation and improved learning experiences.

5.2.2.1. How Digital Leadership Enhances Student Engagement

Schools that actively promote digital learning strategies have reported higher student motivation and participation. This aligns with Fullan's (2014) argument that effective leadership in digital education enhances student-centered learning by leveraging technology to create personalized and adaptive learning experiences. The study found that students in digitally proactive schools frequently use online learning platforms (40%) and educational apps (37%) to supplement their studies. This confirms findings by Clark (2020), who argues that blended learning environments, where traditional and digital methods are combined, result in higher engagement and better learning retention.

5.2.2.2. Barriers to Student Engagement in Digital Learning

Despite these advancements, some students remain disengaged due to factors such as limited access to devices, unreliable internet, and lack of digital literacy training. This aligns with UNESCO (2022), which found that digital exclusion remains a challenge in developing countries, particularly for students from low-income backgrounds.

The study also found that some students struggle with distractions when using digital tools, particularly smartphones. While 27% of students reported using smartphones for learning, qualitative responses indicated that social media and other non-educational content sometimes hinder effective study habits.

5.2.3. Digital Leadership and School Management

Beyond teaching and learning, digital leadership influences overall school management by enhancing administrative efficiency, communication, and implementation of policy.

5.2.3.1. Digital Leadership in School Operations

Findings show that 20% of respondents identified increased operational efficiency as a key goal of digital leadership, indicating that technology is not only transforming classrooms but also streamlining administrative processes. Schools that have embraced digital transformation use technology for:

- Data management and performance tracking (e.g., digital grade books, student attendance systems).
- Communication and collaboration (e.g., school-wide digital platforms, teacher-student portals).
- Resource allocation and financial management (e.g., digital budgeting and procurement tracking).

These findings align with Harris (2018), who argues that digital leadership extends beyond instruction and plays a key role in improving institutional governance.

5.2.3.2. The Role of Digital Policies in School Management

One of the biggest enablers of digital transformation in schools is policy support from school leadership and government agencies. However, findings indicate that some schools still lack clear digital policies, leading to inconsistent implementation of digital strategies.

5.3. Challenges in Digital Technology Integration

The successful integration of digital leadership in secondary schools requires more than just technological resources and policy frameworks; it necessitates institutional readiness, teacher preparedness, and infrastructural support. While findings from Chapter 4 indicate that digital leadership has positively influenced teaching and learning, challenges remain that hinder full digital adoption. The study revealed that 73% of respondents encountered difficulties when using digital tools for learning, underscoring the pervasive barriers to technology adoption in Malawian secondary schools.

This section provides an in-depth discussion of the challenges in digital leadership implementation, including financial constraints, lack of professional development, inadequate infrastructure, and resistance to change. These findings are analyzed in relation to existing literature, transformational leadership theory (Bass & Riggio, 2006), and diffusion of innovation theory (Rogers, 2003) to provide a deeper understanding of why digital leadership struggles to take full effect in Malawian schools. The discussion also highlights patterns, trends, and systemic issues that require leadership-driven solutions.

5.3.1. Financial Constraints and Limited Resources

One of the most significant barriers to digital integration identified in this study is financial resource constraints, with 45% of respondents citing inadequate funding as the primary obstacle. Schools struggle to acquire the necessary technology infrastructure, such as computers, projectors, software, and reliable internet connectivity. The financial burden is particularly heavy for public and community secondary schools, which depend on government funding, donor support, and limited school fees to sustain their operations.

5.3.1.1. The High Cost of Technology and Sustainability Challenges

Investing in digital transformation requires both initial capital and ongoing maintenance. Schools that have received digital tools from donors or government programs often find it difficult to sustain these

resources due to high maintenance costs, software licensing fees, and electricity costs. This aligns with Mingaine (2013), who found that schools in low-income regions often receive technology but lack the funds to maintain or replace it when it becomes outdated. In Malawi, where only 18% of households have access to electricity (Government of Malawi, 2019), digital learning is further complicated by frequent power outages, forcing schools to rely on generators or abandon digital tools altogether.

The results indicate that financial constraints remain a major hurdle, affecting both the acquisition and sustainability of digital resources in schools. Without increased budgetary allocations, stakeholder partnerships, and cost-effective digital strategies, many schools will struggle to achieve long-term digital integration.

5.3.2. Lack of Professional Development for Teachers

Another major challenge identified in the study is the lack of professional development opportunities for teachers, with 41% of respondents highlighting insufficient training as a key barrier to digital adoption. Even in schools where digital tools are available, many teachers lack the skills and confidence to integrate them effectively into their teaching practices.

5.3.2.1. The Link Between Leadership Support and Teacher Confidence

Research by Ertmer & Ottenbreit-Leftwich (2013) emphasizes that teachers are more likely to adopt digital tools when they receive structured training and leadership support. However, findings from this study indicate that many teachers have not received sufficient ICT training, making them reluctant to embrace digital teaching methods. Some teachers expressed concern that technology integration requires extra effort, including redesigning lesson plans, learning new digital tools, and adapting assessments to digital formats. Without ongoing training and mentorship programs, many educators default to traditional teaching methods, even in digitally equipped schools.

5.3.2.2. The Gap Between Policy and Implementation

The Malawian government has introduced several ICT policies and digital education initiatives, including the Digital Malawi Project (2020). However, a gap remains between policy and on-the-ground implementation, particularly in teacher training. While policies emphasize digital literacy for educators, many schools lack formal ICT training programs. This is consistent with findings from UNESCO (2022), which highlight that policy frameworks alone are not enough to drive digital transformation, consistent teacher capacity-building is essential.

5.3.3. Inadequate Infrastructure and Internet Access

Beyond financial constraints and training gaps, 10% of respondents identified inadequate infrastructure, including poor internet connectivity, unreliable electricity, and lack of digital devices, as a barrier to digital learning.

5.3.3.1. The Digital Divide Between Urban and Suburb Schools.

Findings from this study suggest that urban schools have better access to ICT infrastructure than suburb schools. This digital divide is evident in previous research, including World Bank (2023), which reports that internet penetration in Malawi remains low, particularly in suburb areas.

Even in urban schools, bandwidth limitations and high data costs make it difficult for students and teachers to access online resources consistently. Some schools rely on pre-downloaded educational materials to compensate for the lack of internet, but this approach limits real-time engagement, research, and virtual collaboration.

5.3.3.2. The Role of Digital Leadership in Infrastructure Development

According to Bass & Riggio (2006), transformational leadership involves proactive problem-solving and innovation. Findings from this study suggest that schools with strong digital leadership are more likely to find creative solutions to infrastructure challenges, such as:

- Partnering with private companies or NGOs for internet support.
- Installing solar-powered digital classrooms to address electricity shortages.
- Using offline digital learning solutions, such as pre-installed educational apps on tablets and digital libraries.

5.3.4. Resistance to Change and Attitudinal Barriers.

While only 4% of respondents cited resistance to change as a major barrier, it is still a significant challenge for some educators, particularly those who have been teaching for many years using traditional methods.

5.3.4.1. Teachers' Hesitation Towards Technology Adoption.

Some teachers are reluctant to integrate digital tools, perceiving technology as complex or unnecessary. This aligns with Rogers' (2003) diffusion of innovation theory, which suggests that while some educators (early adopters) readily embrace technology, others (late adopters and laggards) resist change until it becomes unavoidable.

Common reasons for resistance include:

- Fear of job redundancy, with concerns that technology may replace teachers.

- Lack of time to learn new tools, given heavy workloads.
- Perception that digital tools do not add significant value to existing teaching methods.

5.3.4.2. The Need for Leadership-Driven Cultural Change

Transformational leadership is critical in shifting mindsets and encouraging teachers to embrace innovation (Bass & Riggio, 2006). Findings suggest that teachers are more likely to adopt digital tools when school leaders provide ongoing support, incentives, and a clear vision for technology integration.

5.4. Strategies for Overcoming Challenges in Digital Leadership.

Despite the challenges limiting the effective implementation of digital leadership in secondary schools, educational institutions are actively developing and implementing strategies to address these barriers. Findings from Chapter 4 indicate that schools have adopted various approaches to mitigate financial constraints, improve teacher training, enhance infrastructure, and address resistance to digital adoption. The most commonly employed strategies include collaboration with stakeholders (50%), professional development programs (35%), and resource mobilization (15%).

5.4.1. Collaboration with Stakeholders as a Key Enabler of Digital Leadership.

The study found that collaboration with stakeholders was the most commonly employed strategy, with 50% of respondents indicating that schools partner with various entities to support digital learning. These stakeholders include government agencies, non-governmental organizations (NGOs), private technology firms, and community members.

5.4.1.1. The Role of Multi-Stakeholder Partnerships in Digital Transformation.

Research shows that effective digital transformation in schools often relies on multi-stakeholder engagement (Harris, 2018). Schools that leverage partnerships with organizations and donors have a better chance of securing financial and material support, such as:

- Provision of ICT infrastructure (computers, tablets, projectors, and smartboards).
- Internet connectivity support, often subsidized by telecom companies or NGOs.
- Teacher training initiatives, facilitated by government education bodies and tech companies.
- Technical support and maintenance, reducing downtime of digital learning tools.

For example, in Malawi, the Digital Malawi Project (2020), supported by the World Bank, has worked with schools to improve ICT infrastructure and training. Schools that have actively sought such collaborations have managed to bridge some of the resource gaps that hinder digital adoption.

5.4.1.2. Strengthening Public-Private Partnerships (PPP) in Education.

Findings suggest that schools that engage in public-private partnerships (PPPs) tend to have better access to technology and training resources. This aligns with Means et al. (2013), who argue that successful digital adoption requires coordinated efforts from multiple sectors. PPPs provide schools with funding, expertise, and infrastructure support, reducing the pressure on limited government resources

5.4.2. Professional Development Programs for Teachers.

Another major strategy identified in this study is teacher professional development, with 35% of respondents stating that schools have implemented training programs to enhance educators' digital skills.

5.4.2.1. The Link Between Teacher Training and Digital Adoption

Research shows that teachers' confidence and willingness to use technology are directly linked to the amount of training and support they receive (Ertmer & Ottenbreit-Leftwich, 2013). The study findings align with this, as schools that have introduced regular ICT training workshops report higher digital adoption rates among teachers.

However, while training programs exist, some teachers reported that these workshops are infrequent, lack hands-on engagement, and are not tailored to specific subject needs. This suggests that while progress is being made, teacher training programs need to be more structured, continuous, and adapted to real classroom needs.

5.4.2.2. Building a Culture of Lifelong Digital Learning for Educators.

A key observation from this study is that teacher training should not be treated as a one-time event, but rather as a continuous process that evolves alongside advancements in educational technology. Bass & Riggio's (2006) transformational leadership model emphasizes that leaders should invest in ongoing professional growth to drive innovation. Findings suggest that schools that have embedded digital learning into their teacher development plans are more successful in sustaining digital integration efforts.

5.4.3. Resource Mobilization: Addressing Financial Constraints

Given that financial constraints were identified as the biggest challenge (45%), resource mobilization has emerged as a strategy in 15% of schools.

5.4.3.1. Schools Exploring Alternative Funding Models

While government funding remains the primary source for ICT investments, findings indicate that some schools including in other countries have taken initiative to secure additional resources through:

- Grant applications to international donors and local organizations.
- Fundraising initiatives involving parents, alumni, and the community.
- Technology leasing or shared ICT programs to reduce costs.

This aligns with UNESCO's (2022) research, which emphasizes that schools that actively mobilize resources beyond government funding have a higher likelihood of sustaining digital programs. However, the study found that many schools lack the expertise to apply for grants or develop long-term financial sustainability plans, suggesting that leadership training in financial resource management is needed.

5.4.4. Enhancing Digital Infrastructure and Internet Access

A significant portion of schools has adopted infrastructure development initiatives to address issues related to poor connectivity, lack of devices, and unreliable electricity.

5.4.4.1. Localized Solutions to Infrastructure Challenges.

Findings from this study including review of experiences from other communities and countries indicate that some schools have implemented localized solutions such as:

- Solar-powered digital labs mitigate electricity shortages.
- Offline digital learning solutions, such as preloaded educational software on school computers.
- Community Wi-Fi initiatives, where schools collaborate with local internet providers for subsidized access.

5.4.4.2. The Role of Digital Leadership in Infrastructure Planning

Digital leadership is not only about adopting technology but also about creating the right conditions for technology to thrive in learning environments. Infrastructure planning plays a crucial role in determining whether schools can effectively integrate digital tools into teaching and learning. According to Bass & Riggio (2006), effective leadership involves problem-solving and strategic resource allocation, meaning that digital leaders must take a proactive approach in ensuring that the necessary infrastructure—such as computers, internet access, and electricity is available and functional.

Findings from this study suggest that schools where leadership actively advocates for infrastructure improvements tend to have better digital learning environments. In the Bwila Cluster, schools that reported higher engagement with digital learning tools were also those where administrators played an active role in securing ICT infrastructure through government support, donor funding, and community partnerships. For instance, schools that established partnerships with NGOs and private companies to

improve internet connectivity were able to offer more consistent and reliable digital learning experiences than those that did not.

5.4.4.2.1. Infrastructure Gaps and Digital Leadership Interventions

One of the major barriers identified in this study was inadequate digital infrastructure, including poor internet access (reported by 10% of respondents), lack of electricity, and insufficient digital devices. In line with findings from UNESCO (2022), this study confirmed that schools in low-income and semi-urban areas struggle the most with infrastructure gaps, making it difficult for students and teachers to consistently engage in digital learning.

However, the study also found that some school leaders have taken proactive measures to address these issues by:

- Advocating for school-wide ICT policies to ensure structured investment in digital infrastructure.
- Securing partnerships with private internet providers for subsidized internet access.
- Applying for grants from organizations supporting education technology initiatives.
- Lobbying local government agencies for funding to install ICT labs and reliable electricity.

These leadership-driven interventions have led to notable improvements in the digital learning experience for students and teachers in the schools that adopted them.

5.4.4.2.2. Transformational Leadership in Infrastructure Planning.

From a transformational leadership perspective, leaders who actively work to improve infrastructure are demonstrating the idealized influence and intellectual stimulation components of Bass & Riggio's (2006) leadership model. These leaders are not just reacting to challenges but anticipating infrastructure needs, thinking strategically, and motivating stakeholders to invest in digital learning environments. For example, in one of the surveyed schools, the headteacher successfully negotiated with a local business to donate 10 computers and secured funding from a government program to install a solar-powered digital classroom. This initiative ensured that students had access to uninterrupted digital learning, even during power outages—a significant challenge reported in other schools that lacked similar leadership interventions.

Findings from this study also align with Harris (2018), who argues that strong digital leadership involves infrastructure planning that goes beyond just acquiring technology—it requires a long-term strategy to maintain, upgrade, and sustain digital learning environments. Schools where leaders had infrastructure plans in place were found to have better digital adoption rates compared to those that relied on short-term or ad-hoc investments.

5.4.4.2.3. The Need for Long-Term Digital Infrastructure Strategies

Despite these efforts, the study found that many schools still lack a structured, long-term plan for digital infrastructure development. While some institutions successfully mobilized resources, others struggled due to limited financial planning, lack of expertise, or absence of clear policies governing digital transformation in schools. This reflects a broader issue in developing country education systems, where digital investment often depends on external donations rather than institutionalized government policies (World Bank, 2023).

Moving forward, digital leadership must focus on creating sustainable infrastructure development plans that include:

- Budget allocations for technology investment and maintenance.
- Collaborations with stakeholders to ensure continuous infrastructure support.
- Integration of digital learning into national education policies.
- Investment in alternative energy sources (e.g., solar power) for uninterrupted digital learning.

5.4.5. Encouraging a Positive Digital Culture and Overcoming Resistance to Change

One of the key findings in this study was that resistance to digital adoption was relatively low, with only 4% of respondents identifying it as a major barrier. This suggests that most educators and students recognize the value of digital learning, but some level of hesitation still exists. The study found that teachers who were reluctant to use technology often cited lack of training, concerns about workload, or uncertainty about the effectiveness of digital tools.

Digital leadership plays a critical role in creating a positive digital culture by fostering a mindset of openness, collaboration, and continuous learning. According to Bass & Riggio (2006), transformational leaders are instrumental in shaping organizational culture by motivating stakeholders, leading by example, and creating a vision that others can embrace. In the context of secondary schools, school leaders must actively work to shift attitudes toward digital learning by providing support, incentives, and a clear vision for technology integration.

5.4.5.1. The Role of Digital Leadership in Changing Attitudes.

Findings from this study suggest that schools with strong digital leadership experience fewer cases of resistance to change. This aligns with Rogers' (2003) Diffusion of Innovation Theory, which explains that people adopt new technologies at different rates, depending on their level of exposure, perceived usefulness, and external influences.

In schools where leaders actively promoted digital learning, teachers and students were more willing to engage with technology. Some of the ways in which digital leadership influenced attitudes included:

- Providing consistent communication on the benefits of digital tools.
- Offering ongoing technical and pedagogical support to reduce anxiety.
- Demonstrating success stories of how digital learning improves outcomes.

A Form 4 ICT teacher interviewed during the study explained:

"At first, I was skeptical about using online platforms, but when I saw my colleagues successfully integrating technology into their lessons, I became more confident. Our headteacher also ensured we had the necessary support, which made the transition smoother."

This statement highlights the importance of peer influence and leadership-driven support in encouraging gradual digital adoption. Teachers are more likely to embrace digital tools when they see their colleagues using them effectively and when leadership provides a clear roadmap for implementation.

5.4.5.2. Strategies for Encouraging a Positive Digital Culture

Schools that have successfully created a digital-friendly environment have done so through structured leadership initiatives aimed at making technology adoption less intimidating and more rewarding. Some of the key strategies observed in this study include:

5.4.5.2.1. Digital Literacy and Capacity-Building Programs

One of the biggest reasons for resistance to digital adoption is the fear of the unknown. Findings indicate that teachers who received hands-on training were more willing to integrate digital tools into their lessons compared to those who had only theoretical exposure. This supports Ertmer & Ottenbreit-Leftwich (2013), who found that teachers with more digital exposure develop higher confidence in using technology. Transformational digital leaders have addressed this by:

- Implementing step-by-step training programs that gradually introduce teachers to digital tools.
- Encouraging peer mentorship, where experienced teachers help guide those who are less confident.
- Providing technical assistance to troubleshoot common digital challenges.

For example, one headteacher interviewed during the study mentioned:

"We made sure that every teacher attended at least one ICT training workshop per term. This has significantly reduced the fear of using digital platforms in class."

5.4.5.2.2. Creating Incentives for Technology Adoption

Findings suggest that teachers and students are more likely to embrace digital tools when they see tangible benefits or rewards. Some schools have implemented incentive programs to encourage digital adoption, including:

- Recognizing and rewarding teachers who integrate digital tools effectively.
- Providing opportunities for career growth, such as leadership roles in digital innovation.
- Offering small incentives for students who actively participate in digital learning programs.

According to Fullan (2014), incentives are an effective motivational strategy for encouraging educators to try new teaching approaches. Schools where leaders actively rewarded digital adoption reported higher rates of engagement and willingness to experiment with new teaching methods.

5.4.5.3. Reducing Fear and Uncertainty Through Leadership Engagement

Another major factor influencing digital adoption is teachers' and students' perceptions of how technology will impact their roles. Some educators, particularly those who have been teaching for many years, expressed concerns that digital tools could undermine traditional teaching methods or increase their workload. Findings suggest that school leaders who take a hands-on approach in guiding teachers through the transition are more successful in overcoming resistance to change. Some of the most effective leadership-driven interventions include organizing forums for teachers to voice concerns and receive clarification on digital integration, implementing gradual technology adoption plans that allow teachers to integrate tools at their own pace, and providing real-life examples of how digital tools enhance, rather than replace, traditional teaching methods.

For instance, one school in the study implemented a phased approach to digital integration, where teachers started with simple tools like PowerPoint presentations before progressing to online learning platforms. This method eased the transition and built confidence over time, allowing educators to adapt comfortably to new technologies without feeling overwhelmed. This approach aligns with Bass & Riggio's (2006) transformational leadership model, which emphasizes building trust and reducing fear when introducing new systems. By providing structured support, clear guidance, and gradual exposure to technology, school leaders can mitigate resistance and encourage a more seamless digital transition.

5.4.5.4. Transformational Leadership in Fostering a Digital Mindset.

A digital-friendly school culture does not happen overnight, it requires continuous leadership efforts to create a mindset shift. This study found that schools where leaders set a clear vision for digital integration

and encouraged collaboration between teachers and students had higher rates of digital adoption. According to Ng'ambi & Bozalek (2021), transformational leaders play a key role in shaping the culture of an institution by promoting open dialogue and fostering an environment where digital learning is seen as a collective effort rather than individual responsibility.

Schools with strong digital leadership reported more enthusiasm among teachers to experiment with digital tools, increased student engagement, particularly when leaders encouraged interactive learning approaches, and a higher level of institutional commitment to digital learning, reducing the risk of technology abandonment after initial implementation. For example, in one school where the principal actively used digital tools during staff meetings, teachers became more comfortable incorporating technology into their lessons. This demonstrates the power of leadership modeling, where leaders lead by example to normalize digital adoption, showing that consistent engagement and visible leadership support can significantly accelerate digital transformation in schools.

5.5. Variations in Digital Leadership Perception Among Stakeholders.

Digital leadership in secondary schools does not operate in isolation—it is shaped by the perceptions, experiences, and engagement levels of different stakeholders, including administrators, teachers, and students. The effectiveness of digital leadership depends on how well these groups embrace, implement, and experience the integration of digital tools in the learning environment. Findings from Chapter 4 reveal that 77.78% of respondents believe that digital leadership impacts different stakeholders in different ways, while 5.56% disagreed, and 16.67% were uncertain. These variations in perception highlight the fact that digital adoption is not uniform across all groups, and leadership strategies must be tailored to address these differences.

5.5.1. Administrators' Perspective on Digital Leadership

School administrators, including principals, headteachers, and deputy headteachers, play a crucial role in shaping the strategic direction of digital leadership in schools. Findings suggest that administrators generally have a more positive perception of digital leadership compared to teachers and students, as they tend to focus on broader institutional benefits such as operational efficiency, resource management, and school-wide ICT policies.

5.5.1.1. Administrators as Digital Change Agents.

According to Bass and Riggio (2006), transformational leaders play a crucial role in driving change by creating a vision, motivating others, and removing obstacles to progress. The study found that

administrators who embraced transformational leadership principles were more likely to advocate for increased investment in digital infrastructure and resources, encourage teachers to integrate digital tools into their instructional practices, and ensure that digital learning aligns with the broader goals of the school. In schools where administrators champion digital transformation, teachers and students were more likely to engage with technology, leading to higher adoption rates and more effective implementation of digital tools. This aligns with Ng'ambi and Bozalek's (2021) argument that strong digital leadership at the administrative level is a key determinant of how successfully technology is integrated into schools. However, despite their positive outlook, some administrators acknowledged challenges in execution, particularly related to financial constraints, resistance from some teachers, and inadequate training programs. This suggests that while administrators recognize the value of digital leadership, they must also ensure that their efforts translate into tangible outcomes for teachers and students.

5.5.2. Teachers' Perspective on Digital Leadership

While administrators focus on policy and strategy, teachers experience digital leadership at an operational level, in the classroom, through lesson planning, and in day-to-day teaching activities. Findings suggest that teachers' perceptions of digital leadership vary widely, depending on the level of institutional support they receive, their familiarity with technology, and the extent to which digital tools enhance their teaching methods.

5.5.2.1. Teacher Readiness and Digital Leadership Effectiveness

Teachers who received adequate ICT training and leadership support were more likely to embrace digital learning, whereas those who lacked these resources often felt burdened by the expectation to integrate technology, leading to frustration and reluctance. This aligns with Ertmer and Ottenbreit-Leftwich (2013), who emphasize that teacher confidence in using digital tools is directly linked to the training and support they receive.

Among the common concerns raised by teachers were the lack of time to learn and integrate new digital tools into their lesson plans, insufficient training on how to use educational technologies effectively, and inconsistent access to digital resources, particularly in underfunded schools. These challenges suggest that while digital leadership is widely recognized as beneficial, its effectiveness is limited if teachers are not adequately supported with the necessary resources and training.

5.5.2.2. The Role of Transformational Leadership in Teacher Buy-In.

Findings indicate that transformational leadership plays a significant role in shaping teachers' attitudes toward digital learning. Teachers were more willing to engage with technology when school leaders

demonstrated active support through initiatives such as providing incentives and recognition for teachers who successfully integrate technology, establishing mentorship programs where digitally proficient teachers support others, and organizing ongoing ICT training workshops tailored to teachers' needs. This aligns with Bass and Riggio's (2006) transformational leadership framework, which highlights that leaders who empower their teams and provide adequate resources create a more positive work environment, ultimately fostering greater teacher buy-in for digital learning initiatives.

5.5.3. Students' Perspective on Digital Leadership

Students are the primary beneficiaries of digital leadership, yet their experiences vary depending on how effectively digital tools are integrated into the learning process. Findings suggest that students generally perceive digital leadership positively, particularly when digital tools enhance engagement, accessibility, and interactivity in learning.

5.5.3.1. How Digital Tools Influence Student Perception

Students generally had a positive response to digital leadership when technology made learning more engaging and interactive, such as through videos, simulations, and digital assessments. Many appreciated having access to computers, tablets, or smartphones, which allowed them to take more control of their learning. They also valued the flexibility that online platforms provided, enabling them to access learning materials beyond the classroom and at their own pace.

However, not all experiences with digital learning were smooth. Some students found it frustrating when internet connectivity issues disrupted access to online resources. Others pointed out inconsistencies in how teachers used technology, while some embraced digital tools, others stuck to traditional methods, making the learning experience uneven. Additionally, a lack of sufficient devices in some schools meant that students had to share computers or, in some cases, miss out on digital lessons altogether. These challenges highlight the need for schools to ensure a more consistent and well-supported approach to digital learning.

5.5.4. Bridging the Perception Gap: Ensuring a Balanced Digital Leadership Approach

The study highlights that digital leadership impacts different stakeholders in distinct ways, creating a perception gap that school leaders need to address. For administrators, digital leadership is primarily seen as a policy and strategic tool, with a focus on long-term school improvement. Teachers, on the other hand, experience digital leadership on a more practical level, and their perception is shaped by the training and support they receive. Meanwhile, students judge digital leadership based on how well technology

enhances their learning experience, yet inconsistencies in how digital tools are integrated across subjects and limitations in infrastructure often hinder their engagement.

Drawing from Rogers' (2003) Diffusion of Innovation Theory, the study reinforces the idea that successful adoption of technology depends on strategies tailored to different groups based on their readiness and needs. In other words, digital leadership is not a one-size-fits-all approach. School leaders must be intentional about bridging the perception gap by addressing the unique expectations and challenges faced by administrators, teachers, and students.

5.6. Summary of Research Discussion

This chapter has explored the effectiveness of digital leadership, the challenges faced in its implementation, the strategies adopted to overcome these challenges, and the variations in how different stakeholders perceive digital transformation in secondary schools within the Bwaila Cluster, Lilongwe, Malawi. The discussion has revealed that while digital leadership is making significant strides in improving teaching quality, student engagement, and school management, its implementation is not without hurdles. The perspectives of school administrators, teachers, and students highlight both successes and gaps in the way digital tools are being integrated into the education system.

One of the key findings is that schools with strong digital leadership exhibit higher adoption rates of technology-driven teaching and learning practices. Administrators play a crucial role in setting the strategic direction for digital transformation, ensuring that schools prioritize the acquisition of ICT resources, infrastructure development, and the implementation of digital policies. Teachers, however, experience digital leadership more directly in their daily instructional practices, and their willingness to adopt digital tools is strongly influenced by the level of professional development and technical support they receive. Findings suggest that teachers in schools where leadership actively provides digital training and mentorship are more confident in using technology in the classroom.

Students, as the primary beneficiaries of digital learning, have mixed experiences depending on the level of digital integration in their schools. In schools where digital leadership is strong and consistent, students reported higher engagement, greater access to digital resources, and more interactive learning experiences. However, inconsistent use of technology across subjects and unreliable infrastructure remain significant challenges, leading to unequal digital learning experiences among students.

The discussion also highlights that financial constraints, inadequate ICT infrastructure, and resistance to change are the most significant barriers to digital transformation in schools. Many schools struggle with

funding, making it difficult to procure enough computers, maintain internet connectivity, and invest in ongoing teacher training. Additionally, while most educators and students recognize the benefits of digital learning, some still face challenges in adapting to new technologies, especially when training and support mechanisms are insufficient.

To address these challenges, schools have adopted various strategies, including collaboration with stakeholders, professional development programs, and resource mobilization. Partnerships with government agencies, NGOs, and private-sector organizations have played a key role in expanding access to digital resources. Schools that have invested in structured professional development programs for teachers have seen higher adoption rates of digital tools in classrooms. Furthermore, some schools have been proactive in securing alternative funding sources and implementing creative solutions, such as solar-powered ICT labs and offline digital learning solutions, to mitigate infrastructure-related challenges.

A key takeaway from this discussion is that digital leadership is not a one-size-fits-all approach. The effectiveness of digital transformation in schools depends on how well digital strategies are tailored to meet the needs of administrators, teachers, and students. While school administrators focus on policy and resource allocation, teachers require ongoing support and capacity-building to confidently integrate technology into their instruction. Likewise, students benefit the most when digital learning is structured, well-resourced, and consistently implemented across subjects.

In conclusion, this chapter has demonstrated that digital leadership is critical for shaping the future of education in Malawian secondary schools. While progress is being made, sustained leadership efforts, policy alignment, and long-term investment in ICT infrastructure and capacity-building are necessary to ensure that all students and teachers benefit equally from digital learning. The next chapter will draw final conclusions from these findings and provide actionable recommendations to enhance digital leadership in secondary schools.

5.7. Chapter Five Summary

This chapter interpreted the study's findings in relation to the research objectives, existing literature, and the guiding theoretical frameworks. It explored how digital leadership influences technology adoption, the nature of challenges faced by schools, and the strategies used to overcome them. The discussion revealed that strong leadership is key to enabling digital transformation, particularly in under-resourced settings. However, disparities in access, teacher preparedness, and institutional support continue to affect the depth and consistency of digital integration. The chapter also highlighted differing perceptions among

stakeholders and emphasized the role of leadership in fostering a positive digital culture. These findings provide the basis for the conclusions and practical recommendations outlined in the final chapter.

CHAPTER 6: CONCLUSION

6.1. Introduction

This chapter presents the final conclusions drawn from the study on digital leadership adaptations in secondary schools within the Bwaila Cluster, Lilongwe, Malawi. The study aimed to explore how school leadership facilitates digital technology adoption, the challenges faced, and the effectiveness of leadership practices in promoting digital integration. Using Transformational Leadership Theory and Diffusion of Innovation Theory, the study explored the role of school leaders in driving digital transformation in resource-constrained environments.

The findings revealed both progress and significant challenges in the adoption of digital leadership in secondary education. While digital tools are increasingly recognized as important for improving teaching and learning, barriers such as financial constraints, inadequate infrastructure, limited teacher training, and inconsistent technology access continue to hinder full-scale digital integration. This chapter summarizes the key findings, discusses their implications, acknowledges study limitations, and provides closing remarks on the role of digital leadership in education.

6.2. Summary of Key Findings

The study addressed four main objectives, which were explored through a mixed-methods approach, combining quantitative and qualitative data collection techniques. The key findings are summarized as follows:

Status of Digital Leadership Practices in Secondary Schools

School administrators play a critical role in promoting digital learning, yet their leadership efforts vary across schools due to differences in resources, training, and institutional policies. Findings from this study indicate that 56% of respondents believe transformational leadership is moderately or extensively applied, suggesting that while digital leadership is gaining traction, its implementation remains inconsistent. Some schools have successfully integrated technology into lesson delivery and school administration, demonstrating proactive leadership in digital transformation. However, other schools continue to struggle with limited digital resources and teacher readiness, highlighting the unequal pace of digital adoption across different institutions.

Challenges in Digital Technology Integration

A significant 73% of respondents reported facing challenges with digital learning, with the most common issues being limited access to devices, poor internet connectivity, and insufficient teacher training. Financial constraints (45%) and inadequate professional development (41%) emerged as the biggest

obstacles to digital transformation in secondary schools, making it difficult for institutions to sustain technology-driven education. Additionally, infrastructure challenges, such as electricity shortages and poor ICT facilities, continue to widen the digital divide between urban and rural schools, limiting equitable access to digital learning opportunities.

Strategies for Overcoming Barriers to Digital Leadership

Collaboration with stakeholders (50%) emerged as the most common strategy for addressing digital challenges, with schools actively engaging NGOs, government agencies, and private sector partners to secure ICT resources. Professional development programs (35%) have played a role in helping teachers gain confidence in using digital tools, although training remains inconsistent and insufficient, limiting widespread digital adoption. Additionally, some schools have adopted resource mobilization strategies (15%), including fundraising and grant applications, to improve access to digital learning tools and infrastructure, though these efforts vary in effectiveness depending on institutional capacity and available support.

Effectiveness of Digital Leadership in Enhancing Learning Outcomes

A remarkable 82% of participants reported that digital leadership has positively impacted student engagement and learning, highlighting its growing influence in secondary education. Statistical analysis using the Chi-Square and G-Test confirmed that digital leadership significantly influences student learning outcomes, though accessibility challenges continue to hinder full adoption, particularly in resource-constrained schools. Despite strong leadership efforts, the inconsistent implementation of digital tools across subjects suggests that more structured policies and leadership-driven interventions are needed to ensure equitable digital integration across all areas of education.

6.3. Implications of the Findings

The findings of this study have several important implications for education policymakers, school administrators, teachers, and stakeholders involved in digital transformation in Malawi's education sector. Addressing the challenges and gaps identified in this study requires a multi-faceted approach, focusing on policy reform, leadership engagement, teacher capacity-building, and equitable access to digital resources.

From a policy and governance perspective, stronger policy frameworks are needed to ensure the equitable distribution of ICT resources across all secondary schools, particularly in rural and underfunded institutions. The government should also consider increasing budget allocations for digital education,

ensuring that schools have adequate infrastructure, reliable internet access, and the necessary digital tools to support technology-enhanced learning. Without consistent financial investment and clear policy guidelines, schools will continue to face unequal access to digital resources, limiting the effectiveness of digital leadership.

For school leadership and administration, it is crucial for principals and headteachers to take a proactive role in driving digital transformation. This involves providing a clear strategic direction, securing external partnerships with NGOs and private sector players, and fostering a school culture that embraces technology. Additionally, more emphasis should be placed on teacher professional development, ensuring that educators receive continuous ICT training and feel confident in integrating digital tools into their instruction. Without strong leadership support, teachers may struggle to keep pace with digital advancements, reducing the overall effectiveness of digital learning initiatives.

At the teacher and student level, educators need to be equipped with ongoing ICT training and pedagogical support to help them effectively integrate technology into lesson plans. Schools must also ensure equal access to digital resources, preventing scenarios where some students benefit from technology-rich environments, while others are left behind due to infrastructure limitations and resource shortages. By addressing these disparities, digital leadership can play a transformative role in creating a more inclusive and technology-driven education system that benefits all learners, regardless of their background or school location.

6.4. Study Limitations

While this study provides valuable insights into digital leadership in Malawian secondary schools, it has some limitations:

- **Geographical Scope:** The study was conducted within the Bwaila Cluster, Lilongwe, meaning the findings may not be fully generalizable to schools in rural or other urban regions of Malawi.
- **Resource Constraints:** A larger sample size could have provided a more detailed picture of digital leadership practices across different school types.
- **Self-Reported Data:** Responses from teachers, administrators, and students were self-reported, meaning there is a possibility of response bias where participants may have overstated or understated their experiences with digital leadership.

Future studies should consider expanding the study scope, incorporating more schools across different districts and longitudinal studies to track digital leadership effectiveness over time.

6.5. Recommendations for Future Research

A. For Policymakers and Government Authorities

- Strengthen national digital education policies by ensuring clear guidelines and accountability mechanisms for ICT implementation at the school level. Policies should be contextualized to address disparities between urban and rural schools.
- Increase budgetary allocations for ICT infrastructure, targeting underserved schools, particularly Community Day Secondary Schools (CDSSs), to bridge the urban-rural digital divide.
- Integrate digital leadership training into national educational leadership programs, equipping school leaders with the skills to plan, manage, and evaluate ICT initiatives.
- Establish a centralized digital monitoring and evaluation framework to track ICT resource utilization, digital adoption rates, and learning outcomes across schools.

B. For School Leaders and Administrators

- Develop school-level digital strategies aligned with national priorities, ensuring that ICT integration is planned, sustainable, and inclusive.
- Foster a culture of innovation and experimentation, encouraging teachers to explore digital tools and share best practices through internal learning circles and peer mentoring.
- Strengthen partnerships with NGOs and the private sector to support ICT infrastructure development, internet connectivity, and training initiatives.
- Ensure equitable access to digital tools among students and staff, including through flexible scheduling, shared device policies, and offline learning options where internet is limited.

C. For Teacher Training Institutions and Educational Development Partners

- Revise teacher training curricula to include hands-on digital pedagogy modules and technology integration strategies that align with classroom realities.
- Provide ongoing professional development opportunities through blended modalities (e.g., workshops, e-learning, coaching), ensuring continuity beyond initial training sessions.
- Support the development of ICT champions within schools who can provide localized mentoring and technical assistance to their peers.

D. For Donor Agencies and NGOs

- Align support programs with national ICT priorities and school-level digital leadership plans to ensure complementarity and sustainability.

- Promote research and documentation of digital education interventions, ensuring that lessons learned are disseminated across the sector.

6.6. Final Conclusion

This study set out to explore how school leaders are shaping the adoption and use of digital technologies in secondary schools within the Bwaila Cluster, Lilongwe. As schools navigate the shifting demands of digital transformation, it has become increasingly clear that leadership plays a defining role—not just in setting direction, but in enabling educators and students to make meaningful use of technology in teaching and learning.

The findings revealed that effective digital leadership extends well beyond the provision of equipment. It involves fostering a shared vision, building trust among teachers, aligning resources with learning goals, and nurturing a school culture that is open to change and innovation. In schools where leadership was grounded in these principles, digital integration was more coherent, more inclusive, and ultimately more impactful. This kind of leadership reflects the core ideas of transformational leadership, where influence is exercised through vision, empowerment, and ongoing support. At the same time, the pace and pattern of digital adoption varied widely across schools and stakeholder groups. Some educators embraced new technologies with enthusiasm, while others remained hesitant—often due to limited support, training, or infrastructure. These variations resonate with how the diffusion of innovation unfolds in practice. Factors like access to reliable internet, peer influence, and the perceived value of digital tools played an important role in shaping who adopted what, and when.

Despite clear progress in some schools, deep-seated challenges remain. Infrastructural gaps, inconsistent connectivity, limited technical support, and financial constraints continue to hinder full-scale digital transformation. Yet even in the face of these barriers, school leaders have found ways to adapt. From building partnerships with NGOs, to introducing offline digital content solutions, to rotating device usage through creative timetabling, many schools are finding context-appropriate ways to move forward. The study also highlighted the value of leadership that is responsive and grounded in local realities. Leaders who encouraged collaboration among teachers, initiated peer mentoring, and recognized innovation in the classroom were able to foster stronger engagement and more sustainable use of digital tools. Where leadership was active and present, teachers were more confident, students more engaged, and technology better aligned with everyday learning.

In sum, this research underscores the importance of leadership that is not only visionary, but practical, adaptive, and inclusive. For Malawi’s secondary schools to make meaningful strides in digital education,

leadership development must be placed at the center of policy and investment priorities. Building stronger support systems, increasing access to training and infrastructure, and cultivating cultures of innovation at the school level are all key to bridging the gap between intention and impact.

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APPENDIX A: MZUNIREC APPROVAL



MZUZU UNIVERSITY

DIRECTORATE OF RESEARCH

Mzuzu University
Private Bag 201
Luwinga
Mzuzu 2
MALAWI
TEL: 01 320 722
FAX: 01 320 648

MZUZU UNIVERSITY RESEARCH ETHICS COMMITTEE (MZUNIREC)

Ref No: MZUNIREC/DOR/24/161 11/11/2024.

Beatrice Atupele Mpandula,

Mzuzu University, P/Bag 201,
Luwinga, Mzuzu 2.

Email: beatricempandula@gmail.com

Dear Beatrice,

RESEARCH ETHICS AND REGULATORY APPROVAL AND PERMIT FOR

**PROTOCOL REF NO. MZUNIREC/DOR/24/161: EXPLORING DIGITAL LEADERSHIP
ADAPTATIONS IN SELECTED SECONDARY IN BWAILA CLUSTER SCHOOLS IN
LILONGWE, MALAWI.**

Having satisfied all the relevant ethical and regulatory requirements, I am pleased to inform you that the above referred research protocol has officially been approved. You are now permitted to proceed with its implementation. Should there be any amendments to the approved protocol in the course of implementing it, you shall be required to seek approval of such amendments before implementation of the same.

This approval is valid for one year from the date of issuance of this approval. If the study goes beyond one year, an annual approval for continuation shall be required to be sought from the Mzuzu University Research Ethics Committee (MZUNIREC) in a format that is available at the Secretariat. Once the study is finalised, you are required to furnish the Committee with a final report of the study.

The Committee reserves the right to carry out compliance inspection of this approved protocol at any time as may be deemed by it. As such, you are expected to properly maintain all study documents including consent forms.

Wishing you a successful implementation of your study.

Yours Sincerely,



Wanangwa K. Msowoya
MZUNIREC Secretariat
FOR: MZUNIREC CHAIRPERSON



Mzuzu University Research Ethics Committee

Directorate of Research
Mzuzu University
P/Bag 201
Luwinga
Mzuzu 2
Email: mzunirec@mzuni.ac.mw
Cell: +265 (0) 99 5 48 32 93

APPENDIX C: DATA COLLECTION OVERVIEW TABLE

The following table provides an overview of the data collection methods and targeted respondents for the research. Each tool is designed to collect specific information aligned with the research objectives.

Questionnaire Description (Data Collection Tool)	Data Collection Method	Targeted Respondents	Sample Size
Structured Questionnaire for Students	Survey	Students	100
Semi-Structured Interview Guide for Educational Leaders	Interviews	Educational Leaders (Headteachers, ICT Coordinators, Deputies)	20
Observation of School Digital Resources	Direct Observation	School Facilities (ICT Labs, Classrooms)	N/A (Qualitative Assessment)
Asset Register for Digital Resources	Document Review	School Administration	N/A (Documentation)

Suggested Information to Collect

Direct Observation:

1. Presence and condition of ICT facilities (e.g., computer labs, projectors, internet access points).
2. Usage patterns of digital devices during classroom sessions.
3. Engagement level of students with digital tools.
4. Interaction between teachers and digital tools, noting how digital tools are integrated into teaching practices.

Document Review:

1. Types and quantities of digital resources listed in the asset register (e.g., computers, tablets, software licenses).
2. Maintenance records for digital devices.
3. Records of digital training sessions for staff and students.
4. Usage policies or guidelines for digital tools within the school.

APPENDIXE D: Data Collection Tools

Tool 1. Student Questionnaire

Part A: Demographic Information

Name of School:	_____
Class/Form:	_____
Gender:	☐ Male ☐ Female

Part B: Device Usage and Digital Access

1. How frequently do you use digital devices for learning?

☐ Daily ☐ Weekly ☐ Occasionally ☐ Rarely ☐ Never

2. Which of the following devices do you use most often for learning? (Select all that apply)

☐ Smartphone ☐ Tablet ☐ Desktop Computer ☐ Laptop ☐ Other: _____

3. What subjects do you mostly use digital tools for?

☐ Mathematics ☐ Science ☐ English ☐ Social Studies ☐ Other: _____

4. What challenges do you face in using digital devices for learning? (Multiple responses allowed)

☐ Lack of devices

☐ Poor internet connection

☐ No electricity at home

☐ I do not know how to use the tools

☐ Other: _____

5. Rate the following statements using the scale: 1 (Strongly Disagree) to 5 (Strongly Agree):

Statement	1	2	3	4	5
Digital tools help me understand better.					
My school encourages the use of technology.					
Teachers help us when using digital tools.					

I feel confident using technology for school work.					
I enjoy learning with digital tools.					

Part C: Open-ended Questions

6. What do you like most about using digital tools in learning?

7. What difficulties do you face when using digital tools in school or at home?

8. Share an experience when using digital tools helped you in your learning. (E.g. "I try to use digital resources for studying, but sometimes the internet connection is too slow, so I give up.")

Tool 2. Interview Guide for Educational Leaders

Section A: Demographic Information

1. Name of School: _____

2. Position: () Principal () Deputy Head () ICT Coordinator () Other: _____

Section B: Digital Leadership Practices

3. How would you describe your school's vision and plan for digital integration?

4. What strategies have you employed to encourage ICT usage among teachers and students?

5. What kind of support do teachers receive for integrating digital tools into lessons?

Section C: Challenges and Adaptive Strategies

6. What are the main challenges your school faces in implementing digital learning?

7. How has your school addressed issues such as lack of devices, poor connectivity, or low teacher readiness?

8. Can you provide examples of innovative strategies used in your school to overcome ICT-related barriers?

Section D: Monitoring and Outcomes

9. How do you monitor the effectiveness of digital integration in teaching and learning?

10. In your view, how has digital leadership impacted student engagement and academic outcomes?

Tool 3. Observation Checklist

Observation Date: _____

School Observed: _____

1. Availability of ICT infrastructure (labs, devices, internet). ☐ Yes ☐ No Comments: _____

2. Usage of digital devices during classroom sessions. ☐ Yes ☐ No Comments: _____

3. Student engagement with digital content. ☐ Yes ☐ No Comments: _____

4. Teacher facilitation of digital learning tools. ☐ Yes ☐ No Comments: _____

5. Presence of any digital usage policy or display materials. ☐ Yes ☐ No Comments: _____

Tool 4. Document Review Template

The following items should be reviewed from school records:

- ICT inventory records (computers, tablets, routers, etc.)
- Teacher training records (names, dates, duration)
- ICT usage policy documents
- Maintenance logs for digital devices
- Any monitoring reports or digital learning evaluation data

b) Positive

c) Neutral

d) egative

e) Very negative

1. 13. Are there variations in digital leadership impact among different stakeholders (administrators, teachers, students)?

- a) Yes
- b) No
- c) Not sure

Section E: Additional Comments

2. 14. Please share any additional comments, experiences, or insights regarding digital leadership in your school.

APPENDIX E: STUDENTS CLEARANCE FORM


MZUZU UNIVERSITY
STUDENT FEES CLEARANCE FORM

A. STUDENT INFORMATION
Name of Student... Bontata M. Mankela Registration... M21M2122
Sex: FEMALE Programme: MA in Leadership Management Level: Semester:
Signature of Student... BM Date: 3 feb 2023

B. FINANCE SECTION
Total amount of fees owed to the University K... 2.5
Other Financial commitment owed to the University (desc) None
Amount paid K... 39,000.00 Receipt No.:
Fees Balance:
Signature... [Signature] Date: Stamp... 
Cheque#.....

C. ENDORSEMENT BY THE UNIVERSITY REGISTRAR
Student Examination Number
Signature..... Date.....

