CONTRIBUTION OF DIGITAL VIDEOS IN IMPROVING BASIC SKILLS OF LOWER PRIMARY SCHOOLS PUPILS IN DODOMA CITY, TANZANIA

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A THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN EDUCATION (PhD)

DEPARTMENT OF CURRICULUM AND INSTRUCTION

OF THE OPEN UNIVERSITY OF TANZANIA

2025

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by The Open University of Tanzania a thesis titled, "*Contribution of digital videos in improving basic skills of lower primary pupils in Dodoma city, Tanzania*" in fulfillment of the requirements for the award of a degree of Doctor of Philosophy in Education of the Open University of Tanzania.

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DECLARATION

I, **Ambwene Nazarius Kilungeja,** declare that this dissertation work is presented as original, and it has not been presented or submitted to any other institution or university. All references or resources to other people's work have been appropriately cited. It is for this reason I declare this to be originally mine. It is hereby presented in fulfilment of the requirement of the Degree of Doctor of Philosophy (PhD).

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Signature

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Date

DEDICATION

I dedicate this dissertation to my esteemed spouse, Martha Eliakimu Lyimo, and my children, Abigail, Ebenezer, and Eliezer, whose consistent support and motivation have been invaluable during the entire duration of this endeavor.

ACKNOWLEDGMENTS

"To begin with, “I want to express my gratitude to God for the grace and mercy that aided me in reaching this significant milestone in my educational journey. Thank you, God, for your unwavering presence throughout this PhD journey. I would like to thank my PhD supervisors, Dr. Theresia Julius Shavega and Dr. Janeth Kigobe, for the good job they’ve done for me for adding value to my educational status.

Dr. Shavega, I want to express my gratitude for your invaluable presence in my life, serving as a supervisor and a mentor who has consistently supported me through successes and failures. You always motivated me to continue working, even when it wasn't going well. You also valued my feelings, especially at the point of disappointment, and you gave me all the confidence and conviction in my abilities. At my novice stage, I could not organize and make sense of various research ideas. Still, you trained me to make my research work look presentable internationally as a student and human being. I could sometimes annoy you by repeating similar mistakes contrary to what you instructed me to do, but you never gave up on me. Thank you so much for your kindness, forgiveness, and loving heart as a teacher and a mother. May the Almighty God bless you and give you extraordinary favour in your life.

Dear Dr. Janeth, I want to express my deep gratitude for your steadfast commitment to me as a teacher and a friend. Your exceptional guidance and support throughout my PhD work have been invaluable. Despite your busy schedule, you never hesitated to listen and offer assistance to the best of your ability. You consistently dedicated quality time to helping me, and I am incredibly thankful for that. Every moment

spent with you has profoundly impacted my PhD journey, and I hold each one in high regard. Your insightful feedback has consistently motivated me to work diligently and independently. Despite my mistakes early in my academic career, you never disrespected me. Instead, you corrected me with admiration and dignity, inspiring me to strive for improvement with each feedback you provided. I appreciate your unwavering support for my success and your role in bolstering my confidence. Your guidance as a supervisor and your friendship have been truly exceptional. I wish you all the best, and may your heart's desires be fulfilled. Warm regards to you Dr. Janeth,

I also want to give exceptional thanks to Dr. Msoroka and Dr. Manyengo from the Open University of Tanzania Dodoma for the academic support you gave me. You were ready to read my work and give me very constructive comments despite your tight programs. Your support has helped me to polish my PhD work and make it much better. Moreover, I would like to extend special thanks to Dr. Sokile from the Oxford Policy Management organization for mentoring me in the early stages of myresearch."

I also thank so much Mr. Mwankusye Mpeli from the Open University of Tanzania Iringa for such a loving heart. You're the person I could share my cry whenever things seemed to go in the opposite direction. God used you to restore my appetite and make sure I continue with my journey. Also I want to offer my profound gratitude to Mr. and Mrs. Philip Chiwanga who gave me incomparable support when I shifted from Iringa to Dodoma to pursue my PhD. I want to thank all pupils and teachers from the selected public primary schools in Dodoma for the hands of

cooperation you gave me.

Thank you so much My Daddy and my Mom Mr and Mrs. Nazarius Kilungeja, thank you very much for your prayers, encouragement and financial support you gave me during the hard times. My Daddy, you have been my role model, specifically in pursuing determination, as you asked me not to give up until I get to my destiny. May God protect you and give you happier days of life. Mom, despite the suffering of attending the dialysis clinic every day, you never stopped encouraging and praying for me. I know how tough your life is, but you never pressured on me requesting assured me to request support because you knew that I was investing in academics for the future benefit. Thank you so much May the Almighty God give you more days of life.

My Uncle and my Aunt Mr and Mrs. Clement Sanga have been very unique people in my Journey. Your house has been my home all the days of school programs in Dar es Salaam. You never got tired of giving me food, accommodation, and financial support whenever I was in need. Apart from that you used to spend your time inspiring me to work hard. Clement Sanga you're such a brilliant man who I always appreciate. God Bless you. To my siblings Nicodemus, Adolph, Happiness, Elizabeth Grentina and Grace. You made me feel exceptional and respected for what I'm doing. Thank you very much my sister Happy for insisting that I open my heart and be ready to learn from my supervisors, this made me humbler. Special thanks to my cousins Eric, Kepson, and Ashery; you guys kept me going during the difficult moments in my life. I love you guys so much and this should be a victory for all of you.

Last but not least is my lovely wife, Martha Eliakimu Lyimo, and my children, Ebenezer, Abigail, and Eliezer.I real appreciate you for the sacrifice you made during my PhD. There were times when I had to stay away from home for several days, leaving you behind with the children, but you never complained or pressured me to stop studying. You cooked food for me and provided all the necessary support to make my school life comfortable. Throughout all the years of my study, you absorbed my stress and tried to create a good atmosphere for me. Thank you for your prayers; I know many times you fasted and prayed for me. I truly appreciate your love, care, kindness, and encouragement. May God bless you. To my children, I know what it takes to have a busy father. There were times you wished to be with me but I was absent, working to make sure my PhD work was done. Thank you so much for your sacrifice.

ABSTRACT

This study examined the contribution of digital videos in improving basic skills (reading, writing, and arithmetic skills) of lower primary pupils in Dodoma City, Tanzania.A mixed-methods approach was adopted, employing a sequential explanatory design, with quantitative data collection preceding qualitative analysis. Data was gathered through questionnaires from 60 standards one and two teachers selected via stratified sampling. Additionally, 160 public primary school pupils were chosen through convenience sampling based on their access to instructional videos. A standardized test assessed the pupils' progress. As the study was interventional, pupils were divided into control and experimental groups based on their lower performance in reading, writing, and arithmetic, with 80 pupils in each group. Guided by the Cognitive Theory of Multimedia Learning, data analysis employed correlation, linear regression, univariate, and multivariate general linear models. Results showed a statistically significant relationship between video-based digital media and improved skills in reading (basic sounds, word pronunciation), writing (spelling), and arithmetic (number identification, addition, subtraction). Pupils exposed to videos achieved higher test scores than those who did not, underscoring its positive impact. The study recommends that policymakers, curriculum developers, teachers, and stakeholders integrate digital videos into primary education to enhance reading, writing, and arithmetic skills among lower primary pupils in Tanzania.

Keywords: *Digital videos, Basic skills, Lower primary, Improvement.*

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LIST OF ABBREVIATIONS AND ACRONYMS

ANOVA	Analysis of Variance
D. E-books	Electronic books
D.V	Digital videos
ECDE	Early Childhood Education
EQUIP	Education Quality Improvement Program
ESDP	Education sector development program
GLM	General Linear Model
ICT	Information Communication Technology
LANES	Literacy and Numeracy Education Support Program
M	Digital media
MOEVT	Ministry of Education and Vocational Training
MPLs	Minimum proficiency levels
OECD	Organization for Economic Cooperation and Development
PEDP	Primary Education Development Program
PERP	Primary Education Reform Project
PISA	Program for International Student Assessment
SPSS	Statistical Package for Social Science

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE PROBLEM

1.1 Overview

This study explores the contribution of Digital videos in improving reading, writing, and arithmetic of lower primary pupils in Dodoma City, Tanzania. This chapter covers the background to the study, statement of the problem, Research objectives, Research Questions, Significance of the study, limitations, delimitation of the study, and Operational definition of terms.

1.2 Background of the Problem

Acquiring Basic skills such as reading, writing, and arithmetic should be considered a fundamental entitlement for all individuals (Derby, 2016). However, a persistent issue affecting many societies today, especially in developing countries, is the ongoing problem of acquiring basic skills (UNESCO, 2017). The enduring prevalence of illiteracy has led to a significant number of individuals globally being unable to exercise their fundamental human rights, thereby limiting their economic and political opportunities (Kabay, 2021).

Obtaining foundational basic skills, such as reading (basic sounds, word pronunciation), Writing skills(spelling), and arithmetic skills, such as number identification, simple addition, and subtraction, has been a longstanding challenge for lower primary pupils worldwide (UNESCO, 2017). According to the World Literacy Foundation (2015), over 796 million pupils face this difficulty. UNESCO (2017) reported that more than 617 million lower primary pupils worldwide are not reaching minimum proficiency levels (MPLs) in reading, writing, and arithmetic.

Sub-Saharan Africa has the highest percentage of pupils struggling to acquire these skills, with 89% of the pupil population affected, compared to 80% in Central Asia and Southern Asia and 64% in Western Asia and Northern Africa (UNESCO, 2017).

Research indicates that 27% of the global illiterate population resides in sub-Saharan Africa, with 17 countries reporting literacy rates below 50% (UNESCO, 2017). In Tanzania, investigations conducted by Uwezo (2019) and Tusome Pamoja (2018) confirmed the existence of similar challenges of lower primary pupils. Kitta (2004) asserted that the challenges in the education sector emerged following the implementation of the cost-sharing policy in the mid-1980s. Notably, these difficulties persisted even after the introduction of free primary education through the Primary Education Development Program (PEDP) in 2005 (MOEVT, 2011).

A report by Uwezo (2019) indicated that only fifty percent of pupils in Standard Three were able to read a Standard Two storybook in Kiswahili, while only twenty percent could read a Standard Two storybook in English. Additionally, only thirty percent of pupils demonstrated the ability to perform Standard Two-level mathematics. Nyirenda (2014) conducted a study involving 2,214 second-grade pupils, revealing that 98 percent of the participants were unable to read, write, or count at the expected level for this stage of education.

Furthermore, Uwezo (2019) indicated that 50 per cent of seventh-grade pupils could not read English textbooks intended for second graders, while 24 per cent were unable to read Kiswahili textbooks at the same level, and 56 per cent could not accurately solve arithmetic problems designed for second-grade students. They also

conducted research in the central regions of Tanzania, where they found that around three out of every ten pupils who completed standard seven in 2017 lacked basic reading, writing, and arithmetic skills. This indicated that pupils did not acquire these basic skills during their lower primary education.

Hennessy, Vignoles, Mwanahanja & Tilya (2020), and Watson (2021) reported that only 50% of students were able to answer arithmetic items about number identification, addition, and subtraction correctly during the Primary School Leaving Examination (PSLE) from 2010 to 2017, as illustrated in Table 1. This statistic underscores the persistent challenges associated with acquiring reading, writing, and arithmetic skills in Tanzania. To address these difficulties, researchers have identified several underlying causes, including a shortage of qualified teachers, an unfavourable teacher-student ratio, insufficient funding, inadequate facilities, a scarcity of educational materials, and suboptimal learning environments (Mabagala and Shukia, 2019).

To address the challenges within the education sector, the Tanzanian Government has initiated several collaborations with development partners to implement various strategic initiatives. Among these efforts is the Primary Education Reform Project (PERP), which is designed to enhance teacher training methodologies (UNESCO/UNICEF, 2014). Another significant initiative is the Education Quality Improvement Program (Equip), which aims to improve learning outcomes in primary schools by revising the curriculum for grades one and two (Equip-t, 2015 & MOEVT, 2014).

Furthermore, the Global Partnership for Education Programme, specifically the Literacy and Numeracy Education Support Programme (Lanes), was established as a three-year initiative to provide in-service training for teachers instructing grades one and two, thereby enhancing their abilities to teach reading, writing, and arithmetic skills effectively. In addition, in partnership with USAID, the Government launched the Tusome Pamoja Project, which focuses on elevating the quality of education for lower primary pupils by developing new teaching materials for students in grades one and two and providing training for teachers and school leaders in effective pedagogical strategies (USAID, 2018).

Further efforts have been made to enhance teaching and learning outcomes in primary education by introducing ICT policy, distributing ICT facilities like computers and laptops, and emphasizing ICT training programs to pre-service and in-service teachers in primary schools (URT 2007). The 2014 Education and Training Policy also promotes the use of ICT in teaching and learning by emphasizing that education can be delivered much more efficiently if ICT and human resources with requisite skills are effectively utilized (Government of United Republic of Tanzania 2014).

The identified challenges in the effective implementation of Information and Communication Technology (ICT) in education encompass insufficient application of ICT in teaching and learning processes, a scarcity of qualified human resources capable of delivering distance education, and a limited availability of ICT equipment that adheres to global standards and advancements in science and technology (Manyengo, 2021). This situation highlights the ineffectiveness of digital videos

utilization among primary school pupils. In response to these challenges, the Ministry of Education, along with the Global e-Schools and Communities Initiative, established the Framework for ICT Use in Teacher Professional Development in Tanzania in 2009.

This framework was designed to facilitate the integration of ICT into the teacher education system by leveraging the existing ICT infrastructure in government teacher training colleges (Manyengo, 2021). Despite numerous initiatives to integrate Information and Communication Technology (ICT) into education, there has been a notable lack of emphasis on utilizing digital media such as audio, video, images, and games—to enhance reading,writing and arithmetic skills among lower primary students in Tanzania (Kafyulilo, 2015). Research by Ghavifekr, Arthirach and Rosdy (2015), as well as Murith and Yoo (2021), indicates that the use of videos in reading, writing, and arithmetic can significantly improve students' reasoning and judgment abilities, thereby strengthening their foundational skills.

Furthermore, Rosen and Back-Hill (2012) observed that students who utilized videos for reading, writing and arithmetic tasks tended to achieve better outcomes compared to their peers who did not engage with video, in the development of these core competencies. Watson (2021) from Tanzania has posited that the incorporation of cartoons on television as a pedagogical tool in mathematics education facilitates students' ability to associate visual images with textual information. This approach enhances critical thinking skills and equips students to derive immediate solutions to mathematical problems. Despite substantial evidence provided by various scholars regarding the positive impact of using digital videos, the effectiveness of video in

improving the reading, writing, and arithmetic skills of lower primary students remains under explored in Tanzania. Therefore, this study aims to explore the contributions of digital videos in improving the reading, writing, and arithmetic skills of lower primary pupils in Dodoma City, Tanzania.

Table 1.1: General Performance of Mathematics in PSLE from 2010-2017

Year	No. of pupils sat for exam	Pass A-C grade Percentage (%)
2010	894665	221013	24.7
2011	973512	383221	39.36
2012	864928	162078	18.74
2013	848690	241741	28.62
2014	791869	297411	37.56
2015	763493	378502	49.58
2016	789166	367866	46.61
2017	909865	49227	54.1

Source: Necta

1.3 Statement of the Problem

The problem of in competency in reading, writing, and arithmetic skills of lower primary pupils in Tanzania has persisted for several years. In response, the government, in collaboration with other stakeholders, introduced the programs which aimed to provide training to teachers and support pupils with learning material like textbooks and computers to improve pupils' basic skills (MOEVT 2014; USAID, 2018).After the programs, the problem was still existing as it was indicated that 50% of standard seven pupils could yet not read standard two English textbooks, 24% could not read standard two Kiswahili textbooks, and 56% could not compute standard two arithmetic problems. Despite the initiatives and advertisement of ICT use in education, little is known about the contribution of digital videos in improving reading, writing, and arithmetic skills of lower primary school pupils of Dodoma

City, Tanzania. Therefore, this study examined the contributions of digital videos in improving reading, writing, and arithmetic skills of lower primary school pupils in Dodoma City, Tanzania.

1.4 Objectives

1.4.1 General Objective

The purpose of this study was to examine the contribution of digital videos in improving reading, writing, and arithmetic skills of lower primary school pupils in Dodoma City, Tanzania

1.4.2 Specific Objective

i. To examine teachers', use of digital videos in facilitating basic skills
ii. To assess the influence of digital videos accessibility on teachers' use in facilitating basic skills
iii. To assess the influence of teachers' perception on digital videos and their use in facilitating basic skills
iv. To evaluate the effect of digital videos on improving basic skills

1.5 Research Questions

The study attempted to answer the following questions:

i. To what extent teachers use digital videos to facilitate basic skills
ii. What influence does digital video accessibility have on teachers' use of digital videos in facilitating basic skills?
iii. How do teachers' perceptions of digital videos influence their use in facilitating basic skills?

iv. What is the effect of digital videos in improving basic skills?

1.6 Significance of the Study

By documenting the positive effect of digital videos on basic skills in Standard One and Two classrooms, this research equips Tanzanian ICT and education policymakers with empirical evidence to support the integration of digital videos learning into national curricula and instructional standards. The study enhances teacher awareness and practical skills in digital video pedagogy. As a result, educators are better positioned to incorporate digital videos into daily lessons, thereby improving pupils' engagement and performance in reading, writing, and arithmetic. Targeted at lower primary school pupils in Dodoma City, Tanzania, this investigation addresses a significant deficit in context-specific research on digital video-aided pedagogy. Consequently, it enriches the academic literature and provides a strong foundation for future experimental or longitudinal studies on digital video interventions in similar educational settings.

1.7 Delimitation of the Study

It was proposed that this study be conducted in Dodoma, Tanzania. The study involved a sample population of 160 pupils and 60 teachers from standard one and two, with the sample size determined based on minimum academic research requirements. The study was delimited to four objectives: To examine teachers', use of digital videos in facilitating basic skills, to assess the influence of digital videos' accessibility on teachers' use in facilitating basic skills, to assess the influence of teachers' perception on digital videos and their use in facilitating basic skills and arithmetic skills of lower primary pupils. To evaluate the effectiveness of digital

videos on improving basic skills

1.8 Limitations of the Study

The internal validity of the study was limited by teachers' inadequate skills in using digital video technology and insufficient availability of digital videos. This resulted to inconsistent implementation of digital videos across classrooms, which ultimately affected the outcomes. The lack of systematic access to these tools introduced variations in intervention quantity and quality, leading to measurement errors that undermined the study's methodological integrity.

Furthermore, the high pupil-to-teacher ratio reduced the external validity of the intervention; overcrowded classrooms hampered individual attention and complicated the management of digital video-based instruction. As a result, the combination of inadequate teacher preparation, resource shortages, and large class sizes restricted the generalizability of the findings. Future research should aim to address these challenges by implementing structured teacher training, ensuring that adequate equipment is available in every classroom, and optimizing class sizes to improve both the reliability and applicability of the results.

1.9 Operational Definition of Terms

1.9.1 Contribution

A part played by a person or thing in bringing about a result or helping something to advance (Oxford Dictionary,2024). In this study, the contribution involves the effect of videos in improving reading, writing and arithmetic skills.

1.9.2 Digital Videos

Digital videos referred to as any information transmitted through electronic devices on a screen or audio in the form of digital images, video games or digital sounds (Cambridge Dictionary, 2021). In this study, digital videos involved electronic information in the form of visual or audio visual.

1.9.3 Improve

Cambridge Dictionary (2021) conceptualizes the word improve as cultivating the quality, amount, or strength of something. In this study improving basic skills means refining the reading, writing, and arithmetic skills.

1.9.4 Basic Skills

Basic are foundational skills in education (Collins Dictionary, 2014). In this study, the basic skills involve literacy and numeracy skills like reading, writing, and arithmetic

1.9.5 Lower Primary

In this context, the lower primary school pupils involves Grade One and Grade Two.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter provides explanations on related theories, different empirical literature based on objectives, the knowledge gap, and ICT policy. It focuses on the use of digital videos in education in Tanzania. The chapter starts by presenting a theoretical Framework, empirical reviews, different works of literature based on Objectives, Tanzania ICT policy review, and conceptual framework. The theory that guides the study is the Cognitive Theory of Multimedia Learning.

2.2 Theoretical Framework

2.2.1 Cognitive Theory of Multimedia Learning

A cognitive theory of multimedia learning (CTML) posits that effective information sharing occurs through multiple channels, including text, graphs, interactive games, sound, video, and images. This multimodal approach enhances the learning process by engaging different cognitive capacities (Mayer, 2003). It consists of three major components: Dual channels, Limited capacity, and Active processing. The Dual Channels theory posits that the brain processes visual and verbal information separately (Austin, 2009; Mayer & Moreno, 2003). The principle of limited capacity suggests that the brain can only manage a finite amount of information at any given time (Mayer & Moreno, 2003). Active processing highlights that deeper learning takes place when learners effectively process, select, organize, and integrate the presented verbal and visual information with their existing knowledge (Mayer, 2008).

The "multimedia principle" asserts that individuals learn significantly more when words are paired with relevant images than when they rely on text alone (Mayer, 2003). This principle highlights the undeniable advantages of integrating visual elements with verbal information, as this combination captivates attention and enhances comprehension. To fully appreciate the power of multimedia learning, one must explore the mechanisms by which the brain efficiently processes and synthesizes information, underscoring the effectiveness of this dynamic approach.

Mayer suggests that the brain processes information through multiple channels, depending on its presentation. Visual information, such as pictures, videos, charts, and printed words, is processed in the visual channel, while auditory information, including spoken words and non-verbal sounds, is handled separately. When learning, new material is initially stored in sensory memory. Then, it moves to working memory, where the learner can work with the information in separate channels. Relevant images and words are processed and organized into models to help understand and remember the information. For the text and images to be stored in long-term memory, the learner must process and integrate written text with visualizations (Schmidt-Weigand, Kohnert & Glowalla, 2010).

Finally, the learner integrates the visual and auditory models with their prior knowledge and experiences. The new knowledge can move into long-term memory once all the material has been combined functionally. Multimedia instruction significantly enhances student learning by engaging individuals through the integration of textual content, images, and videos (Clark & Salomon, 1986). This instructional approach accommodates diverse learning styles, including visual and

verbal formats (Mayer, 2003), fosters profound understanding, and stimulates multiple senses simultaneously, thereby increasing both engagement and retention. Additionally, multimedia presentations facilitate interactivity within educational contexts, particularly in computer-based instruction, such as Computer Assisted Language Learning (CALL) (Reeve, 1998).

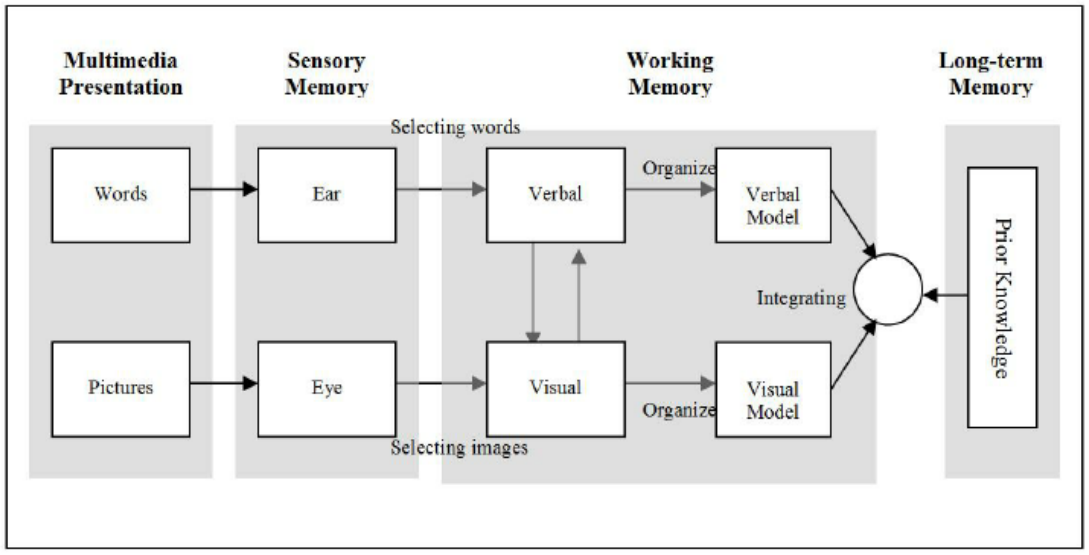

Figure 2.1: Framework for CTML
Source: Mayer, (2001).
Note: *Active processes of selecting, organizing, and integrating information that comes from words and pictures into the brain and is in a position to give a correct interpretation.*

2.2.2 Relevance of the Theory to the Study Objectives

Teachers' use of digital media

According to Mayer (2003), there are three major components of CTML: dual channels, limited capacity, and active processing. Dual channels explain how the brain processes visual and verbal material separately (Austin, 2009; Mayer & Moreno, 2003), Limited capacity describes the limited capacity of the brain to process information (Mayer & Moreno, 2003), and Active processing explains the cognitive ability of a learner to process, select, organize, and integrate the

information (verbal and visual) being presented with prior knowledge (Mayer, 2008). From the CTML point of view, it should be noted that for effective teaching and learning to take place, teachers should understand that it is important to use digital media by considering the ability of learners and the capacity of information pupils can afford to learn at a specific period. It is also important to give priority to the use of verbal and visual channels collectively when teaching pupils rather than single channels alone. This will give learners a wide scope of understanding of the concepts.

Accessibility of digital media

The CTML points out the significance of digital devices like computer-based instruction devices in learning. It confirms that the presence of digital devices promotes the use of videos, digital games, digital pictures and audio, which stimulate multiple senses simultaneously, thus making learning more attentive and effective. Therefore, the availability of digital devices, electricity, and internet connectivity for lower primary pupils is crucial in primary school for learning to be more effective.

Teachers' perception of digital media

Mayer's "multimedia principle" states that people learn more deeply from words integrated with pictures than from words alone (Mayer, 2003). The statement points out the importance of digital media and cultivates a positive attitude towards using audio, video, and pictures in teaching and learning. If teachers are built with a positive attitude towards digital media, they can easily integrate audio, video, and pictures in the classroom, thus promoting deep learning. Therefore, the theory provides a call for rethinking about equipping teachers with digital skills and supporting them with digital devices to build a positive attitude towards digital

media for its effective use.

Effect of digital media

The theory asserts that, for learning to bring positive effect, digital media is essential because text and images help learned information to be stored in long-term memory (Schmidt-Weigand, Kohnert, & Glowalla, 2010). Therefore, using audio, video, games, and pictures among pupils supports their ability to grasp and retain various concepts for a long time, thus developing their reading, writing, and arithmetic skills.

Strength and weakness of the theory

The Cognitive Theory of Multimedia Learning (CTML) has displayed a significant contribution of digital media to the cognitive development of a leaner. The theory has shown how digital media can facilitate learners' ability to conceptualize new knowledge found in the pictures, videos, graphs and sounds thus being able to store in a long term memory. However, the theory has not indicated on the relationship between the use of digital media and how the digital media can improve the attitude and motor skills.

The application of the Cognitive Theory of Multimedia Learning (CTML) in Tanzanian Context

The Theory addresses the significant contribution of digital media in the learning context. Since the use of videos in facilitating reading, writing and arithmetic skills is significant, it can similarly have positive impact in improving reading, writing and arithmetic skills of lower primary pupils in Dodoma City, Tanzania. In Tanzania, videos are not well utilized in teaching lower primary pupils due to the scarcity of

human resources capable to use digital media in teaching lower primary, and limited supply of ICT equipment that can meet global standards and developments in science and technology (Manyengo 2021).Therefore, the application of the theory could support improvement of basic skills in Tanzania although could be more effective when teachers are well trained and supplied with digital facilities like projectors, tablets, computers or smart televisions.

2.3 ICT Policy for Basic Education in Tanzania

The ICT Policy for Basic Education (2007) is a set of guidelines that is desired to position Tanzania at the universal level for pre-primary, primary, secondary, and vocational education. This article delves into the role played by ICT in the education sector, particularly at the primary level. It brings out the objectives, issues, and challenges in basic education that have been done so far in Tanzania. The Ministry of Education and Vocational Training (MOEVT) believes that using ICT in teaching and learning helps to achieve educational and national development objectives effectively.

One of this ICT policy's key objectives is to promote ICT integration in the education sector. From the evaluation point of view, the objectives of the ICT policy for Basic Education in Tanzania point out the contributions of ICT in education, however, the policy has not indicated the contribution of ICT in improving reading, writing and arithmetic skills in lower primary pupils. This confirms the necessity of this study in the reformation of the ICT policy to address the importance of digital media (videos) in improving reading, writing, and arithmetic skills of lower primary pupils in Tanzania.

2.4 Empirical Literature Review

The empirical literature for this study focused on the four objectives, which include teachers' use of digital media, accessibility of digital media, Teachers' perception of digital media, and the effects of using digital media in reading, writing, and arithmetic. The works of literature aimed to show the research conducted in the empirical world about the objectives of this study so that a knowledge gap can be established.

2.4.1 Teachers' Use of Digital Videos in Primary Schools

In this objective, the researcher sought to demonstrate the extent to which teachers use digital video to improve lower primary pupils' reading, writing, and arithmetic skills. Ignoring the use videos among primary pupils between and within classrooms remains a huge challenge in developing countries (UNESCO, UNICEF, AND WORLD BANK, 2021). A report shows that only 25 per cent of low-income countries and 96 per cent of high-income countries use digital media in classrooms. For instance, about 218 Countries in the world are said to be using digital media in learning; among them are countries from the Organisation for Economic Co-operation and Development (OECD), which invested in digital learning systems, digital learning resources, and teachers' digital learning pedagogues for more than two decades, through teacher training in the use of digital videos including digital videos (UNESCO, UNICEF AND WORLD BANK, 2021).

Using digital videos to lower primary pupils improves sound identification efficacy in vocabulary, pronunciation, word formation, tracing letters or forming words and memory capacity, thus opening an opportunity for quick grasping of reading,

writing, and arithmetic skills amongst pupils (Goldwyn, 2014). Various Scholars have explored the extent to which digital video is used worldwide. Vandelinde and Braak (2011) conducted a comprehensive study on the use of digital video curricula by primary school teachers in Belgium. Their sample included 471 teachers from grades one to six, and they employed both regression and descriptive analyses to interpret the data.

The study revealed that approximately 59.9% of teachers incorporated digital videos into their instruction. Based on these findings, the authors recommended that government authorities to invest in building the expertise, vision, and policy framework required to support the integration of digital media in primary education. Their methodological approach, particularly the combination of regression and descriptive analysis, directly informed the design of my study. However, my research extends beyond their work by focusing exclusively on digital video usage in the lower primary grades (one and two), whereas Vandelinde and Braak examined digital media use across all primary grades.

Tezci (2011) conducted a large-scale study of 1,540 Turkish primary school teachers to examine their frequency of digital video use in instruction, employing a one-way ANOVA for data analysis. The findings revealed that while a majority (62.4%) used digital videos for 1 to 3 hours per week, a smaller proportion reported higher usage levels 18.8% for 4 to 7 hours and only 9.9% for eight or more hours indicating that consistent, regular integration of digital tools remained limited (Tezci, 2011). Drawing on these results, Tezci recommended that government-led professional development efforts be prioritized to raise teachers' awareness of the pedagogical

benefits of regular digital video use. Our current study aligns with Tezci's focus on primary education but advances the analytical framework by applying correlation, regression, and multivariate general linear modeling to more comprehensively assess factors predicting digital videos adoption. This deeper analysis allows us to build on Tezci's foundational work by identifying not only usage patterns but also the predictors and interrelations that can inform targeted interventions and training programs.

Hutchison, Beschorner, and Crawford (2012) conducted a quantitative investigation in the United States involving 23 fourth-grade classrooms, utilizing standardized assessments to evaluate the impact of digital videos on reading and writing and arithmetic. Their results indicated that most teachers integrated digital videos into literacy instruction, noting that these tools facilitated more rapid acquisition of phonemic awareness, letter recognition, and numerical skills compared to traditional methods (Hutchison et al., 2012). This study mirrors the current research in its interventional design; however, it differs in educational level, focusing on fourth-grade students, whereas the present study is centred on lower primary learners. Thus, while both studies share methodological approaches and objectives enhancing literacy outcomes through digital media, their findings apply to different stages of primary education, underscoring the need for age-specific insights into technology's pedagogical efficacy.

Ramadhan, Sukma, and Indriyani (2019) explored how 112 middle-school language teachers in West Sumatra, Indonesia, used digital videos through surveys and interviews, analyzing the data with descriptive statistics. They discovered that most

teachers used only a narrow range of digital devices, lacked policies, infrastructure, and competencies, and primarily relied on textbooks rather than creative digital content. The authors recommended that schools invest in modern digital tools and provide training for teachers to build their capacity in using these technologies. Although Ramadhan et al.'s study and the current research both use questionnaires and interviews, they differ in focus: while their work examined language teachers in middle school, the current study centers on lower-primary teachers across basic skills subjects. By extending their approach to a younger age group, this study revealed whether similar challenges and needs exist earlier in the education system.

Varelie, Calderon, and Margaret (2019) conducted a study in the USA to assess the value of using digital videos in the classroom. They gathered data through questionnaires and analyzed it using descriptive statistics. Their results showed that at least 80% of teachers reported using digital videos in their teaching. Based on these findings, Varelie et al. (2019) recommended that frequent training is essential to keep teachers aware of the importance of digital videos in classroom instruction. Although their study offers valuable insight into classroom digital video use, it differs from my own research, which is located in Tanzania.

Gray and Lewis (2021) used questionnaires to collect data and descriptive statistics for data analysis. Gray and Lewis (2021) found that over 70% of schools agreed that teachers used digital media for class activities in reading, writing, and arithmetic. Gray and Lewis's (2021) study was important to this study because it was conducted to a public school. However, Grey and Lewis (2021) differed from my study in analysis tool, where their study used descriptive analysis, while this study used

descriptive, correlation, regression and Multivariate General Linear Model.

Thresha (2022) from India conducted a study on teachers' views on using digital videos in the classroom context of Kailali District. Thresha (2022) used questionnaires to collect data from 10 teachers and analysed it using descriptive statistical methods. Thresha (2022) found that, despite most teachers being equipped with electronic gadgets such as laptops and desktop computers with reliable internet access, both in school and at home, more than 50% of them never used digital videos in the classroom context. The reason was that they lacked sufficient knowledge about web-based teaching tools and did not receive any training related to the use of digital media in the classroom context. Thresha (2022) recommended that teachers receive more training to acquire the necessary skills and knowledge for using modern technology tools to effectively incorporate digital videos into the classroom. Thresha's (2022) study was important in this study because it highlighted similar things to the current study, like the tools for data collection. However, the sample size used by Thresha (2022) was too small compared to this study.

Murithi and Yoo (2021) carried out an experimental study in Kenya involving 351 primary-school teachers to examine how digital videos were used in implementing a competency-based curriculum. They collected data via a questionnaire and analysed it using descriptive statistics along with a two-way ANOVA. Their findings showed that approximately 44.7% of respondents never used digital videos in teaching. The authors attributed this lack of integration to limited training and inadequate access to digital tools, and thus recommended enhanced professional development and improved accessibility of digital videos for pupils. Murithi and Yoo's (2021) study is

particularly relevant to the present research due to its experimental design. However, it differs from the current study in its analytic approach: Murithi and Yoo employed ANOVA to explore group differences, whereas this study applies descriptive statistics, correlation, regression, and multivariate general linear model techniques

Koomar, et al., (2022), in collaboration with HakiElimu, conducted a survey of 774 government school teachers in Tanzania to explore their experiences using digital videos for teaching, learning, and professional development. Using questionnaires between 2020 and 2021, they found that over 40% of teachers reported never using digital videos in their classrooms. Based on these findings, Koomar et al. (2022) recommended that primary teachers receive targeted training in digital video use. This study is particularly relevant to the present research due to its focus on public schools; however, it differs in its scope, as the current study specifically examines how digital media contributes to learning among lower-primary pupils.

2.4.2 Accessibility of Digital Videos in Primary Schools

In this objective, the researcher aimed to explore how the accessibility of digital videos in primary schools influences the use of digital videos in improving reading, writing and arithmetic skills. Various studies, including global and local, have shown how the accessibility of digital videos influences the use of digital videos in teaching and learning. The Economist Intelligence Unit (2021) study on the accessibility of digital videos among developed countries found that 2.8 million schools, specifically in developing countries, are still without Internet accessibility, which affects the availability of digital audio, digital video, and pictures. A report by (UNICEF (2020) showed that among the pupils and students in the world who have access to digital

video and use it in classrooms, 89% are from high-income countries,59% are from middle-income,19% are from low and 8% are from lower-income countries. Various empirical studies have displayed how accessibility influences teaching and learning.

Kiryakova and Kozhuharova (2024) conducted a study in Bulgaria to evaluate the accessibility of digital video for teaching activities to 92 primary school teachers. The study employed questionnaires as data collection method and analysed by Chi-Square analysis; the findings show that 84.8% of teachers in Bulgaria who had access to digital media used digital videos in teaching. Kiryakova and Kozhuharova (2024) also found that the accessibility of digital videos highly influenced the use of digital videos in teaching and learning. The study by Kiryakova and Kozhuharova (2024) claimed that the government should provide teachers in primary schools with digital videos and internet connectivity to ensure the availability of digital video in primary schools. Kiryakova and Kozhuharova's (2024) study is essential in this study because it explores the accessibility of digital videos among primary school teachers. However, Kiryakova and Kozhuharova's (2024) study differs from this study because it used a Multivariate General Linear Model to analyse data, while they used Chi-Square.

Blackwell, et al., (2014) conducted a study in the USA to determine the impact of digital video accessibility on early childhood educators in teaching reading, writing, and arithmetic. Blackwell et al (2014) collected data from 1234 children educators through questionnaires and analysed using descriptive frequency and chi-square. Blackwell et al., (2014) found a direct correlation between digital videos accessibility and the use of digital videos in the teaching process. Blackwell et al.,

(2014) recommended that the government support teachers with digital video devices and internet connectivity to ensure the availability of digital media to primary school teachers. The study by Blackwell et al., (2014) is significant to this study because it explored the impact of digital media accessibility on the use of digital media among childhood educators. However, this study goes beyond their study because this study was conducted on lower primary teachers and not early childhood teachers.

Li and Takada (2018) conducted a study in Japan to explore the factors affecting teachers' use of digital video in primary school, and they found that the accessibility of digital video was statistically significant in influencing the use of digital media in primary schools. Li et al. (2018) used questionnaires to collect data from 838 primary school teachers in Mongolia. Li et al. (2018) analysed data by multiple linear regression and found that accessibility of digital video influences the use of digital video in teaching, although a lack of digital skills could be a hindering factor. Li et al (2018) suggested the provision of computers, laptops, and internet to teachers to ensure their accessibility to digital video. The study by Li et al. (2018) is important in this study since it was conducted in Primary schools. However, this study goes beyond Li, Yamaguchi, and Takada (2018), because it used the Multivariate General Linear Model for data analysis while their study used multiple linear regression.

Cheng and Weng (2017) conducted a study in Taiwan to identify factors influencing teachers' accessibility to digital video materials in the classroom. Their research involved a sample of 441 teachers across 26 primary schools in a major city in

Taiwan. Data were collected via questionnaires and analysed using descriptive statistics and correlation analysis. Findings indicated that a majority of teachers who had access to digital video resources integrated them into their classroom instruction. Additionally, Cheng and Weng found a significant positive correlation between teachers' access to digital video technology and its actual use in teaching contexts. Based on these results, the authors recommended that government authorities enhance support for digital video in education by providing additional resources and technological infrastructure to schools. Their study is highly relevant to the present investigation, as it employs similar analytical methods; however, our study extends this prior work by drawing on a substantially larger sample, thereby offering greater statistical power and generalizability.

Nkengbeza, Mbuzi, and Chainda (2022) investigated the contribution of digital video use among primary English teachers in the Zambezi Region of Namibia. Their qualitative case-study involved two primary schools in the Katima Circuit, with data collected through classroom observations and semi-structured interviews, and analyzed using thematic analysis (Nkengbeza et al., 2022). The authors found that educators with access to digital video resources were more inclined to integrate these materials into English language instruction.

A major barrier identified was the lack of access to both digital devices and reliable internet connectivity. Consequently, they recommended that government stakeholders should enhance support for media technology infrastructure to increase teachers' adoption of digital videos. This study is particularly relevant because it similarly investigates government-supported schools and the role of digital videos in

teaching. However, it extends beyond Chainda et al.'s (2022) focus in several critical ways. First, rather than restricting the scope to English language teaching, this research examines the effect of digital video on learning outcomes across reading, writing, and arithmetic domains, offering a broader interdisciplinary perspective. Second, while the prior study utilized a small case-study sample of four teachers across two schools, the present study employs a much larger, more diverse sample. This enhanced scope improves the robustness of findings and allows for more generalizable insights into the role of digital video in primary education.

Nawa (2019) investigated how access to technology influences teaching practices among educators in Luampa District, Zambia. Through a questionnaire survey administered to 15 primary and secondary school teachers, descriptive frequency analysis revealed that most participants perceived a positive relationship between technology accessibility and its classroom use. Based on these findings, Nawa (2019) recommended that the government enhance teacher access to digital devices and Internet connectivity to promote integration of technology into teaching and learning. This endorsement of improved technological infrastructure supports the current study's focus on the impact of digital tools on instructional methods.

Although Nawa's sample included both primary and secondary teachers, the current study narrows its scope to only lower primary teachers, offering a more targeted exploration of technology use at the early stages of education. By comparing Nawa's (2019) findings with the present study, it becomes clear that both studies support the conclusion that increased technology access correlates with increased use in educational contexts. This continuity underscores the importance of digital

infrastructure in enhancing teacher engagement with technology. However, by limiting the participant pool to lower primary teachers, the current study refines and extends Nawa's broader analysis, enabling more nuanced insights into how technology is adopted in early primary-grade instruction.

Maeda and Juma (2023) examined challenges influencing the use of digital media by teachers in Dodoma, Tanzania. Using a mixed-methods design combining questionnaires (n = 36 respondents: 12 public teachers, 12 private teachers, six head teachers, and six ICT teachers), interviews, and classroom observations, they analyzed data with descriptive statistics. The authors identified that a primary obstacle was the lack of digital devices and requisite skills among teachers, and recommended that the government provide adequate equipment and training to facilitate digital videos. This study is particularly relevant to the current investigation for two main reasons. First, it was conducted within the same geographical and institutional context (Dodoma City), allowing for meaningful comparisons of findings. Second, both studies employed similar data collection instruments.

However, the current study extends beyond Maeda and Juma's work by focusing specifically on the contribution of digital videos to enhancing reading, writing, and arithmetic skills among lower primary pupils, rather than centering on the barriers to digital media use. Maeda and Juma's (2023) findings align with broader trends in educational technology, where insufficient access to devices and low teacher proficiency are consistently reported as major impediments in sub-Saharan contexts. Concerning the present study, this alignment underscores the importance of contextual readiness before the pedagogical affordances of digital video tools, such

as improving literacy and numeracy, can be fully realized. By focusing on lower primary classrooms, the current research narrows its scope to examine the effectiveness of digital video as an instructional medium, thereby complementing Maeda and Juma's foundational work on accessibility and competence.

Manyengo (2021) explored the effects of digitalisation on the teaching profession across 3,742 public and private primary and secondary schools, as well as eight public technical secondary schools in Tanzania. Employing a desktop literature review, qualitative analysis, and both face-to-face and telephone interviews, the study applied contextual analysis to synthesise findings. It revealed that many teachers were not utilising digital media due to insufficient digital devices, inadequate training in digital skills, poor internet connectivity, and unreliable power supply.

Consequently, Manyengo (2021) urged the government to invest in digital devices and strengthen internet infrastructure to motivate and enable teachers to integrate digital technology effectively. This investigation is especially pertinent to the current study, as it highlights systemic barriers inhibiting digital media use within Tanzania's educational sector. By focusing on nationwide trends affecting teachers' digital compliance, Manyengo offers a broader context for understanding technological adoption in classrooms.

However, the current study diverges by concentrating solely on lower primary settings and examining how digital videos contribute specifically to reading, writing, and arithmetic development among pupils rather than evaluating adoption barriers. These consistent insights reinforce the need for foundational support, such as policy-

driven provision of hardware, connectivity, and teacher training before pedagogical innovations like video integration can be successful. Thus, the current study builds upon this groundwork by investigating not only whether teachers can access digital tools but also what specific educational gains can be achieved when these tools, namely videos, are employed in early primary grades.

2.4.3 Teachers' Perception of Digital Videos

Research highlights that teachers' perceptions of digital videos significantly influence their integration into foundational literacy and numeracy instruction. Goodwyn (2014) found that educators' attitudes toward e-reading devices shaped their classroom use, with the majority welcoming digital tools as a means to engage reluctant or linguistically diverse readers, despite some reservations about traditional books.

Similarly, Dorgan, Agacli, and Celik (2020) surveyed 1,335 primary teachers in Florida using questionnaires and correlation analyses. They reported a clear positive association between educators holding favorable views of digital videos were more likely to use them in teaching (Dorgan et al., 2020). Moreover, their findings revealed that teachers who actively employed digital videos typically displayed more positive perceptions, leading to the authors' suggestion that governmental initiatives should support teacher awareness and training in digital videos. Building on these international findings, my study investigates the Tanzanian context specifically how access to digital videos influences their use in teaching reading, writing, and arithmetic in lower primary schools' pupils. While aligning methodologically with Dorgan, et al. (2020) through the use of surveys and correlation analysis, this

research extends the inquiry by examining the role of digital video accessibility in shaping usage practices in Tanzania.

Gündoğdu (2022) examined the link between pre-service teachers' perceptions of ICT and their readiness to adopt digital game-supported learning (DGSL). The study involved 306 third- and fourth-year pre-service teachers enrolled in Ankara, Turkey. Data were gathered using an adapted Turkish version of the Digital Game Supported Learning (DGSL) Scale and the Synthesis of Qualitative Evidence (SQE) Scale, followed by exploratory and confirmatory factor analyses, descriptive statistics, and linear regression models. Results demonstrated that positive perceptions of ICT strategies in teacher education were significantly associated with more favorable attitudes, higher self-efficacy, and stronger perceptions of DGSL.

Regression analysis further revealed that pre-service teachers' perceptions of DGSL were the strongest predictors of their overall perception of ICT integration. This finding aligns with prior research (e.g., Dorgan et al., 2020; Goodwyn, 2014), which similarly highlighted that positive teacher perceptions are crucial drivers behind the use of digital technologies in educational settings. Gündoğdu (2022) concluded that teacher education programs should intentionally foster positive attitudes towards digital media through targeted training for both pre-service and in-service teachers.

While Gündoğdu's (2022) research focused on enhancing awareness and attitudes toward ICT-based game learning, the present study shifts the focus toward digital videos specifically, it explores how teachers' perceptions of video accessibility influence their integration of digital video content to improve reading, writing, and

arithmetic skills in Tanzanian lower primary school pupils. Although both studies address how digital media perceptions affect usage, this study extends the literature by examining the contribution of digital videos in improving basic skills and a different educational context (Tanzania).

Suryani, Ayu Sari, Rochsantiningsih, and Suharno (2017) explored English teachers' perceptions regarding the integration of digital-based teaching materials in senior high schools in Solo, Indonesia. Using a mixed-methods approach that included questionnaires and interviews, and analyzing the data with an interactive qualitative model, the study aimed to examine teachers' technical readiness, attitudes, obstacles, and overall perceptions of digital media use. Findings revealed that although most teachers expressed a strong desire to effectively integrate digital materials into their instruction, their overall technical readiness fell only slightly above neutral. Consequently, the authors recommended that intensive training is needed to raise awareness and build competence in digital media among English teachers.

This study is particularly relevant to the current research due to its methodological parallels, utilizing both interviews and questionnaires to explore teacher perceptions. However, the scope of Suryani et al. (2017) was limited to senior high school English instruction, whereas the present study focuses on how perceptions of digital video accessibility influence the use of digital videos to enhance reading, writing, and arithmetic skills among lower primary teachers. By targeting a younger demographic and a different digital video this research expands upon Suryani et al.'s framework and contributes new insights into technology adoption in early education settings.

Wanjiku, et al., (2017) investigated perceptions of digital videos among public primary pre-service teachers in Kenya's Rift Valley region. Using a sequential mixed-methods design, the study involved questionnaires, interviews, and structured observations from 232 pre-service teachers and 36 tutors across five teacher training colleges. Quantitative data were analyzed descriptively (frequencies and percentages), while qualitative responses underwent thematic analysis. Findings indicated that teacher trainees and tutors held positive attitudes toward the integration of digital videos in Kiswahili instruction. They reported enhanced student engagement, students "retain knowledge," find learning "easier and fun," and are "motivated to apply technology" However, the authors noted that positive attitudes did not always lead to actual digital video integration in classroom practice.

Consequently, Wanjiku et al. (2017) recommended that institutions like Kenya Institute of Curriculum Development (KICD) should provide digital Kiswahili content (e.g., e-books, DVDs, hyperlinks) and mandate in-service training to encourage tutors to integrate digital video into teaching. While this study shares methodological parallels with the current research such as the use of questionnaires and interviews in a primary education context it differs in substance. Wanjiku et al. (2017) focused on Kiswahili subject instruction among pre-service teachers, whereas the present study centres on how primary school teachers' perceptions of digital video accessibility influence their use to support reading, writing, and arithmetic skills in lower primary classrooms.

Mwalongo (2011) investigated Tanzanian primary school teachers' perceptions of ICT usage for teaching purposes. Employing a mixed-methods design, the study

surveyed 74 teachers via an online questionnaire on Survey Monkey and gathered qualitative reflections from the researcher's blog. Quantitative responses were analysed using descriptive percentages, while qualitative data were subjected to thematic coding via Weft QDA. Findings revealed that access to digital media and teacher competence, enhanced through training, significantly influenced the frequency and mode of ICT use. However, most teachers employed digital tools to reinforce traditional practices rather than transform their pedagogy.

This study demonstrated that awareness and training are pivotal in fostering positive attitudes toward digital videos, a premise underscored by Mwalongo's recommendation for awareness programs, teacher training, and device provision in educational environments. Although Mwalongo's (2011) work holds methodological resonance with the present study given the use of surveys and qualitative analysis, it differs in focus and tools. While Mwalongo examined broad ICT applications, the current research narrows its scope to digital video use specifically, assessing how primary school teachers' perceptions of digital video accessibility influence their use of digital videos to support reading, writing, and arithmetic skills in Tanzanian lower primary schools.

Manjale and Abel (2017) investigated teachers' perceptions of digital video in implementing the primary curriculum across public lower primary schools in Kinondoni District, Tanzania. With a stratified sample of 34 teachers, the study employed questionnaires and correlation analysis to analyse attitudes toward digital media use. The findings revealed that most teachers held positive perceptions regarding the integration of digital devices such as computers, projectors, televisions,

tablets, and laptops into teaching practice. They concluded that providing such devices would further enhance these positive attitudes and support effective curriculum implementation. Manjale and Abel's (2017) work links closely with the current study in its focus on public primary school teachers in Tanzania and the use of questionnaires to examine teacher perceptions. However, the present study extends their research by employing a larger, stratified sample and specifically explores how teachers' perceptions of digital videos' accessibility influence the use of digital videos to enhance reading, writing, and arithmetic skills in lower primary classrooms.

Ndibalema (2014) explored secondary school teachers' attitudes toward using digital media as pedagogical tools in Kondoa District, Tanzania. Employing random sampling, the study surveyed 80 teachers across 10 schools and conducted follow-up interviews. Quantitative data from questionnaires and qualitative insights from interviews were analysed using descriptive statistics and thematic content analysis. Findings indicated that although most teachers held positive attitudes toward digital media for instruction, actual use was limited by low awareness of how to integrate these technologies effectively: Many felt confident in their attitudes but lacked practical familiarity. Ndibalema recommended targeted teacher training to enhance willingness, confidence, motivation, beliefs, and actual digital pedagogy practices in the classroom.

The relevance of Ndibalema's (2014) study to the present research is clear as it examines teacher attitudes regarding digital media use. However, whereas Ndibalema focused on secondary school educators and general digital media, the current study examines lower primary teachers' attitudes specifically toward digital

videos content, and how these perceptions affect their use of digital videos to support reading, writing, and arithmetic instruction.

Abdelrad, et al., (2022) from Pakistan conducted a systematic literature review on teachers' perceptions regarding the use of digital media in teaching and learning practices at all levels of education in a series of five years. Abdelrad et al, (2022) found that teachers who positively perceive technology are used in teaching and learning practices. Abdelrad et al, (2022) further found that when technology is incorporated into teaching, it enhances instructional practices effectively, making the learning process exciting and interactive, and keeping learners motivated. Regarding barriers, the slow speed of the internet, lack of infrastructure, online teaching experience, and training were reported as the main obstacles that hinder teachers from effectively integrating ICT into their teaching practices.

Abdelrad, et al., (2022) suggested that the government should set clear and effective policies to make efficient use of ICT by allocating a sufficient budget and ensuring all necessary facilitation, e.g., ICT infrastructure, tools, software, internet, and labs. Abdelrad, et al, (2022) study are very essential in this study because it investigated how teachers' perception of digital video influenced the use of digital video in Pakistan learning practices, however, the current study was beyond their study because it explored teachers' perception of the use of digital videos in improving reading, writing and arithmetic skills.

2.4.4 Effect of Digital Videos on Basic Skills

In examining the influence of digital videos on basic skills, several empirical studies have highlighted significant benefits for lower-primary pupils. For instance, Hess

(2014) investigated the use of e-readers and e-books among nine- and ten-year-olds in the United States. Employing standardised literacy assessments, Hess (2014) compared student performance between those using digital reading tools and their peers who relied on traditional print materials. Through correlation analysis, the study revealed a positive relationship between digital media use and literacy achievement. Based on these findings, Hess (2014) recommended that teachers receive more targeted training on integrating digital media into the classroom.

While Hess's (2014) study underscores the potential of digital text formats to enhance literacy, the present research extends this inquiry to digital video interventions, assessing their impact not only on reading but also on writing and arithmetic skills. By synthesizing Hess's evidence of improved literacy with the broader application of multimedia tools, this study aims to determine whether video-based instruction can produce similar or greater gains across multiple domains of lower-primary education.

Rosen and Beck-Hill (2012) conducted a U.S.-based study examining the effectiveness of digital video and pictorial media in teaching English, Arts, and Mathematics to children aged six to nine. Using standardized tests, the researchers collected pre- and post-intervention data and applied both correlation and regression analyses to assess learning outcomes. They found that students exposed to the digital media–enhanced curriculum significantly outperformed their peers in the control group on measures of phonemic awareness (reading sounds), letter and simple word recognition, number identification, and basic arithmetic operations (addition).

Additionally, the study demonstrated that the use of digital media positively impacted learning across all three subjects. Rosen and Beck-Hill recommended that educators integrate digital videos into classroom instruction to enhance student comprehension and engagement. While Rosen and Beck-Hill (2012) underscored the value of digital video and images for improving literacy and numeracy in English, Arts, and Mathematics, the current study builds on their work by focusing specifically on the impact of digital videos and excluding Arts to evaluate improvements in reading, writing, and arithmetic. This narrower scope allows for a more targeted investigation into how digital video-based instruction can support those foundational academic skills in lower-primary pupils.

Huang, Huang, and Hwang (2014) conducted a quasi-experimental study in Taiwan, focusing on seven- and eight-year-old primary students using a game-based learning model with embedded diagnostic feedback to improve addition and subtraction skills. In this model, when learners made mistakes, the system identified error types and provided tailored instruction to support mathematical understanding. Participants in the experimental group (game-based model) and two comparison groups underwent pre- and post-testing. Results showed significantly higher post-test achievement for the game-based group ($F = 3.89$, $p < .05$), as well as enhanced self-efficacy and motivation. Although overall anxiety did not differ significantly across all groups, the team reported a modest (~3.5%) reduction in mathematics anxiety for the intervention group.

The authors recommended that educational authorities promote the adoption of diagnostic game-based systems in classrooms for math instruction. While Huang et

al.'s (2014) study emphasizes the efficacy of interactive, game-based tools in enhancing arithmetic performance and reducing anxiety for upper primary students, the current research extends this line of inquiry by exploring the effects of digital video specifically and at lower primary levels on reading, writing, and arithmetic skills. This approach allows for a focused examination of whether digital video-based interventions can yield comparable benefits in basic skills.

Archer and Savage (2014), in a comprehensive meta-analysis of studies involving children aged 5 to 16 in England, investigated the impact of digital media on vocabulary development and reading comprehension. Analyzing data from multiple studies using standardized tests and employing simple linear regression, they found that digital media produced a statistically significant positive effect on both vocabulary growth and comprehension skills. Furthermore, the authors discovered that the effectiveness of digital interventions was markedly enhanced when teachers received targeted training and support, with the average effect size increasing from 0.18 to 0.57 in these contexts. They recommended that educational policymakers ensure teachers are equipped and supported to effectively integrate digital tools and resources into literacy instruction. While Archer and Savage’s findings underscore the significant benefits of digital videos, particularly for vocabulary and comprehension, the present study extends their insights by narrowing the focus to digital video-based interventions for lower-primary learners.

Specifically, this research examines the impact of digital video on foundational reading (phonemic awareness, pronunciation), writing (spelling), and arithmetic (number identification, addition, subtraction). By concentrating on these core

academic domains and leveraging the proven strengths of digital video formats, this study aims to determine whether similar

Lysenko and Abrami (2014) did a study on the impact of digital videos on comprehension ability for elementary pupils aged six to eight years in Canada. Lysenko and Abrami (2014) collected data from 26 teachers in grades one and two by standardised test. Lysenko and Abrami (2014) used a regression analysis tool for data analysis. Lysenko and Abrami (2014) found that there was a significant improvement in comprehension ability among pupils who used digital technology compared to pupils who depended on printed educational books only. Lysenko and Abrami (2014) suggested to the government that, educators should be supported with digital device and training to help them use digital videos in their teaching and learning process. Lysenko and Abrami (2014) study was a very important study because it targeted grade one and two teachers, similar to the current study. However, the current study was beyond Lysenko and Abrami (2014) study because it explored the effect of digital videos in reading, writing and arithmetic skills while their study focused on comprehension ability.

Beschorner and Hutchison (2013) conducted a study in England examining the role of audio and video media in promoting literacy among two- and three-year-old children. Using a test–retest design, they collected baseline and follow-up data and applied regression analysis to explore outcomes. Their findings indicated that digital media features, such as episodic storytelling and memory-based play activities, significantly support early literacy acquisition. Consequently, Beschorner and Hutchison (2013) recommended incorporating digital video resources in early

childhood classrooms to enhance children's understanding and development of literacy skills. Although this research is foundational for the current study demonstrating how audio-video interventions cultivate literacy, it differs in scope; the present research extends beyond literacy to investigate how digital video media influence a broader set of academic domains, including reading, writing, and arithmetic.

Rodrigues and Biagi (2017) investigated how the relationship between students' learning outcomes and the use of digital technologies varies across socioeconomic backgrounds in Cyprus, Malta, Romania, and Scotland. Analyzing data from PISA 2015, the study found that students from low socioeconomic status (SES) backgrounds tend to begin using digital devices later, have slightly less access at home, and use ICT less intensively outside of school. However, the multivariate regression revealed a significant positive association between low-SES students' academic achievement and their use of digital technologies particularly for those with low-intensity usage, though this association did not differ significantly from that of higher-SES peers. The exception was general ICT use outside school, where low-SES students benefited more from increased usage. Additionally, resilient low-SES students were more likely to use ICT at school for educational purposes and at home for both schoolwork and general use. Based on these findings, the authors recommended expanding access to and support for digital materials in schools.

This research is highly relevant because it explores the interplay between digital technology use and learning outcomes among students from different socioeconomic backgrounds. The current study builds on this foundation but extends the focus

beyond overall achievement: rather than examining generalized ICT use, it investigates the specific impact of digital video-based interventions on foundational academic skills reading, writing, and arithmetic among lower primary pupils.

Higgins et al. (2012) conducted a quantitative study in Scotland examining the effects of digital games and audio stimuli on pupils aged 5 to 16 across 40 primary schools. They used standardized tests to collect outcome data from both experimental and control groups, and analyzed the results using correlation and regression methods. The study revealed small but consistent positive associations between the use of digital games/sounds and improved learning outcomes across literacy, numeracy, and science, with an overall effect size approaching the average for educational interventions (0.3–0.4). Higgins et al. concluded that digital tools can enhance attainment, particularly when integrated thoughtfully by teachers. This research underpins the current study, notably with its use of standardized testing to measure impact. However, the present study advances beyond Higgins et al.'s work by incorporating both standardized assessments and questionnaires to evaluate how digital video-based affect reading, writing, and arithmetic skills among lower primary pupils broadening the scope of digital intervention evaluation.

Dartani et al. (2017) conducted a quasi-experimental study at Manyaran Elementary School in Indonesia to investigate whether digital multimedia enhances fourth-grade students' understanding of fractions. Both the experimental group (taught via interactive digital media) and the control group (taught via traditional methods) completed a pretest to establish baseline knowledge, followed by a posttest after instruction. Independent t-tests revealed that students in the multimedia-supported

experimental group outperformed those in the control group; the control group's mean score was 64.32%, indicating that digital video significantly improved students' grasp of fractions by fostering creativity and conceptual understanding. Based on these findings, Dartani et al. recommended integrating digital media into mathematics instruction. This research is highly relevant to the current study, as it demonstrates the efficacy of digital content in improving arithmetic skills among primary pupils. However, while Dartani et al. (2017) focused exclusively on fractions in mathematics, the present study extends this line of inquiry by examining the impact of video-based interventions not only on arithmetic but also on reading and writing skills among lower primary students, thereby offering a broader assessment of digital video media's educational potential.

Hajar and Rahman (2020) conducted a mixed-methods study in Indonesia to examine the effects of audiobooks on reading comprehension among eleventh-grade students at SMA Negeri 2 Buru. A total of 60 students were involved, and data were collected using reading comprehension tests and open-ended questionnaires. Quantitative analysis (paired and independent t-tests via SPSS) revealed a significant mean difference favoring the audiobook group (mean = 68.00 vs. 48.80; $p = .000$), indicating that audiobooks were more effective than traditional methods. Qualitatively, students reported finding audiobooks stimulating, challenging, accessible, and innovative in supporting their reading.

Accordingly, Hajar and Rahman recommended integrating audiobooks into reading instruction in Indonesian classrooms. This study is particularly relevant to the current research due to its use of a mixed-methods design combining standardized

tests with questionnaire data to assess literacy outcomes. However, the present study extends beyond Hajar and Rahman's focus on eleventh-grade reading comprehension by examining how digital video-based media influence not only reading but also writing and arithmetic skills among lower primary students.

Ghavifekr and Rosdy (2015) conducted a quantitative study in Malaysia to assess teachers' perceptions of ICT integration's effectiveness in reading instruction across ten public secondary schools. Using a questionnaire distributed to 101 teachers, the researchers analyzed the data with descriptive and inferential statistics via SPSS, including regression analysis. They found that well-prepared teachers equipped with ICT tools significantly enhanced pupils' reading skills, and that ongoing professional development was a crucial factor in successful ICT implementation. Consequently, the authors recommended that governments and school leaders invest in digital media resources and provide targeted training for educators. This study is important to the current research because it rigorously evaluates the impact of digital videos on reading, employing survey instruments and regression techniques similar to those in the present work. However, while Ghavifekr and Rosdy focused on secondary-level reading improvement in Malaysia, the current study expands geographically and methodologically: it is situated in Tanzania, targets lower primary pupils, and examines the effects of digital video not only on reading but also on writing and arithmetic skills thus providing a broader evaluative framework.

Amosa et al. (2015) conducted a quantitative intervention study across primary schools in South and West Africa to evaluate the effectiveness of digital media compared to traditional expository teaching for basic school pupils. Using a test–

retest design, they administered an initial test to establish a baseline, implemented different teaching methods (digital media vs. conventional), and then conducted a post-test. Independent t-test results indicated that pupils taught with digital videos, including games, songs, and cartoons, achieved significantly higher scores than those in the expository-only group.

Based on these findings, the authors recommended providing teacher training on integrating digital video into classroom instruction. This study is especially relevant to the current research because, like Amosa et al., it employs an intervention design to examine the impact of digital videos on pupil learning. However, it differs in both methodology and scope: while Amosa et al. used independent t-tests to compare pre- and post-intervention performance, the present study applies a multivariate general linear model to assess how digital video media affect reading, writing, and arithmetic skills among lower-primary pupils offering a broader and more statistically nuanced analysis of educational video interventions.

Musyoka, Marima and Mwangi (2018) conducted a study on using digital media in teaching and learning reading skills in the Mavoko sub-county, Machakos County, Kenya. The objective was to determine the effectiveness of digital media utilisation in teaching and learning reading skills. The study adopted a descriptive research design on two sampling techniques: stratified random sampling and purposive sampling. The study targeted head teachers, teachers, and children from public and private from early childhood Education centre. Face-to-face interviews and questionnaires were used as tools for data collection. The data was presented in the form of frequencies, percentages, tables, and charts.

Musyoka et al, (2018) found that the efficacy of the use of digital media in teaching and learning was very significant. The study recommends that all the key stakeholders concerned to be involved in looking for ways of encouraging and enforcing the utilization of digital media in the ECDE centre. The government also needs to put more effort into setting up the ICT infrastructure in ECDE.The study by Musyoka et al, (2018) was very important in this study because it explored on the contribution of digital media in reading skills though my study was beyond Musyoka, et al (2018). After all, this study was conducted in lower primary.

Abrami, Marsh, Wade (2014) conducted a quasi-experimental intervention study in Kenya to assess the impact of digital videos, specifically the ABRACADABRA literacy software on the reading skills of early elementary students. Sixty-six Grade 2 English teachers and their students (180 in the experimental group and 174 in the control group) from six schools were randomly assigned to either condition. After a 13-week intervention, the experimental group achieved significantly greater gains in reading comprehension compared to peers receiving regular instruction this study is pivotal to the current research because it similarly employs a classroom-based digital-media intervention aimed at early learners.

However, the present study expands upon Abrami et al.'s (2014) work both contextually and methodologically by targeting lower-primary students in Tanzania and by assessing the impact of digital video, not only on reading comprehension but also on writing and arithmetic. Instead of focusing solely on reading outcomes, the current study adopts a multivariate general linear model to examine multiple

academic domains, thereby offering a more comprehensive evaluation of digital video's educational potential.

Abobo (2018) conducted a qualitative study in Kisii County, Kenya, to evaluate the influence of technology education on Kiswahili language achievement in primary pupils. Employing interviews, observations, and focus group discussions with teachers and standard-seven learners, data were thematically analyzed. Findings revealed that although many teachers lacked sufficient capacity for ICT integration, digital media significantly enhanced pupils' proficiency in reading, writing, vocabulary, pronunciation, and comprehension.

Consequently, Abobo recommended that teachers receive training and support to effectively incorporate computer-based tools in Kiswahili language instruction. This study is especially pertinent to the current research for several reasons: it examines digital media's effect on language proficiency in a primary-school context; it involves competency-based outcomes (e.g., reading and vocabulary); and it recommends capacity building for educators. Nevertheless, the present study extends beyond Abobo's work in both scope and design. Whereas Abobo focused solely on Kiswahili language acquisition within a qualitative framework, this study adopts a mixed-methods approach integrating standardized tests and questionnaires, and situates its intervention among lower-primary pupils in Tanzania. Moreover, it explores the impact of digital video-based media across multiple academic domains, including reading, writing, and arithmetic, thereby broadening both disciplinary reach and methodological robustness.

Watson, Hennessy, & Vignoles (2020) examined the relationship between exposure to educational television and mathematics capability among primary-aged children in Tanzania. Drawing on nationally representative data for 38,682 pupils aged 7–16, they employed a household fixed-effects regression model, controlling for variables such as age, sex, school enrollment, and Kiswahili proficiency. The results indicated a significant positive association between exposure to the "Ubongo Kids" program and mathematics outcomes, even in unsupervised home environments.

Additionally, cost-effectiveness analyses suggested that educational television may outperform other interventions in delivering learning benefits in low-income settings. Watson et al.'s (2020) study is highly relevant to the current research due to its use of large-scale standardized assessment methods, similar to those employed here. However, while their research focused exclusively on television-based interventions and mathematics proficiency, the present study expands both the modality and academic domains: it explores digital video-based media, encompassing not only arithmetic but also reading and writing skills, within a lower-primary cohort. Moreover, the current study applies a multivariate general linear model to evaluate educational impact across multiple literacy and numeracy domains, thereby offering a more nuanced and comprehensive investigation of digital video media's pedagogical effects in Tanzania.

Eustace (2011), Kihoza (2016), and Mfaume (2019) explored the role of online books in supporting teaching and learning in Tanzania using mixed qualitative and quantitative approaches. Across their studies, descriptive statistics and thematic analysis were employed. Mfaume et al. (2019) found that the integration of online

books motivated learners and contributed to improved academic performance. They emphasized that while digital videos can bolster reading, writing, and arithmetic instruction, its effectiveness depends on factors such as accessibility, skills, and user willingness among both teachers and pupils. This body of work is highly pertinent to the current study because it highlights practical benefits and critical constraints of integrating digital video materials in Tanzanian classrooms. However, the present research advances beyond these studies by focusing specifically on digital videos-based and its impact on a broader array of foundational skills reading, writing, and arithmetic, among lower primary pupils. Additionally, it uses a more rigorous mixed-methods design that combines standardized testing and questionnaires, providing a comprehensive assessment of pedagogical effectiveness.

Meanwhile, a large work of literature focused on the significance of digital videos in primary schools, many studies have inquired into the contribution of digital videos in English, Kiswahili, arts and Mathematics, but not on literacy skills and arithmetic (Abobo 2018, Dartani, et al, 2017 & Watson 2019). Among studies that focused on the usefulness of digital media in the lower primary were from Western countries (Archer and Savage, 2014, Beschorner and Hutchison, 2013 & Lysenko and Abrami 2014), The present research attempted to explore the contribution of digital videos in the improving reading (basic sounds, word pronunciation), Writing (spelling) and arithmetic skills (number identification, addition, and subtraction skills) in lower primary pupils of Dodoma City, Tanzania. As such, this will be the first research study to examine the contribution of videos in improving reading, writing, and arithmetic skills in lower primary pupils of Dodoma City, Tanzania.

2.5 Conceptual Framework

In this study, a conceptual framework was developed to illustrate the contribution of digital videos and digital videos to reading, writing, and arithmetic development among lower primary pupils in Dodoma City, Tanzania. The framework is organized into three levels: Level 1 comprises independent variables use of digital videos, accessibility of digital videos, and perceptions and effects of digital video; Level 2 represents the dependent variables reading (basic sounds, word pronunciation), writing (spelling), and arithmetic (number identification, addition, subtraction); and Level 3 identifies intervening variables digital skills, device availability, electrical power, and internet connectivity (see Figure 2.1). Each component is interconnected, with arrows indicating that improvements in literacy and numeracy skills depend on both the utilization and accessibility of digital videos and digital video, while intervening variables may mediate these relationships. This structured representation of variables and their expected associations aligns with best practices in conceptual framework design for establishing cause-effect relationships in research (Cherry, 2024; Stolle, 2022).

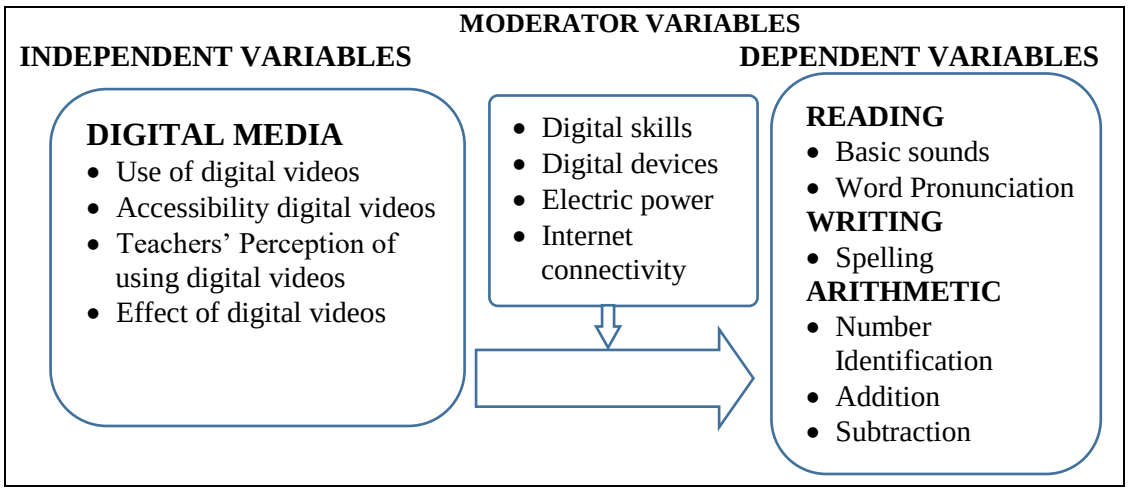

Figure 2.2: Conceptual Framework
Source: Researcher [2021].

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview

This chapter presents the research paradigm, approaches, design, study population, area of the study, sampling design and procedures, data collection methods and tools, data analysis processes, reliability, validity, and ethical considerations.

3.2 Research Paradigm

The pragmatism paradigm advocates for the use of quantitative, qualitative, or mixed methods solely based on their ability to effectively address the problem (Mackenzie & Knipe, 2006; Creswell, 2003). Pragmatist researchers are methodologically uncertain, meaning they do not commit to a single philosophical stance or methodology, but select approaches that best answer the "what" and "how" of the inquiry (Mackenzie & Knipe, 2006; Rossman & Wilson, 1985) This paradigm emerged from the classical contributions of Peirce, James, and Dewey, emphasizing that knowledge is action-oriented, grounded in experience, and validated through practical consequences (Maxcy, 2003; Morgan, 2014)

3.3 Research Approach

This study utilized a mixed-methods approach, integrating qualitative and quantitative techniques to address the research problem comprehensively. The quantitative component enabled data collection from a large sample, enhancing the potential for generalization to the broader population (Enosh et al., 2014). Meanwhile, the qualitative component brought rich contextual insights, highlighting participants' experiences and adding depth to the findings. The integration of both

approaches ensured methodological flexibility and offered a balanced “breadth and depth” perspective (Maxwell, 2016). Although both methods were employed, the quantitative strand was given greater emphasis, guiding the primary analysis and interpretation.

3.4 Research Design

This study employed a sequential explanatory mixed-methods design (Creswell & Creswell, 2018), consisting of two distinct phases. First, quantitative data were collected and analyzed to establish general trends and statistical relationships. Based on these results, a qualitative phase followed, aimed at explaining, interpreting, and elaborating upon the initial findings (Creswell et al., 2003; Creswell & Plano Clark, 2011) This design was selected because it allows greater emphasis on quantitative results, while the qualitative component provides contextual depth, especially when clarifying unexpected or complex quantitative outcomes (Morse, 1991; Creswell & Plano Clark, 2011)

3.5 Research Area

The research was conducted in Dodoma City, as depicted in diagram 3.1. The reasons for selecting Dodoma City were as follows: Dodoma City is among the Tanzanian regions where Uwezo found problems in reading, writing, and arithmetic among lower primary pupils (Uwezo, 2019). It was reported that three out of every 10 pupils, 30 percent of whom graduated from primary school in 2017, lacked basic reading and numeracy skills (Uwezo, 2019). Also, Pembe and Bali (2017) assessed the situation of writing difficulties among primary school children in Dodoma City, Tanzania and found that 78 (27.9%) out of 280 children were low achievers in

writing tests, while 53 (26.2%) out of the remaining 202 were identified as children with writing difficulties. This therefore makes Dodoma City the right place to conduct this study.

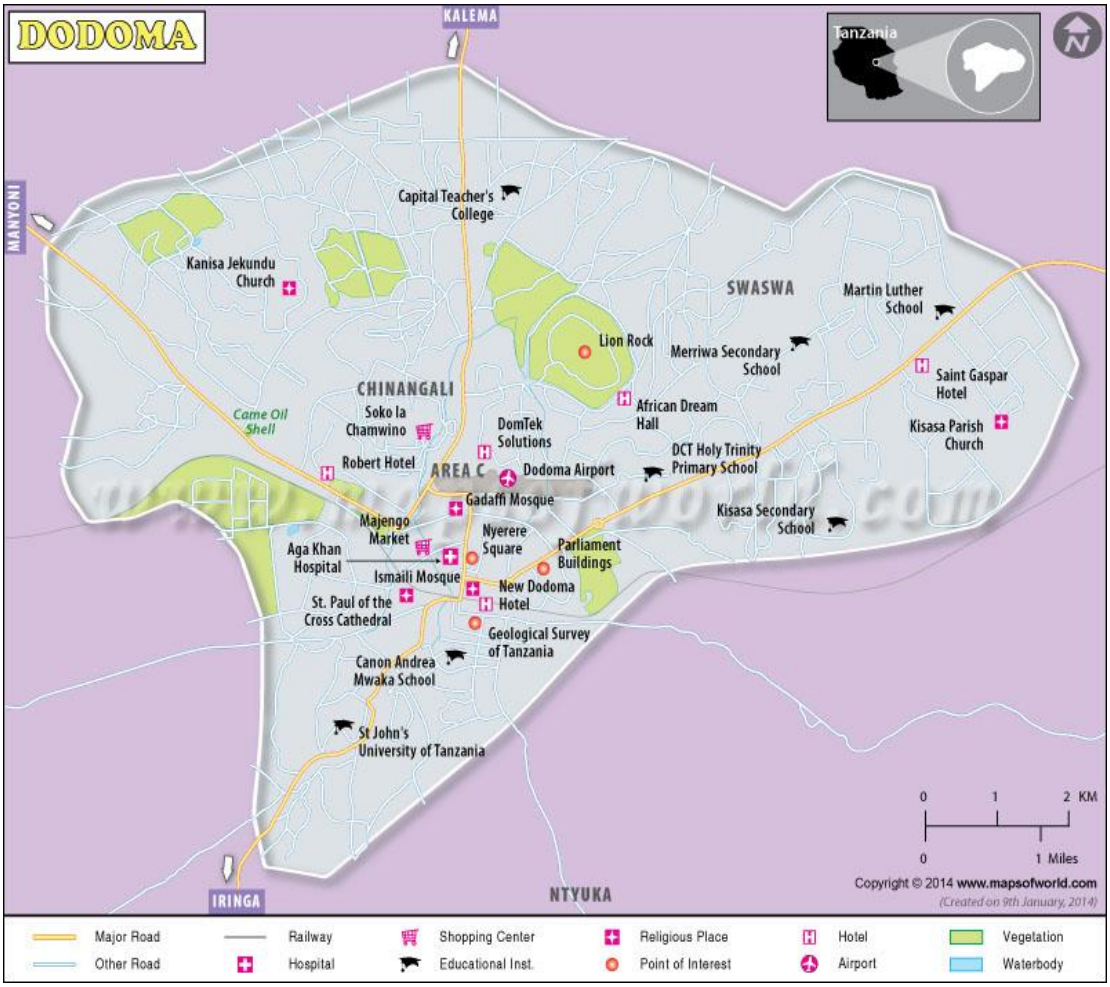

Figure 3.1: The Location of Dodoma City

3.6 Target Population

The population in this study involved the lower primary pupils (classes one and two) and their teachers. The study specifically involved the population of 267 pupils from primary schools in Dodoma City, which helped to get the sample size of the study.

3.6.1 Sample Size

Pupils sample:

The Yamane formula was used to get a sample of 160 pupils from the targeted population of 267 pupils. The selection of the targeted population based on the accessibility of videos in a school setting. According to Miaoulis and Michener (1976), in quantitative sampling, three criteria need to be determined: the level of precision, confidence or risk, and the degree of variability in the attributes being measured. Therefore, the level of precision adopted for this study was (±5 percent).

The formula used to calculate sample size was Yamane (1967).

Formula:

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

Where,

N = total population of pupils in Dodoma city (267),

P = 0.05

n= sample size

Calculation: Yamane (1967) was used to calculate the sample size of pupils at a 95 percent confidence level, and p = .05 was assumed for this equation. A simplified formula to calculate sample size (where ‘n’ is the sample size, ‘N’ is the population size, and ‘e’ is the level of precision)

n = 267/ [1+267*.05*.05] =160 sample size of the pupils. In this study, the target population was 267 and the sample size was 160 participants according to the Yamane formula.

Teachers' Sample

The study focused on a sample of 60 teachers of lower primary schools from a population of 71 teachers. The selection of a targeted population for teachers focused on the accessibility of videos in a school setting. The sample was calculated by the Yamane formula. The stratified sampling technique was used to select the sample of teachers basing on stratum. Since the study focused on lower primary pupils, the class level determined the strata. However, to get teachers' opinions on the contribution of digital videos in improving reading, writing and arithmetic skills five teachers from the sample of 60 teachers were randomly selected. The targeted population of teachers was 71 teachers from grade one and grade two teachers teaching reading, writing and basic skills (Creswell, 2017).

Schools Sample

The school sample was obtained using a convenient sampling technique. Since the study explored the contribution of videos in improving reading, writing and arithmetic skills in lower primary pupils, not every school could fit for research; therefore, considering the availability of digital devices such as computers, projectors, and televisions was significant (Etikar, Musa & Alkassim, 2016).

3.6.2. Sampling Techniques

The study used stratified and convenient sampling techniques (Creswell, et al., 2006).

Stratified Sampling Technique.

The stratified sampling technique involves the selection of a sample from sub-groups called strata based on characteristics like age, ethnicity, religion, and educational level, then using sampling intervals to choose sample members from each stratum

(Ebenezer, 2023). This sampling method produces characteristics in the sample that are proportional to the overall population. The researcher selected pupils with F-grade reading, writing, and arithmetic skills in this study. The scores were obtained from the continuous assessment list of pupils in standards one and two. Similarly, the technique was used to select standard one and two teachers who responded to the questionnaires.

Convenient Sampling Technique

According to Etikar, Musa and Alkassim (2016), Convenience sampling involves choosing people who are easily accessible or readily available. This technique was used to select the schools where digital devices were accessible to support the use of digital media. Since the study explored the contribution of videos in improving reading, writing and arithmetic skills in lower primary pupils, not every pupil could fit for research therefore, considering the availability of digital devices such as computers, projectors, and televisions was significant.

Simple random techniques

Simple random sampling is a process of choosing individuals to be representatives of the population. This was used to select some few teachers who participated in the interview after the intervention. The researcher prepared the small papers with numbers one up to five and then give teachers to pick. Those who picked from number one to five were involved for the interview.

3.7 Data Collection Tools

This study collected data using methodological triangulation, employing standardized tests, structured questionnaires, and interviews to gather diverse

perspectives and strengthen validity (Patton, 1999; Creswell, 2017). These multiple instruments ensured a comprehensive and robust dataset by capturing both quantitative measurements and qualitative insights across the research phenomenon (Creswell, 2012; Patton, 1999).

3.7.2 Interview Schedule

This study utilized unstructured interviews with teachers who participated in the entire intervention process to elicit their reflections on integrating digital media into reading, writing, and arithmetic instruction. This format allowed respondents to express their views freely, drawing from their own understanding and experiences during the intervention.

3.7.3 Questionnaire

This study employed questionnaires with closed-ended questions to collect data from teachers regarding their perspectives on the effect of digital video on reading, writing, and arithmetic. The items were developed based on the study's content and contextual relevance, then submitted to academic supervisors and field experts for proofreading and validity assessment before administration. A pilot study was conducted in four schools to evaluate both the validity and reliability of the instrument. Following the pilot, all weak items identified through Cronbach's alpha analysis were removed, retaining only those that demonstrated acceptable internal consistency and the ability to generate the intended responses (Creswell, 2017).

3.7.5 Standardizes Test

This study employed a standardized test to evaluate the average score differences among lower primary pupils in Tanzania before and after the introduction of digital

media in reading, writing, and arithmetic (Uwezo, 2015; Selfridge, 2020). This instrument facilitated a comparison of pre- and post-intervention scores, demonstrating the contribution of digital media to students' basic skills by revealing whether mean scores improved following the intervention.

3.8. Reliability and Validity Test

3.8.1 Reliability

This section examined the internal consistency of the questionnaires using Cronbach's alpha, based on data from a pilot involving 20 students and four teachers across two schools. Nine variables remained after removing items that decreased reliability. The internal consistency results for each variable were as follows: Accessibility of digital videos (4 items): $\alpha = .92$, Teachers' use of digital video (7 items): $\alpha = .98$, Teachers' perception of digital vid (5 items): $\alpha = .92$, Basic sounds in reading skills (3 items): $\alpha = .88$, Word pronunciation in reading skills (7 items): $\alpha = .84$, Spelling in writing skills (10 items): $\alpha = .82$, Number identification in arithmetic skills (5 items): $\alpha = .86$, Addition skills in arithmetic (3 items): $\alpha = .89$, Subtraction skills in arithmetic (2 items): $\alpha = .89$.All nine measures exceeded the acceptable threshold of $\alpha = .70$, with many falling into the "good" to "excellent" range (> .80), indicating strong internal consistency across items (George & Mallery, 2003; Gliem & Gliem, 2003;).

3.8.2 Validity

In this study, particular attention was given to construct validity, ensuring that our survey items accurately represented the theoretical concepts under investigation. Items were developed based on a clear theoretical framework and subjected to pilot

testing and expert review methods commonly used to enhance construct validity (Lee & Meehl, 1955; Lee, 2025). To confirm that items measured their intended constructs, we examined convergent validity, assessing the correlation between related measures and discriminant validity, ensuring that unrelated constructs did not correlate (Sarah Lee AI, 2025). Finally, factor analysis (exploratory and/or confirmatory) was employed to verify the internal structure of each scale, confirming that items clustered around the intended constructs (Peter, 1981; Sarah Lee AI, 2025). This multi-step approach, defining constructs theoretically, developing items accordingly, seeking expert feedback, and applying statistical validation, provides robust evidence that the instruments validly measure the targeted constructs and support sound inferences within the study's context.

3.9 Data Analysis

The Quantitative data was collected and analysed by using descriptive statistics methods, correlation coefficient, regression analysis, and univariate and multivariate General Linear Model analysis methods. These methods were used to check the mean difference between the groups, the linear relationship and the influence of digital media in the improvement of reading, writing, and arithmetic in lower primary pupils. All these calculations were conducted with the assistance of a statistical package for social science (SPSS) version 26. The qualitative data were analyzed through the content system and thematic analysis.

3.9.1 Descriptive Analysis

Descriptive analysis is a statistical method that provides valuable information on the central tendency (mean, median, mode), variability (standard deviation, variance,

minimum, maximum variables, kurtosis, skewness), and distribution (graphical or tabular format) of the data. This allows researchers to make informed decisions on the appropriate statistical techniques to use (Leeuw & Hox, 2008). Descriptive statistics are an essential component of research techniques, allowing researchers to efficiently summarize and display survey results. It provides numerous benefits to academia, such as summarizing large data sets and providing a snapshot of the key characteristics of the data (Leeuw & Hox, 2008). In this study, the descriptive analysis helped to present the percentages of teachers who used digital media in teaching and those who did no use it.

3.9.2 Correlation Coefficient

The correlation coefficient shows the relationship and indicates how well a straight line fits the data. The coefficient ranges from −1 to 1 and is dimensionless (i.e., it has no unit) (Hosea & Jaga, 2021). In this study, the correlation was used to find how teachers' perception of digital media use relates to an improvement in reading, writing, and arithmetic. However, Correlation in the broadest sense is a measure of an association between variables. In correlated data, the change in the magnitude of 1 variable is associated with a change in the magnitude of another variable, either in the same (positive correlation) or in the opposite (negative correlation) direction.

Most often, the term correlation is used in the context of a linear relationship between 2 continuous variables and expressed as Pearson product-moment correlation. The Pearson correlation coefficient is typically used for bi-variate normally distributed data. For non-normally distributed continuous data, ordinal data, or data with relevant outliers, a Spear-man rank correlation can be used as a

measure of a monotonic association. Both correlation coefficients are scaled such that they range from -1 to +1, where 0 indicates that there is no linear or monotonic association, and the relationship gets stronger and ultimately approaches a straight line (Pearson correlation) or a constantly increasing or decreasing curve (Spearman correlation) as the coefficient approaches an absolute value of 1. (Schwarte, et al., 2018). In this study, the correlation coefficient was used to find the relationship between the use of digital media and the development of reading, writing, and arithmetic skills among lower primary pupils.

3.9.3 Regression Analysis

Regression analysis is a statistical tool for the investigation of the causal effect of one variable upon another (Hosea & Jaga, 2021). In this study, the regression analysis was used to show the influence of teachers' perception on the use digital videos in improving reading, writing, and arithmetic skills among the lower primary pupils.

3.9.4 Uni-variate

The GLM Uni-variate procedure is based on the General Linear Model procedure, in which factors and covariates are assumed to have a linear relationship to the dependent variable (Horton, 1978). In this study, the GLM uni-variate was used for modeling the relationship between the use of digital videos and the improvement of the writing (spelling) skills.

3.9.5 Multivariate General Linear Model

In the Multivariate GLM analysis, we assumed a linear relationship between the dependent variables, factors, and co-variate variables to understand how they might

impact specific situations or outcomes (Horton, 1978). This study used GLM multivariate analysis to demonstrate how digital media such as videos, impact pupils' reading (basing sounds, word pronunciation) and arithmetic skills (Number identification, addition, subtraction) in the lower primary after intervention.

3.10 Thematic Analysis

Thematic analysis was used to identify and record patterns (themes) arising from qualitative data. In this study, qualitative data was obtained from teachers through interview during the evaluation phase. Teachers were given open-ended questions to express their feelings on how the use of videos is of significance in improving reading, writing, and arithmetic. Themes become the categories for analysis where patterns are important for describing and interpreting the phenomenon associated with research questions (Guest, 2012). Therefore, thematic analysis was performed through the process of coding in six phases: familiarization with data, generating initial codes, searching for themes among codes, reviewing themes, defining and naming themes, and producing the final report.

In this study, thematic analysis was applied to generate themes relating to the use of digital media in improving reading, writing, and arithmetic that provide an in-depth understanding and interpretation of data.

3.10.1 Ethical Consideration

The study research ethics considered all ethical rules and guidelines including anonymity, confidentiality, privacy, plagiarism, and beneficence to ensure the integrity of the subject under study (Gajjar, 2013). In this study, the appropriate

ethical procedures were followed. A request for a permission letter from the Open University of Tanzania was taken into consideration. This letter was submitted to the Dodoma City Council director to get approval for data collection from respective schools. However, prior to data collection all the participants were given the information on the purpose of collecting data from them and give them freedom to agree or disagree to participate in the study. Moreover, the participants were informed about the confidentiality of the information they provided that it was only for academic purposes and was not going to give to any other person.

3.10.2 Research Procedures

Research procedures are steps that researchers should take to increase the reliability and validity of their research.

3.10.3 Data Collection Procedures

The study involved a 16-item teacher questionnaire, with the first six items assessing the use of digital videos to improve reading, writing, and arithmetic skills, the next four evaluating the accessibility of digital videos, and the remaining six measuring teachers' perceptions of using digital videos for these purposes. To ensure content validity, the items were reviewed by supervisors and research experts, resulting in the removal of irrelevant questions. Reliability was assessed using Cronbach's alpha: overall ($\alpha = .95$), indicating excellent internal consistency, with specific coefficients reported for each subset of items (see Table 3.1). Teachers rated both usage and perceptions on 5-point Likert scales "very poor" to "very good" for usage and "strongly disagree" to "strongly agree" for perception questions, where $\alpha = .70$ or higher is acceptable in social science research (Cohen & Holliday, 1982).

The experimental phase spanned 10 weeks, beginning with a pretest administered in early February 2023. The 30-item test covered reading (10 items: 3 phonetics, 7-word pronunciation), writing (sound-spelling), and arithmetic (10 items: 5 number identification, 3 additions, 2 subtraction). In the second phase, a one-week training familiarized ten first- and second-grade teachers with using digital videos and games downloaded and integrated via projectors and internet-connected laptops for arithmetic instruction. The third phase entailed an eight-week intervention during which teachers used digital videos and games to teach arithmetic (number identification, addition, subtraction) for 40 minutes daily. A posttest in late April 2023, modeled on Tanzania Institute of Education review formats and validated by expert review and a four-school pilot, demonstrated strong reliability ($\alpha = .89$; see Table 3.2).

Table 3.1: Cronbach's Alpha for Teachers' Items

Measures	Number of items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha α
Accessibility of video	4	20.2833	93.054	.957	.922
Teachers' use of video	7	17.9083	113.375	.872	.988
Teachers' Perception of video	5	17.5250	88.739	.961	.921

Note: The Cronbach's alpha demonstrated excellent internal consistency of (α=.95),

Table 3.2: Cronbach's Alpha for Pupils Items

Item-Total Statistics

Measures	Number of items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha α
Basic Sounds	3	44.672	669.762	.683	.880
Word Pronunciations	7	38.259	386.219	.948	.842
Spelling	10	40.636	457.094	.930	.828
Number Identification	5	39.650	534.210	.787	.855
Addition	3	49.229	722.927	.836	.889
Subtraction	2	49.229	722.927	.836	.889

Note: The Cronbach's alpha demonstrated excellent internal consistency of (α=.86)

3.10.4 Data Analysis Procedures

We used SPSS Statistics software version 26.0 to merge two data sets with the same variables into one file. We conducted correlation and linear regression analysis of findings collected from teachers by questionnaires. A Uni-variate General Linear Model and a Multivariate General Linear Model were used to determine whether there was a statistically significant linear relationship between the use of digital videos and the development of reading (basic sounds, word pronunciation), writing (spelling) and arithmetic skills (number identification, addition, subtraction) among lower primary pupils. We chose this statistical test because our sample sizes were equal and we wanted to assess the relationship thus it was vital to ensure a homogeneous population.

It's important to note that using the Uni-variate and Multivariate General Linear Models is not recommended if the sample sizes for each group are not equal, as the p-value would not be reliable. Before conducting the Uni-variate and Multivariate General Linear Model, we assessed whether the data met various requirements, such as the homogeneity assumption of the data and the linearity of the variables. To do this, we checked Levine's test to prove the homogeneity assumption of the variance between the variables (see Table 4.18,4.22). Lastly, we used the Multivariate General Linear Model to assess the linearity of the variables (if the independent variable has a linear relationship with the dependent variable. In analyzing qualitative data, the first procedure was to familiarize with the data, then generating initial codes in relation to the research question, there after searching for the appropriate themes from the codes and reviewing potential themes for report writing.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION OF FINDINGS

4.1. Overview

This chapter presents data collected through both quantitative and qualitative methods, structured around four objectives: first, to describe teachers' use of digital videos in enhancing lower primary pupils' reading, writing, and arithmetic skills; second, to examine how the accessibility of digital videos influences their use in cultivating these skills; third, to explore how teachers' perceptions of digital videos affect their implementation in improving reading, writing, and arithmetic among lower primary pupils; and fourth, to assess the overall impact of digital videos on pupils' performance in these fundamental areas.

4.2. Response Rate

Collection of data took place in Dodoma City; questionnaires and interview guides were administered to teachers and standardized tests were used to collect data from pupils. Response to the questionnaire return process was 100% successful as in Table 4.1. A total of 60 questionnaires which were distributed to teachers from the 15 schools in Dodoma City, were returned. The interview was conducted with 5 teachers. 160 pupils did a standardized test (pretest and post-test). The results have been presented according to the order of the objectives.

Table 4.1: Response rate for Teachers and pupils

Distributed	Returned	Percent
Teachers' 60	60	100%
Pupils' 160	160	100%

Source: Researcher data (2023).

4.3 General Characteristics of Respondents

This study consisted of Teachers and Pupils Respondents. The General Characteristics of teachers included Gender, Age, and working experience as shown in the tables below. The general characteristics of students involved Gender, Age, and Class level as shown in the Table 4.2.

Table 4.2: Demographic Characteristics for Teachers

Variable	Category	Frequency	Percent
Gender	Male	1	1.7
	Female	59	98.3.
Age	20-25	10	16.7
	26-30	7	11.7
	31-40	11	18.3
	41+	32	53.3
Experience	0– 5 years	5	8.3
	6-10	8	13.3
	11-15	14	23.3
	15+	33	55

Source: Field Data (2023).

Table 4.3: Demographic Characteristics for Pupils

Variable	Category	Frequency	Percent
Gender	Boys	92	57.5
	Girls	68	41.3
Age	6-7 years	106	66.3
	8 -9 years	54	33.8
Class Level	Standard 1	108	67.5
	Standard 2	52	32.5
Group of participants	Experimental	80	50
	Control	80	50

Source: Field Data (2023).

4.3.1 Age Group of Teachers and Pupils

The age for teachers was grouped into four groups: 20-25 years,26-30 years,31-40 years, and 41 and above years. The analysis on age group showed that ten respondents (16.7%) were in the age group 20-25 years old, seven respondents (11.7%) were in the age group 26-30 years old, eleven respondents (18.3%) were in

the age group of 31-40 years old and thirty-two respondents (53.3%) respondents were in age 41 and above years old (see Table 4.2). This indicates that the majority of Teachers who teach lower primary belong to the age group of 41 and above years old. The age for pupils was grouped into four groups 6 years, 7 years, 8 years and 9 and above years. The analysis on age group showed that fifty-eight respondents (36.3%) were in the age group 6 years old, forty-eight respondents (30%) were in the age group 7 years old, Thirty-four respondents (21.3%) were in the age group 8 years old and twenty respondents (12.5%) were in age group of 9 and above years old as shown in table 4.3 This indicates that majority of pupils belonged to the age group 6 years old.

4.3.2. Gender of Teachers and Pupils

Gender can be either the male or female division of species; the study wants to know the ratio between males and females concerning the use of videos in improving reading, writing, and arithmetic of lower primary pupils. The analysis showed that fifty-nine respondents (98.3%) were female and one respondent (1.7%) was male (see Table 4.2). Gender for pupils included ninety-two boys (57.5%) and sixty-eight (41.3%) girls (see Table 4.3). This indicates that more boys are enrolled in primary schools compared to girls.

4.3.3 Work Experience of Teachers

Work experience of teachers was grouped into four major categories: 0-5 years, 6-10 years, 11-15 years, and 15 and above years. The analysis showed that five respondents (8.3%) had work experience between 0-5 years, eight respondents (13.3%) had work experience between 6-10 years, fourteen respondents (23.3%) had

work experience between 11-15 years and thirty-three respondents (55%) had above 16+ years of working experience. This indicates that the majority of respondents had more than sixteen years of working experience (see Table 4.2).

4.3.4 Class Level of Pupils

The class level of the respondents was grouped into two categories which are standard one and standard two. The analysis showed that one hundred and eight respondents (67.5%) were in standard one and fifty-two respondents (32.5%) were in standard two. This indicates that the majority of respondents were in standard one (see Table 4.3).

4.4. To Examine Teachers' Use of Digital Videos in Improving Reading, Writing and Arithmetic Skills of Lower Primary Pupils

The study sought to examine the extent to which teachers use digital media in reading, writing, and arithmetic skills of lower primary.

The results displayed about 50% of teachers never use videos in facilitating reading, writing, and arithmetic of lower primary pupils. The Likert scale ranged between 1 to 5 was calculated as 1=never, 2=not often, 3= occasionally, 4= regularly and the 5= always as shown in Table 4.4.

Table 4.4: The Descriptive Frequency Showing Teachers' Use of Videos

Likert Scale	Frequency	Percent
1.00	30	50.0
1.14	1	1.7
1.29	1	1.7
1.43	1	1.7
3.00	12	20.0
4.00	1	1.7
4.43	2	3.3
4.57	1	1.7
5.00	11	18.3

Likert Scale items: 1=Never, 2=Not often, 3=Occasionally, 4=Regularly, 5=Always

The interviewee's responses from teachers when asked to tell about the extent to which teachers use digital media in reading, writing, and arithmetic skills.

Teacher A1 stated: “I never use digital videos … because I don’t know how to use it. If I had any skills, I would like to use them.” This highlights a lack of confidence and digital competence, preventing video adoption.

Teacher A2 noted: “I wish to use digital videos, but I can't because our classrooms lack internet and electrical power. Only the assembly hall has electricity.” Structural deficits, such as unreliable electricity and no internet access, were major obstacles.

Teacher A3 stated, “I don't use digital videos… because the syllabus doesn't specify where I should incorporate them……Using digital videos might slow down my progress in finishing my syllabus. This reflects concerns about meeting curriculum pacing requirements and a lack of direction in the syllabus for video use.

4.5 To Assess the Influence of Digital Videos Accessibility on Teachers’ Use of Digital Videos in Improving the Reading, Writing and Arithmetic Skills of Lower Primary Pupils

A correlation analysis and simple linear regression were conducted to assess the relationship and influence of digital video accessibility on its use in improving reading, writing, and arithmetic skills among lower primary pupils. The Pearson correlation analysis was employed to determine the extent to which digital video accessibility is associated with teachers' use of digital videos in promoting foundational academic skills. The results indicated a strong positive correlation between the accessibility of digital videos and their use in teaching reading, writing,

and arithmetic, which was statistically significant, r (60) = .839, p < .01 (see Table 4.5).

Table 4.5: Correlation between Accessibility of Digital Videos and Teachers' Use of Digital Videos in Improving Reading, Writing and Arithmetic Skills

Variables	N(items)	α	M	SD	
1. Accessibility of d.v	4	.98	7.58	5.2456	.839**
2. Teachers' Use of d.v	7	.98	9.95	4.511	.000

N=60 **. Correlation is significant at the 0.01 level (2-tailed).

Simple linear regression was conducted to examine the extent to which accessibility of digital videos predicts teachers' use of digital videos in improving reading, writing, and arithmetic skills among lower primary pupils. The results showed that digital video accessibility significantly predicted digital video usage, accounting for 74.5% of the variance, R^2 = .745, F (1, 58) = 169.669, p < .001. The predictor variable accessibility of digital videos was found to be strong and statistically significant, β = .863, t (58) = 13.026, p < .001. These findings indicate that the availability of digital videos plays a critical role in facilitating their use by teachers to improve foundational academic skills among lower primary pupils (see Tables 4.6, 4.7, and 4.8).

Table 4.6: Simple Linear Regression Showing How the Accessibility of Digital Videos Influences Teachers' Use of Digital Videos in Improving Reading, Writing, and Arithmetic Skills

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.863[a]	.745	.74	2.7	.745	169.7	1	58	.000

a. Predictors: (Constant), Use of d.v
b. Dependent Variable: Accessibility of d.v

Table 4.7: ANOVA on the Accessibility of Videos in Influencing the Use of Videos in Improving the Reading, Writing and Arithmetic of Lower Primary Pupils

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1210.118	1	1210.1	69.7	.000[b]
	Residual	413.670	58	7.132		
	Total	1623.788	59			

a. Dependent Variable: Accessibility of d.v
c. Predictors: (Constant), Use of d.v

Table 2.8:Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	T
1	(Constant)	-2.413	.841		-2.870
	Use of d.v	1.004	.077	.863	13.026

a. Dependent Variable: Accessibility of digital videos

4.6 Teachers' Perception of Using Digital Videos in Improving Reading, Writing, and Arithmetic Skills of Lower Primary Pupils

The study aimed to assess the relationship between teachers' perceptions of using digital videos and their use in improving lower primary pupils' reading, writing, and arithmetic skills. Interview results revealed that most teachers held positive attitudes and were willing to implement digital videos in teaching these foundational skills. For example, Teacher A4 emphasized that digital videos can significantly bolster reading, writing, and arithmetic abilities in lower primary students, though noted that usability issues can limit their effectiveness. Teacher A5 highlighted the crucial role of digital videos in foundational-skills development, yet pointed out that a lack of essential digital equipment (e.g., computers, laptops, projectors, televisions) and poor internet connectivity impede access to digital videos and related resources. A

correlation analysis between teachers' perceptions and their use of digital videos in improving reading, writing, and arithmetic revealed a strong positive correlation ($r = 0.976$, $p < 0.01$), indicating that more favorable perceptions are directly associated with greater use of digital videos, a result that is statistically significant and reflects a very strong linear relationship.

Table 4.9: Correlation Between Teachers' Perception of Using Videos and The Use of Videos in Improving the Reading, Writing and Arithmetic Skills

Variables	N(items)	α	M	SD	1
1. Teachers' perception of d.v	4	.92	2.35	1.63	
2.Use of d.v	7	.98	2.37	1.63	.976** .000

**p< 0.01 Spearman non-parametric indicating statistically significant correlations between Teachers' perception of using digital videos and Teachers' use of digital videos

4.6.2 Simple Linear Regression to Show the Influence of Teachers' Perception of Using Videos on the Use of Videos in Improving the Reading, Writing and Arithmetic Skills

Simple linear regression analysis was conducted to examine the extent to which teachers' perceptions of using digital videos influenced their actual use of digital videos in improving reading, writing, and arithmetic skills among lower primary pupils. The results indicated that teachers' perceptions significantly predicted digital video usage, accounting for 99.8% of the variance, $R^2 = .998$, F (1, 58) = 29,424.818, $p < .001$. The predictor variable, teachers' perception, was strong and statistically significant, $\beta = .999$, t (58) = 171.537, $p < .001$. These findings suggest that positive

perceptions toward digital video use among teachers strongly contribute to their integration of videos in teaching foundational literacy and numeracy skills (see Tables 4.10, 4.11, and 4.12).

Table 4.12: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.02	.017		-1.343	.184
	Teachers' Perception of Using d.v	1.0	.006	.999	171.537	.000

a. Dependent Variable: Use of d.v

4.7 Effect of using Digital Videos on Reading, Writing and Arithmetic Skills of Lower Primary Pupils

The purpose of this study was to evaluate the effect of digital video usage on the development of reading (basic sounds and word pronunciation), writing (spelling), and arithmetic skills (number identification, addition, and subtraction) among lower primary pupils. To analyze the data, both univariate and multivariate General Linear Models (GLMs) were employed (Ross & Wilson, 2017). The univariate GLM was applied to investigate the relationship between digital video use and improvements in writing skills, specifically spelling.

Additionally, the multivariate GLM was used to examine the association between digital video use and enhancements in reading (basic sounds and word pronunciation) and arithmetic skills (number identification, addition, and subtraction). The results revealed statistically significant linear relationships between

digital video use and the enhancement of reading and arithmetic skills, indicating that digital video-based instruction supports learning and contributes to the development of core literacy and numeracy skills. Furthermore, interview responses corroborated the quantitative findings, highlighting the substantial role that digital videos play in improving pupils' reading, writing, and arithmetic abilities.

4.7.1 Effect of Digital Videos on Reading Skills (Basic Sounds and Word Pronunciation)

Mean and Standard deviation of reading skills

The results for reading skills showed that the majority of pupils in the experimental group displayed a positive increase in their scores for reading skills. The mean and standard deviation of the basic sounds were as follows: T1 was (*M*=7.3, *SD*=3.7) for the control group and (*M*=6.9, *SD*=4.1) for the experimental group. T2 (*M*=7.9, *SD*=3.9) in the control group and (*M*=8.1, *SD*=3.9) in the experimental group. For word pronunciation, the mean of T1 was (*10.5*, *SD*=7.4) in the control group and (*M*=17.2, *SD*=9.3) in the experimental group, and for T2, the mean was (*M*=12.5.*SD*= 8.7) in the control group and (*M*=21, *SD*=9.1) in the experimental group (see Table 4.13, Figure 4.1 and Figure 4.2).

Table 4.13: Mean and Standard Deviation of Pupils Basic Sounds and Word Pronunciation Score between T1 and T2

Skills	Time	Condition	M	SD
Basic Sounds	Time 1	Control	7.2727	3.69849
		Experimental	6.9136	4.06632
	Time 2	Control	7.8845	3.85115
		Experimental	8.1194	3.90144
Word Pronunciation	Time 1	Control	10.5224	7.36763
		Experimental	17.2434	9.32694
	Time 2	Control	12.5073	8.74549
		Experimental	21.0256	9.05135

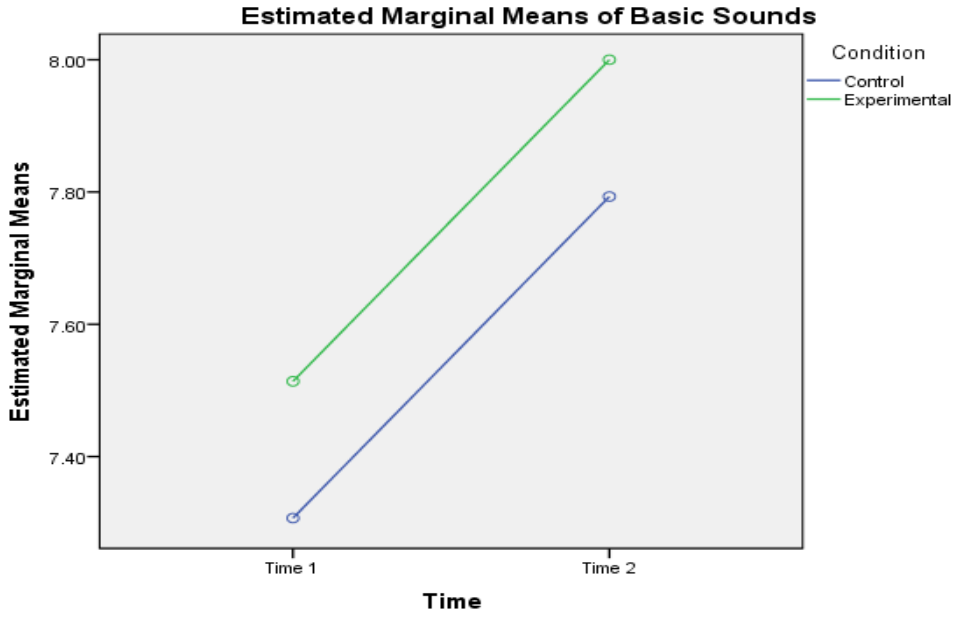

Figure 4.1: Mean of the Basic Sounds for the Experimental Group and Control Group between T1 and T2

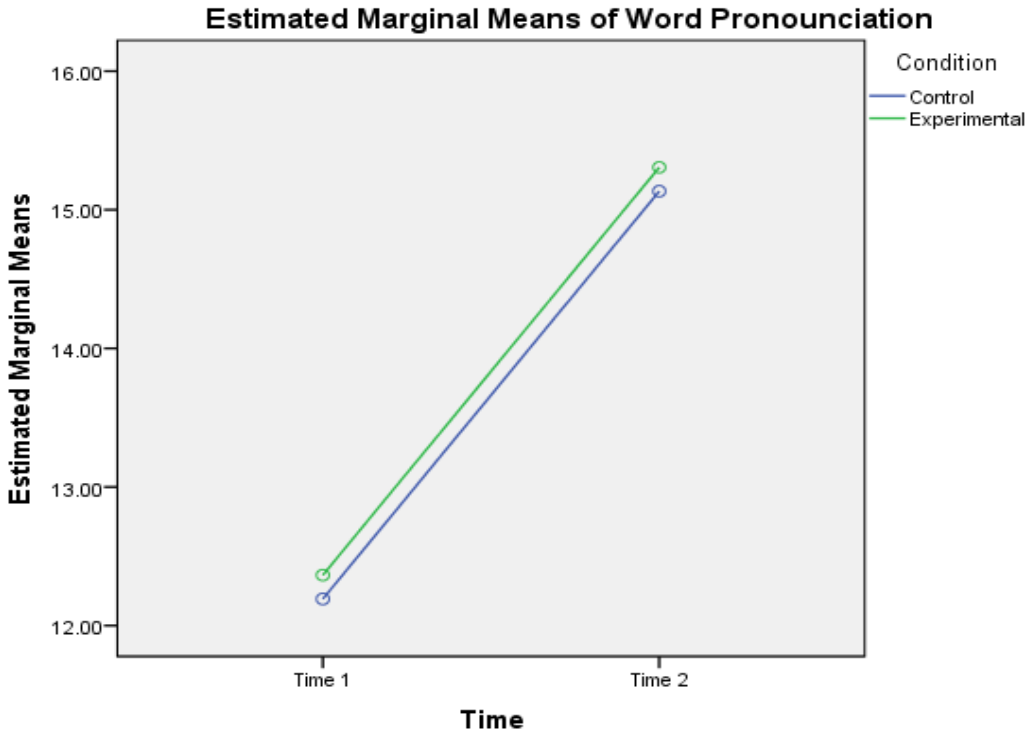

Figure 4.2: Mean of the word Pronunciation the Experimental Group and Control Group between T1 and T2

Levine's Test for the homogeneity assumption of variance

Levine's Test for reading skills indicates that the null hypothesis was maintained and confirmed equal error variance between T1 and T2 for basic sounds, F (3,316) = .565, p = .639 and word pronunciation, F (3,316) = .776, p = .508, not statistically significant. For Levene's test, if the p-value is greater than 0.05 (p > .05), the null hypothesis is statistically significant, and the homogeneity assumption of the variance is considered to be met (see Table 4.14).

Table 4.14: Levene's Test of Equality of Error Variances

	F	df1	df2	Sig.
Basic Sounds	.565	3	316	.639
Word Pronunciation	.776	3	316	.508

Note: Levine's Tests suggested the null hypothesis that the error variance of the dependent variable is equal across groups was not statistically significant at p>.05; thus, the homogeneity assumption of the variance was met

The Correlations between gender and reading skills (Basic sounds) displayed statistically non-significant r (160) =. -051, p=.0366, Class level reading skills (Basic sounds) displayed statistically non-significant r (160) =. 067, p=.231, but for age, the correlation was statistically significant and the improvement of basic sounds r (160) =. -117, p=. 037. The correlation between gender and word pronunciation displayed a statistically non-significant r (160) =. -081, p=.147, Class level and the Reading skills (word pronunciation) displayed statistically non-significant r (160) =.054, p=. 333. The correlation between age and word pronunciation was statistically significant, r (160) =.221, p=.0001. This relationship between age, basic sounds and word pronunciation was probably because most pupils at a lower age are motivated to learn by videos (see Table 4.15).

Table 4.15: Correlation between Age, Class level, Basic Sounds and Word Pronunciation

	1	2	3
1. Gender			
2. Age	-.007		
	.899		
3. Class level	-.039	.075	
	.483	.178	
4. Basic Sounds	-.051	-.117*	.067
	.366	.037	.231
5. Word Pronunciation	-.081	.221**	.054
	.147	.000	.333

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Multivariate General Linear Model output

Using the multivariate General Linear Model (GLM), a statistically significant linear relationship was found between the use of digital videos and pupils' improvement in reading skills—specifically basic sounds, F (1, 314) = 86.4, $p < .001$, partial η^2 = .216 and word pronunciation, F (1, 314) = 88.1, $p < .001$, partial η^2 = .219. Class level and school type did not reach statistical significance (see Table 4.16). The multivariate GLM was chosen to determine whether the use of digital videos was associated with gains in basic sounds and word pronunciation, and the results confirmed a significant relationship. According to Cohen's (1988) benchmarks, which classify effect sizes as small (d = 0.2), medium (d = 0.5), and large (d = 0.8), the observed pupil-level effect ($d \approx 0.22$) is small yet notably larger than the negligible effects at class and school levels ($d \approx 0.003$), suggesting that digital videos have greater impact in individual or small-group settings.

Table 4.16: Multivariate General Linear Model Output

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
School Type	Basic Sounds	.558	1	.558	.048	.826	.000
	Word Pronunciation	25.92	1	25.9	.462	.497	.001
Class Level	Basic Sounds	12.08	1	12.1	1.04	.307	.003
	Word Pronunciation	46.86	1	46.8	.83	.362	.003
Participants	Basic Sounds	998.5	1	998.5	86.8	.000	.216
	Word Pronunciation	4943.7	1	4943.	88.1	.000	.219
Error	Basic Sounds	3629.7	314	11.6			
	Word Pronunciation	17626.6	314	56.1			

a. R Squared = .227 (Adjusted R Squared = .214)

b. R Squared = .364 (Adjusted R Squared = .353)

4.7.2 Effect of Digital Videos on Writing (sound-spelling)

The Mean and Standard Deviation for the sound-spelling were presented as; T1 (*M*=8.8, *SD*=6.) for the control group and (*M*=14.3, *SD*=7.6) for the experimental group. T2 (*M*=10.3, *SD*=7.2) in the control group and (*M*=17.5, *SD*=7.4) in the experimental group. (see Table 4.17, Figure 4.3)

Table 4.17: Mean and Standard Deviation of Writing Skills (spelling) in T1 and T2

Condition	Time	M	SD
Control	Time 1	8.8316	5.98048
	Time 2	10.3215	7.23235
Experimental	Time 1	14.3395	7.62888
	Time 2	17.4826	7.38339

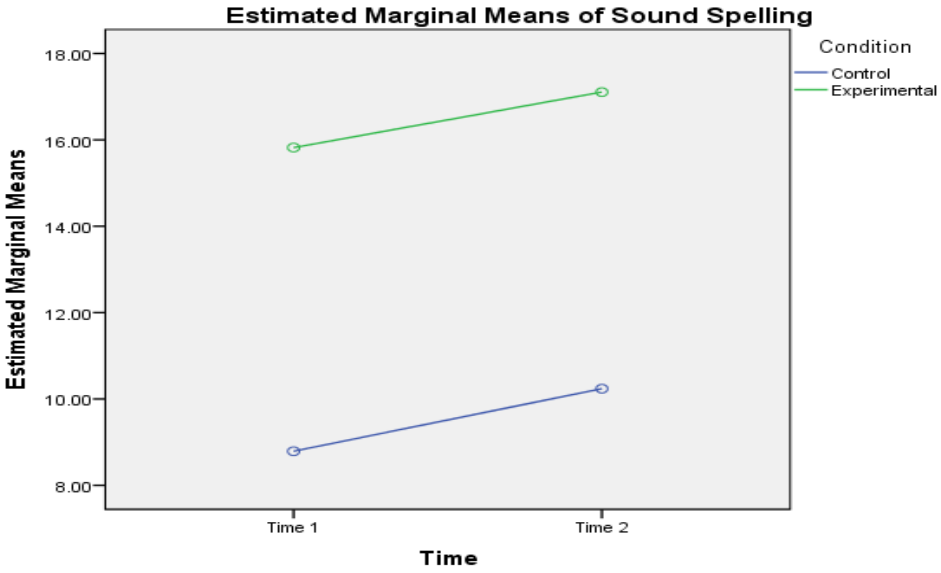

Figure 4.3: Mean of Sound Spelling for the Experimental Group and Control Group between T1 and T2

Levine's Test of homogeneity assumption of variance

Levine's Test for the Sounds Spelling indicates that the null hypothesis was maintained, showing equal error variance between T1 and T2 for the Sounds Spelling F (3,316) = .992, p = .397. The p-values being greater than, p>.05 means that the homogeneity assumption of the variance was met. (See Table 4.18).

Table 4.18: Levene's Test of Error Variances

Dependent Variable:	Sounds Spelling		
F	df1	df2	Sig.
.992	3	316	.397

Note: Levine's Tests suggested the null hypothesis that the error variance of the dependent variable is equal across groups was not statistically significant at p>.05 thus the homogeneity assumption of the variance was met

Correlation between Gender, Age, Class Level, and sound spelling

The Correlation between Gender, and sound spelling was negative weak, and statistically non-significant *r* (160) =. -183, *p*=.139, age and sound spelling was positive and statistically significant *r* (160) =.217, *p*=.000. However, the correlations between class level and the sound spelling was weak and statistically not significant *r* (160) =.044, *p*=.429. The implication for the relationship between age and sound-spelling was probably significant because most pupils at the lower age are motivated by videos in learning process (see Table 4.19). Since the correlation is vital is assessing the relationship between variable, it was important using it to measure the level of relation between the demographic variables and the improvement of writing skills(sounds-spelling).

Table 4.19: Correlation between Gender, Age, Class level and Sound Spelling

	1	2	3
1. Gender			
2.Age	-.007 .899		
3.Class level	-.039 .483	.075 .178	
4.Sounds Spelling	-.083 .139	.217** .000	.044 .429

**Correlation is significant at the 0.01 level (2-tailed).

Univariate General Linear Model output

Using the univariate General Linear Model (GLM), a statistically significant linear relationship was found between the use of digital videos and pupils' sound-spelling skills: $F\ (1, 313) = 85.90,\ p < .001$, partial $\eta^2 = .215$, while class- and school-level effects were non-significant (see Table 4.20). The univariate GLM was employed to assess the association between digital video use and improvement in sound-spelling among lower primary pupils. Following APA 7 style, effect sizes are reported using partial eta-squared (η^2_p), without italics for the abbreviation and omitting the leading zero. Interpreting effect sizes based on Cohen's (1988) benchmarks—small ($d = 0.2$), medium ($d = 0.5$), and large ($d = 0.8$)—the pupil-level effect ($d \approx 0.22$) was substantially larger than school-level ($d \leq .001$) and class-level ($d \approx .003$) effects, indicating a stronger relationship at the pupil level. This suggests digital videos are most effective when used in individual or small-group settings.

Table 4.20: Univariate General Linear Model Output

Tests of Between-Subjects Effects

Dependent Variable: Sound Spelling

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	6802.565[a]	6	1133.8	29.84	.000	.364
Intercept	15728.7	1	15728.7	414.1	.000	.570
School Level	.499	1	.499	.013	.909	.000
Class Level	30.94	1	30.94	.815	.367	.003
participants	3262.4	1	3262.4	85.89	.000	.215
Condition	2723.8	1	2723.8	71.71	.000	.186
Time	105.12	1	105.12	2.77	.097	.009
Condition * Time	.375	1	.375	.010	.921	.000
Error	11888.6	313	37.98			
Total	62488.2	320				
Corrected Total	18691.2	319				

a. R Squared = .364 (Adjusted R Squared = .352).

4.7.3 Effect of Digital Videos in Arithmetic Skills (Number identification, addition, subtraction)

Mean and Standard Deviation of Pupils' Arithmetic Score

The Mean and Standard Deviation of Pupils' Arithmetic Score over time exhibited that the mean of the Number identification in T1 was (*M*=13.1, *SD*=7) for the control group and (*M*=11.2, *SD*=6) for the experimental group. In T2 (*M*=12.6, *SD*=6.8) in the control group and (*M*=13.5, *SD*=6.7) in the experimental group. For Addition skills, the mean of T1 was (*M*= 2.8, *SD*=2.1) in the control group and (*M*=2.6, *SD*=1.7) in the experimental group, and T2 the mean was (*M*=3.4.*SD*= 2.2) in the control group and (*M*=3.4, *SD*=2.1) in the experimental group. For Subtraction, the mean in T1 was (*M*=2.8, *SD*= 2.1) in the control group and (*M*=2.6, *SD*=1.7) in the experimental group while for T2 (*M*=3.3, *SD*=2.2) in the control group and (*M*=3.4, *SD*=2.1) in the experimental group (see Table 4.21, Figure 4.4, 4.5 and 4.6).

Table 4.21: Means and Standard Deviation of Pupils' Arithmetic score between T1 and T2

Skills	Time	Condition	M	SD
Number Identification	Time 1	Control	13.1385	6.99036
		Experimental	11.2297	6.02258
	Time 2	Control	12.5900	6.76999
		Experimental	13.4895	6.70670
Addition	Time 1	Control	2.8173	2.11212
		Experimental	2.5676	1.67848
	Time 2	Control	3.3750	2.19680
		Experimental	3.3991	2.11315
Subtraction	Time 1	Control	2.8173	2.11212
		Experimental	2.5676	1.67848
	Time 2	Control	3.3750	2.19680
		Experimental	3.3991	2.11315

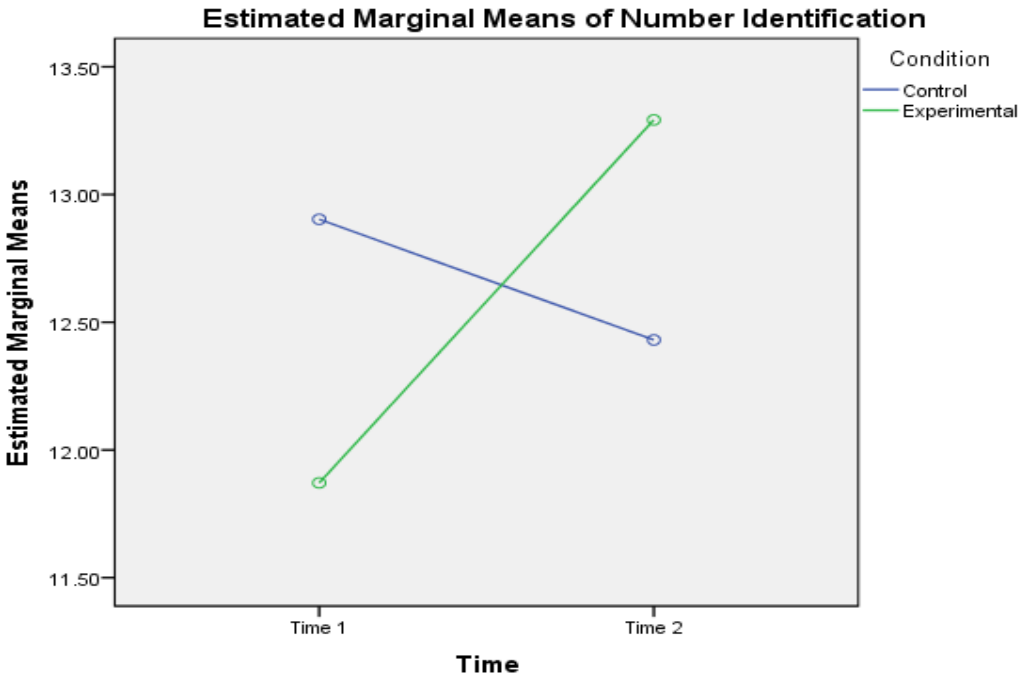

Figure 4.4: Mean of Number Identification for the Experimental Group and Control Group at T1 and T2

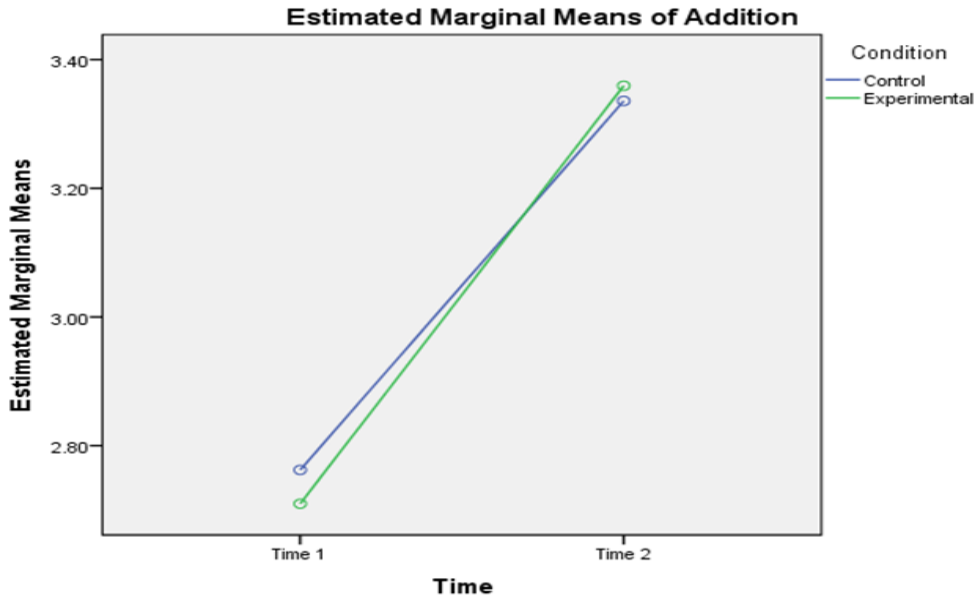

Figure 4.5: Mean of Addition Skills for the Experimental and Control Group in T1 and T2

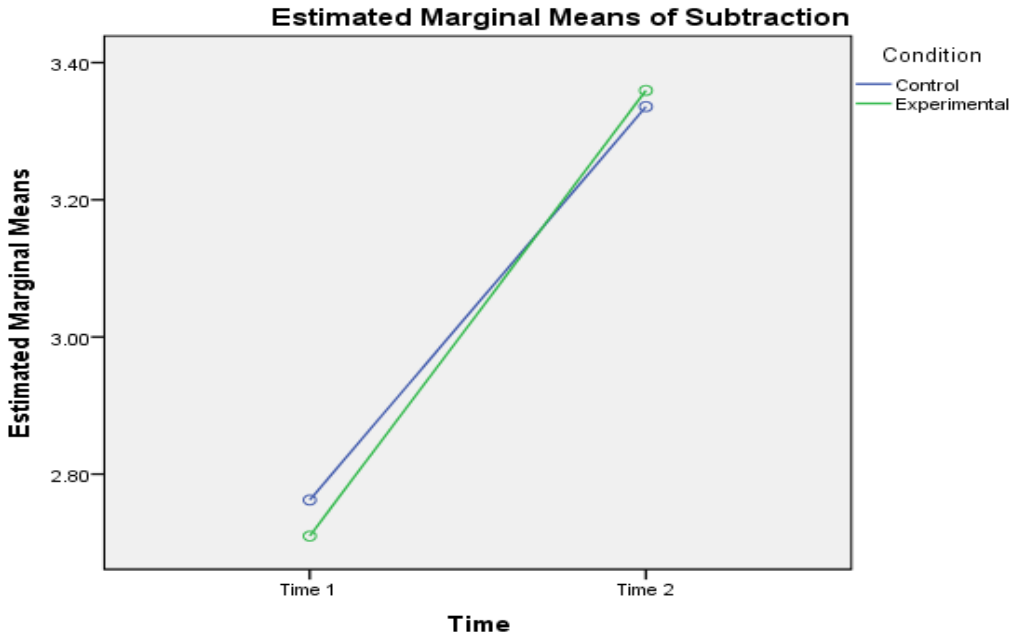

Figure 4.6: Mean of Subtraction Skills for the Experimental and Control Group in T1 and T2

Levine's Test for homogeneity assumption of variance

Levine's Test indicates that the null hypothesis was maintained, showing equal error variance between T1 and T2 for Number Identification F (3,316) = 0.116, p = .950, Addition F (3,316) = .198, p = .117, and Subtraction F (3,316) = 1.98, p = .117. The p-values being greater than, p>.05 means that the homogeneity assumption of the variance was met. (See Table 4.22).

Table 4.22: Levene's Test of Equality of Error Variances

	F	df1	df2	Sig.
Number Identification	.116	3	316	.950
Addition	1.981	3	316	.117
Subtraction	1.981	3	316	.117

Note: Levine's Tests suggested the null hypothesis that the error variance of the dependent variable is equal across groups was not statistically significant at p>.05 thus the homogeneity assumption of the variance was met

Correlations between gender, age, class level and arithmetic skills

The Correlations between gender and number identification showed statistically significant relationships *r* (160) =.211, *p*=.007, between gender and addition showed a statistically significant relationship *r* (160) =.215, *p*=.006, and between gender and subtraction showed a statistically significant relationship *r* (160) =.175, *p*=.027.The correlation of age and number identification was statistically not significant *r* (160) =.111, *p*=.163, Age and addition skills were statistically not significant *r* (160) =.-116, *p*=.143, Age and subtraction skills were statistically not significant *r* (160) =.105, *p*=.187.The correlation between Class level and number identification was statistically not significant *r* (160) =.111, *p*=.163. Class level and addition skills was statistically not significant *r* (160) =. -116, *p*=.143 and Class level and subtraction skills was statistically not significant r (160) =.105, *p*=.187. The implication for the significant correlation between gender and arithmetic skills was probably because boys at a lower age engage in games with girls help their parents in household activities. Since the correlation was positive weak, the relationship was possibly less (see Table 4.23).

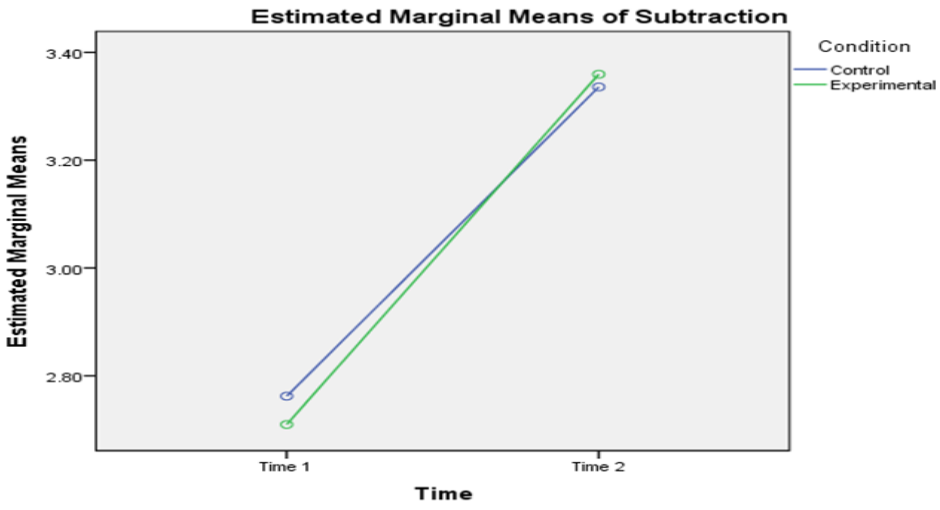

Table 4.23: Correlation between Gender, Age, Class level, Number identification, Addition and Subtraction

	1	2	3	4	5
1. Gender					
2. Age of the participants	-.572**				
	.000				
3. Class level	-.572**				
	.000				
4. Number Identification	.211**	.111	.111		
	.007	.163	.163		
5. Addition	.215**	-.116	-.116	.173*	
	.006	.143	.143	.028	
6. Subtraction	.175*	.105	.105	.164*	.331**
	.027	.187	.187	.038	.000

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Multivariate General Linear Model output

The Multivariate General Linear Model displayed a statistically significant relationship between the use of digital videos and the development of arithmetic skills (number identification, addition, subtraction) within pupils (Participants) on Number Identification F (1, 314) = 91.72; $p < .0005$; partial $\eta^2 = .23$; addition F (1, 314) = 42.5; $p < .0005$; partial $\eta^2 = .12$ and F (1,314) =42.5, $p<.0005$; partial $\eta^2 =.12$ for Subtraction. There was no statistically significant effect of the Test at the class level, $p>.0005$ and school type p>.0005. (see Table 4.24). According to Cohen (1988), the commonly used interpretation of effect sizes is (d = 0.2) small, (d = 0.5) medium, and (d = 0.8) large. The smaller the effect size, the smaller the relationship between the variables. Since the effect size of the participant (pupils) in this study was d=0.226, larger compared to school level d=000 and class level d=.005, the results indicated that the use of videos had a stronger relationship with pupils' level and a weak relationship at the class level and school level. This implies that the use of digital videos is more effective in a small group setting.

Tests of Between-Subjects Effects of digital videos in Number identification, addition and subtraction.

Table 3.24: Multivariate General Linear Model Output

Source	Skills	Types III Sum of squires	Df	Mean Square	F	Sig	Partial Eta Squared
School Type	Number Identification	2.469	1	2.469	.072	.789	.000
	Addition	.007	1	.007	.002	.964	.000
	Subtraction	.007	1	.007	.002	.964	.000
	Number Identification	3.144	1	3.144	.091	.763	.000
Class Level	Addition	5.635	1	5.635	1.530	.217	.005
	Subtraction	5.635	1	5.635	1.530	.217	.005
	Number Identification	3158.138	1	3158.138	91.721	.000	.226
Participants	Addition	156.466	1	156.466	156.466	156.466	.119
	Subtraction	156.466	1	156.466	156.466	156.466	.119
	Number Identification	10811.671	314	34.432			
Error	Addition	1156.296	314	3.682			
	Subtraction	1156.296	314	3.682			

a. R Squared = .232 (Adjusted R Squared = .220) b. R Squared = .150 (Adjusted R Squared = .136)

The following synthesizes the interview responses provided by teachers regarding the effect of digital videos on improving lower primary pupils' skills in reading, writing, and arithmetic.

Lower primary teachers have noted that digital videos significantly enhance students' motivation and improve memory retention in foundational literacy and numeracy, particularly in reading, writing, and arithmetic. This is largely due to the ability of digital videos to engage learners visually more effectively than text alone. However, the successful integration of this technology hinges on having adequate technical infrastructure, such as digital devices, reliable electricity, and internet connectivity, along with proper teacher training. Educators must have the necessary digital skills to effectively operate classroom equipment. Furthermore, overcrowded classrooms can diminish individual student engagement, which may counteract the advantages of video usage. Therefore, while digital video-based learning provides clear benefits in motivation, retention, and skill development, its effectiveness is limited by infrastructural challenges, the need for comprehensive teacher training, and issues related to class size.

CHAPTER FIVE

DISCUSSION OF THE FINDINGS

5.1 Overview

This chapter interprets the study's findings in light of the research objectives and examines their implications for policy, educational practice, and future research. The study investigated (a) teachers' utilization of digital videos for teaching reading (including basic sounds and word pronunciation), writing (sound–spelling), and arithmetic skills (number identification, addition, subtraction); (b) how access to digital videos influences teachers' use of digital videos in teaching these foundational skills; (c) the influence of teachers' perceptions of digital videos on use for improving lower-primary pupils' reading, writing, and arithmetic skills; and (d) the effect of video use on pupils' performance in those skill areas.

The discussion integrates the interpretation of empirical findings with evidence from the literature review, the guiding theoretical framework, and the researcher's experience regarding the effects of videos on learning. Taken together, the results provide a comprehensive understanding of how video-based instruction can enhance basic literacy and numeracy, the conditions under which teachers are more likely to use video resources, and the beliefs that drive their instructional choices. These insights inform policy recommendations for digital video integration, practical guidelines for classroom implementation, and directions for future studies on technology-mediated learning in early education.

5.2 Teachers' Use of Digital Videos in Reading, Writing and Arithmetic Skills

The purpose of this study was to examine the extent to which teachers in Dodoma City, Tanzania, use digital videos to improve reading (basic sounds, word pronunciation), writing (sound spelling), and arithmetic (number identification, addition, subtraction) skills among lower-primary pupils. Although digital video-based instruction is recognized as beneficial for foundational skill development, its utilization in Tanzania remains underexplored (Kihoza, 2016; Mfaume, 2019). Our results indicate that over 50% of teachers reported never using videos in classroom instruction, a finding that aligns with studies in Nepal and Kenya where many teachers similarly avoided digital videos due to limited access to devices, insufficient digital literacy, unreliable electricity, and poor internet connectivity (Murith & Yoo, 2021; Thresha, 2022).

Interpretation of Findings: Interview data corroborated these survey results. For example, Teacher A1 stated, "She never used videos to facilitate reading, writing, and arithmetic skills … because she didn't know how to use it." This suggests that while teachers are willing to integrate videos, they lack the necessary technical skills to download and use content effectively. Comparable findings were reported by Ramadhan, Sukma, and Indriyani (2019) in Indonesia, where low digital competency impeded teachers' integration of digital videos. Teacher T2 highlighted infrastructural challenges: unreliable electricity and internet access.

This supports Li, Yamaguchi, and Takada's (2018) argument that accessibility to digital technologies influences their use in teaching. Teacher A3 further emphasized the lack of policy emphasis: "Our education policy doesn't emphasize on use of

videos … although we have access to mobile phones, lack of projectors, television, and internet connectivity hinders the use." This reflects findings by Vandelinde and Braak (2011) in Belgium, who called for government policies mandating digital media integration in primary schools. Implications These findings suggest an urgent need for policymakers and curriculum developers in Tanzania to provide both pre-service and in-service teachers with targeted training in digital pedagogy.

Additionally, schools require investments in reliable electricity, internet connectivity, and appropriate hardware (e.g., projectors, tablets). Without such systemic support, even motivated teachers remain unable to deploy video-based instruction effectively (Ramadhan, et al., 2019; Li et al., 2018; Vandelinde & Braak, 2011). Our results contrast markedly with data from Western countries, where a majority of teachers incorporate digital media in basic skills instruction (UNESCO, UNICEF, & World Bank, 2021). UNICEF (2020) reported that while 96% of high-income countries use digital media in education, only 25% of low-income countries do, a disparity largely attributed to financial capacity (UNESCO et al., 2021). This study focused on teachers within Dodoma City, limiting generalizability to other regions.

Additionally, reliance on self-report and interview data may introduce bias. Future research should include classroom observations and student outcome measures to assess the actual effectiveness of video-aided instruction in improving literacy and numeracy. In summary, the present study demonstrates that although teachers in lower-income contexts are open to adopting digital video-based instruction, insufficient digital skills, inadequate infrastructure, and weak policy support critically hinder implementation.

To bridge this gap, Tanzania must enhance teacher training, reinforce infrastructure, and introduce supportive policy frameworks. These measures could significantly improve basic skill acquisition in early primary education through effective integration of video and digital game-based learning. From the perspective of the Cognitive Theory of Multimedia Learning (CTML), these barriers are particularly problematic. CTML posits that effective learning occurs when verbal and visual information is processed in separate channels under conditions of limited cognitive capacity and active learner engagement (Mayer, 2005; Paivio, 1991).

In Dodoma, teachers' limited digital competency means they cannot design or select videos that follow CTML principles such as coherent narration, synchronized visuals, segmented content, and prompts that stimulate active cognitive processing. Without appropriate infrastructure and training, cognitive overload occurs, reducing instructional effectiveness. Therefore, to enhance basic literacy and numeracy, Tanzania must invest in teacher digital-skills development, frame policy to support multimedia-based pedagogy, and ensure schools have reliable electricity, internet, and multimedia equipment ready for CTML-compliant video instruction.

5.3 Accessibility of Digital Videos and Use of Digital Videos in Improving Basic Skills among Lower Primary Pupils

The accessibility of digital videos has been shown to significantly influence teachers' utilization of these tools for teaching reading (focusing on sounds and pronunciation), writing (emphasizing spelling), and arithmetic (covering number identification, addition, and subtraction). Correlation and regression analyses revealed strong positive relationships, indicating that better access leads to higher

usage rates. Findings from Tanzania align with global trends: UNICEF (2020) reported that 89% of pupils in high-income countries, 59% in middle-income countries, and only 8% in low-income countries utilize digital videos for foundational learning, which is largely due to inequitable access. Research from various countries, including the USA (Blackwell et al., 2014), Taiwan (Cheng & Weng, 2017), Nepal (Kiryakova & Kozhuharova, 2024), and Japan (Li et al., 2018), supports this association, reinforcing the notion that access to devices, infrastructure, and connectivity is essential for effective digital media integration. In Tanzania, Manyengo (2021) similarly noted that teachers' limited access to computers, projectors, and reliable internet significantly restricted usage in primary classrooms.

From the perspective of the Cognitive Theory of Multimedia Learning (CTML), these findings underscore important implications for instructional design. CTML posits that meaningful learning necessitates dual-channel input, limited cognitive load, and active processing (Mayer, 2021, 2022). Without accessible media, teachers are unable to implement CTML-aligned strategies such as synchronized narration and visuals, segmented learning, and interactive prompts that enhance cognitive processing and mitigate overload (for instance, addressing split-attention and modality principles). In low-resource settings like Tanzania, deficits in infrastructure and a lack of digital literacy hinder teachers from delivering coherent multimedia instruction. Therefore, ensuring equitable access to digital videos, along with training in CTML-based design principles, is essential to foster active cognitive engagement and effectively integrate video into instruction for foundational literacy and numeracy skills.

5.4 Teachers' Perception of Digital Videos and Its Use in Improving Reading Writing and Arithmetic Skills of Lower Primary Pupils

In this objective, the research wanted to show how teachers' perceptions of using digital videos influence the use of digital videos in improving reading, writing, and arithmetic skills among lower primary pupils. The correlation analysis revealed that there was a strong positive relationship between teachers' perception of using digital videos and Teachers' use of digital videos in improving reading, writing, and arithmetic skills. This resembles the studies by Dorgan, Agacli, and Celik (2020) who confirmed that positive perception towards digital videos among teachers might influence the use of digital videos learning because positive perception stimulates the cognitive abilities, creating a positive attitude towards digital media and promote self-motivation towards the digital media.

The results of the correlation were strong positive which implies that, teachers have a view that videos improve reading, writing and arithmetic amongst lower primary pupils. The results suggested that the perception of teachers towards digital videos had a direct and statistically significant connection with the use of digital videos in education. The study also noted that teachers' use of digital videos was influenced by the teachers' perception of digital videos because the regression results revealed that 99.8% of the change in using digital videos was influenced by the awareness of Teachers on the contribution of videos in reading, writing, and arithmetic. This matched with Wanjiku, Simon, and Mosul, (2017) who found that the use of digital media in Kiswahili subjects was statistically significantly influenced by the perception of teachers in digital videos at $p<0.01$.

This implies that influencing the use of digital videos in reading, writing, and arithmetic among teachers in lower primary pupils requires a positive attitude among teachers through regular training and workshops to change their attitude towards digital media positively. I therefore suggest the government consider organizing teachers training on the use of videos and supporting schools with digital devices and internet connectivity.

5.4 The Effect of Digital Videos on Reading, Writing and Arithmetic Skills of Lower Primary Pupils

The objective of this study was to examine the outcomes of using digital videos to enhance reading, writing, and arithmetic skills among lower primary pupils in Tanzania. The research intervention revealed a statistically significant linear relationship between the use of digital videos specifically digital videos and the improvement of foundational skills, including reading (basic sounds and word pronunciation), writing (sound-spelling), and arithmetic (number identification, addition, and subtraction). These findings provide empirical evidence that digital video based instruction positively influences literacy and numeracy skills among lower primary learners. Consistent with existing literature, this study highlighted the beneficial role of digital videos in fostering academic development within the classroom setting.

Moreover, the study established a significant difference between the experimental and control groups. Pupils in the experimental group, who were exposed to digital video-based instruction, demonstrated higher average performance compared to those in the control group. This performance difference underscores the effectiveness

of using digital videos in enhancing educational outcomes. In the current digital era, pupils are increasingly attracted to multimedia content such as audio, images, and videos, which makes learning, particularly reading, more engaging than traditional printed materials. Digital videos offer features that contribute to improved learning outcomes, including enhanced creativity, motivation, confidence, and a positive attitude towards learning.

These results are consistent with findings by Amosa and Ogunlade (2015) and Chinooneka and Mupa (2015), who demonstrated a significant correlation between the use of digital videos and improvements in reading skills such as basic sound recognition and word pronunciation. Similarly, Rensi et al. (2020) reported a significant relationship between digital videos usage and improved arithmetic skills, particularly in number identification, addition, and subtraction. These improvements are attributed to the stimulating and interactive nature of digital videos, which tend to engage pupils more effectively than traditional methods.

Furthermore, digital videos are especially effective for younger learners, many of whom are visual learners. Sorden (2013) noted that digital videos -based learning not only enhances pupils' reading abilities but also entertains and motivates them to engage with reading materials. Archer and Savage (2014) also emphasized the importance of digital videos including videos and educational games in improving learning outcomes among primary school learners. Supporting this, Umoh, Udo, Muhammad, and Gloria (2023) found that Nigerian pupils taught using digital videos outperformed their peers taught through traditional chalk-and-talk methods in both literacy and numeracy skills acquisition. According to Teacher T1 in the current

study, children learn better when visuals such as digital videos are used, as they are more motivated and engaged during the learning process.

Interview responses further support the quantitative findings. Teacher T2 indicated that digital videos help improve pupils' performance, particularly in arithmetic skills such as number identification, addition, and subtraction, because they enhance memory retention. Pupils tend to remember visual content more easily than textual content. These findings suggest that incorporating digital videos in teaching may boost pupils' confidence and motivation, thereby supporting their development in reading, writing, and arithmetic.

In conclusion, the study recommends that the Tanzanian government take deliberate and timely actions to support primary school teachers with the provision of digital facilities and internet access. This would enable the effective use of digital videos in teaching foundational skills. Additionally, policymakers and curriculum developers should consider integrating digital videos into instructional design to build a stronger educational foundation for Tanzanian learners

CHAPTER SIX

STUDY SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

6.1 Overview

The study explored the contribution of digital video in reading (basic sounds, word pronunciation) writing (sound-spelling) and arithmetic (number identification, addition, subtraction) among lower primary pupils of Dodoma City in Tanzania. This chapter consequently, presents a summary of the study which brought about a brief discussion of each chapter. The conclusion conveys an overall understanding of the studied problem and the findings thereof. Further, the chapter highlights recommendations based on the findings to inform policy and action as well as recommendations for further research.

6.2 Summary of the Study

This study assessed the contribution of digital videos in improving reading, writing, and arithmetic among the lower primary pupils in Tanzania. Findings showed that the use of videos is one of the contributing factors for improving reading, writing, and arithmetic among the lower primary pupils. However, the lack of enough digital devices, internet services, and capacity-building training among lower primary teachers affects its effectiveness.

The first chapter presents background information on the problem of reading, writing and arithmetic skills and the contribution of videos in improving reading writing and arithmetic of lower primary pupils in Tanzanian. Further, the chapter presented the research problem with a clear focus on objectives and research questions respectively. Chapter two presents a literature review of the study. It provided the

theoretical framework, empirical studies, conceptual framework, and knowledge gaps. The cognitive theory of Multimedia learning was used to the study variables. Empirical studies were presented based on the objectives of the study drawing works of literature from global, African, and local perspectives. The chapter also describes the conceptual framework of the study, showing the relationship among the variables. Finally, chapter two presents the research gaps identified from the theory and the empirical works of literature.

Chapter Three outlined the research methodology used in this study. It began by explaining the research paradigm, discussing the philosophical foundations of the study, namely the pragmatic paradigm, which guided the selection of mixed methods. The research design sequential explanatory design to allow for in-depth analysis and causal inference. The study employed a mixed-methods approach, integrating both quantitative (e.g., standardized tests and questionnaires) and qualitative (e.g., interviews) data to provide a comprehensive understanding of the contribution of digital videos in improving reading, writing, and arithmetic among lower primary pupils.

This chapter also detailed the data collection instruments, which included standardized academic tests to measure pupil performance, structured questionnaires for teachers, and interviews to collect rich qualitative insights. In addition, the chapter explained the sample size, sampling techniques, and procedures, along with validity and reliability checks to ensure the trustworthiness of the instruments. Ethical considerations were also thoroughly addressed, including informed consent, confidentiality, and data protection.

Chapter Four presented and analyzed the study's findings in alignment with the research objectives. Descriptive and inferential statistical methods, such as correlation analysis, simple linear regression, and General Linear Models (GLM), were used to analyze the quantitative data. The findings revealed a statistically significant improvement in reading, writing, and arithmetic skills among pupils who were taught using digital videos. For instance, results showed that accessibility of digital videos had a strong positive correlation ($r = .839$, $p < .01$) with their use in classrooms, and teachers' perceptions significantly influenced usage ($\beta = .999$, $p < .001$). Furthermore, standardized test scores in the experimental group improved substantially compared to the control group. Qualitative data from interviews supported these findings, indicating that videos made learning more engaging, memorable, and effective, particularly for young, visual learners.

Chapter Five provided an in-depth discussion of the findings to the theoretical framework, Cognitive Theory of Multimedia Learning and existing empirical studies. The chapter interpreted how the use of digital videos improved pupils' abilities in basic reading (sounds, word pronunciation), writing (spelling), and arithmetic (number identification, addition, subtraction). The discussion confirmed that digital videos stimulate multi-sensory learning, which aligns with Mayer's theory that learning is enhanced when information is presented through both visual and auditory channels.

The chapter also discussed barriers to effective implementation, such as limited digital infrastructure, lack of teacher training, and inconsistent access to electricity and internet. These contextual challenges were compared with similar issues

identified in prior studies conducted in Kenya, Nigeria, and Uganda.

Chapter Six concluded the study by summarizing the key findings and offering actionable recommendations for policy, practice, and further research. It emphasized that digital videos are effective tools for improving foundational academic skills among lower primary pupils. The study contributed to the field of educational technology and curriculum development by demonstrating how integrating digital video into early-grade education improves learning outcomes. Policy recommendations included updating the ICT Policy for Basic Education (2007), incorporating digital media training into teacher education programs, and establishing a national repository for educational digital content. The chapter also called for strategic collaborations with telecom companies, EdTech organizations, and international donors (e.g., UNICEF, UNESCO) to support digital infrastructure in schools. Lastly, the study suggested further research into the use of digital videos for special needs education, pre-primary learning, and mathematics at the secondary level, as well as comparative studies across rural and urban contexts.

6.4 Contribution of the Study

The findings of this study contribute meaningfully to the ongoing development of educational policy in Tanzania, particularly in emphasizing the role of instructional media within primary education. Specifically, the study provides guidance to curriculum developers, highlighting the importance of integrating digital video such as educational videos alongside traditional printed materials. This integration aligns with contemporary pedagogical approaches that support multimodal learning. Additionally, the study raises awareness among teachers regarding the pedagogical

value of digital media, demonstrating its effectiveness in enhancing curriculum implementation at the classroom level. From a research perspective, the study addresses a significant knowledge gap concerning the challenges of reading, writing, and arithmetic acquisition among lower primary pupils in Tanzania, offering empirical evidence on how digital video can be used to support foundational skill development in early-grade education.

6.5 Recommendations of the Study

The study identified the contribution of digital video in improving reading, writing, and arithmetic among the lower primary pupils. However, there are notable implications that a call for attention and appropriate measures are required in terms of policy and further studies.

6.5.1 Recommendations on Policy and Action

The findings of this study revealed that the majority of teachers did not use digital videos in their teaching practices, and only a few recognized their importance in improving reading, writing, and arithmetic skills among lower primary pupils. This observation contrasts sharply with the results from standardized tests, which demonstrated that videos significantly enhance foundational academic skills. Based on these findings, several policy and action-oriented recommendations are proposed.

First, it is recommended that the Government of Tanzania revise the *ICT Policy for Basic Education (2007)* to ensure that digital tools particularly educational digital videos are systematically integrated into lower primary education programs. Moreover, teacher education curricula at universities and colleges should include training modules focused on the pedagogical use of digital videos, thereby

strengthening teachers' capacity to effectively integrate digital videos into classroom instruction.

The Tanzania Institute of Education (TIE) should develop a national guide for implementing educational digital videos, ensuring consistency in their use across schools. In addition, the Ministry of Education should establish a centralized repository of approved digital media resources, including instructional videos, educational games, and other interactive learning materials accessible to teachers and schools.

To promote professional development, it is suggested that teacher training colleges and in-service training programs introduce short-term certification courses in digital pedagogy. The Tanzania Teachers' Service Commission (TSC) could collaborate with EdTech organizations such as Ubongo Kids and Shule Direct to offer free, online professional development courses for teachers.

Infrastructure support should also be addressed. The Universal Communications Service Access Fund (UCSAF) should prioritize funding for ICT infrastructure development in rural schools, ensuring equitable access to digital learning tools. Furthermore, the government should partner with telecommunications providers (e.g., Vodacom, Airtel, and Tigo) to offer free or subsidized educational data bundles to pupils, enabling them to access digital learning resources from home.

To strengthen national efforts, the government is encouraged to seek support from development partners such as UNESCO, UNICEF, and the World Bank to fund large-scale digital learning initiatives targeting lower primary schools. Schools themselves should be encouraged to invest in digital devices such as personal

computers, laptops, tablets, projectors, or televisions to support the teaching of word pronunciation, spelling, number identification, addition, and subtraction.

Finally, schools should organize parental engagement workshops to educate families on how to support their children's learning through the use of digital videos at home. Schools could also develop mobile applications or establish WhatsApp groups to distribute weekly digital learning content and instructional guidance to parents, thereby extending learning beyond the classroom.

6.5.2 Recommendation for Further Research

While this study provided valuable insights into the contribution of digital videos in improving reading, writing, and arithmetic skills among lower primary pupils in Dodoma City, several research gaps emerged that warrant further investigation:

i. Geographical implementation gap: The current study was limited to urban schools within Dodoma City. However, digital infrastructure and educational practices often vary significantly between urban and rural areas. Future studies should conduct comparative research in both rural and urban settings to assess how geographical context influences the accessibility, integration, and effectiveness of digital videos in early-grade learning.

ii. Inclusive educational gap: This study did not address how digital videos supports learners with special needs. Further research is recommended to explore the effectiveness of digital videos in enhancing reading skills among pupils with disabilities, including cognitive, visual, and learning impairments, in Tanzanian primary schools.

iii. Deaf leaners digital video accessibility gap: Little is known about how digital videos support literacy development among deaf pupils. Future research should investigate the role of digital videos, especially with sign language support or subtitles, in improving reading skills for deaf primary school pupils in Tanzania.

iv. Curricular scope gap: Although this study focused on arithmetic at the lower primary level, the use of digital video in mathematics at other levels remains under-researched. It is therefore recommended that future studies examine the contribution of digital media to mathematics performance among secondary school students in Tanzania.

v. Early childhood educational gap: The study did not address pre-primary learners, who are also in a critical stage for foundational literacy and numeracy development. Future research should explore how digital videos influence reading, writing, and arithmetic skills among pre-primary pupils, especially considering their developmental learning styles.

By addressing these gaps, future research can contribute to a more comprehensive understanding of the role of digital media in promoting equitable, inclusive, and effective learning across diverse educational contexts and learner groups in Tanzania.

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APPENDICES

Appendices 1: Questionnaires

Name: _____[optional]_ Date: _____

To the Educator:

This questionnaire is composed of well-validated portions of several questions that have been used to test teachers' experience with the use of digital media. We will use the combined information to help develop a profile of how teachers view digital media. Please complete all items even if you feel that some are redundant. This may require 10-15 minutes of your time. Usually, it is best to respond with your first impression, without giving a question much thought. Your answers will remain confidential.

Thank you for your cooperation!

Ambwene Nazarius Kilungeja
The Open University of Tanzania
P.O Box 23409
Dar es Salaam

i) Background Information professional

1.Gender.Tick one of them.1. __M, 2. __F.

2.Age: Circle one

1.__20-25,

2.__26-30,

3.__31-40,

4.__41+

3. How long have you been teaching lower primary? Circle one.

1. 0-5years

2. 6-10 years

3.11-15 years

4.16+years

4. What kind of digital facilities do you have at your school?

1. Computer

2. Tablet

3. Television

4. Projector

5. More than one

ii) To assess teachers' use of digital media in reading, writing, and arithmetic skills amongst the lower primary pupils. Put a Tick to the answer of your choice by using the following Scale items;1=never,2=not often, 3=occasionally, 4=regularly, 5=always

No	Scale	1	2	3	4	5
	Teachers' use of digital media					
6	I know to use videos and digital games in the class					
7	I teach by using videos and digital games in the class					
8	I motivate pupils by videos and digital games					
9	I get notes from videos and digital games					
10	I can download the videos and digital games for teaching					
11	The use videos and digital games help me influence pupils' participation in the class.					

iii) To assess how the accessibility of digital media influence use of digital media in reading, writing, and arithmetic skills among lower primary pupils. Put

a Tick to the answer of your choice by using the following Scale items;1=never,2=not often, 3=occasionally, 4=regularly, 5=always

No	Scale	1	2	3	4	5
	Accessibility of digital media					
12	There is internet connectivity all the time					
13	There is frequent training on use of digital media					
14	There digital devices to use					
15.	There is availability of electrical power					

ii)To assess how teachers' perception of digital media influences the use of digital media in improving reading, writing, and arithmetic among lower primary pupils. Use the Scales below to respond to the following questions. 1. very unimportant, 2. 3. agree 4. Highly agree.

No	Scale	1	2	3	4	5
16	Digital media is important in teaching the basic skills					
17.	Digital media is more interesting and motivating in learning basic skills					
18.	Digital media makes reading, writing, and arithmetic classes more participatory					
19.	Digital media promote a learner-centered approach to learning					
20.	Digital media offer various teaching and learning materials					
21.	Digital media is the Best media for teaching the basic skills					

1.1.2 A standardized Test for reading, writing and arithmetic

iii) Effect of using digital media in improving basic skills among the Tanzanian lower primary pupils

A standardized Test to evaluate the effect of digital media in reading, writing, and arithmetic among Tanzanian lower primary pupils.

WRITING TEST FOR STANDARD ONE AND TWO

Dictations

1. _____
2. _____
3. _____
4. _____

Write a missing syllable

5. ***ba ____ bi bo bu (bo, be)***
6. ka ke ki ____ ku (ke, ko)
7. ga, ge, gi, go _____ (ga, gu)
8. Fill blanks by writing a correct vowel sound from the bracket to complete a word (a, e, i, o, u)
9. mam_____
10. ch_____i
11. mez _____

READING TEST FOR STANDARD ONE AND TWO

Read the following vowels and syllables

1. ***i, a, o, e, u***
2. ba, di, ko, me
3. Sa, li, ja, pu

Read the following words

4. ***meza***
5. miti
6. papai
7. mama
8. sasa
9. nanasi
10. kuku

ARITHMETIC TEST FOR STANDARD ONE AND TWO

Write the following numbers in words

1. ***6 =***
2. 3 =

Write the following in numerical form

3. ***Eight =***
4. Five=

Write the missing number

5. ***1,2, __,4__***

Addition and Subtraction

6. ***5 + 2 =***
7. 6 + 3 =
8. 9 + 0=
9. 7 - 2=
10. 9 - 5=

1.1.3: Interview Question

1. Do you use digital media in teaching basic skills? _____

2. To what extend do you have an access to digital media for facilitating basic skills? _____

3. What is your comment on the use digital media in improving basic skills?

_____

Appendices 2: Permission letter from the University and Dodoma City Director

THE OPEN UNIVERSITY OF TANZANIA

DIRECTORATE OF POSTGRADUATE STUDIES

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

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

Our Ref: PG201702946

14th July, 2022

Regional Administrative Secretary,
Dodoma Region,
P.O. Box 914,
DODOMA.

RE: RESEARCH CLEARANCE

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

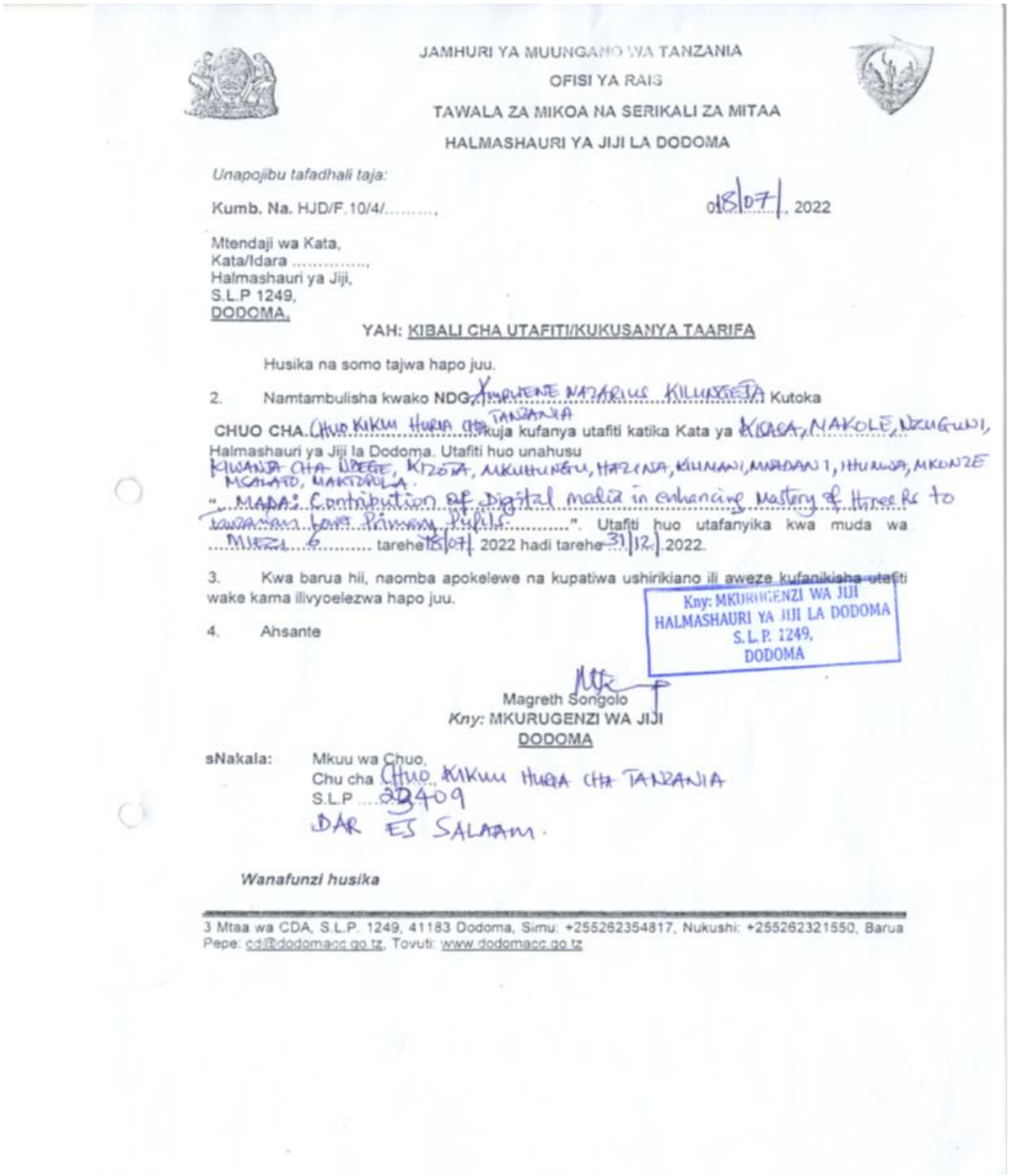
To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Mr. Ambwene Nazarius Kilungeja** (Reg No: **PG201702946)** pursuing **PhD**. We here by grant this clearance to conduct a research titled "**Contribution of Digital Media in Enhancing Mastery of Three Rs to Tanzanian Lower Primary Pupils. A Case of Dodoma City**". He will collect his data in primary Schools located in your region between 18th July to 31st December 2022.

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

Yours,
THE OPEN UNIVERSITY OF TANZANIA

Prof. Magreth S.Bushesha
DIRECTOR OF POSTGRADUATE STUDIES.

Appendices 3: Permission letter from Dodoma City Council Director



JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA
HALMASHAURI YA JIJI LA DODOMA

Unapojibu tafadhali taja:

Kumb. Na. HJD/F.10/4/....., 05/07/.. 2022

Mtendaji wa Kata,
Kata/Idara .....,
Halmashauri ya Jiji,
S.L.P 1249,
DODOMA.

YAH: KIBALI CHA UTAFITI/KUKUSANYA TAARIFA

Husika na somo tajwa hapo juu.

2. Namtambulisha kwako NDG. INNOCENT NAZARIUS KILUVEJA Kutoka CHUO CHA CHUO KIKUU HURIA CHA TANZANIA kuja kufanya utafiti katika Kata ya KIBAGA, NAKOLE, MZUGUNI, Halmashauri ya Jiji la Dodoma. Utafiti huo unahusu KIWANGO CHA UELEWE, KIZOTA, MKUHUNGU, HAZINA, KILIMANI, MADUKANI, HURUMA, MKONZE MGUNDO, MAKUTUPULA. "... MADA: Contribution of Digital media in enhancing mastery of literacy to standard four Primary Pupils". Utafiti huo utafanyika kwa muda wa MIEZI 6 tarehe 05/07/ 2022 hadi tarehe 31/12/2022.

3. Kwa barua hii, naomba apokelewe na kupatiwa ushirikiano ili aweze kufanikisha utafiti wake kama ilivyoelezwa hapo juu.

Kny: MKURUGENZI WA JIJI
HALMASHAURI YA JIJI LA DODOMA
S.L.P. 1249,
DODOMA

4. Ahsante

Magreth Songolo
Kny: MKURUGENZI WA JIJI
DODOMA

sNakala: Mkuu wa Chuo,
Chu cha CHUO KIKUU HURIA CHA TANZANIA
S.L.P 23409
DAR ES SALAAM.

Wanafunzi husika

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