

**UTILIZATION OF DIGITAL DEVICES IN ENHANCING DIGITAL  
LITERACY ACQUISITION AMONG EARLY YEARS LEARNERS IN  
THARAKA SOUTH SUB-COUNTY, THARAKA NITHI COUNTY, KENYA**

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**A Thesis Submitted to the Graduate School in Partial Fulfillment of the  
Requirement for the Award of Degree of Master of Education in Early  
Childhood of Tharaka University.**

**THARAKA UNIVERSITY**

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## DECLARATION AND RECOMMENDATION

### Declaration

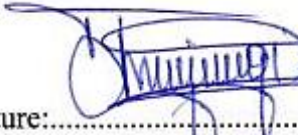
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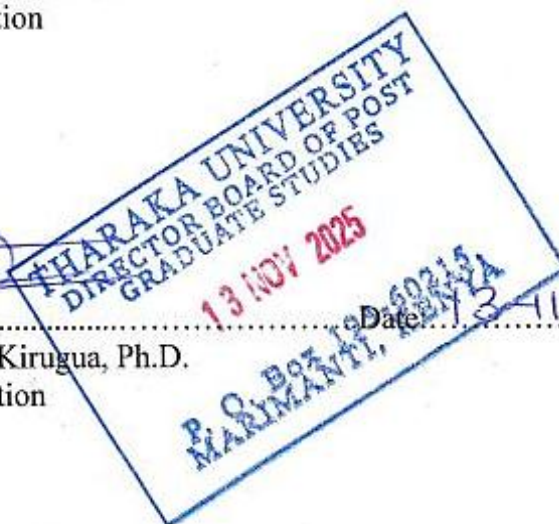
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## **DEDICATION**

I dedicate this work to my dear husband Francis, for his unwavering understanding, help, and humor, as well as his love and moral support during my most trying times. Thank you to our beloved children, Felisters, Robert, and Sharon, for your unfailing moral support and for putting up with me while I struggled with this task. It was quite inspiring to read books and other materials with you by my side.

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## ABSTRACT

The advancement of technology in the current world demands learners to be digitally literate from an early age in order to fit in the digital world. As a result, the government of Kenya has heavily invested in provision of digital devices to schools as well as teacher retooling on utilization of digital devices in teaching and learning. This study's purpose was therefore to ascertain the utilization of digital devices in enhancing acquisition of digital literacy among early years learners in Tharaka South sub-county, Tharaka Nithi county. The following objectives led the study; establishing the accessibility of digital devices for use among early years learners, evaluating teachers' competence in utilization of digital devices in enhancing acquisition of digital literacy among early years learners, examining teachers' perception on use of digital devices and assessing challenges faced by teachers in utilizing digital devices in enhancing acquisition of digital literacy among early years learners. Technological Pedagogical Content Knowledge (TPACK) model guided the study. The study was conducted in Tharaka South sub-county in 13 public primary schools which were randomly selected from the five zones in the sub-county. The descriptive survey research design was employed to gather and analyze data regarding study variables. The target population was 2746 early years learners and 64 teachers in public primary schools in Tharaka South sub-county. Using purposive sampling, grade three learners and teachers were selected for the study giving a sample size of 102 learners and 13 teachers. Questionnaires were used to collect data from teachers while observation and interview schedules gathered information from grade 3 learners. A pilot study was carried out in schools with similar characteristics in Tharaka North to ascertain reliability and validity of the instruments. Validity of instruments was ensured by ascertaining that information obtained related to study objectives while their reliability was tested using test-retest method. Reliability results were 0.71. Data analysis was done using quantitative and qualitative methods. Quantitative data was analyzed using descriptive statistics and presented using frequency tables and graphs, while thematic analysis was used to analyze the qualitative data which was presented using detailed thematic description. Statistical Package for Social Sciences (SPSS) version( 29.0) analyzed the data. The study established that; Grade three teachers lacked competent in the utilization of digital devices; accessibility of digital devices was limited and grade three learners had not acquired the necessary digital literacy. The key recommendations of the study was that; sufficient teacher trainings on digital utilization and supply of adequate digital devices is necessary. The study findings may be of help to the Ministry of Education which may consider investing more funds on ICT equipment and infrastructure for early years as well as, in collaboration with the Teachers' Service Commission, leverage teacher training and retooling on the utilization of digital devices to enhance digital skills acquisition among early years learners. The results of this study may also provide a basis for further research.

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## ACRONYMS AND ABBREVIATIONS

|                |                                                            |
|----------------|------------------------------------------------------------|
| <b>CBE</b>     | Competency Based Education                                 |
| <b>DCS</b>     | Digital Content Server                                     |
| <b>DD</b>      | Digital Device                                             |
| <b>DLP</b>     | Digital Literacy Programme                                 |
| <b>EFL</b>     | English Foreign Language                                   |
| <b>GOK</b>     | Government of Kenya                                        |
| <b>ICT</b>     | Information Communication and Technology                   |
| <b>IWB</b>     | Interactive Whiteboards                                    |
| <b>KICD</b>    | Kenya Institute of Curriculum Development                  |
| <b>LMS</b>     | Learning Management System                                 |
| <b>MD</b>      | Mobile devices                                             |
| <b>NACOSTI</b> | National Commission for Science, Technology and Innovation |
| <b>OECD</b>    | Organization for Economic Co-operation and Development     |
| <b>OLPC</b>    | One-Laptop-Per-Child                                       |
| <b>SPSS</b>    | Statistical Package for Social Sciences                    |
| <b>TPACK</b>   | Technological Pedagogical Content Knowledge                |
| <b>TPD</b>     | Teacher Professional Development                           |
| <b>TSC</b>     | Teachers Service Commission                                |
| <b>UK</b>      | United Kingdom                                             |
| <b>UNICEF</b>  | United Nations International Children Emergency Fund       |
| <b>UTAT</b>    | Unified Theory of Acceptance and use of Technology         |

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background to the Study**

Digital literacy skills are indisputable assets and unquestionably valuable tools for children to acquire and develop in the modern world. These skills have become an inescapable feature of 21st century communication. It is a skill linked to teachers' core competencies in teaching and learning process (Atmojo et. al., 2022). The world of interactive media that today's children are growing up in is very different from that of their predecessors. This change has been enhanced by use of digital skills for educational and entertainment purpose.

Digital literacy refers to knowledge, abilities, attitudes, and values that allow children to play, learn, socialize, become ready for the workforce, and take part in civic activities in digital spaces with confidence and independence. (UNICEF, 2019). In addition, Pala and Başibüyük (2020) state that digital literacy is being able to obtain new information by using digital tools, use them to solve problems and use these technologies effectively and safely. According to Fallon (2020), it encompasses both technical ability with digital devices and applications and a thorough awareness of ethical concepts and considerations.

Digital devices (DD) are electronic tools, systems, resources, and equipment that produce, store, or process data (Victorian Curriculum and Assessment Authority, 2021). Devices such as desktops, laptops, tablets, peripherals, servers, mobile phones, smartphones, and any other kind of storage device that is currently or may become available as technology improves are all included in this category.

Teachers that are knowledgeable about these digital gadgets and use them in the classroom will encourage learners to use them to improve and both adults and children use tablets, iPads, and smartphones frequently. For instance, 75% of 3 to 4 year-olds in the UK watch live television, and 98% of them use DD to watch movies or television shows for roughly 12 hours every week, 39% enjoy games for more than 4 hours per week, and 51% watch YouTube for 8 hours per week (Ofcom, 2019). Young children have been using DD more frequently during the COVID-19 pandemic for things like e-

learning and distance communication. Consequently, the utilization of DD has become a normal routine in children's lives.

In the current world, using digital devices for teaching and learning in schools should not be perceived as a luxury. This is predicated on the reality that the present generation occasionally uses technology to satisfy their learning needs. Digital technology is becoming more and more ingrained in our daily lives as we use it at home, at work at school, and more and more during our free time. Children today may utilize more technology than those of prior generations since they are surrounded by a greater variety of technology than they had previously (Saykili, 2019). According to Stevens, (2022), children are swapping real world experiences for digital world experiences and there has been an increase in technology being used in early childhood education throughout the last decade.

Digital technology Utilization has progressively become an important feature of the 21st century early childhood classroom instructional strategy Jannah et.al (2020). Gjelaç et al. (2020) reported that when digital devices are properly and successfully incorporated into early childhood classrooms, it creates a long lasting impression providing new opportunity for social interactions, and alter the dynamic between learners and teachers. The report further shows that digital literacy may provide children with more opportunity to participate in attractive and relevant games, learning, communication, exploration and other school activities required for the development of fundamental 21<sup>st</sup> century skills.

The study by Churchill (2020) on development of digital literacy among learners shown that the usage of mobile devices has influence on development of learners' digital literacy skills. In addition, the learner is able to acquire information whenever they would like to access online materials, share and give feedback on information searched online with the peers and teachers. Obiweluzo's (2021) study affirm that general usage of digital gadgets in early years classrooms increases motivation, improves self-concept and mastery of basic skills, makes learning engagement a more learner-centred method. Digital technology may also be used as a scaffolding tool in the early years classrooms. For example, children's reading activities can be made with

digital cameras. According to Khodabandeh (2022), these digital cameras can also be utilized to record children's learning through portfolios, wall displays, and daily recording.

Educators should have digital competencies to utilize the digital tools in classroom instruction to enhance achievement of the above-mentioned benefits. Digital competence involves the ability to choose and use appropriate digital tools to obtain, evaluate, save, create, display, and share information, as well as to interact and take part in cooperative networks through the Internet. To help learners acquire digital literacy abilities, personnel who engage with children and students should become competent in selecting and utilizing the right digital resources for instruction.

Developed countries have embraced the application of digital gadgets in early years education owing to the aforementioned benefits. For example, in China, A number of policies have been established by the government to develop and strengthen incorporation of technology into schooling for young children since 2012. Chinese children nowadays have plenty of access to various Digital gadgets and opportunities to increase their level of digital literacy in their early years. 82.9% of Chinese households with little children own more than three smartphones at home, and 55.7% of Chinese young children are able to independently take photos on tablets (Dong et al.2021). A study by Pengjuan Zheng & Jin Sun (2021) that sought to investigate the relationship between the utilization of electronic gadgets (DD) by preschool children in Hong Kong and their early development of digital literacy reported that 74.54% of the children, aged 3 to 5 years had experience using DD. The most popular digital device was smartphones which were mainly used for entertainment and educational purposes.

The Finnish Cultural and Educational Ministry launched a digitalisation project called the “digital leap” in 2015 whose objective was to help schools quickly modernize their Communication and Information Technology ,infrastructure and pedagogy. Finnish schools have had many digitalisation projects, but utilizing digital devices in teaching and learning has been comparatively modest scale in contrast to other Nordic countries (Olofsson et al. 2021). In Finland, The National Core Curriculum for Early Childhood Education and Care in Finland (2018) views technology use as an important component

of the educational curriculum. The curriculum states that children need to become acquainted with the application of digital devices and teachers need to provide versatile and safe ways to use technology in daycare. The curriculum's multi-literacy learning areas view technology as a natural part of children's and families' daily lives, and early childhood care and education are essential for fostering development of their technology abilities. However, Finland's National Core Curriculum appears to offer very little helpful advice on utilizing technology in early childhood education, Ahtianen et.al (2021). This may limit teachers in the usage of digital devices thus hindering the acquisition of proficiency in digital literacy among early years learners in Finland.

The Swedish national pre-school curriculum highlights the value of utilizing digital tools to enhance learning and emphasizes the importance of early childhood education in providing children with the chance to acquire sufficient digital skills by letting them to comprehend the digitalization they experience in daily life. Education's National Agency (2020) addresses children's digital proficiency in four areas including; understanding the impact of digitization on society, getting conversant with the application of digital tools and media, having a critical and responsible approach as well as solving problems and turning ideas into action. Despite the above efforts, United Nations International Children's Emergency fund (UNICEF) report shows that unskilled and unmotivated preschool teachers are the main barrier in developing children's digital competences in Sweden (Nascimbeni & Vosloo, 2019).

In Japan, Japanese children have availability of a range of technology-related activities in early childhood educational settings. Their schools have computers in every classroom as a component of children's play, and children possess them whenever they choose without adults' assistance. The schools also offer computer sessions led by a professional instructor once a week to four and five-year-old children (Izumi-Taylor, 2020). A survey in Japan by the Education Ministry revealed that the proportion of children utilizing mobile electronics for more than an average of 1 hour per day was 15% among elementary schoolers and 48% among junior high schoolers. The National Institute for Educational Policy Research (2019). This disparity of numbers both in elementary and junior high school schoolers could suggest the unavailability of various electronic devices for early years learners in Japanese schools.

Government and educational institutions in India have taken various significant initiatives to enhance the digital literacy of young children and adults. For instance, youngsters are using a variety of digital gadgets and applications as a result of the National Digital Literacy Mission (NDLM) and Digital India, 2015, which seek to make India a knowledge economy and society empowered by technology. Children gradually gain information that improves digital literacy abilities like coding, graphic design, and video production through experimentation and application. The investigations stated above make it clear that digital devices have been purchased and used in classrooms all around the world.

Additionally, African nations are not left behind in this digital move. For instance, in Rwanda, the government has made effortt to raise educational standards in schools by providing access to technology. Among the efforts in its Vision 2020 framework, the Rwandan government launched the One-Laptop-Per-Child (OLPC) program in 2008. In their ideal, all learners would have laptops and the next generation would be equipped with digital skills. With one laptop per child, school children in primary schools start utilizing computers while they are 7–8 years old. The deployment of laptops also include the training of teachers where all 4 to 6 primary school teachers have been retooled on basic technological skills for teaching and learning (De Dieu, et al. 2022)

In 2007, the Tanzanian government formulated an ICT Policy for Education in response to recognizing the significant role that technologies for information and communication (ICT) can play in improving the quality of education. In the education sector, it has made notable investments in ICT equipment and training within its schools. The government has distributed digital and related technological tools to primary and secondary schools, including desktop computers, smartphones, laptops, printers, photocopiers, projectors, and televisions (Manyengo, 2021). It embraced the Technological Pedagogical Content Knowledge (TPACK) framework and developed the Information and Communication Technology for Teacher Professional Development (ICT-TPD) as espoused in their basic education policy (Swarts & Wachira, 2010). The main aim of ICT-TPD was to improve teachers' ICT uptake capacity as they integrate technology in English, Mathematics, and Science subjects in

Tanzania's education system. The government acknowledges the potential of Information and Communication Technology (ICT) in enhancing the quality of education through the acquisition of relevant skills aligned with the demands of the twenty-first century.

Similar to other developing nations, Kenya has also made strides on the utilization of digital devices in education. In Kenya, an ICT policy was put in place in 2006 and was reviewed across years spent with the recent being a 2021 review 'Policy on Information and Communication Technology in Education and Training (GOK, 2021). All these policies have endeavored to emphasize on open availability of ICT infrastructure for education institutions. The Digital Literacy Programme (DLP) was created in response to the government's goal of giving pupils the pertinent skills they would need in the modern digital world. (Ogolla, 2018). To solve the issues facing the nation's educational system, authorities see technology in education as a means of facilitating information acquisition that spurs creativity and skill development (Republic of Kenya, 2019). The 8-4-4 style of instruction has been replaced by a competency-based curriculum in accordance with Kenya's development roadmap, Vision 2030 with an aim of offering Competency-Based Education (CBE).

As to the Kenyan Basic Education Curriculum Framework of 2017, the goal of the basic education curriculum revisions is to give learners the cutting-edge standards and abilities they need to succeed in the twenty-first century, like digital literacy (KICD, 2017). The utilization of Digital gadgets has been highly emphasized in all learning areas in the Competency Based Education. This is a change from the previous approach, which only allowed technology integration as an elective in secondary schools and excluded it from primary education. Digital literacy is among the seven core competencies that CBE intends to impart in learners. Therefore, Computer studies is taught as part of the pre-technical studies learning area right at the seventh grade, a clear indicator that the government of Kenya wants her learners to be digitally literate.

In 2015, the Kenyan government initiated the Digital Literacy Programme with the aim to distribute digital devices to learners in grade one and to instruct educators in the use of digital learning content. Digital devices were made available to both teachers and

learners in 2016. The devices included the teachers' digital device, learners' digital device, projectors, Digital wireless routers, digital content servers (DCS), digital literacy programs (DLP), grid or solar power sources, device storage, charging, and devices with special needs (Mukara, 2019). The Ministry of Education Science and Technology and the Teachers Service Commission (TSC) also targeted teachers for ICT training to provide both basic and enhanced ICT competence. Overall, approximately 81,000 teachers were trained under the programme. Nevertheless, despite the government's effort to train educators on the use of the supplied digital devices, Statistics from the 2017 Africa Digitization Maturity survey show that digital literacy penetration in the education sector in Kenya remains below 50% of the global threshold limit. A similar national survey by the Communications Authority on technology and Education matters in Kenya shows that most primary schools in Kenya with digital equipment use less than 40% of the available infrastructure, and 18% of public schools use the digital devices as an alternative method for delivering the learning curriculum (Communication Authority, 2018).

A survey by Kenya Teachers Service Commission on the application of tablets in 1200 respondents and public primary schools that specifically targeted certain schools also showed that educators in public institutions faced challenges in using digital devices while instructing as 84.2% of the respondents agreed that they had problems with the use of these devices in classrooms. Technology integration was identified by the survey as the primary professional skills gap influencing instructors' ability to provide services. (Wanzala & Nyamai, 2018).

## **1.2 Statement of the Problem**

The government of Kenya has heavily invested in the provision of digital devices to schools as well as teacher retooling on ICT utilization in teaching and learning. In 2016, the Kenyan government purchased and distributed approximately 1.2 million tablets for Standard One learners. The tablets were distributed to 21,637 public primary schools at a cost of approximately Sh. 30 billion to help children continue learning online. This represents a 99.6 per cent of the total number of primary schools in the country, with 1,168,798 tablets distributed for use by Grade 1 to Grade 3 pupils in 2016. This programme aimed at ensuring that learners acquire digital literacy, which is a key

skill requirement of the 21<sup>st</sup> century learner, and a key core competence that the learner should attain under the Competency Based Education. There exists a dearth of literature on the impact of this programme, digital devices supply, on attainment of digital literacy among learners in grade 1 to 3. This study therefore sought to fill in this gap by analyzing the utilization of digital devices in enhancing digital literacy acquisition among grade 3 learners in Tharaka South sub-county in Tharaka Nithi county of Kenya.

### **1.3 Purpose of the Study**

The purpose of the study was to investigate utilization of digital devices as an enabler in the acquisition of digital literacy among early years learners in Tharaka South sub-county, Tharaka Nithi county, Kenya.

### **1.4 Objectives of the Study**

The study objectives sought to;

- i. Establish learner's accessibility to digital devices for enhanced acquisition of digital literacy in Tharaka South sub-county, Tharaka Nithi County, Kenya.
- ii. Evaluate teachers' competence in the utilization of digital devices in enhancing acquisition of digital literacy among early years learners in Tharaka South sub-county, Tharaka Nithi county, Kenya.
- iii. Examine teachers' perception on utilization of digital devices in enhancing acquisition of digital literacy among early years learners in Tharaka South sub-county, Tharaka Nithi county, Kenya.
- iv. Assess challenges faced in utilizing digital devices in enhancing acquisition of digital literacy among early years learners in Tharaka South sub-county, Tharaka Nithi county, Kenya.

### **1.5 Research Questions**

- i. What digital devices are accessible for use by learners in enhancing acquisition of digital literacy among early years learners in Tharaka South sub-county?
- ii. What competences do early years teachers have on the utilization of digital devices in enhancing acquisition of digital literacy among early years learners in Tharaka South sub-county?

- iii. What perception do early years teachers have on the utilization of digital devices in enhancing the acquisition of digital literacy among early years learners in Tharaka South sub-county?
- iv. What challenges face the utilization of digital devices in enhancing acquisition of digital skills among early years learners in Tharaka South sub-county?

### **1.6 Significance of the Study**

The study findings may shed light to teachers on the significance of utilizing digital devices in enhancing attainment of digital literacy among early years learners. This may in turn influence teachers positively to choose utilizing the digital devices as a new pedagogy to use in teaching these learners. The results of this investigation may as well prompt curriculum designers at the KICD to recognize the necessity of developing materials that will support utilization of the devices in teaching and learning (T/L). The study's findings could be extremely beneficial to early years learners who would see the need of utilizing digital devices to acquire digital literacy skills. The Ministry of Education may rethink providing sufficient teacher instruction on how to utilize digital devices to improve the knowledge of digital literacy among early years learners and invest more funds on acquisition of digital equipment and infrastructure for especially the early years learners. Moreover, the findings might help other researchers even more as they try to close different gaps.

### **1.7 Scope of the Study**

The study was conducted in public primary schools in Tharaka South, Tharaka Nithi County. The study specifically acquired information on the utilization of digital devices among early years learners, the accessibility of the digital devices, teacher competence and perception to the use of digital devices in enhancing acquisition of digital literacy among early years learners as well as the challenges relating to the same.

### **1.8 Limitation of the Study**

The researcher experienced challenges during the study. First, there was change in school curriculum routines as there were co-curricular activities which actually made both learners and teachers unavailable to give the required information. To encounter this limitation, the researcher liaised with the administration and the respondents and

created extra time from the normal class hours. Also, Respondents developed mistrust with the researcher and thought that the information received may be used for political gain. To curb this, the researcher clearly explained to the respondents that the information revealed was purely intended for educational purposes.

### **1.9 Assumptions of the Study**

The researcher assumed that;

- i. Utilization of digital devices enhances acquisition of digital literacy among early years learners.
- ii. Teachers teaching early grade learners could effectively utilize the digital devices.
- iii. Honest, accurate and truthful information would be gotten from the respondents.

### 1.10 Operational Definition of Terms.

- Digital Devices** : Digital devices are used in reference to any communication device or programme including radio, television, cell phones, computers, network software and hardware that can be used to help early years' learners achieve digital literacy.
- Digital Literacy** : Refers to the ability to use and interact with digital technologies for learning among early years learners as well as acquisition of the right digital skills to apply in their daily lives.
- Early Childhood Education** : Refers to period of learning that takes place from preprimary 1 to grade 3.
- Early Years' Learners** : Refers to learners from grade 1 to grade 3.
- ICT Integration** : Alludes to the smooth utilization of communication and information technology to improve the achievement of digital literacy among early years learners.
- Perception** : It has been used interchangeably with words like opinions, attitudes, feelings, viewpoint and such to refer to how early years' teachers view or regard the use of digital devices in enabling learners acquire digital literacy.
- Utilization** : Refers to the use of digital devices in enhancing digital literacy acquisition among early years learners.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Learners Acquisition of Digital Literacy Skills**

In the present world, digital literacy skills are unquestionably useful competences for children to learn and acquire. According to Khlaisang and Yoshida (2022), digital literacy is the knowledge and ability of person to use technology to access, assess and integrate digital tools to create new knowledge in a rapidly globalizing digital environment while remaining safe and in control of their situation in methods that are appropriate for their age and particular local cultural and societal contexts. These abilities are now an essential part of communication in the twenty-first century.

Digital literacy development is contingent upon both the availability of technology and its integration into instruction. Studies indicate that digital devices can improve student motivation, engagement, and teamwork, especially when the tasks are interactive and age-appropriate (Papadopoulou et al., 2023). Digital literacy acquisition in early learners involves multiple components: familiarity with digital devices, understanding how to navigate digital interfaces, the ability to interpret multimedia content, and the confidence to communicate using digital tools or expression. It is increasingly vital in early education, and its development can be effectively supported through the utilization of digital devices/tools, provided their use is intentional, guided, and developmentally appropriate.

Digital Tools (DT) are effective resources such as laptops, smartphones, tablets or desktop computers, audiobooks, interactive whiteboard, digital libraries, digital dictionaries, multimedia which learners and educators use to communicate, teach, express in the contemporary teaching-learning process (Barltrop, 2018). These tools hold significant promise for education when integrated thoughtfully.

A number of research have demonstrated that digital devices, when appropriately included in early childhood education classes, support literacy, numeracy, and socio-emotional development. For instance, Liu et al. (2024) found that preschoolers exposed to interactive digital storybooks showed significant gain in vocabulary, print knowledge, and phonemic awareness compared to peers who used traditional print

materials. According to a study by Pengjuan Zheng & Jin Sun (2021) which investigated the relationship between the use of digital devices (DD) by preschool children in Hong Kong and attainment of digital literacy which targeted 877 preschoolers from 18 kindergartens and their parents found that, 74.54% of children aged 3 to 6 years in Hong Kong had experience using digital devices (DD) and had acquired digital literacy at an early age. In a similar study conducted by Scott (2023) in the UK and South African countries indicated that digital devices such as smartphones, tablets, laptops, smart televisions and smart toys were made available for use to children aged five to fifteen years. With early exposure to the use of digital devices, developing digital literacy abilities is enhanced at an early age.

A study by Finnish (2021) on investigation of early educators Audio-visual media preferences for children screen viewing revealed that when parents or teachers engaged with children during digital activities like asking questions, giving prompts, or co-viewing content, the children exhibited better comprehension and longer attention spans. Similarly, in a study of digital literacy in early childhood in urban Chinese households, findings indicated that children grew stronger in digital literacy when caregivers actively participated in screen time activities, as opposed to leaving children to interact with devices independently, Zhao et al. (2024).

Gjelaj et al. (2020) study on use of digital devices within the classroom as well as the outcomes for digital literacy acquisition in early childhood education in Australia reported that when digital devices are properly and successfully incorporated into early childhood classrooms, provides children with new opportunities to take part in attractive and educational games, dialogue, exploration, and other school activities required for the advancement of fundamental 21<sup>st</sup> century skills. Also, a study conducted by Bourbour et al. (2020) in Sweden on preschool teachers' actions to aid in learning of children processes in the use of digital devices indicated that early learners interacted with computers, iPads, interactive whiteboards and other technologies. Interactions with these devices enabled learners acquire digital literacy skills.

In Tanzania, Evans et al. (2021) conducted a study examining the utilization of digital tools for instructional purposes among early- grade learners. The findings of this

investigation indicated that the increasing prevalence of digital devices in educational settings enhanced comprehension of individual words, texts, and concepts, while also facilitating the instruction of reading and writing. Its utilization also offers significant benefits to teachers, as it enhances quality of instruction by facilitating the learning process for learners.

In the Kenyan context, utilization of digital tools into early childhood education is a growing area of interest as it equips children with critical cognitive, technical, and communication abilities required for lifelong learning as well as participation in the digital world. In Kenya, a study conducted in Bungoma County by Wafula et.al (2025) on effects of digital literacy program on learning in early childhood centres reported that the introduction of tablets and digital content improved children's attention span, language acquisition, and comprehension. A related study by Sabiri in Nairobi County (2020) indicated that using digital devices in the classroom allows pupils to communicate their learning challenges and helps them learn language, improves communication between pupils and teachers as well as between pupils and other pupils. In the classroom, technology use has improved pupil motivation and involvement, leading to greater comprehension (HawkrIDGE, 2022).

The above-mentioned literature shows that when children properly use digital devices in their learning and socialization, it leads to the acquisition of digital literacy skills.

## **2.2 Accessibility of Digital Devices and Acquisition of Digital Literacy**

Access to digital devices and the development of digital literacy are essential for a learner's academic achievement and general growth in the modern digital age. The ability to find, assess, produce, and share information using digital tools and platforms is referred to as digital literacy. In order to acquire this crucial set of skills, they must first have equal and continuous access to digital devices like computers, tablets, and smartphones, along with dependable internet connectivity.

The digital divide, or the difference between those who have access to digital technologies and those who do not, is one of the major issues in this field. The availability of infrastructure, geographic location, and socio-economic position all

frequently have an impact on this disparity. Learners from low-income households or those living in rural regions could not have access to the gadgets needed or reliable internet connections, which would disadvantage them in comparison to their peers in more affluent or urban environments. Their capacity to connect with educational content outside of the classroom, finish digital assignments, and take part in online learning may be hampered by this discrepancy.

In learning institution, digital tools and resources are considered as precursors for successful knowledge adoption and technology transfer (Brites, 2020). The installation and provision of suitable digital devices and infrastructure facilitates the learning of digital skills and knowledge with few limitations (Rutere, 2023). Teachers' and learners' digital devices, projectors, DLP content servers (DCS), digital wireless routers, grid or solar power supplies, device storage and charging, and special needs devices are among the infrastructure and technology deemed essential for the Digital Learning Programme (DLP). Other considerations are desks and classrooms that learners will use during learning which are learner friendly.

Today, many young children grow up in societies with broad access to various digital technologies intertwined in their everyday lives (Arnott & Yelland, 2020). This leads to many children experiencing media-rich lives from infancy since they are encouraged to utilize digital devices and gain digital skills (Teichert & Anderson, 2021). For instance, a study conducted by Bourbour et al. (2020) in Sweden on preschool teachers' actions to aid in the learning of children processes in the use of digital devices indicated that early learners interacted with computers, iPads, interactive whiteboards and other technologies. A study in Sweden by Lindeman et al. (2021) on Digitalisation which used domestication theory and interview to acquire information in early childhood education discovered that, in both preschools and public primary schools, all learners and teachers were equipped with individual laptops, computer or iPads. In addition, most classrooms are equipped with interactive whiteboards and digital projectors. Additionally, a study by Belay Mengislu (2022) in Sweden on Technology integration and its Challenges in Primary School which utilized Substitution, Augmentation, Modification and Redefinition model (SAMR) opined that in both preschools and public primary schools, all learners and teachers were equipped with individual laptops

or ipads. The study found that using these digital devices in the learning environment encouraged information exchange among early learners, broadened knowledge, enhanced learning performance, enabled independent learning and inspired learners to take control of personal/ individual learning. Whereas the study by Belay used SAMR model targeting grades 4-9, the current study adopted TPACK model with learners in early grades.

A Survey by Kabali et al. (2021) in Italy on the technological usage of 350 children aged 6 months to 4 years which used a cross-sectional survey design found that 20% of the kids used smartphones for the first time since their first year of life. Additionally, 80% of kids between the ages of 3 and 4 years are able to use their parents' smartphones. Nearly all youngsters (96.6%) utilized mobile devices (MD). In a similar study conducted by Scott (2023) in the UK and South African countries on parents experiences of children using digital technology for learning at home that used a social construction of childhood theory indicated that digital devices such as smartphones, tablets, laptops, smart televisions, and smart toys were made available for use to children aged five to fifteen years. Early grade learners can develop digital literacy at an early age if they are exposed to digital gadgets at a young age. Whereas the study by Kabali used a cross-sectional survey design targeting children aged 6 months to 4 years, the current study adopted a descriptive survey design with children aged 4 to 8 years. Also while the study by Scots used social construction of childhood theory, the current study was anchored on TPACK theory.

A study in Spain by Maddox (2023) which used semi-structured interview method to gather information on parents of children aged 8 years and under found that majority (98%) of the parents reported living in a home with some type of mobile device which the children are able to use during their free times. As a result of this exposure, Spanish children today have many opportunities to explore and play with digital devices. Similarly, a study conducted in China with young children aged 3-6 years found that majority of these children used screen devices such as computers, laptops, digital cameras, projectors and school phone and participated in online learning during the COVID shut down (Cao, Dong, & Li, 2021). Also, a survey conducted by Zhen et al. (2025) to investigate the impact of digital devices use at home on early English literacy

development among 121 Chinese-Canadian first graders, found that 93% of children who are 3-4 years and 91% of children that are 5-8 years were regularly exposed to television. Due to the widespread use of digital devices, learners in China acquire digital literacy skills at a young age. While the reviewed studies were carried in developed countries, the current research was conducted in Kenya, a developing country.

### **2.3 Teachers' Competency in Digital Utilization and Learners Digital Literacy**

Digital technology integration in education has evolved from a trend to a necessity in the 21st-century learning environment. Teachers' proficiency in infusing technology into their lessons is crucial to the efficient usage of digital devices in the learning environment. The development of children's digital literacy is facilitated and modeled by teachers, and the learning of critical digital skills is directly impacted by teachers' proficiency with digital tools. Learners who are digitally literate and ready for the needs of a global, technologically advanced world are thus greatly supported by their teachers' competence with digital technologies.

As schools increasingly integrate technology into classrooms, teachers are expected not only to be familiar with a range of digital tools, such as tablets, interactive whiteboards, learning management systems (LMS), and educational apps, but also to use them effectively to enhance learners engagement and achievement. Digital competence among teachers encompasses a range of skills including the ability to use digital tools for instruction, manage digital content, evaluate online resources, ensure digital safety, and promote ethical use of technology. Competence in digital devices goes beyond basic operational knowledge. It involves pedagogical understanding of how to use technology to support differentiated instruction, formative assessment, collaboration, and personalized learning. Teachers must be able to evaluate the appropriateness of various digital tools for specific educational contexts, adapt their teaching methods accordingly, and remain flexible as new technologies emerge. (OECD, 2023). The competence of teachers in digital device usage directly impacts student outcomes. When used effectively, digital tools can make learning more interactive, personalized, and accessible. Competent teachers are able to harness data analytics tools to track student progress, adapt instruction in real time, and provide targeted feedback. This not

only boosts academic performance but also prepares students for a technology-driven world.

Teachers' competence in the utilization of digital devices is understood as the set of digital skills and abilities which educators possess or should develop to perform various activities both within and outside the classroom (Revuelta-Domínguez, 2022). The digitization of early childhood education necessitates proficiency in handling and staying current with various digital devices and applications in educational contexts (Otterborn et al., 2019). Teachers' active involvement is essential to ensuring effective utilization of digital devices within the class (Seufert et al., 2021). Teachers' ability to incorporate technology into the lessons taught in the classroom and appreciate the versatility of technology as an important teaching and learning tool depends on their knowledge and ability to apply digital devices on their own (Atabek, 2020).

Teacher proficiency with digital devices is widely recognized as a decisive factor in whether information and communication technologies (ICT) translate from supplied hardware into meaningful classroom learning in Kenya. Since the national rollout of the Digital Literacy Programme (DLP) and related ICT initiatives, empirical studies have frequently demonstrated that device Availability by itself does not assure improved teaching or learning; rather, pedagogical competence among teachers is the linchpin of sustained, high-quality ICT integration ( Murithi, 2021).

A study in Spain by Fernández-Batanero et al. (2022) on Digital Competence of Special Education Teachers which targeted 184 teachers found that special education teachers lacked training and expertise in using digital gadgets for instruction and learning in special schools. The study noted that this resulted in low acquisition of digital literacy skills by the learners. Similarly, Fernández-Batanero (2023) conducted a study on Analysis from the Voices of Members of School Management Teams to investigate schools' management judgments of teachers' ability in utilizing digital devices in primary schools and concurred with the study by Batanero as they discovered that a low degree of training and digital competence of teachers in special education are the reasons why they do not make use of digital tools in their teaching. According to the study, teachers' proficiency with digital tools is a guarantee of the success of high-

quality learning experiences. This highlights the significance of ongoing development since a proficient teacher can incorporate technology into daily instruction, satisfying the needs of learners and producing engaging content. While Fernández-Batanero's study focused on students and teachers in special education, the current study focused on early childhood educators and teachers in conventional schools.

The development of digital skills and other 21<sup>st</sup> century skills in learners depends on the digital literacy of teachers. Therefore, a teacher needs to be equipped with the requisite digital skills to be able to assess the learners' use of digital devices and their acquisition of digital literacy skills. Teachers who use digital tools regularly experience significant improvements in instructional effectiveness, lesson planning, and professional competence. Similarly, educators having no prior knowledge with technology will limit their creativity and confidence when using it in the classroom.

In Sweden, a study by Marklund, (2022) on Swedish pre-school teachers experiences on the utilization of digital tools found that early year instructors' lack of experience in digital applications hampered the incorporation of tablet-supported activities. The teachers also recommended that they needed clearer curricular requirements and adequate training to make use of the tablets effectively. They concluded that it is necessary for schools to adjust to modern demands by ensuring constant teacher training in digital education. Similarly, in Turkey, Raygan and Moradkhani (2022) indicated that early years teachers lacked the skills needed to effectively employ technology resources in teaching English as a Foreign Language (EFL) in the classroom. As a result of inadequate technological expertise, many teachers are unable to use digital resources in their lessons, preventing learners from acquiring the necessary digital skills. Such a trend is detrimental as it may bring loss in terms of education outcomes hindering early grade learners from reaping the full benefit of education.

Studies conducted in South Africa on teachers' utilization of computer as resources for instruction and learning by Bansila (2024) indicated that teachers or instructors, particularly the older generation cohort lacked the necessary skills in handling computers in the classroom. The study suggested that there is need for meaningful

instruction on how to use computers for teaching and learning and the necessity of teacher professional development. In addition a study by Senjam et al. (2020) on pre-service and in-service usage of technological tools in teaching in Turkey demonstrated that teachers were not competent and therefore indicated the need for professional training and progression as a form of support for teachers to more successfully integrate technology in teaching and learning to enable learners acquire digital literacy.

A study conducted by Omito et al. (2019) in Kenya which employed a cross-sectional survey design to collect data from 362 teachers and 85 headteachers on teachers' computer expertise as a prelude to the utilization of laptops discovered that quantity of teachers trained on the use of computers by the government was low. Their results showed that around 62.3% out of the 85% teachers trained on computer use in teaching/learning by the ministry of education felt that there was insufficient training for teaching and learning. Omito maintained that the situation was thus because trained teachers were anticipated to train their colleagues who also had not acquired enough competence in their use. The inadequate training therefore would lead to the ongoing application of the traditional ways of teaching preventing learners from acquiring the digital abilities that are required in the 21<sup>st</sup> C. While the study by Omito used a cross-sectional survey design to ascertain teachers' competences in utilizing digital devices in the upper grades, the current study deviated and adopted descriptive survey design to establish the competences teachers have in utilizing digital devices in teaching the early grade learners.

#### **2.4 Teachers Perception on the Utilization of Digital Devices and Learners Digital Literacy**

Among the elements influencing the utilization of electronic gadgets in the classroom is the perception of the teacher. In order to inspire learners creativity and innovation, teachers' perceptions of the value of technology to learners and their pedagogical judgments regarding the utilization of digital devices in the classroom are crucial (Waweru, 2024). While some educators embrace the use of technology as a valuable pedagogical tool, others express concerns about its appropriateness and potential drawbacks for young learners. Teachers' opinions differ greatly based on how well-versed they are in modern technologies. Teachers may feel overburdened or reluctant to incorporate new technology into their lesson plans if they have little experience with

it or have not received enough training. They could occasionally view digital gadgets as a hindrance rather than a benefit, particularly if children abuse them in class. Furthermore, some educators worry about the "digital divide," which might increase educational disparities as not all pupils have equal access to devices or dependable internet connections at home.

The opinions of teachers are also influenced by institutional support. More favorable attitudes are typically fostered by schools that offer enough technical support, continual professional development, and access to contemporary equipment. Teachers are more inclined to use technology in the classroom when they perceive that digital resources are in line with curriculum objectives and feel supported. On the other hand, a lack of resources, time restraints, and ambiguous policies can cause frustration and mistrust.

Teachers' opinions might also be influenced by factors like age and prior teaching experience. Teachers who grew up with technology and are younger or less experienced might be more flexible and excited about adopting digital tools. In his inquiry on teachers' utilization of computers as tools for teaching and learning, Bansila (2024) discovered that instructors especially the 'older generation cohort' face the challenge of being fearful of computer technology usage in the classroom. On the other hand, some seasoned educators might be more wary, particularly if they have developed instructional strategies that do not significantly rely on technology. The study suggested that there is the need for meaningful instruction in the utilization of computers into teaching and learning and the necessity of teacher professional development in conjunction with dynamic curriculum reform stating that because curriculum is unavoidable, its effectiveness ultimately depends on teacher's continual development.

However, it is crucial to remember that adaptability to digital learning is not just age-dependent; many experienced teachers adopt technology after realizing its demonstrable advantages for improving student results. Thus, Teachers should be ready to embrace and implement the paradigm shift in learning and teaching brought about by the utilization of digital devices in learning/teaching environments, as they are the facilitators and agents of change in the classroom to infuse 21<sup>st</sup> century skills, as noted by (Pultoo et al., 2020).

Many early childhood educators perceive digital devices positively when they are used to enhance learning through interactive, age-appropriate content. Tablets, smartboards, and educational apps can provide engaging, multisensory learning experiences that support the development of literacy, numeracy, and problem-solving skills. For instance, A study conducted by Muslem et al. (2022) on attitude and barriers to digital devices use among 113 English teachers in Indonesia which used questionnaires and interviews to gather information indicated that participant teachers had positive perceptions on the utilization of digital devices in classroom teaching and learning. Teachers wanted to learn new ways of using digital devices to deliver instructional materials to learners effectively and showed their willingness to incorporate digital devices in their lessons frequently. This is because they believed technology is a current trend, and it has many benefits to learners. According to a study done in Spain by Chai et al. (2021) on Teachers' Attitudes to Use of Advanced Technological Tools as Teaching and Learning Aids that used Unified Theory of Acceptance and use of Technology (UTAT) found that most teachers had positive attitude regarding the use of digital tools and believed that there is a connection between the attitudes of teachers and the use of digital devices and that instructors with positive attitudes are more likely to incorporate technology into their lessons, whereas teachers with negative attitudes will not get the most out of using technology in the classroom. While the study by Chai, used Unified Theory of Acceptance and use of Technology (UTAT), the current study used Technological Pedagogical Content Knowledge (TPACK) theory.

Gumus (2021) study which used a descriptive research design and questionnaire for 353 teachers employed in various schools in Ankara, Turkey, found that high school teachers had a high degree of positive attitude towards the use of digital devices in the classroom and a low level of anxiety regarding the use. A study by Mwangi et al. (2022) on classroom use of digital devices in teaching of English language in secondary schools in Nyeri county found that teachers had positive attitude towards use of digital resources in teaching English language lessons. In a similar study on in-service Mathematics teachers' utilization of digital devices as innovative practice in lower secondary conducted by Baya'a et al. (2022) pointed out that the teachers had positive attitude and beliefs on the use of digital devices in the classroom. Despite their positive feelings, teachers were reluctant to use technological devices in their lessons due to

their little experience and different obstacles they encountered in the utilization of digital devices in education. The studies by Gumus and Baya'a targeted secondary school learners and employed experimental research design but the current study targeted early grade learners in public primary schools.

Kagali, (2022) conducted a study in Western Kenya's Vihiga county on teachers' opinions about the value of digital devices in the classroom. The gender variable was employed in this study which easily sampled county instructors, to see whether there were any statistically significant differences between female and male teachers' opinions on digital device usage in classroom. The means of the two groups shown no statistically significant variation in the teachers' perceptions on the value of computer-based learning environments according to gender. Whereas the study by Kagali used convenient sampling technique and gender as the study variable, the current study will use both simple random and purposive sampling techniques with no concern to gender.

## **2.5 Challenges Faced by Teachers and Learners in the Utilization of Digital Devices**

The integration of digital devices in education holds immense potential for enhancing digital literacy among learners. A successful implementation of Digital Literacy Programme must be reinforced by sufficient infrastructure. Governments world over acknowledge the significant role of digital devices use in education. However, a number of obstacles prevent learners as well as teachers from using these resources effectively.

Consequently, they have implemented several policies pertaining technology usage in Learning and teaching (L/T). However, a number of obstacles prevent learners as well as teachers from using these resources effectively. For instance, A study by Langat (2020) on examining the influence of teacher related factors on utilization of digital devices in public secondary schools which employed Everett Rogers' Diffusion of Innovation theory indicated that most of the institutions studied lacked digital equipment and insufficient learning space which would lead to inadequate acquisition of digital skills among learners. Agbor et al. (2024) in his study on using digital devices in secondary schools' learning/teaching process, a case of two Cameroonian schools, opines that appropriate utilization of digital devices in education has greatly been

affected by shorter lesson duration, inadequate digital resources, negative learners' perceptions of the technology use, poor physical class structure, teacher's pedagogical content knowledge inadequacy, class diversity and socio-economic background of teachers and learners. While the above studies employed Everett Rogers' Diffusion of Innovation theory, the current study deviated and employed the TPACK theory.

Furthermore, a notable obstacle is the restricted availability of digital gadgets and internet connectivity. Evidently, a study done by (Keirungi, 2021) in Uganda on challenges facing learners with hearing impairment, the research revealed that there were inadequate digital devices, poor internet connectivity, poor infrastructure, outdated curriculum and teachers' lack of awareness and proficiency in utilizing digital devices for educational purposes. Similarly Studies by Ross et al. (2022) in Uganda indicate that the budget's limitations have always been a stumbling block for implementing many educational programs within the educational system including improving ICT infrastructure to make teaching and learning more accessible than before, Inadequate teacher professional development that renders teachers digitally incompetent to effectively integrate technologies into their practices , lack of internet connection that has tarnished digital learning and unreliable devices. While a study by Keirungi targeted learning with hearing impairment, the current study targeted regular/normal learners.

A study by Achebo (2022) on utilization of digital devices into early years education in Nigeria encounters similar challenges as there is lack of; Access to digital devices, reliable internet connectivity, and educational software varies significantly between rural and urban settings. While urban centers enjoy relatively improved accessibility to technology, rural and underserved communities often lack the necessary infrastructure, exacerbating educational inequalities, experience internal and external challenges that have continued to impede efficient usage of digital tools especially within the early years' learners. In addition, Mushimiyimana et al. (2025) studies on ICT integration in Rwandan education high- lightened shortage of electricity in schools, particularly in remote regions, internet shortage in some of the urban areas' pupil-teacher ratios, especially in primary education in the region (about 58:1 and beyond) and classroom sizes as some of the factors that impede effective use of digital devices among learners

and teachers in Rwanda. The study also indicated teacher's low capacity and skills which is mostly accompanied or associated with lack of confidence and/or reluctance since teachers will not be sure of how to operate some of the digital tools as well as solving some technical issues. This brings doubts and fear of making mistakes in a belief that things might not work and therefore shame the teacher in front of his learners

In the midst of the COVID 19 pandemic, Thaheem et al. (2021) conducted a survey to investigate the advantages and difficulties teachers encountered when implementing online instruction. The primary obstacles teachers reported facing were a lack of infrastructure, technological difficulties, and personal limitations. Certain researches have documented low competences and avoidance behaviour among teachers as pertaining incorporation of technology into their pedagogical approaches. For example, according to Shah et al. (2020), only a tiny proportion of teachers reported successful manipulation of digital devices into their lessons. Other teachers asserted that they were unable to leverage ICT into their pedagogical strategies because of their rigorous work schedules and limited time. Despite their generally positive attitudes toward technology integration, preservice language teachers in Hong Kong (2025) also reported difficulties. These included increased workload, challenges with classroom management, policy constraints (such as school policies regarding device use), and differences between the expectation that they use technology and their actual support or ability to do so in their day-to-day teaching.

According to a study by Murithi and Yoo (2021) on teachers' use of digital tools in bringing the competency-based curriculum into practice in Kenya, 87.7 percent of public primary schools have challenges of internet connectivity and lack projectors in the school to promote competence in digital literacy acquisition. Additionally, they believed that schools lacked sufficient ICT resources, which made it difficult to integrate technology while the new curriculum was being implemented. The majority of educators responded that they only had minimal computer literacy training. Wairumbi (2021) report that where teachers' training is limited and infrastructure is unreliable, they tend to use devices infrequently, and their ability to translate basic digital literacy into subject-specific, learner-centred practices remains weak. Without proper guidance on how to integrate technology into lesson plans, teachers may struggle

to use digital devices for meaningful learning rather than just as a substitute for traditional methods

Additionally, Muinde and Mbataru (2019) on the same study found that 68.5% of the sampled teachers had a high perception on the use of laptops in their teaching and learning. Even so, they found that 39% of educators believed there was insufficient time allotted for integrating technology, and that the majority of their lessons' time was spent putting together the gadgets. Additionally, the perception of time was noted as a barrier by Heinrich et al. (2020) in their study on the possibilities and requirements of successful tablet integration in rural Kenya. Similarly, studies conducted by Maeda and Juma (2023) who employed a mixed-method approach in early grade classrooms in Dodoma, Tanzania found that teachers struggle with insufficient time to integrate digital media into literacy lessons, lack of hardware, software, and reliable Wi-Fi infrastructure, tight budgets, and curricula (syllabi) that do not support or promote such integration. These structural, resource, and policy constraints limit teachers' ability to use digital tools consistently. Instructors complain that incorporating digital lessons requires more preparation time, and many fall back on traditional approaches in the absence of schedule modifications or acknowledgment. Because time allocated for the utilization of the digital devices was found inadequate. During technology integration, teachers frequently omitted children who were thought to be slow learners. Some of the teachers interviewed claimed that the short lesson time prevented them from accommodating pupils who were struggling academically.

Further, Soomro et al. and Noor et al.'s studies both in (2020), in an investigation of the critical factors for incorporating ICT reported resistance of teachers to digital device utilization in their teaching methods, a circumstance that was brought about by insufficient technological infrastructure and competencies. While Muinde and Mbataru's study were conducted in Kenyan schools in upper primary, the current study was carried out among early years learners, grades that constitute the lower primary level.

Mwatsaka (2020) in his study on the use of technology in promoting learning in special schools in Mombasa county, found out that desk computers and laptops were

inadequate. The study recommended that all schools handling learners with hearing impairments should invest in technology to make sure learners have access to enough ICT resources for their education. Availability of these devices enables the learner to access the learning materials, gain confidence, and connect with educators which opens up to a wide range of resources through the Internet. While the above study was conducted in Mombasa targeting special schools, the current study was done in Tharaka Nithi in regular schools.

A study by Argawati and Suryani (2020) on the difficulties of incorporating digital literacy into instructional activities for English Foreign Language (EFL) learners in Indonesia found that several learners felt disappointed and a bit stressed in the school because they could not find sufficient internet signal that can reach out to every single location of the school. According to Martínez-Alcala et al. (2021) on the Challenges of Implementing Digital Literacy in Teaching and Learning Activities for EFL Learners in Indonesia, this aspect would definitely not allow them to enhance their digital competences and use them in their learning activities. This statement aligns with a study from Pumayanti, (2022) which found that when the learners do not have enough access to the internet, then digital literacy competence might get lower among themselves.

Certain researches have documented low competences and avoidance behaviour among teachers as pertaining incorporation of technology into their pedagogical approaches. For instance, According to Shah et al. (2020), only a tiny proportion of teachers reported successful utilization of digital devices in their lessons. Omboto's (2022) study of special-unit schools in Nairobi opined that where devices lack accessible adaptations or teachers lack training in assistive technologies, competent device use remains out of reach for teachers serving learners with disabilities. Similarly, rural teachers often face weaker infrastructure, meaning that competence gaps are most acute where learners may need digital resources the most. From the available literature, the researcher came across no studies on digital device utilization in enhancing digital skills acquisition among early years learners within Tharaka South sub-county, thus a knowledge gap exists in the area and the researcher sought to fill it.

## **2.6 Theoretical Framework**

This study was anchored on the Technological Pedagogical Content Knowledge (TPACK) model proposed by Mishra and Koehler in 2006. Mishra and Koehler state that the TPACK model consists of some components: pedagogical knowledge, which is teachers' comprehension of various teaching strategies; classroom management and assessment skills; technological knowledge, which is teachers' knowledge of a particular technology, specifically computer-based technologies and the content knowledge that addresses teachers' subject matter expertise.

The TPACK framework stresses that the most effective way to teach and mentor students is by means of the specific technical tools in conjunction with pedagogical practices and subject matter knowledge. It involves several combinations and recombination of TK, PK, and CK. CK refers to teachers' personal subject-matter expertise, encompassing knowledge of concepts, theories, and organizational frameworks within a specific discipline. PK involves understanding teaching and learning procedures, techniques, and practices, covering goals, values, and objectives of education. This knowledge is crucial for effective technology use, ensuring that technology complements teaching practices and enhances student learning experiences. Technological content knowledge (TCK) describes the relationships between technologies and learning objectives, while technological pedagogical knowledge (TPK) describes the interactions between technological tools and pedagogical practices. Pedagogical content knowledge (PCK) describes the relationship between pedagogical practices and specific learning objectives. The combination of these three domains forms TPACK.

The TPACK framework served as this study's main pillar because of its significance in modern education. Technology is increasingly becoming a significant part of students' lives both in and outside the classroom. It has the potential to improve comprehension of difficult subjects and foster peer cooperation. Herring, Koehler, and Mishra (2016) have demonstrated the effectiveness of the TPACK model in assessing classroom interventions and conducting extensive studies on utilization of digital tools. Therefore, the theory seems to be appropriate in this study because when early grades teachers have right knowledge on the subject-matter and are conversant with the appropriate

method to apply in their teaching and learning process, they would be able to utilize the correct digital tool. This in turn would enable involvement of learners in the manipulation of the digital devices thus giving them the ability to navigate and source for information from the available digital devices hence enabling learners acquire digital literacy.

## 2.7 Conceptual Framework

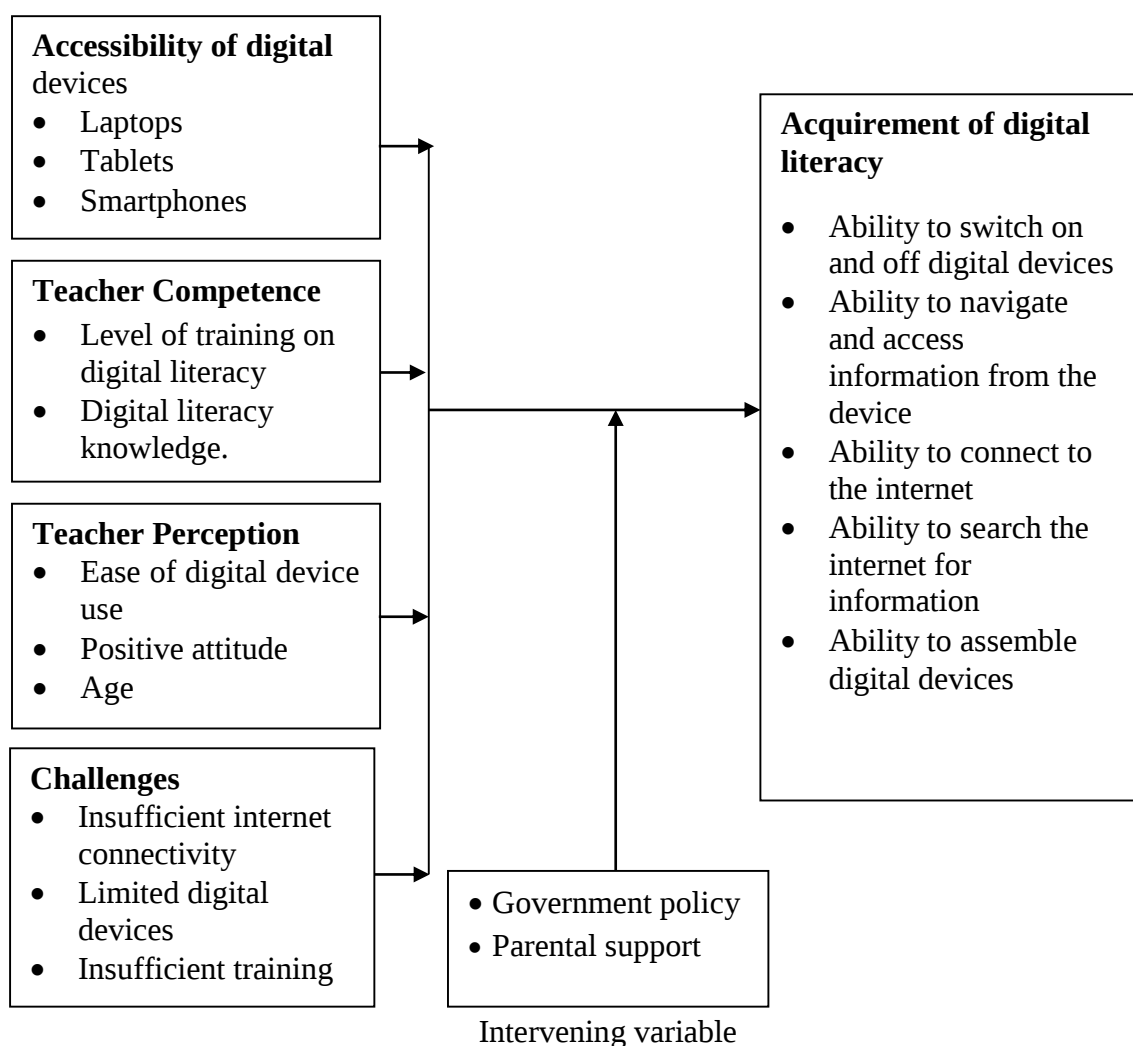
The following conceptual framework was used to show the interaction between the variables in Figure 1

Figure 1

*Conceptual Framework*

Independent variables

Dependent Variable



The study was guided by the conceptual framework that shows how independent variable enhances attainment of the dependent variable. The development of digital skill which include turning on and off digital devices, navigating and retrieving information from them, and connecting to and searching the internet for educational materials is the study's dependent variable. These results could be the consequence of the independent variable, the utilization of digital devices.

It is anticipated that when educators receive adequate training on how to utilize digital devices and exhibit favorable attitudes about their use, their knowledge may be passed on to learners, resulting in the development of digital skills. Similar to this, learner may be able to manage the gadgets for the acquisition of digital skills with little to no difficulty, such as having enough digital devices and reliable internet connectivity.

However, learners cannot acquire digital skills if teachers lack effective instruction on digital use and foster a negative attitude toward it. This is because they are unable to operate the devices. However, intervening variables like parental support and governmental policies may have an impact on the influence of the independent and dependent variables.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.1 Location of Study**

The study was conducted in public primary schools in Tharaka South sub-county in Tharaka Nithi county. The study was conducted in this area because, since the supply of digital devices by the government of Kenya in 2016, the research has not come across any research on the impact of these devices in this area. Also, the number of public primary schools offering early learners' education in the sub-county is large, an aspect that enhanced generalizability of study findings. The sub-county has 5 educational zones namely; Marimanti, Ntugi, Matakiri, Nkondi and Turima with a total early year learners' population of 2746. Out of this number, the total population for grade 3 learners, which the study drew sample size from, was 1024.

#### **3.2 Research Design**

A descriptive survey research design was used in the study, which involved gathering information in order to provide answers concerning the current status of the study subjects. This design was appropriate in this research because it enabled the description of the state of affairs as far as digital devices utilization and digital literacy was concerned. This also helped in establishing the utilization of digital devices among early years learners in enhancing acquisition of digital literacy in Tharaka South sub-county.

#### **3.3 Target Population**

The population targeted by the research comprised of all early grade learners and their teachers. Early year learners were targeted because it is at this level of beginning that the Kenyan government first supplied the tablets to. The target population was 2746 early year learners and 64 early year teachers as per data from the sub-county educational office in 2024.

#### **3.4 Sample Size and Sampling Procedure**

According to Kothari (2004), an optimum sample is the one that fulfills the requirements of efficiency, representativeness, reliability and flexibility. This sample should be in the range of 10% - 30% (Mugenda and Mugenda, 2003). The researcher purposively sampled 10% of grade 3 learners in Tharaka South Sub-County giving a

total of 102 learners who were in the 13 public primary schools which had been randomly sampled. The use of simple random sampling gave each school an equal chance for participation in the study. In addition, all grade 3 teachers in the sampled schools (13) were involved in the study to provide information on utilization of electronic devices to enhance acquisition of digital literacy. The researcher chose grade 3 learners as it was assumed that these learners had acquired digital literacy because they had interacted with the devices from grade 1.

Table 1

*Sample Size Matrix*

| Sub-County          | Target Population | Sample Size |
|---------------------|-------------------|-------------|
| Schools             | 64                | 13          |
| Early year learners | 2746              |             |
| Grade 3 learners    | 1024              | 102         |
| Grade 3 teachers    | 64                | 13          |
| Total               | 3834              | 128         |

### **3.5 Research Instruments**

Research tools included; teachers' questionnaires, observation schedules and interview schedules.

#### **3.5.1 Questionnaires for teachers**

The researcher used questionnaires with both closed and open-ended questions as the main tool to obtain information from teachers. Questions were founded on the research issue being examined and directed by the objectives of the study. The questionnaires were divided into the following parts; first part contained the background information namely gender and age of the respondent, the second part addressed teacher digital competence, the third part on teacher perception and the last part on challenges. These were able to gather information based on study's objectives; teachers' competence in using digital devices to enhance acquirement of digital literacy among early years learners, Perception of 5y early years teachers in enhancing the acquirement of digital skills and Challenges faced by teachers in using digital devices to enhance acquirement of digital skills among early years learners.

### **3.5.2 Observation Schedule**

The researcher issued tablets to the learners under class teacher's assistance, gave guidance on what was to be done and observed them as they interacted with digital devices. The researcher checked whether learners had; the ability to switch on and off the gadgets, to navigate and get educational materials both offline and online, take photos, ability to typeset information and to play educational games.

### **3.5.3 Interview Schedules**

Interview schedule is the oral administration of a questionnaire. They are significant because they provide correct in-depth information which may not be captured in a questionnaire. The researcher interviewed grade 3 learners to find out whether the digital devices are accessible to them in their schools.

## **3.6 Piloting of the Study**

Before the actual data collection, the researcher conducted a pilot study among early years learners in Tharaka North Sub county. Schools in the pilot study shares similar characteristics to those of the schools in the main study. The pilot established instruments' weaknesses, checking questions or items' clarity and eliciting respondents' comments assisted in modification and improvement of the main study instruments for enhanced validity and reliability. The piloted school will not participate in the main study.

### **3.6.1 Validity**

Validity, as defined by (Avinc, 2024), refers to the extent to which inferences made from data analysis accurately capture the phenomenon being studied. Content and face validity will be established in this study. Content validity measures the degree to which the test items represent the domain or universe of the trait or property being measured (Marshall & Rossman, 2016). The researcher ensured that the research objectives are adequately covered in the questionnaires to enhance content validity. Additionally, the researcher ascertained the face validity of the research instruments by use of the appropriate font size, line spacing, logical arrangement of items and clarity of information. The face validity enabled the subjects of the study to conveniently read, understand and answer the question items. To ensure validity of research instrument,

the questionnaires were scrutinized by the experts, majorly the supervisors, against the study objectives for consistency.

### **3.6.2 Reliability**

Reliability is the degree to which an instrument gives consistent results after repeated trials each time it is used under the same condition and with the same subject. The reliability of the instrument was established through test-retest method. The research instruments were presented to the respondent in the institution selected for a pilot study then recorded, the same instruments were presented to the same group after two weeks and the results for both tests were correlated. The study obtained a Cronbach's alpha value of a 0.71 which is considered acceptable for educational and social science research (Yudhistir, 2022). The study respondents were issued with questionnaires for them to fill. The same questionnaires was again administered to the same respondents twice with an interval of two weeks. The two weeks gave a good test for consistency as the respondents might not recall how they responded the first time.

### **3.7 Data Collection Procedure**

The researcher sought permission from the Tharaka University ethics committee given that she was collaborating with human participants. A research permit from the National Commission for Science, Technology and Innovation (NACOSTI) and parents' consent letter to engage their learners in the study as they were minors were also given. The researcher presented copies of the research permit to the sub-county director of education in order to obtain the required authority to proceed with the study. Later, the researcher booked in-person appointments with the headteachers and early years' teachers to be allowed to visit and administer the instruments. The researcher introduced herself to the respondents and explained the purpose of the visit and later gave questionnaires to be filled and collected before departure from the station.

### **3.8 Data Analysis**

The obtained data was carefully examined for completeness and comprehensibility. The data generated both qualitative and quantitative was then cleaned, summarized, classified, coded and entered in the computer for analysis using the latest version of Statistical Package for Social Sciences (SPSS). This would help to ensure better and

efficient analysis. Qualitative data was organized using the themes and presented in a descriptive form which gave the researcher an easy way to discuss the findings. Quantitative information for this research was computer analyzed using the Statistical Package for Social Sciences (SPSS) version (29.0). Results were presented in frequency distribution tables, graphs, and pie charts and in narrative forms.

Table 2

*Data Analysis Matrix*

| Research Question                                                                   | Independent Variable(s)           | Dependent Variable           | Test Statistics      |
|-------------------------------------------------------------------------------------|-----------------------------------|------------------------------|----------------------|
| What digital devices are accessible to early grade learners?                        | Accessibility of digital devices. | Digital acquisition literacy | Frequency Percentage |
| What competencies do teachers have in utilizing digital devices?                    | Teacher competence                | Digital acquisition literacy | Frequency Percentage |
| What perceptions do early year teachers have on the utilization of digital devices? | Teacher perception                | Digital acquisition literacy | Frequency Percentage |
| What challenges are faced in the utilization of digital devices                     | Challenges                        | Digital acquisition literacy | Frequency Percentage |

### 3.9 Ethical Consideration

The researcher got authorization to conduct the research from the Ministry of Education, Science & Technology through the letter of introduction given from the graduate school - Tharaka university. The study observed ethical considerations especially during data collection. Individual respondents were assured of their anonymity and confidential treatment of their responses. To ensure this, there was no writing of the respondents' names. Also, it was made clear to them that, the information the researcher sought was purely for academic purposes and that their participation is voluntary and any decision to withdraw or decline any information whatsoever at any time of the study would be respected. Since most of the subjects are minors, parental consent was sought before engaging them in the research.

## CHAPTER FOUR

### DATA ANALYSIS AND DISCUSSIONS

#### 4.1 Introduction

The aim of this study was to find out the utilization of digital devices in enhancing acquisition of digital literacy among early years learners in public primary schools in Tharaka South Sub-county. In presenting the results of the investigation, the chapter is arranged in two sections. Section one (4.2) covers the general biodata information of the respondents while section two which begins at 4.3 presents descriptive statistics on the findings, interpretations and discussions focusing on the study objectives.

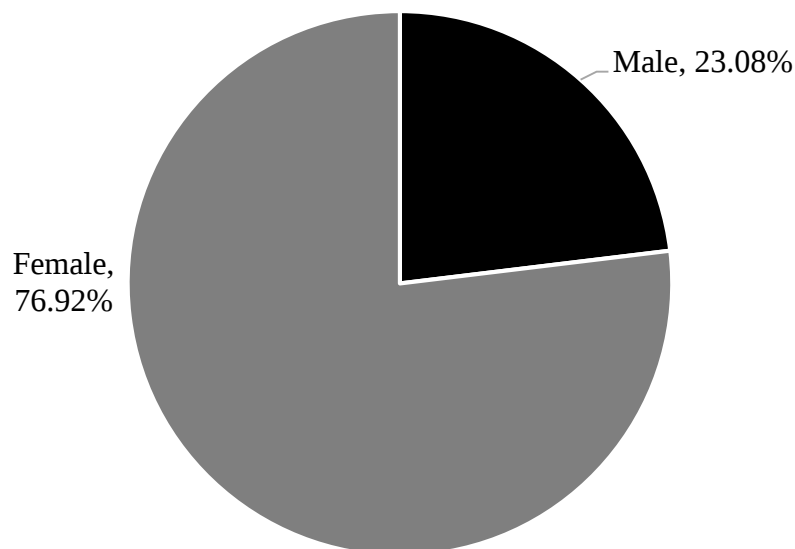
#### 4.2 General Biodata Information

The researcher looked for biodata information of the respondents in relation to gender and age.

##### 4.2.1 Gender of the Respondents

Findings on the gender of the teachers teaching grade three are shown on Figure 2

Figure 2  
*Teachers' Gender*



On the gender of grade three teachers, findings indicated that 10(76.92%) of the teachers in the sample were female, whereas only 3 (23.08%) of the sample were males. This demonstrates that there are more females than male grade three teachers teaching in public primary schools in early years classrooms. This implied absence of gender

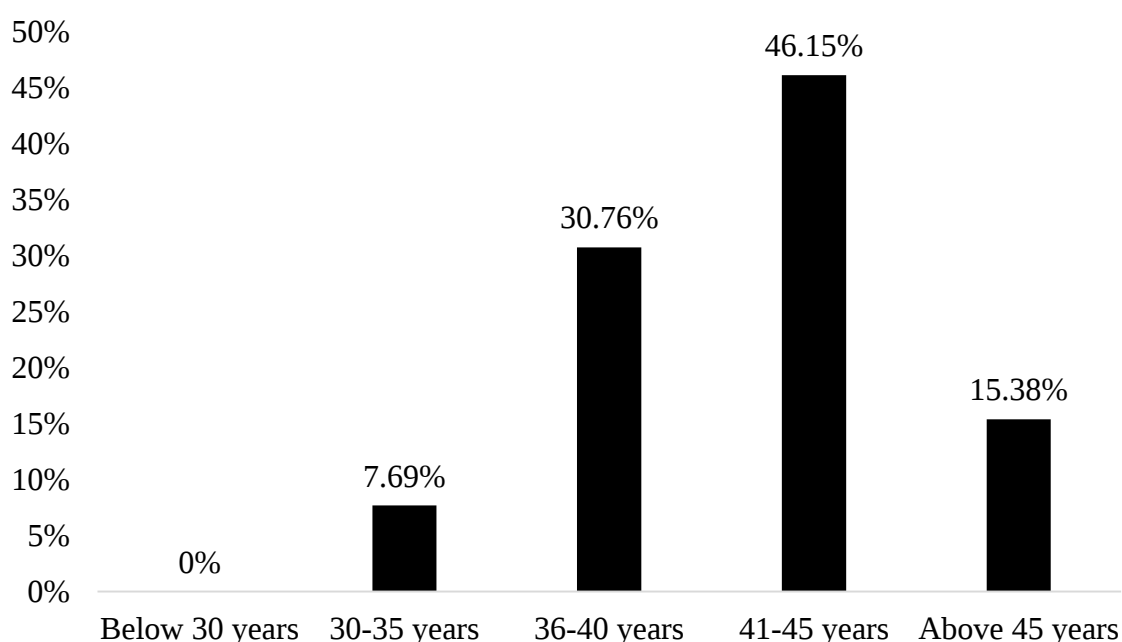
balance among teachers teaching grade three learners in public primary schools in Tharaka south sub-county. This serves as evidence of early years classes being left for female teachers.

#### 4.2.2 Respondents' Age.

The findings on teachers' age is presented in Figure 3

Figure 3

*Teachers' Age*



Based on the age of grade three teachers, the findings revealed that no teacher was below 30 years of age, 1 (7.69%) ranged between 30-35 years, 4 (30.76%), between 36-40 years, 6 (46.15%) were between 41-45 years while 2 (15.38%) were above 45 years. These findings reveals that majority (6) of teachers were aged between 41-45 years who have accumulated wealth of knowledge in handling early years learners, however they are less conversant with utilization of digital devices translating to minimal acquisition of digital literacy among grade three learners. Those aged below 30 years have more competence on the use of digital devices but were not teaching in lower classes as most of them are transiting to senior schools in CBE.

### 4.3 Accessibility of Digital Devices in Enhancing Acquisition of Digital Literacy.

The first study objective aimed at establishing learners' accessibility to digital devices for enhanced acquisition of digital literacy among early years learners. The responses are provided in the table 3

Table 3

*Accessibility of Digital Devices to Learners*

| Digital device                           | Unavailable (%) |       | Available in classroom (%) |       | Available in library (%) |       | Available in office (%) |       |
|------------------------------------------|-----------------|-------|----------------------------|-------|--------------------------|-------|-------------------------|-------|
|                                          | Fr(/102)        | P     | Fr                         | P     | Fr                       | P     | Fr                      | P     |
| Computers (desktops/laptops/tablets etc) | 2               | 1.97  |                            |       | 100                      | 98.03 |                         |       |
| Projectors                               | 102             | 100   |                            |       |                          |       |                         |       |
| Internet                                 | 100             | 98.03 | 2                          | 1.96  |                          |       |                         |       |
| Printers                                 | 90              | 88.24 |                            |       | 1                        | 0.98  | 11                      | 10.78 |
| Smartphones                              | 60              | 58.82 | 12                         | 11.76 |                          |       | 30                      | 29.41 |

Key: Fr= Frequency, P= Percentage

Based on the results, the researcher discovered that 100 (98.03%) learners out of 102 sampled learners attested that computers (tablets and laptops) were available in their educational institutions, but were not accessible to them as they were in the library while 2 (1.97%) learners said they were unavailable in their schools. However, majority of the learners said these tablets were mostly handled by teachers and learners in the junior school, leaving early grade learners out. This would deny early grade learners' chances of interacting with the devices hence lowering their attainment of the necessary digital literacy skills. These findings disagreed with studies conducted by Bourbour et al. (2020) and Lindeman et al. (2021) in Sweden on preschools and public primary schools whose findings indicated that most classrooms have digital devices and that early learners and their teachers are equipped with individual laptops, computer or iPads and that they interacted with them during the teaching and learning process.

All sampled grade three learners reported that there were no projectors availed to them a glaring sign that teachers did not utilize them. As cited by Rahmawati et al. (2025) the use of projectors in learning creates more understanding, participation and recalling

of concepts learnt and reduces monotony of lecturing. Based on the findings there is a strong sign that these learners' chances of retention and understanding would not be well achieved as the learners had little chance of interacting with projectors thus leading to low technological skills acquisition. 100 (98.03%) learners said that internet was not available in their schools and 2 (1.96%) said it was available in the classroom. .This implied learners would rarely search for information using the internet. Based on accessibility of printers, findings revealed that 90 (88.24%) grade three learners said that these were unavailable, 11 (10.78%) stated that they were available, though kept in the office for office use and 1 (0.98%) revealed that they were kept in the library. On smartphones, 12 (11.76%) out of 102 learners said they were available in the classroom, 30 (29.41%) said they were available in the office while 60 (58.82%) said they were not accessible to them. The findings reveal that smartphones are mostly for individual teachers and are rarely used by teachers in the classroom for teaching and learning. Responses from the learner observation schedule are presented in Table 4.

Table 4

*Learner Observation Schedule*

| Statement                                                   | Fr (/102) | P      | Fr | P      |
|-------------------------------------------------------------|-----------|--------|----|--------|
| Ability to switch on and off a tablet                       | 42        | 41.18% | 60 | 58.82% |
| Ability to navigate and access materials offline and online | 30        | 29.41% | 72 | 70.59% |
| Ability to take photos                                      | 10        | 9.80%  | 92 | 90.20% |
| Ability to play games                                       | 50        | 49.02% | 52 | 50.98% |
| Ability to typeset information on the gadget                | 20        | 19.61% | 82 | 80.39% |

Key: Fr= Frequency, P= Percentage

Responses from the learners on ability to switch on and off the tablets/laptops reveals that 42 (41.18%) would confidently switch them on and off, 60 (58.82%) could not switch them on and off. From the observation, majority of the grade learners shown lot of willingness to manipulate the tablets though they lacked essential knowledge in its operations. This would have been brought about by teachers' lack of knowledge on their operations making them spend very little time with the learners thus hindering them from attaining the necessary digital skills. These findings differ with a study by Bourbour et al. (2020) and Lindeman et al. (2021) in Sweden which found that all early learners and their teachers would confidently switch on and off digital tools as they at

all times interacted with computers, tablets, iPads and interactive whiteboards in their learning processes.

On the ability to navigate and access materials both offline and online, 30 out of 102 grade three learners had the ability while 72 (70.59%) learners could not navigate and access materials offline and online. With this low percentage (29.41%) of learners with this ability, attainment of digital literacy was found to be low. Based on learner's ability to take photos, 10 (9.80%) would do so with ease while 92 (90.19%) had challenges and were not able to take photos. On the ability to play games almost half of the learners (50) were able to play various games while 52 were not able to play games using the gadgets. Findings also indicated that 82 grade three learners were not able to typeset information on the tablets while 20 out 102 learners typed information on the gadgets. These findings clearly indicate that almost all the learners experienced difficulties in manipulating the digital devices which would be attributed to teachers' incompetence on digital use, inadequate digital devices and lack of electricity in various schools.

#### 4.4 Teachers Competence in the Utilization of Digital Devices

Objective two sought to evaluate teachers' competence in the utilization of digital devices in enhancing acquisition of digital literacy among early years learners in Tharaka south sub-county. The findings are tabulated in table 5

Table 5

*Teachers Competence in the Utilization of Digital Devices*

| Statement                                                   | Competence |        | Little competence |        | No competence |        |
|-------------------------------------------------------------|------------|--------|-------------------|--------|---------------|--------|
|                                                             | Fr         | P      | Fr                | P      | Fr            | P      |
| Ability to switch on and off a computer                     | 8          | 61.54% | 3                 | 23.08% | 2             | 15.38% |
| Ability to update a computer software                       | 2          | 15.38% | 7                 | 53.85% | 4             | 30.77% |
| Ability to connect a computer to a projector                | 3          | 23.08% | 5                 | 38.46% | 5             | 38.46% |
| Ability to prepare PowerPoint slides                        | 3          | 23.08% | 2                 | 15.38% | 8             | 61.54% |
| Ability to prepare a lesson using a computer and project it | 3          | 23.08% | 2                 | 15.38% | 8             | 61.54% |
| Ability to access online platforms for lessons/notes        | 4          | 30.77% | 7                 | 53.85% | 2             | 15.38% |

Key: Fr= Frequency, P= Percentage

Responses from the teachers indicated that majority, 8 (61.54%) of the grade three teachers had competence in switching on and off a computer, 3 (23.08%) had little competence while 2 (15.38%) showed no competence. Majority of teachers had competence in switching on and off a computer which indicate high level of digital literacy knowledge which if well put into practice the teachers would possess the ability to utilize digital devices to enhance acquisition of digital literacy. The finding is in agreement with Ravuella (2022) assertion that teachers abilities and skills in utilization of digital devices both in and out of the classroom enhances competences in their teachings. Yet, in contrast to that, 3(23.08%) of teachers had little competence while 2(15.38%) had no competence. This would translate to minimal use of digital devices in teaching diminishing attainment of digital literacy among grade three learners.

The findings further showed that 4 (30.77%) of the teachers had no competence in updating computer software, 7 (53.85%) had little competence while 2 (15.38%) teachers had competence in updating computer software. This suggests that the majority of teachers exhibited some levels of competence in updating computer software where 7(53.85%) had little competence while 2(15.38%) were competent. This places them at a better position to come up with more programs and applications that are appropriate for teaching and learning to support the acquisition of digital literacy among grade three learners. The finding corroborates with Otterbon (2019) postulation that teachers' proficiency in use of digital applications in educational contexts promotes the attainment of digital literacy among the learners.

Findings on the ability of grade three teachers to connect a computer to a projector found that 5 teachers out of 13 had no competence, 5 showed little competence and 3 teachers had competence on the same. Results show that most of the teachers had some knowledge to connect a computer to a projector translating to learners' ease of acquisition of digital literacy.

Responses from the respondents on preparing PowerPoint slides indicates that 8 (61.54%) teachers had no competence, 2 (15.38%) were found to show little competence while 3 (23.08%) teachers had competence. Based on the findings, there is a clear indication that more than half of teachers had no knowledge on preparing

PowerPoint slides. This would clearly show that these teachers would hardly use PowerPoint to present their lessons to learners. Therefore, digital literacy by grade three learners would not be attained. This is in agreement to a study by Silvania et al (2024) in Indonesia on improving early childhood teachers' skills in creating animated English learning media through PowerPoint-based animated media which revealed that only 2 (7%) out of the studied early childhood teachers had ever used PowerPoint learning media in teaching English resulting to learners' low acquisition of digital literacy.

Researcher's findings from the respondents on the ability to prepare a lesson using a computer and project in class indicated that 2 (15.38%) of teachers had little competence, 3 (23.08%) teachers had competence whereas majority, 8 (61.54%) of the teachers displayed no competence. From the findings, more than half of the teachers; 8 out of 13 demonstrated no knowledge in preparing a lesson using a computer and projecting it in class. This suggests that learners therefore, would not acquire some of the basic digital literacy skills. On the other hand 4 out of 13 teachers revealed no competence which would deter/ dissuade learners from attaining digital literacy.

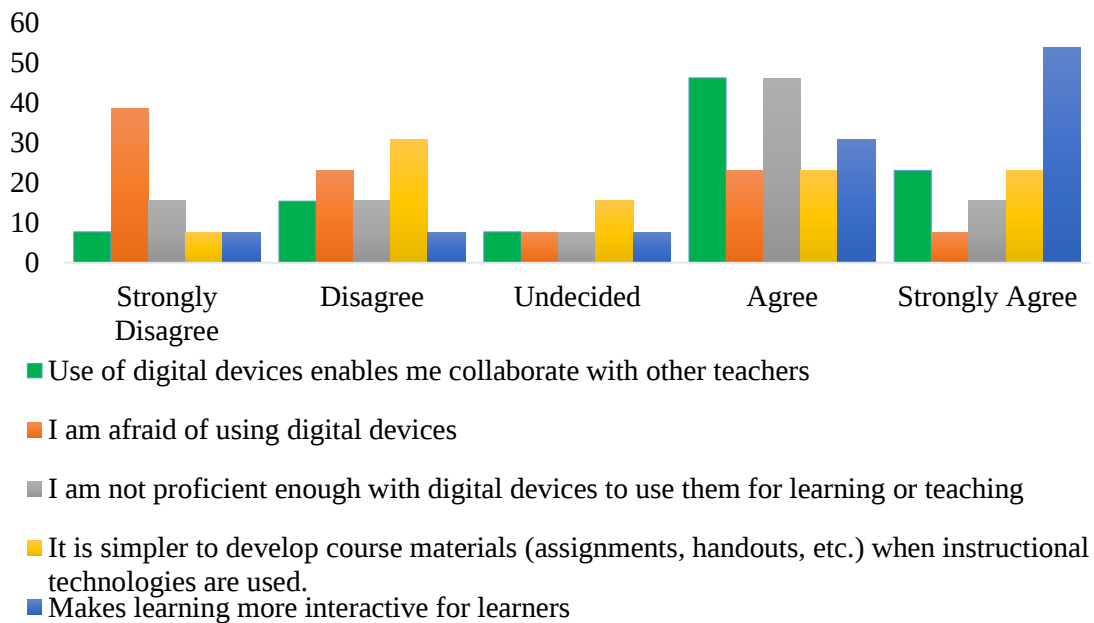
Similarly, only 4 teachers out of 13 could access online platforms for lessons/notes, 7 showed little competence while 2 had no competence. This can be linked to the issue of internet availability in schools or general digital competence of the teachers. From these findings, The study discovered that the majority of teachers had little competence which could be attributed to lack of proper training on utilization of the digital devices which would in turn have hindered the acquisition of digital literacy among the early learners. The results of the current study are also supported by Fernández-Batanero et al. (2022) study which pointed out that teachers lack of training and expertise on the use of digital devices in teaching and learning led to low acquisition of digital literacy.

#### **4.5 Teachers Perception on Digital Device Utilization**

The third objective sought to examine teacher's perception on utilization of digital device in enhancing acquisition of digital literacy. The results are provided in figure 4.

Figure 4

*Teacher Perception on Digital Device Use*



On teachers' perception on Digital Device use the findings revealed that 30.76% disagreed that it is simpler to develop course materials when instructional technologies are used, 23.07 % agreed, 15.38% were undecided, 23.07% strongly agreed while 7.69% of the respondents strongly disagreed. The findings showed low perception (23.07%) of teachers on the utilization of the digital devices developing more teaching and learning materials which would translate to these learners acquiring inadequate content. The findings disagreed with a study by Baya'a et al. (2022) which found that teachers showed positive perception and beliefs on their use which triggered their utilization in the teaching and learning process in the classroom thus promoting learners' interactions.

The researcher also sought to find out from the teachers whether utilization of digital devices makes learning for the learners more interactive. The study found that 7 (53.84%) out of 13 sampled grade three teachers strongly agreed that utilization of digital devices makes learning for learners more interactive and had positive attitude on their use, 4 agreed while 1 strongly disagreed and 1 was undecided. The study showed that more than half of the respondents (53.84%) have positive attitude on the use of digital devices and believe that when learners interact with these digital devices learning becomes more interactive. These findings resonated with several other findings which indicated that early grade teachers had positive attitude on the use of

digital devices. For instance, Gumus (2021) study on 353 teachers employed in various schools in Ankara, Turkey, discovered that teachers at secondary schools exhibited a high level of positive attitude towards the use of digital devices in the classroom and a low level of anxiety regarding their use. Also results of a study by Baya'a et al. (2022) revealed that teachers showed positive attitude and beliefs on their use which triggered their utilization in the classroom teaching and learning thus promoting learners' interactions.

Furthermore, Chai et al.(2021) indicated that most teachers had positive attitude on the use of digital tools and believed that there is a connection between the attitudes of teachers and the use of digital devices and that instructors possessing optimistic outlooks are more likely to incorporate technology into their lessons as opposed to those with negative perception. Despite teachers' positive perception, studies reveal that these teachers did not utilize digital devices in teaching and learning due to inadequate trainings. Findings of these researches can therefore hinder learners from acquiring digital literacy at an early age. Similar challenges might have also been encountered by teachers teaching grade three learners translating to learners' minimal attainment of digital literacy.

On teacher's proficiency in digital device use for learning and teaching, the researcher found that 6(46.15%) of the respondent agreed that they were not proficient enough, 1 (7.69%) was undecided, 2 (15.38%) strongly agreed, disagreed and strongly disagreed with a similar number. Based on the findings, learners' acquisition of digital literacy skills was hampered by teacher's little knowledge on utilization of digital devices. This was a clear indicator that training in use of these devices was paramount. The findings concur with a study by Marklund, (2022) who asserted that early year instructors' lack of experience in digital applications hampered the incorporation of tablet-supported activities thus hindering digital literacy acquisition skills among the early learners. The findings are backed up by Raygan and Moradkhani (2022) study which indicated that early years teachers lacked the skills needed to effectively employ technology resources in teaching in the classroom. This study pointed out that this led to low acquisition of digital literacy skills by the learners. The researcher's findings allude to this study as 46.15% of teachers were not proficient in the use of digital devices in teaching and learning hence diminishing learners from acquiring the necessary digital literacy.

Based on teachers' fear of using digital devices, findings indicated that 6 teachers out of 13 strongly disagreed that they were afraid of using digital devices, 2 disagreed, 3 agreed 1 was undecided while 1 strongly agreed. Though the study found that most teachers teaching early grades were aged between 40-45 years and termed as old, they acknowledged that they lacked adequate training on the use of digital devices but had no fear of manipulating the device. The findings therefore would mean that with adequate trainings, these teachers would confidently use the devices. These findings differ with those of Bansila (2024) which indicated that teachers or instructors, particularly the older generation cohort lacked the necessary skills in handling computers in the classroom as they feared operating them. Due to insufficient trainings, teachers would rarely or hardly utilize the devices in teaching and learning which would in turn lower digital literacy attainment among grade three learners. These findings are supported by a study of (Keirungi, 2021) in Uganda which revealed that teachers' lack of awareness and proficiency in utilizing digital devices for teaching and learning purposes lowers learners' acquisition of digital literacy.

#### 4.6 Challenges Faced on the Utilization of Digital Devices

The fourth objective sought to assess challenges faced in utilization of digital devices in enhancing acquisition of digital literacy among early learners. The findings are as highlighted in Table 6.

Table 6

*Challenges Faced in Digital Device Utilization*

| Challenge                                                            | SA    |        | A  |        | U  |        | D  |       | SD |       |
|----------------------------------------------------------------------|-------|--------|----|--------|----|--------|----|-------|----|-------|
|                                                                      | Fr    | P      | Fr | P      | Fr | P      | Fr | P     | Fr | P     |
|                                                                      | (/13) |        |    |        |    |        |    |       |    |       |
| Lack of adequate training on use of digital devices                  | 7     | 53.85% | 4  | 30.77% | 1  | 7.69%  | 0  | 0%    | 1  | 7.69% |
| Inadequate time to prepare learning materials on ICT                 | 6     | 46.15% | 3  | 23.08% | 2  | 15.38% | 1  | 7.69% | 1  | 7.69% |
| Inadequate technical expertise to create ICT based teaching material | 5     | 38.46% | 4  | 30.77% | 2  | 15.38% | 1  | 7.69% | 1  | 7.69% |

Key: SA= Strongly Agree A= Agree U= Undecided D= Disagree  
SD= Strongly Disagree, Fr= Frequency, P= Percentage

Based on the findings, 7 out of 13 sampled teachers strongly agreed that there was lack of adequate training on the use of digital devices in teaching and learning, 4 agreed, 1 strongly disagreed and 1 was undecided. These findings reveal that majority of grade three teachers attest that there are no sufficient trainings which would translate to minimal utilization of the digital devices leading to low attainment of digital literacy skills among grade three learners. The findings resonates with Keirungi (2021) study who indicated that inadequate teacher professional development rendered teachers digitally incompetent to effectively integrate technology in their teaching and learning. Similarly, on inadequacy of time to prepare learning/teaching materials on ICT, 1 teacher strongly disagreed and said there was enough time, 1 disagreed, 2 were undecided, 3 agreed and 6 strongly agreed that the time was not adequate. The findings revealed that majority, 9(69.23%), of the participants clearly stated that there was inadequate time to utilize the digital devices in teaching and learning. With this challenge, most teachers would prefer minimizing the manipulation of the tablets in teaching and learning. This would eventually hinder grade three learners from acquiring the necessary digital literacy skills. The results concurs with studies by Muinde (2019) and Agbor (2024) which revealed that teachers felt that the time allocated for the integration of technology was not adequate and that most of their lessons' time was spent assembling the gadgets and thus were not able to effectively manipulate the digital devices to enable early learners acquire adequate digital skills.

On technical expertise to create ICT based curriculum materials, 5 teachers strongly agreed there was inadequate technical expertise to create ICT based curriculum materials, 2 were undecided, 4 agreed, 1 strongly disagreed while 1 disagreed that teachers had inadequate technical expertise to create ICT based curriculum materials. Based on the availability of digital devices and infrastructural materials, the researcher found that 6(46.15%) teachers out of 13 strongly agreed there are no digital and infrastructural materials while 3 agreed. The findings revealed that the presence of digital devices and quality infrastructure would contribute to high acquisition of digital literacy while their absence leads low digital literacy attainment. Grade three teachers said that these digital devices needed to be provided to them as well as improving their infrastructure to enable grade three learners acquire digital literacy. This is in agreement with a study conducted by Achebo (2022) which found that lack of necessary digital

devices and infrastructure continually impeded the effective use of the devices thus diminishing attainment of digital literacy among the lower grades.

From the findings, 6 teachers strongly agreed, 2 agreed that there was absence of safe and secure storage facilities in the schools for digital devices, while 2 were also undecided, 1 disagreed and 2 strongly disagreed and confirmed that there was safe and secure storage facilities for the digital devices.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter summarizes the research findings according to the study's objectives. It also gives the conclusion and recommendation of the study and suggestions for additional research.

#### **5.2 Summary of the Findings**

Based on the obtained biodata, it was found that most of the grade three teachers were female. These findings imply that gender disparity is a significant problem regarding teaching young children. According to data on the ages of grade three teachers, the majority of them were between the ages of 40 and 45. These teachers are thought to have a wealth of competence in working with young children, but they are less familiar with using digital devices, which means that grade three learners have not learned much about digital literacy.

According to data gathered from objective one, digital devices (laptops and tablets) were available in the majority of the sampled schools, but were not accessible to early grade learners. It was found that junior school teachers and students used the majority of these gadgets, which suggests that early childhood education learners' digital literacy development was relatively poor.

All the learners in these schools attested that there are no projectors in their school and majority of them also said there was no internet available. This translated to teachers and learners minimal utilization of these digital devices in searching for information online thus diminishing attainment of digital literacy among grade three learners

Based on objective two, it was clear that most of the teachers teaching grade three learners had attained minimal training on the utilization of digital devices as most of them were only able to switch on and off the laptops and tablets. With such minimal training, the researcher felt that these teachers may lack the requisite knowledge and skills needed in enabling early years learners acquire the relevant digital literacy skills

needed to fit in the digital world. Sufficient training is a key to effective utilization of the devices.

From objective three on teachers' perception, the findings revealed that more than half of sampled teachers had positive attitude on the use of digital devices in teaching and learning. This therefore, would imply that with the right and adequate technological knowledge and ICT infrastructure, they would easily utilize the digital devices with the grade three learners. However, they reported that the training was insufficient. These difficulties tend to reduce teachers' attitudes, which would hinder grade three learners from acquiring digital literacy.

In line with objective, it was evident that the majority of the sampled teachers, seven out of thirteen had insufficient instruction on how to utilize the tablets and computers. Additionally, research showed that there was insufficient time allotted for teaching and learning to allow teachers and learners to utilize digital devices efficiently.

Similarly, the teachers reported that there were not enough digital facilities and equipment to be utilized in teaching. This was evident as findings from these schools shown that half of the tablets supplied by the Kenyan Government had stopped functioning. Internet, power and safe storage facilities were also found as some of the challenges faced by both teachers and learners especially in schools which are not nearing market or town centres. The above findings implies that the educational needs of the early years learners in the sampled schools are not met hence barring these learners from acquiring their digital literacy at an early age.

### **5.3 Conclusions**

Based on the research findings, the study made the following conclusions;

- i. The digital facilities are also a fundamental factor for the learners' attainment of the digital literacy.
- ii. Adequate training of the teachers in utilization of digital devices is a key factor that hindered learners from acquisition of digital literacy.
- iii. Also, provision and installation of technological facilities in schools is vital to make it possible for the learners attain the right digital skills.

#### **5.4 Recommendations**

Based on the results of the study, the researcher, guided by the objectives of the study, recommends the following;

- i. The TSC through the Ministry of Education to organise retooling on the utilization of digital devices for all teachers teaching in primary schools to enable them acquire the competences needed to help learners attain their digital literacy.
- ii. The university to ground teacher trainees in digital device utilization for teaching and learning.
- iii. The Government to ensure that all schools are connected to a reliable source of power for effective utilization of digital devices by early grade teachers and learners.

#### **5.5 Suggestions for Further Research**

The following suggestions for further research were made;

- i. A similar study can be carried in private schools to investigate how teachers enhances acquisition of digital devices through utilization of digital devices among the early grade learners.
- ii. Since the research focused early grade learners and their teachers in Tharaka south sub-county, the same research can be replicated in all other sub-counties.

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## **APPENDICES**

### **Appendix I: Introduction Letter**

My name is Gladys Karimi, a masters student at Tharaka University. I am conducting a research on utilization of digital devices in enhancing digital literacy acquisition among early learners in Tharaka South sub-county, Tharaka Nithi County, Kenya. The purpose of the study is to investigate utilization of digital devices as an enabler in the acquisition of digital literacy among early years learners in Tharaka South sub-county, Tharaka Nithi county, Kenya.

I assure you that all information given during given during this study will be confidential and will be used for research purposes only.

I humbly request some of your time from your busy schedules to answer the questions in order to enhance the success of the research.

Thanking you in advance.

Gladys Karimi Rwaimba  
Tharaka University

## Appendix II: Teachers Questionnaire

The purpose of this questionnaire is to assist the researcher in gathering data regarding teachers' competence, perceptions availability of digital devices and challenges faced towards the use of digital devices in the early years' learning. All provided information will be handled in the strictest confidence. We really appreciate your willingness to take part in this research project.

### PART A: General biodata (Mark the relevant box)

To the best of your knowledge, please provide the information needed below.

|             |                                                               |                                |                                |                                |                                   |
|-------------|---------------------------------------------------------------|--------------------------------|--------------------------------|--------------------------------|-----------------------------------|
| Gender      | Male <input type="checkbox"/> Female <input type="checkbox"/> |                                |                                |                                |                                   |
| Age bracket | Below 30 <input type="checkbox"/>                             | 30-35 <input type="checkbox"/> | 36-40 <input type="checkbox"/> | 40-45 <input type="checkbox"/> | Above 45 <input type="checkbox"/> |

### PART B: Teachers' digital competence

Please choose the option in this section that most accurately reflects you for each item.

| Statement                                                       | No Competence | Little Competence | Competent |
|-----------------------------------------------------------------|---------------|-------------------|-----------|
| I can switch a computer on and off safely                       |               |                   |           |
| I can update my computer software                               |               |                   |           |
| I can connect a computer to a projector                         |               |                   |           |
| I can prepare PowerPoint slides                                 |               |                   |           |
| I can prepare a lesson using a computer and project it in class |               |                   |           |
| I can access online platforms for lessons/notes                 |               |                   |           |

Key: Competence means one can easily and effectively navigate digital tools

Little competence: means can navigate but with support from an experienced person.

No competence: means one cannot navigate with or without support.

### PART C: Teachers Perception on Digital Device Use

Indicate the extent to which you agree with each of the following statement based on a scale of 1 to 5 where 1= strongly disagree (SD) 2= Disagree (D) 3= Undecided (UD) 4= agree (A) 5= strongly agree (SA).

| Statement                                                        | 1 | 2 | 3 | 4 | 5 |
|------------------------------------------------------------------|---|---|---|---|---|
| Use of digital devices enables collaboration with other teachers |   |   |   |   |   |
| I am afraid of using digital devices                             |   |   |   |   |   |

|                                                                                                                   |  |  |  |  |  |
|-------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| I am not proficient enough with use of digital devices for learning or teaching                                   |  |  |  |  |  |
| It is simpler to develop course materials (assignments, handouts, etc.) when instructional technologies are used. |  |  |  |  |  |
| Makes learning more interactive for learners                                                                      |  |  |  |  |  |

Others, specify .....

#### **PART D: Challenges Faced on the Use of Digital Devices**

Indicate the extent to which you agree with each of the following statement based on a scale of 1 to 5 where 1= strongly disagree (SD) 2= Disagree (D) 3= Undecided (UD) 4= Agree (A) 5= strongly agree (SA).

| Statement                                                                                                    | 1 | 2 | 3 | 4 | 5 |
|--------------------------------------------------------------------------------------------------------------|---|---|---|---|---|
| Lack of training on utilization of digital devices for teaching and learning                                 |   |   |   |   |   |
| Inadequate time to prepare learning/teaching materials based on ICT                                          |   |   |   |   |   |
| Inadequate technical expertise of teachers to create ICT-based curriculum materials                          |   |   |   |   |   |
| Absence of digital devices and infrastructural materials such as computers, tablets, internet and projectors |   |   |   |   |   |
| Absence of safe and secure storage facilities.                                                               |   |   |   |   |   |

Others, specify .....

### Appendix III: Learners' Observation Schedule

Grade 3 learners will be provided with tablets and the researcher will observe the following:

- The ability to switch the gadgets on and off safely.
- The ability of the learner to navigate and access educational materials both offline and online.
- The ability to take photos
- The ability to play games.
- The ability to typeset information on the gadget

Learner ..... (Assign anonymous code)

| Statement                                            | Yes | No |
|------------------------------------------------------|-----|----|
| Can Switch off and on the Tablet                     |     |    |
| Can navigate and access materials offline and online |     |    |
| Can take photos                                      |     |    |
| Can play games                                       |     |    |
| Can typeset information on the gadget                |     |    |

#### **Appendix IV: Interview Schedule for Grade 3 Learners**

The researcher will interview grade three learners to find out availability and accessibility of digital devices.

| Assertion                                     | Unavailable | Available in<br>classroom | Available in<br>library | Available<br>in office |
|-----------------------------------------------|-------------|---------------------------|-------------------------|------------------------|
| Computers (desktops/<br>laptops/tablets etc.) |             |                           |                         |                        |
| Projectors                                    |             |                           |                         |                        |
| Internet                                      |             |                           |                         |                        |
| Printers                                      |             |                           |                         |                        |
| Smart phone                                   |             |                           |                         |                        |

Others, specify .....

## **Appendix V: Parental/Guardian Consent Form**

Title of the Research.

Utilization of Digital Devices in Enhancing Digital Literacy Acquisition among Early Years Learners in Tharaka South - Sub County, Tharaka Nithi County, Kenya.

Researcher : Gladys Karimi Rwaimba

School : Tharaka University

### **Dear Parent/Guardian,**

Your child is invited to take part in a research study aimed at understanding how utilization of digital devices has enhanced acquisition of digital literacy among early years learners in Tharaka South sub -county.

Your child will be interviewed to find out the availability and accessibility of these digital devices in their school environment.

Participation is voluntary and all information will be treated as confidential and used for academic purposes only.

Kindly read and sign below to give your consent.

## **Appendix VI: Consent Declaration**

I .....am the parent/guardian of .....

I have read and understood the purpose of this research and what it entails.

I give permission for my child to take part in this research.

Signature of Parent/Guardian .....

Date .....

Phone Number (optional).....

THANK YOU FOR YOUR SUPPORT.

## Appendix VII: Tharaka University Institutional Scientific and Ethics Review Committee Authorization

**THARAKA**

P.O BOX 193-60215,  
MARIMANTI, KENYA



**UNIVERSITY**

Telephone: +(254) 0202008549  
Website: <https://tharaka.ac.ke>  
Social Media: [tharakauni](#)  
Email: [info@tharaka.ac.ke](mailto:info@tharaka.ac.ke)

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**INSTITUTIONAL SCIENTIFIC AND ETHICS REVIEW COMMITTEE**  
8<sup>th</sup> August 2025.

REF: TUNISERC/NSEC/ M073

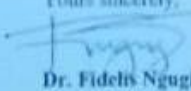
Dear, Gladys Karimu Rwaimba,  
**RE: Utilization of Digital Devices in Enhancing Digital Literacy Acquisition among Early Years Learners in Tharaka South Sub-County, Tharaka Nithi County, Kenya**

This is to inform you that *Tharaka University ISERC* has reviewed and approved your above research proposal. Your application approval number is *ISERC04023*. The approval period is *8<sup>th</sup> August 2025– 8<sup>th</sup> August 2026*.

This approval is subject to compliance with the following requirements;

- Only approved documents including (informed consents, study instruments, MTA) will be used
- All changes including (amendments, deviations, and violations) are submitted for review and approval by *Tharaka University ISERC*.
- Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to *Tharaka University ISERC* within 72 hours of notification
- Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to *Tharaka University ISERC* within 72 hours
- Clearance for export of biological specimens must be obtained from relevant institutions.
- Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- Submission of an executive summary report within 90 days upon completion of the study to *Tharaka University ISERC*.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI)  
<https://research-portal.nacosti.go.ke> and also obtain other clearances needed.

Yours sincerely,  
  
**Dr. Fidelis Ngugi**  
Chair, ISERC Tharaka University



THARAKA UNIVERSITY  
ETHICS COMMITTEE  
08 AUG 2025  
CHAIRPERSON

## Appendix VIII: NACOSTI License

|                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br><b>REPUBLIC OF KENYA</b>                                                                                                                                                                                                                                                                                                                                    | <br><b>NATIONAL COMMISSION FOR<br/>SCIENCE, TECHNOLOGY &amp; INNOVATION</b> |
| Ref No: <b>439589</b>                                                                                                                                                                                                                                                                                                                                                                                                                            | Date of Issue: <b>16/August/2025</b>                                                                                                                           |
| <b>RESEARCH LICENSE</b>                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                |
|                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                |
| <b>This is to Certify that Ms. GLADYS KARIMI RWIMBA of Tharaka University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Tharaka-Nithi on the topic: UTILIZATION OF DIGITAL DEVICES IN ENHANCING DIGITAL LITERACY ACQUISITION AMONG EARLY YEARS LEARNERS IN THARAKA SOUTH SUB COUNTY, THARAKA NITHI COUNTY, KENYA. for the period ending : 16/September/2026.</b> |                                                                                                                                                                |
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| <b>439589</b>                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                           |
| Applicant Identification Number                                                                                                                                                                                                                                                                                                                                                                                                                  | Ag. Director General                                                                                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>NATIONAL COMMISSION FOR<br/>SCIENCE, TECHNOLOGY &amp;<br/>INNOVATION</b>                                                                                    |
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