CHALLENGES FACING DIGITAL LEARNING IN UNIVERSITIES IN KIAMBU COUNTY, KENYA

MERCY NASEI

BRILLIANT CHERUTO

PHIBIAN KEMUNTO

MERCY CHEPKOECH

A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF EDUCATION AND SOCIAL SCIENCES IN PARTIAL FULLFILLMENT IN THE REQUIREMENT FOR THE AWARD OF DEGREE OF BACHELOR OF EDUCATION (ARTS) OF GRETSA UNIVERSITY

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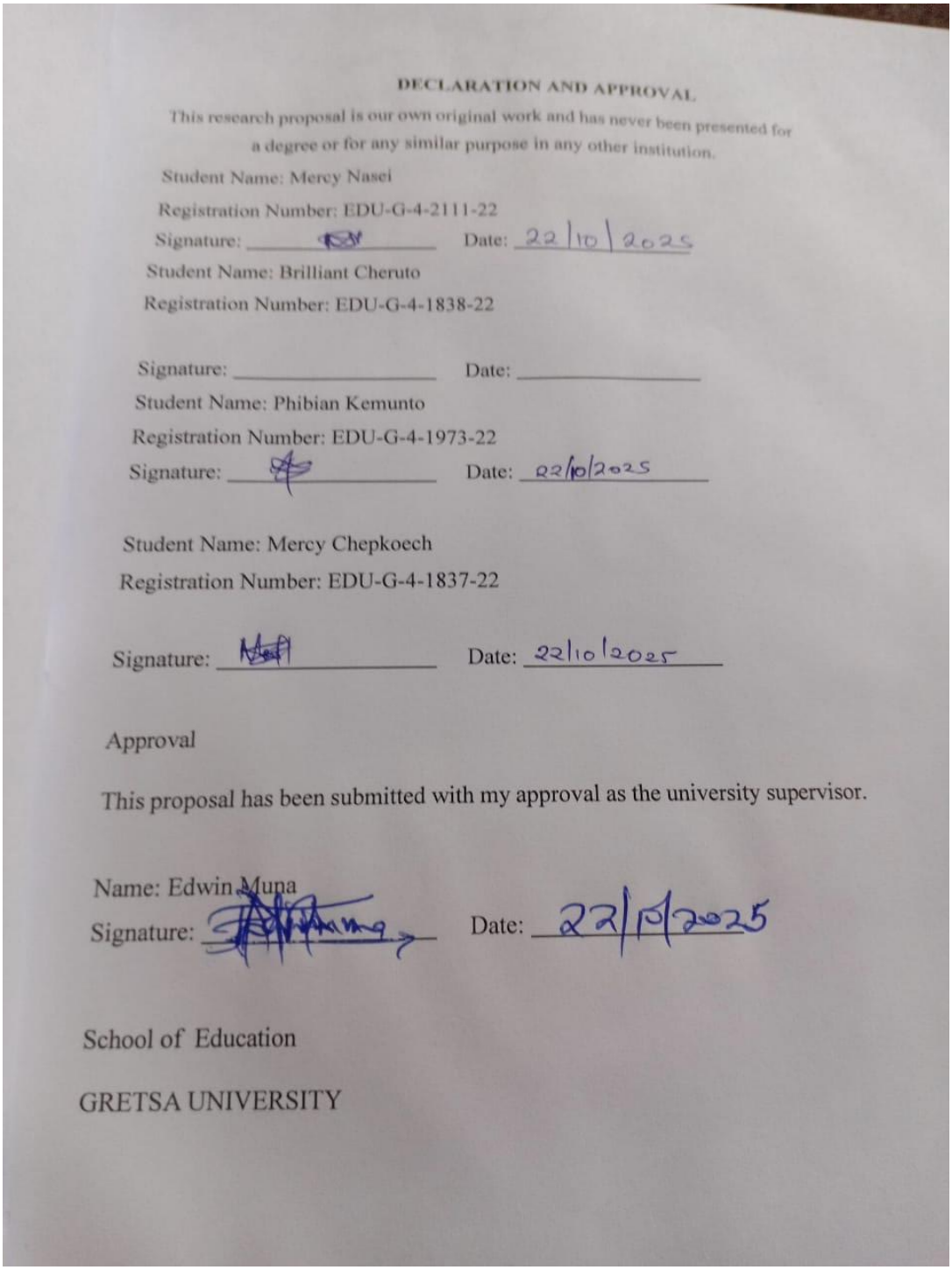
DECLARATION



DECLARATION AND APPROVAL

This research proposal is our own original work and has never been presented for a degree or for any similar purpose in any other institution.

Student Name: Mercy Nasei

Registration Number: EDU-G-4-2111-22

Signature: _____ Date: 22/10/2025

Student Name: Brilliant Cheruto

Registration Number: EDU-G-4-1838-22

Signature: _____ Date: _____

Student Name: Phibian Kemunto

Registration Number: EDU-G-4-1973-22

Signature: _____ Date: 22/10/2025

Student Name: Mercy Chepkoech

Registration Number: EDU-G-4-1837-22

Signature: _____ Date: 22/10/2025

Approval

This proposal has been submitted with my approval as the university supervisor.

Name: Edwin Muna

Signature: _____ Date: 22/10/2025

School of Education

GRETSA UNIVERSITY

Dedication

The project is dedicated to our parents for the sacrifices they made to ensure we received good education; this achievement is as much theirs as it is ours.

To all students facing financial and technical barriers, may this research serve as a voice and light towards building a more inclusive and supportive academic environment.

Acknowledgement

We are thankful to God granting us the strength, wisdom, and perseverance through this academic journey. Our heartfelt appreciation goes to our supervisor, Mr. Edwin Muna, for his invaluable guidance, continuous support, and constructive feedback, which greatly enhanced the quality of our work. Special thanks go to our families and friends for the unwavering support, patience, and understanding during the research process. Lastly, we are grateful to all participants who willingly provided their time and information, making this study possible.

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ABBREVIATIONS AND ACRONYMS

Abbreviation	Meaning
CUE	Commission for University Education
DLP	Digital Literacy Program
IT	Information Technology
LMS	Learning Management System
MOOC	Massive Open Online Course
NGO	Non-Governmental Organization
OCL	Online Collaborative Learning
ODEL	Open, Distance, and Electronic Learning
UNESCO	United Nations Educational, Scientific, and Cultural Organization

Table 1 Abbreviations and Acronyms

OPERATIONAL DEFINITION OF TERMS

1. **Digital learning**- It's a learning supported by technology and the use of IT in delivery practices.
2. **Curriculum**- A standards–based sequence of planned experiences that help students to learn and become proficient in subject matter and applied learning skills
3. **Pedagogical**- This is the method of how teachers teach in theory and in practice
4. **Impediments**-These are hindrances and obstructions in doing something
5. **Bandwidth**- the maximum rate of data transfer across a given path

Abstract

Digital knowledge has developed as a vital component of higher education, particularly in the wake of technological advancements and disruptions like the COVID-19 pandemic. However, universities in Kiambu County, Kenya, face significant challenges in implementing effective digital learning systems. The study aims to identify and analyze these challenges, focusing on technical challenges, financial constraints, and content coverage and deleverage. This will be through questionnaire interviews to gather information from the institutional university students, lecturers, and IT staff in selected universities in Kiambu County. Major findings suggest that insufficient internet access, restricted availability of digital devices, and insufficient training for educators are major barriers to successful digital learning implementation. The research underscores the need for target interventions, including investment in digital infrastructure capacity-building programs and inclusive policy frameworks to enhance digital learning in higher education. These findings provide a foundation for policymakers and university administrators to address the digital gap and improve education quality in Kiambu County

CHAPTER ONE: INTRODUCTION

This chapter entails the background to the study, statement of research problem, purpose of the study, conceptual framework, research question, objectives of the study, hypothesis of the study, significance of the study, scope of the study, and limitations of the study.

1.1 Background to the study

The study's background, problem statement, purpose, conceptual framework, research questions, aims, hypotheses, importance, scope, and limits are all presented in this chapter. 1.1 The Study's Context The term "digital learning" describes how learning experiences are created, delivered, and supported through the use of technology and online resources. Siemens and Tittenberger (2009) claim that it entails incorporating digital resources to improve teacher-student interactions during learning.

Wheeler (2012) explains it as technology-mediated methods that enable assessment, tutoring, and instruction through digital means. More broadly, digital learning encompasses any educational practice supported by technology to facilitate access, participation, and engagement in the learning process.

Globally, digital learning has evolved over the past century. In the United States, early innovations such as the “teaching machine” by B.F. Skinner in 1954, laid the foundation for computer-based training. By 1960, the (PLATO) system at became one of the first interactive digital learning platforms. In Asia, the introduction of (MOOCs) such as edX and Khan Academy around 2010 revolutionized access to higher learning by allowing learners to study at their own time and from anywhere in the world (Taylor & Wallace, 2022).

In Africa, the adoption of digital learning has gradually expanded as governments and development partners sought to bridge educational gaps and promote information and communication technologies (ICTs) for development (UNESCO, 2019). In Kenya, significant progress began in 2009 with the introduction of e-learning content in universities, followed by the Digital Literacy Programme (DLP) launched in 2016 to expand digital knowledge in schools. Most higher-learning institutions have since developed laws to support Open, Distance and

Electronic Learning (ODEL). For example, Kenyatta University established its Digital School in 2020 to promote online and blended learning.

Despite these efforts, universities in Kiambu County face multiple challenges in sustaining effective digital learning. Technical limitations such as unreliable internet connectivity, inadequate access to computers, and frequent power interruptions hinder progress. Financial barriers—including limited institutional budgets and the high cost of ICT infrastructure—further restrict digital expansion. In addition, insufficient training for educators and uneven content delivery reduce learning effectiveness. This study therefore investigates the major challenges that constrain digital learning in universities within Kiambu County.

1.2 Statement of the problem

Although many universities in Kenya have adopted digital platforms, persistent challenges undermine their effectiveness. The shift from classroom instruction to online learning—particularly during the COVID-19 pandemic—exposed weaknesses in infrastructure, digital literacy, and staff preparedness (Mtebe & Raphael, 2021). Many institutions operate under limited budgets that restrict investment in ICT infrastructure, training, and support systems. Students from low-income backgrounds often lack access to stable electricity, reliable devices, and affordable internet. These constraints risk widening the digital divide and compromising equitable access to quality higher education. This study, therefore, seeks to analyze the key technical, financial, and content-delivery challenges affecting the implementation of digital learning in universities in Kiambu County, Kenya, and to propose evidence-based strategies for improvement.

1.3 Purpose of the study

The aim of the study was to investigate the challenges facing digital learning in universities in Kiambu County, Kenya.

1.4 Conceptual framework

The study examines three main independent variables—technical challenges, financial constraints, and content delivery and coverage—and their collective influence on the dependent variable, effectiveness of digital learning.

1. Technical Challenges: Issues such as poor internet connectivity, unreliable electricity, and limited access to computers or learning platforms.

2. Financial Constraints: Limited funding for ICT infrastructure, high cost of digital devices, and expensive data bundles.
3. Content Delivery and Coverage: Low instructor preparedness, limited interactive tools, and inconsistent curriculum delivery.

these factors determine how effectively universities implement and sustain digital learning

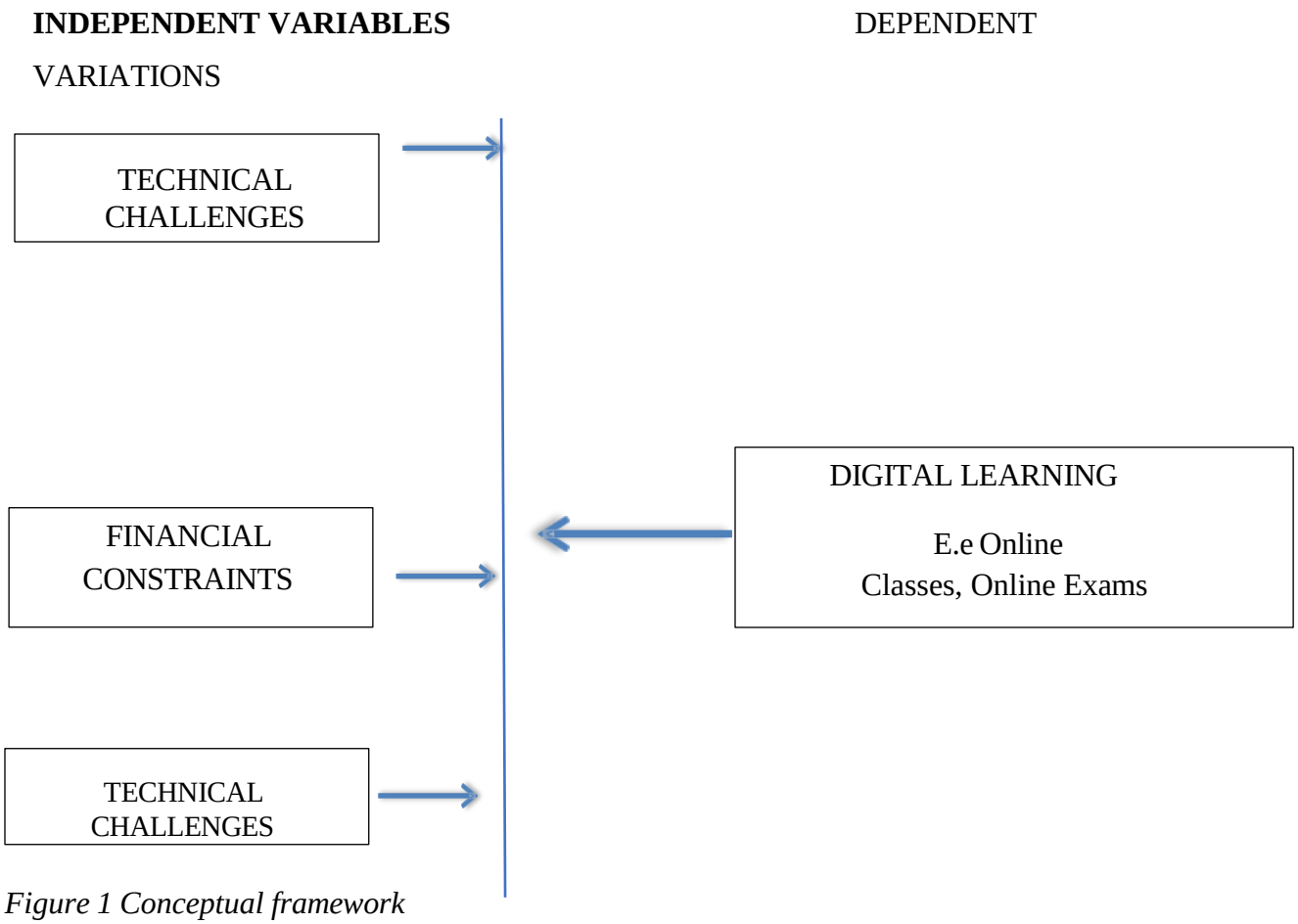

Figure 1 Conceptual framework

1.5 Research questions

i. What are the technical challenges affecting digital learning in universities in Kiambu County, Kenya?

ii. Do financial constraints affect digital learning in universities in Kiambu County, Kenya?

iii. What are the challenges affecting content delivery and coverage in digital universities in Kiambu County, Kenya?

1.6 Objectives

1.6.1 General objective

To examine the challenges facing digital learning in universities in Kiambu County, Kenya

1.6.2 Specific objectives

1. To investigate how technical difficulties affect digital learning in universities in Kiambu County, Kenya.
2. To determine how financial constraints affect digital learning in universities in Kiambu County, Kenya.
3. To assess how content delivery and coverage affect digital learning in universities in **Kiambu** County, Kenya

1.7 Hypotheses of the study

Ho1 Technical difficulties do not affect digital learning in Kenyan universities

Ho2 Economic status has no significant influence on digital learning in Kenyan universities

Ho3 Content delivery and coverage are not affected by digital learning in Kenyan universities.

1.8 Significance of the study

The outcome of the study will be advantageous to multiple parties. Pupils will study how digital learning may enhance their communication and technological skills—two things that are crucial in today's workplace—while facilitating flexible and self-paced education. So as to provide interactive and captivating classes, lecturers can recognize areas that need pedagogical and technological improvement. The findings can be used by university administrators to improve institutional capability and create sustainable ICT budgets. The results can also be used by policymakers like the Commission for University Education (CUE) to develop plans to improve digital inclusion in Kenyan universities.

1.9 Scope of the study

Even though Kenya has sixty-nine universities, this study focused only on universities in Kiambu County. Kiambu has eight universities. A sample of six universities was selected since they were nearer to the researchers**,** hence less costly to access. A sample of students, academic deans, and IT faculty were chosen for data collection from each university. The research work was limited to the above sources as they had more information concerning the research topic.

1.10 Limitations of the study

The research faced limitations; however, the researchers requested for permission to conduct their research. One limitation was the limited time since the deadline for completion of the project. The researchers devised a strategy to overcome some of the limitations they encountered during the research, such as limited time, by acknowledging and mentioning a requirement for future study to solve the research problem in a better way. The researcher reviewed their schedule so as to be aligned with the deadline of completion of the project. Security to the universities were a challenging factor since most universities use biometrics and school ID. The researchers requested that their institution write them a letter that allowed them to conduct research in the institutions in Kiambu County. Unwillingness of the respondents to respond limited the information to could be acquired for the study. The researchers assured the respondents of the confidentiality of their responses.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This topic aims to review previous literature in relation to the study. The review is done on the challenges facing digital learning in universities in Kiambu County, Kenya. The review is organized as per the objectives of the study, technical challenges, financial challenges, and content delivery and coverage effects to digital learning, the theoretical framework work, and the summary of identified gaps in the reviewed work and the relevance of theory of the project.

2.1 Digital learning

Digital knowledge has become a transformative approach to teaching by enabling students and educators to interact in dynamic, technology-supported environments. As noted by Livari et al. (2020), the integration of digital platforms creates new possibilities for engagement, collaboration, and flexible learning. With continued technological progress, digital learning contributes significantly to improving both the quality and accessibility of education. In developed countries, it promotes interactive and learning that foster active participation (Louis et al., 2021; Tapalova & Zhiyenbayeva, 2022). However, challenges such as inadequate access to devices, unstable internet connections, and socio-cultural resistance continue to hinder its effective adoption in many developing contexts.

2.2 Technical challenges in digital learning

Mtebe and Raphael (2021) observed that one of the major obstacles to digital learning in Africa is unstable internet connectivity, particularly in rural and under-resourced areas. Slow or unreliable connections often prevent students and instructors from participating consistently in online sessions. Similarly, König et al. (2020) and Trust and Whalen (2021) noted that the sudden transition to virtual learning exposed a lack of technical readiness in many institutions, leaving both educators and learners with minimal IT support. Scherer et al. (2021) further emphasized that many instructors were inadequately trained to integrate digital tools and adapt teaching strategies to online formats, resulting in reduced teaching effectiveness and student engagement.

2.3 Financial constraints in digital learning

Research by Manaro, Singh, and Joshi (2012) and Sabi (2014) revealed that financial limitations remain a key barrier to implementing e-learning in developing nations. Establishing and maintaining reliable ICT infrastructure demands significant investment, which many universities—particularly in low-income countries such as Kenya—struggle to afford. Kashorda and Wema (2014) acknowledged that while ICT integration enhances teaching, research, and management efficiency, it simultaneously raises operational costs for institutions that already operate under tight budgets. Similarly, Tarus, Gichoya, and Muumbo (2015) found that state-sponsored universities often deprioritize e-learning initiatives due to competing financial needs, thereby slowing the advancement of digital education.

2.4 Content delivery and coverage in digital learning

Taylor and Wallace (2022) emphasize that interactive elements are used in digital content delivery. They the tools like quizzes, discussion boards, and live chats to increase engagement and comprehension among students. However, such tools demands investment in digital and instructor time, which may be difficult for a resource-constrained institution. Singh and Kumar (2020) noted that dependence on high-bandwidth multimedia content can also disadvantage students with poor internet access.

Research by Green and Chan (2019) discusses the difficulties educators face in covering the curriculum when constrained by digital platforms, which sometimes limit the scope and depth of instructional material.

Digital learning environments tend to encourage a modular approach, which can result in fragmented content delivery (Lil & Brown, 2021). This approach might cause students to miss essential cross-disciplinary linkages, leading to a more compartmentalized understanding of complex topics. Additionally, instructors may find it challenging to provide sufficient depth on each subject due to time limitations leading to time limitations leading to concerns over whether students are receiving a comprehensive education (Williams et al., 2022).

2.5 Theoretical framework

The study was confined to Terry Andersons theory of learning (2008) This theory of learning was regarded as appropriate since the study was based on challenges facing digital learning in universities in Kiambu county, Kenya, which is Anderson's major preoccupancy in the theory. According to Orodho (2019), a theoretical framework provides an organized set of related concepts and propositions that help explain and interpret a research problem. It offers a structured lens for understanding the study's variables, guiding analysis, and linking the project to existing theories in the field.

2.5.1 Community of inquiry

It is a model developed by Garrison, Anderson &Archer (2008) is has the three distinct presences: cognitive, interaction, and learning. Anderson, Garrison, Rourke, and Archer (2001) also recognized the overlapping and the relationship among components. Their method correlates the design of online and blended learning as or communities that depend on instructors and students sharing their thoughts. social of inquiry has become popular in activites within learn ing.

Social presence relates participants to what one can do in their individual personalities in order to identify and communicate with the community and develop interpersonal relationships (Garrison 2009)

Cognitive presence is the way to which students are able to know the meaning through self reflection (Garrison, Archer &Anderson 2001, 2004) Teaching presence is the design, facilitation, and direction of the social and cognitive process for the purpose of realizing the relevant learning outcomes.(Anderson, Archer, Garrison & Rourke 2001)

2.5.2 Connectivism

George Siemens (2004), describes connectivism as a gaining knowledge of model most important manner of understanding and records goes well, matures, and transit due to giant facts conversations networks. It highlights comprehending studying within the virtual world and the way technologies contribute to online getting to know. the explanation , Siemens stated the paintings of Alberto Barabasi . , which accurately identified how massive-scale networks grow to be integral in assisting in supporting humans and agencies in controlling records and information. Siemens mentioned that connectivism, as an idea, is driven by a dynamic of records drift. Students want to understand navigating and recognizing oceans of continuously transitting statistics.

2.5.3 Online collaborative learning

OCL is a concept that specializes in the center of the net to offer gaining knowledge of surrounding that boost working together and knowledge construction. he describes OCL as a brand new principle of getting to know that concentrates on group learning, expertise constructing, non- formal, and informal schooling for the Age (Harasim,2012,p.81). Siemens, sees Harasim the advantage of shifting and gaining knowledge to large- scale networked education.

1. coceptualization : section in which divergent minds are accrued
2. structuring: the section where thoughts are compared, analyzed, and classified through dialogue and argument
3. Intellectual convergence; the section where thinking synthesis and take place, inclusive of agreeing to disagree, normally via a venture, of labor (Harasim,2012,p.82)

OCL additionally comes from stucturing, considering the fact learners are recommended to collaboratively clear up troubles via discourse, and in which the teacher

plays the position of facilitator,to getting to know community members.

The researchers used Terry Anderson's theory because it was reliable to the study, which focuses on interactions in digital learning. A student may experience limited teacher interaction due to poor internet and faculty availability

Peer interaction may be minimal because of a lack of collaborative tools and platforms

This theory helps to examine how these interaction gaps directly impact learning outcomes

The theory is flexible as it states that deep andimportant to learning occurs when at least one of the types of interactions is at a high level

Anderson’s model can evaluate where digital learning is failing: learner-content, learner-teacher, learner-learner. The theory advocates for a balance in interactions, reminding institutions that all interactions are important.

2.6 Summary of identified gaps in the reviewed literature.

This chapter has reviewed the critical literature and identified the existing gaps. More existing studies focus on digital learning at a national level in major urban institutions; there is still a gap in universities in semi-urban counties like Kiambu, where we have a mix of rural and urban student populations. Challenges like ICT, infrastructure, digital devices, and equity issues, as well as connectivity and technical support. From the literature reviewed in this chapter, lack of ICT, infrastructure-learning resources, digital divide, and lack of broadband access are among the issues that have emerged clearly. Kenyan universities need to invest in ICT infrastructure, e-learning resources, and digital learning in order to gain a competitive edge among universities in the provision of digital learning programs. Often, the university's ranking is based on adoption and usage of ICT, and no wonder Kenyan universities are ranked distant behind their African peers. Massive resources would be required to bridge the huge digital divide and infrastructure.

CHAPTER THREE RESEARCH METHODOLOGY

3.1 Introduction

This topic analyzes a series of steps, design, study area, target population, sampling techniques, sample size, measurement of variables, research instruments, validity of measurement, reliability of measurements, collection techniques, analysis, and logistical and ethic considerations.

3.2 Research design

This research adopted a descriptive design, idea of Creswell (2003), is suitable for systematically describing characteristics of a population or phenomenon based on collected data. This approach enabled the researchers to obtain detailed information from students, academic deans, and ICT personnel regarding digital learning challenges. Data was collected using questionnaires and structured interviews to ensure both qualitative and quantitative insights were captured.

3.3 Study place

The study took place in universities in Kiambu County, Kenya. The place was chosen since many of the universities in Kiambu County have embraced digital learning, and the project aimed at finding out the challenges facing digital learning.

3.4 Target population

The aimed population comprised students, academic deans, and ICT staff from eight universities located in Kiambu County, Kenya. Specifically, it included students enrolled in digital learning programs, lecturers utilizing online tools, and administrators overseeing implementation processes. Based on information from the Commission for University Education (CUE) and the (KNBS), the estimated population was approximately 183,760 university students, along with eight academic deans and thirty ICT specialists across the selected institutions.

3.5 Sampling techniques

The research employed a combination of purposive and random sampling techniques. Purposive sampling was applied to identify the six universities in Kiambu County that actively utilize digital learning systems. Within each selected institution, random sampling used twenty students, one academic dean, and two ICT staff members. This method

ensured that every eligible participant had an equal opportunity to be included, minimizing selection bias.

3.6 Sample size

Sample size is the portion of the population that is picked for the research study to represent the aimed population.

Table 1: sample

Respondent	Target population	Sample size	Sample size per university
Students	89000	180	30
Academic deans	6	6	1
IT faculties	36	12	2
TOTAL	89042	198	33

Table 2 Sample size

3.7 Measurement of variables

Table 2: Measurement of variables

Variable	Measures/indicators	Measurement scale	Question number
Technical challenges	Internet connectivity inadequate IT support	Ordinal scale	1
Financial constraints	High cost of laptops lack of enough funds to construct infrastructures such as a computer lab	Ordinal scale	2
Content delivery and coverage	Lack of enough time to be able to cover the content	Ordinal scale	3

Table 3 Measurement Of Variable

3.8 Research instruments

The study used structured interviews wherein a formal set of questions was posed to every interviewee and recorded. This approach aims to make sure that interviewee was presented with the same quiz in the same order. It was carried out face-to-face. The structured interview questions are open-ended and closed-ended. Questionnaires were used to gather facts from students and academic deans.

3.9 Validity of measurement

Validity means to the extent to which a research equipment accurately measures what it is designed to measure (Mugenda & Mugenda, 2003). To ensure this, both face validity and content validity were applied. Face validity focused on the clarity and relevance of the questions to the study objectives, while content validity ensured that all essential aspects of the research topic were comprehensively represented in the instruments.

3.10 Reliability of measurement

Reliability concerns the research instrument in producing similar results when repeated under comparable conditions (Mugenda & Mugenda, 2003). This study utilized the test–retest method to establish reliability. The previous questionnaires were administered to a sample of students and ICT personnel from the six universities and then reissued one week later. The consistency of the responses indicated that the equipment's were stable and dependable for data collection.

3.11 Data collection techniques

The researchers sought permission from the universities` boards to conduct their research. They visited the universities and administered questionnaires and interviews. They guided respondents on filling them correctly. Finally, the researchers collected the questionnaires.

3.12 Data analysis

Data involves critical examination of recorded data and drawing meaningful conclusions. Since the study employed questionnaires and interviews, descriptive statistical

methods were applied to summarize quantitative data through tables, charts, and percentages. responses from interviews were analyzed thematically to complement the quantitative findings.

3.13 Logistical and ethical considerations

This consideration protects the rights of research participants, enhances research validity, and maintains scientific integrity.

The various logistical and ethical considerations was used in the research study as follows.

1. The researchers ensured that the questions in the questionnaire did not infringe on the respondent's privacy. The researchers avoided asking for identifiable information such as their names, phone numbers, and emails. Researchers ensured that they met any additional expenses accruing from the research study.
2. The researchers were given a letter by the university to permit them to conduct research in those various universities.

CHAPTER FOUR: FINDINGS AND DISCUSSION

Introduction

This topic provides the analysis, presentation, and interpretation of data that relates to the study objectives. Descriptive , including frequencies, percentages, tables, and graphs, were applied to the responses.

The results are organized thematically to correspond with each specific research objective.

1. To investigate how technical difficulties affect digital learning in universities in Kiambu County, Kenya.
2. To determine how financial constraint affects digital learning in universities in Kiambu County, Kenya.
3. To assess how content delivery and coverage are affected by digital learning in Kiambu County, Kenya.

Data analysis was done through frequencies and percentages were used to display the results, which were presented in tables and charts.

4.2 Response

total of 198 respondents, including students, academic deans, and IT members from six universities in Kiambu County. Out of the targeted respondents, 180 students, six academic deans, and 12 IT faculty members finisshed and gave back the questionnaire. 198 questionnaires were distributed the returned questionnaires were 185, a 93.4% response rate.

4.3 Technical challenges

The study sought to determine the technical challenges faced by students and staff in digital learning. Results indicated that 55.5% of respondents cited unreliable internet connectivity, .22.5% reported inadequate access to digital devices, .15.4% noted frequent outages as major barriers. These issues significantly disrupt the educating process, most during online lectures and the submission of assignments.

CHALLENGES	FREQUENCY	PERCENTAGE
Unreliable internet	110	55.5%
Inadequate devices	45	22.5%
Power outage	30	15.4%

Table 4 Technical Challenges

Further qualitative responses from students highlighted frustration with slow-loading platforms and frequent disconnection during the life session. Some IT members also saw challenges in supporting large volumes of simultaneous users due to limited server capacity.

4.4 FINANCIAL CONSTRAINTS

Financial challenges were another major concern in the implementation of digital learning .47.9% of the respondents pointed out the high cost of internet and devices, 27.9% stated lack of institutional funding, and 17.6% cited high maintenance cost. These constraints affected both learners and institutions, limiting participation and investments in digital infrastructure.

FINANCIAL CONSTRAINTS	FREQUENCY	PERCENTAGE
High cost of internet/devices	95	47.9%
Lack of institutional funding	55	27.9%
High maintenance cost	35	17.6%

Table 5 Financial Constraints

Some students reported relying on e-learning platforms, which proved costly and unsustainable, and academic deans express concern about limited budget allocations for digital learning, infrastructure, and software licensing

4.5 CONTENT DELIVERY AND COVERAGE

The study found that digital content delivery was hindered by a lack of interactive tools, poor instructor preparedness, and insufficient training. 50.5% of respondents cited inadequate instructional methods, 27.9% mentioned content overload, and 15% identified a lack of real-time engagement.

CONTENT DELIVERY AND COVERAGE	FREQUENCY	PERCENTAGE
Inadequate instructional methods	100	50.5%
Content overload	55	27.9%
Lack of real-time engagement	30	15%

Table 6 Content Delivery

These challenges resulted in limited comprehension and retention of course material. Some students noted that prerecorded lectures were not updated regularly and lacked clarity, making it difficult to follow the curriculum. Instructors also faced challenges with technology integration and adapting to new platforms, impacting the quality of education delivered.

4.6 : DISCUSSION AND FINDINGS

The study revealed three key challenges in digital learning within Kiambu County;

1. Technical challenges such as internet issues, inadequate devices, and unstable electricity.
2. Financial constraints limiting student access and institutional investments in e-learning systems.
3. Content delivery issues arising from an untrained instructor, a lack of engagement tools, and disorganized learning material.

These findings highlight institutional reforms to support digital learning. There is a visible need for government subsidies on the internet and learning devices, structured training programs for faculties, and investments in robust ICT infrastructure.

The result of this study align with the existing literature on digital learning challenges in developing regions. For instance, Mtebe &Raphael (2013) reported similar technical and financial barriers in Tanzanian universities. The findings also resonate with Trust &Whalen (2021), who emphasized the unpreparedness of educators in digital platforms during rapid transitions like the COVID-19 pandemic

Moreover, the study supports Anderson's Online Learning Theory, which underscores the necessity of strong interaction between content, instructors, and learners. Poor engagement, as highlighted in the study, reflects a breakdown in these interaction points. The limited interactions observed in this study aligns with Anderson's concept of teaching, cognitive, and social presence.

Improving technical support, funding, and pedagogical strategies can greatly enhance the effectiveness of digital learning in Kiambu County. Incorporating more user-friendly platforms, increasing internet bandwidth, and training faculty on interactive content delivery will likely yield positive outcomes.

In conclusion, universities in Kiambu County must take a multi-dimensional approach to resolve digital learning challenges. Collaboration with private tech firms, the national government, and international education partners may offer long-term solutions that are sustainable and scalable.

CHAPTER FIVE: SUMMARY, CONCLUSION, AND RECOMMENDATIONS

5.1 Introduction

This topic provides the study findings, draws summary from the analyzed data, and outlines practical recommendations and directions for future research. The discussion aligns with the study objectives and the results presented in Chapter Four.

5.2 Summary of the findings

The research sought to identify the core challenges that universities in Kiambu County face while implementing digital learning. The findings were based on responses from the students, academic dean, and IT staff across six universities

5.2.1 Technical challenges

A significant number of respondents (55.5%) reported that unreliable internet connectivity was the biggest obstacle. this issue made it hard for the student to participate in live online classes and upload assignments on time.

Inadequate digital devices like laptops and tablets were a challenge for 22.5% of the respondents. Many students depend solely on smartphones, which are limited in functionality for academic work.

Power outage affected 15.4%of users since stable electricity is crucial for digital learning outages severely disrupted learning schedules.

IT department members also shared that university servers and systems often crashed when many students accessed them at the same time, due to limited server capacity

5.2.2 Financial constraints

Nearly half of the respondents (47.9%) said that the cost of the internet bundles and devices was too high for sustained use. Many relied on mobile data, which is expensive and runs out quickly.

About 27.9% of university staff mentioned limited institution funding, meaning universities lacked the budget to invest in reliable e-learning platforms, software, and IT personnel.

High maintenance costs (17.6%) further strained budgets. Regular updates, server maintenance, and content creation are expensive for already financially struggling institutions

5.2.3 Content delivery and coverage

50.5% of participants felt that instructors were not adequately prepared to teach online. Many relied on uploading text documents without engaging in methods like live discussion of questions. 27.9% felt overwhelmed by the content overload, where too much material was posted with little guidance and structure. 15% pointed to a lack of real-time engagement, for example absence of live Zoom sessions, which reduced interaction and made learning impersonal.

Students mentioned that pre-recorded lectures were outdated and unclear, while lecturers struggled to adapt teaching methods to suit online platforms

5.3 Conclusion

The study concludes that the effectiveness of digital learning in universities largely depends on the availability of adequate ICT infrastructure, stable internet connectivity, and sustainable financial support. The combined effect of these factors determines the overall success of online education. Enhancing ICT infrastructure, ensuring reliable connectivity, and allocating sufficient financial funds are used for strengthening digital learning systems in higher education.

5.4 Recommendations

The following recommendations are proposed to address the challenges identified in the study:

1. Enhance Internet Connectivity: Universities should work together with internet providers to improve connectivity and ensure stable access for both lecturers and students.
2. Increase ICT Funding: The government and university board should distribute more materals toward the development and maintenance of ICT infrastructure.
3. Capacity Building for Lecturers: on going professional progress plan should be introduced to train lecturers on the use of digital tools and platforms.
4. Subsidize Internet and Devices: relationship with own people sector groups should be encouraged to provide affordable devices and internet packages to students.
5. Develop Interactive Learning Content: Institutions should invest in creating dynamic and engaging digital content that promotes active participation and collaboration among learners.

5.4.1 Improve infrastructure and technical support

The government and universities should invest in reliable internet infrastructure and increase server capacity to support online traffic.

Provide affordable laptops and tablets through partnerships with tech companies and a student loan scheme

Install a backup power system (like a generator, solar system) to mitigate electricity problems

5.4.2 Enhance financial support

Government subsidies can reduce the cost of internet bundles and devices for students

Universities should allocate specific budgets for e-learning development, including software, digital tools, and IT personnel.

Explore a partnership with NGOs and private companies to sponsor and donate digital equipment and services

5.4,3 Improve content delivery

Conduct training programs for lecturers to improve their digital teaching skills (using Zoom, model, and Google Classroom)

Design interactive content that includes videos, live discussions, quizzes, and forums.

Universities should adopt user-friendly learning management systems (LMS) with consistent updates and tech support

5.4,4 Policy development

The Ministry of Education should develop clear policies and standards for digital learning, ensuring that all institutions maintain quality and accessibility.

Universities should have internal policies for regular monitoring and upgrading of digital programs.

5.5 Recommendation for further studies

Further study could explore the effectiveness of specific e-learning platforms used in universities and how different teaching approaches influence student engagement. Studies could also focus on evaluating the long-term impact of digital learning policies introduced by the government and institutions.

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APPENDIX I: QUESTIONNAIRES

This questionnaire aims to collect information on the challenges facing digital learning in universities in Kiambu County, Kenya. Your responses will be treated with strict confidentiality and used solely for academic purposes.

SECTION A: GENERAL INFORMATION

1. Name of the university: _____
2. Your role:

   ☐ Student ☐Lecturer ☐Administration
3. Age group:

   ☐ 18–24 ☐25–34 ☐35–44 ☐45 and above
4. Level of study (if student):

   ☐ Undergraduate ☐Postgraduate ☐Diploma/Certificate

SECTION B: TECHNICAL CHALLENGES

1. Can you get to a reliable internet connection for learning?

   ☐ Yes ☐No ☐Sometimes
2. What is your primary device for accessing digital learning?

☐ Smartphone ☐Laptop/PC ☐Tablet ☐ None

3. Do your school provide digital learning platforms (e.g., Moodle)?

   ☐ Yes ☐No
4. How do you see the quality of ICT infrastructure in your university?

   ☐ Excellent ☐Good ☐Average ☐Poor

SECTION C: FINANCIAL CONSTRAINTS

5. Which difculty have you faced in accessing digital learning materials? (Tick all that apply)

   ☐ Lack of device (e.g., laptop, smartphone)

   ☐ High internet costs

   ☐ Poor internet connectivity

   ☐ Lack of digital literacy skills

   ☐ Limited content availability

   ☐ Inadequate university support

6. How many times you experience technical issues (e.g., system failures, login difficulties)?

   ☐ Always ☐Frequently ☐Rarely ☐Never

7. Have you experienced challenges adapting to online learning due to teaching methods?

   ☐ Yes ☐No ☐Not sure

8. How do you see your lecturers'/instructors' ability to effectively use digital learning tools?

   ☐ Excellent ☐Good ☐Fair ☐Poor

SECTION D: CONTENT COVERAGE AND DELIVERY

9. Does your university provide training or orientation on digital tools for learning?

   ☐ Yes ☐No

10. What type of support do you feel is most lacking in digital learning?

    ☐ Technical support

    ☐ Digital literacy

    ☐ Financial support (e.g., subsidy for devices)

    ☐ Academic support

11. Are there any government or university policies promoting digital learning

in your institution?

☐ Yes ☐No ☐Not aware

SECTION E: SUGGESTIONS AND RECOMMENDATIONS

12. What improvements would you recommend to enhance digital learning in your university?

_____
_____
_____

13. Are you contented with digital learning in your university?

☐ Very satisfied ☐Satisfied ☐Neutral ☐Dissatisfied ☐Very dissatisfied