European Journal of Open Education and E-learning Studies
ISSN: 2501-9120
ISSN-L: 2501-9120
Available on-line at: www.oapub.org/edu

DOI: 10.46827/ejoe.v10i4.6355 Volume 10 | Issue 4 | 2025

CHALLENGES FACED IN UTILIZATION OF DIGITAL DEVICES IN ENHANCING ACQUISITION OF DIGITAL LITERACY AMONG EARLY YEARS LEARNERS IN THARAKA SOUTH SUB-COUNTY, KENYA[i]

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Abstract:
The Kenyan government has launched initiatives in recent years to help the nation become middle-income by supporting technological skills right from the early years of education. Through the implementation of the Digital Literacy Program, the government has provided tablets to public primary schools nationwide to enhance digital literacy in early years learners. However, inadequacy in the utilization of digital devices may hinder the acquisition of digital literacy, resulting in poor technological skills. This study aimed to investigate the challenges encountered by teachers while utilizing digital devices in teaching and learning among early years learners in Tharaka South Sub-County. The study employed a descriptive survey design. Data were obtained from 13 public primary schools, which were randomly sampled from 64 public primary schools. The sample size included 102 grade three learners and 13 teachers, who were purposively sampled. Questionnaires for teachers, as well as observation and interview schedules for learners, were used in the study. Analysis of data was done both qualitatively and quantitatively. The findings of the study revealed several challenges that early grade teachers faced, thus hindering the effective acquisition of digital literacy. These were inadequate teacher

[i] DÉFIS LIÉS À L'UTILISATION DES APPAREILS NUMÉRIQUES POUR RENFORCER L'ACQUISITION DES COMPÉTENCES EN LITTÉRATIE NUMÉRIQUE CHEZ LES APPRENANTS DE LA PETITE ENFANCE DANS LE SOUS-COMTÉ DE THARAKA SUD, AU KENYA

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training on the use of digital devices (84.62%), insufficient digital devices (69.23%), inadequate time to prepare learning materials on ICT (69.23%) and lack of safe and secure storage of digital devices (61.53%). For maximum attainment of digital literacy for the learners, the study recommends in-service training on the use of digital devices by early grade teachers, replacement of malfunctioning digital devices, installation of power and internet in schools, as well as improvement of digital devices storage facilities.

Keywords: challenges, digital devices, digital literacy, utilization of digital devices

1. Introduction

In the 21st-century, digital literacy has become a fundamental skill for learners in the educational environment. Digital literacy goes beyond mere technical proficiency: it encompasses the ability to locate, evaluate, use, and create information via digital technologies, as well as understanding ethical, social, and critical dimensions of digital engagement (Tabieh, Hamzeh, Abu-Foudeh, Jarrar, & Seikaly, 2023).

These skills are employed to learn new things, manage, integrate, analyze, and assess the information required, as well as to build relationships or communicate with others in order to participate fully in society. The use of digital devices by teachers in classroom practice is a key enabler of this process, acting both as a medium and as a scaffold for digital literacy development. As such, teachers play a crucial role in facilitating learners' acquisition of these skills. Teachers' integration of digital devices such as tablets, interactive whiteboards, computers, and mobile phones in instructional settings allows learners not only to use technology but to learn through it.

Nowadays, using digital gadgets in the classroom shouldn't be seen as a luxury. Children are replacing real-world experiences with digital ones, and the use of technology in early childhood education has increased over the past 10 years (Stevens, 2022). A study by Obiweluozo (2021) in Japan revealed that the widespread use of digital devices in early childhood education classrooms boosted motivation, enhanced self-perception and fundamental skill mastery, which made learning more engaging by adopting learner-centred activities. This was supported by providing computers for the children to play with, and they were allowed to use them even in the absence of teachers. In addition, the schools offered computer sessions where a professional instructor engaged four- and five-year-old learners in technological activities once a week, thus enhancing digital literacy (Izumi-Taylor, 2020).

In support of digital literacy in early years education, China's government in 2012 enacted a number of laws to advance and improve the incorporation of technology into learning activities. Based on experiences at that early age, Chinese children have easy access to a wide range of electronic gadgets, which expose them to opportunities for learning digital literacy. In support of this notion, a study by Dong *et al.* (2021) postulated that 82.9% of Chinese households with young children own more than three cellphones, out of which 55.7% of these young children can snap pictures on tablets.

In this digital shift, African nations are not left behind either. In Rwanda, for example, the government has worked to raise the standard of teaching in schools by giving learners access to technology. The Rwandan government started the One-Laptop-Per-Child (OLPC) program in 2008 as part of its Vision 2020 framework. Every learner would have a laptop in their ideal world, and the following generation would be prepared with digital abilities. Children in primary schools begin utilizing computers at the age of seven or eight, with one laptop per student (de Dieu *et al.*, 2022).

Kenya, like other developing countries, has also made strides in the use of digital devices in education. In 2015, the Kenyan government initiated the digital literacy programme with the aim of distributing digital devices to grade one learners and to train teachers in the delivery of digital learning content. Digital devices for both teachers and learners, such as projectors, digital content servers, solar power and charging devices, were provided in 2016 with an aim of enabling learners to acquire digital literacy at an early age.

Despite the increased utilization of digital devices in early years education globally, there are challenges that minimizes the extent to which digital literacy is attained by the learners. In support of this position, Keirungi (2021) and Mushimiyimana *et al.* (2025) posited that challenges like inadequate digital devices, poor internet connectivity, teacher-pupil ratios and lack of proficiency by teachers in utilizing digital devices for teaching and learning hampered the acquisition of digital literacy among early learners. On the same vein, Achebo (2022) postulated that unreliable internet connectivity and inaccessibility to digital devices also tend to thwart the learning process using digital devices in most of the early childhood classes. Similarly, challenges like shorter lesson duration, inadequate digital devices and deficient teacher training, as noted by Agbor *et al.* (2024), hindered the utilization of digital devices for the attainment of digital literacy by early learners. Based on this knowledge, the study sought to find out the challenges teachers experience in enhancing the acquisition of digital literacy among early years learners in Tharaka South Sub-County, Kenya.

2. Purpose of the Study

The purpose of this study was to establish challenges faced by teachers in the utilization of digital devices to enhance the attainment of digital literacy among early years learners in Tharaka South Sub-County.

3. Reviewed Literature

Digital literacy abilities are undoubtedly valuable competencies for children to learn and develop in the current era of technology. In order for the Digital Literacy Program to be implemented successfully, enough infrastructure, such as digital devices, is required.

Digital devices (DD) are useful tools that educators and students use to communicate, teach, and express themselves in the modern teaching learning process.

Examples of these tools include audio books, interactive whiteboards, laptops, smartphones, tablets, and desktop computers (Barltrop, 2018). The integration of these gadgets into early childhood classes tends to promote the development of reading, numeracy, and socio-emotional skills compared to the use of traditional print materials. In support of this position, Liu *et al.* (2024) discovered that preschoolers exposed to interactive digital storybooks had notable improvements in vocabulary, print knowledge, and phonemic awareness.

An earlier study by Gjelaj *et al.* (2020) in Australia on the use of digital devices in the classroom revealed that the gadgets were successfully and appropriately integrated into early childhood classrooms, resulting in active engagement in learning, communication, exploration, and other educational activities that are necessary for the development of core 21st-century skills.

A research by Evans *et al.* (2021) in Tanzania examined the use of digital technologies for learning among early-grade children. The findings revealed that growing use of digital devices in classrooms improved learners' understanding of specific words, texts, and ideas in addition to making reading and writing instruction easier. Its use has major advantages for teachers as well because it improves the caliber of their teaching by making learning easier for their students.

In the Kenyan context, utilization of digital tools in early childhood education is a growing area of interest as it equips children with critical cognitive, technical, and communication skills needed for lifelong learning and participation in the digital world. According to a study on the impact of digital literacy programs on learning in early childhood centers in Bungoma County, Kenya, by Robert *et al.* (2021), the use of tablets and digital content enhanced children's understanding, language acquisition, and attention span. This supports a study conducted in Nairobi County by Sabiri (2020), which established that utilizing digital devices in the classroom enhances communication between students and teachers as well as among the learners. Further, the use of technology in learning also enables learners to express their learning difficulties and aids in language acquisition.

Despite the notable benefits of digital devices' utilization in early childhood education, the majority of educators have cited a number of barriers that tend to hinder optimal application of these tools in teaching and learning. For instance, research conducted in Uganda by Keirungi (2021) and Ross *et al.* (2022) revealed that there were insufficient digital devices, inadequate internet connectivity, outdated curricula, and teachers lacked proficiency in the use of digital devices in learning activities. In addition, a study by Achebo (2022) on the use of digital devices in early childhood education in Nigeria revealed that lack of internet connectivity and lack of access to digital devices are some of the challenges faced by teachers in the utilization of digital devices in enabling early learners to acquire digital literacy.

Similar to this, Muinde and Mbataru's (2019) study on Kenyan teachers' use of digital technologies to construct competency-based curricula revealed that 68.5% of the studied teachers had a positive opinion of using computers for teaching and learning.

They did, however, find that 39% of the teachers said that the time allotted for integrating technology was insufficient and that assembly of the devices took up the majority of their class time. Also, Heinrich *et al.* (2020), who examined the possibilities and requirements for successful tablet integration in rural Kenya, found that time perception was a challenge. Shorter lesson lengths and a lack of digital resources have a significant impact on the proper use of digital devices in education, according to Agbor *et al.* (2024). Thus, when integrating technology, teachers frequently left out pupils who were thought to be sluggish learners. According to a few of the teachers surveyed, the short class periods prevented them from meeting the needs of students who were struggling academically.

4. Research Methodology

The study used the descriptive research design to provide an in-depth description of the state of affairs as far as digital devices utilization and digital literacy among early years learners are concerned. The target population for the study was 64 public primary teachers and 2746 grade three learners, from which a sample size of 13 teachers was randomly sampled and 102 learners purposively sampled. The data from teachers regarding challenges encountered in utilization of digital devices in teaching was obtained using five-point Likert scale questionnaires.

For data analysis, both qualitative and quantitative methods were employed because the data generated consisted of both numeric and non-numeric values. Specifically, qualitative data were analyzed thematically using narratives. Quantitative data, on the other hand, were analysed using SPSS version 26.0 and presented in percentages.

5. Findings and Discussions

The purpose of the study was to establish challenges that teachers in early grades face in the utilization of digital devices to enhance the acquisition of digital literacy in public primary schools. The findings are presented in Table 1

Table 1: Challenges in the Utilization of Digital Devices

	SA	A	U	D	SD
Lack of adequate training on the use of digital devices	53.85%	30.77%	7.69%	0%	7.69%
Inadequate time to prepare for learning materials on ICT	46.15%	23.08%	15.38%	7.69%	7.69%
Insufficient digital devices and infrastructural materials	46.15%	23.08%	15.38%	15.38%	0%
Absence of safe and secure storage of digital devices	46.15%	15.38%	15.38%	7.69%	15.38%

The findings in Table 1 indicate challenges teachers encounter in using digital devices in teaching early learners. These challenges tend to limit the effectiveness of digital devices in supporting the attainment of digital literacy among early years learners. The findings show that majority (84.62%) of teachers agreed that there was lack of adequate training on use of digital devices, 69.23% indicated that the time allocated to prepare materials with digital devices for teaching was limited, 69.23% revealed that there was lack of digital devices and infrastructural materials while 61.53% identified absence of safe and secure storage of digital devices. The findings are in agreement with studies by Keirungi (2021) and Mushimiyimana *et al.* (2025), asserting that challenges like inadequate digital devices, poor internet connectivity, teacher-pupil ratios and lack of proficiency by teachers hampered the attainment of digital skills among early years learners. Based on the findings, it is evident that the current situation in public schools is inadequately supporting the attainment of digital skills among early years learners.

6. Conclusion and Recommendations

6.1 Conclusion

From the findings of this study, it is clear that the attainment of adaptive skills among early grade learners is inadequate as a result of recorded challenges. This calls for immediate action to address the current situation in schools, for the government to implement the Digital Literacy Program. This may be possible through equipping teachers with adequate digital knowledge to support the realization of maximum potential in the digital world by learners. In addition, teachers also need more time for the lessons in order to fully manipulate the digital devices with the learners. Internet and power installations were also identified as lacking in most of the institutions.

6.2 Recommendations

1) The Ministry of Education, in collaboration with the teachers' service commission, is to organise comprehensive training for teachers on digital use.
2) The government should allocate more funds to the education sector for the school managers to solicit the necessary digital equipment.
3) The government should supply more digital devices and replace the malfunctioning ones to ensure one tablet per learner.
4) The government should ensure internet and power connectivity to the most remote public primary schools in the country, to ensure every Kenyan child has access to digital devices in early grades.

Conflict of Interest Statement
The authors declare no conflict of interest.

About the Author(s)
Gladys Karimi holds a degree in early childhood education and is a dedicated and enthusiastic university student pursuing a master's degree in Early Childhood Education. Her academic journey is guided by a deep commitment to improving the quality of learning experiences for young children, with a particular focus on integrating technology into early education. Her primary research interest centers on Digital Literacy Acquisition Among Early Years Learners, exploring how technology can be effectively used to support foundational learning skills. Gladys is equally passionate about advocating for digital literacy, aiming to ensure equitable access to digital learning tools and resources for all children, regardless of their background. Throughout her academic career, Gladys has actively participated in workshops and seminars at the university level, where she has engaged in discussions on educational innovation, child development, and pedagogical strategies. These participations have enhanced her understanding of contemporary issues in early childhood education and equipped her with practical insights into teaching and advocacy. Gladys continues to build her expertise in early childhood education, aspiring to contribute to policy development, curriculum design, and community initiatives that promote digital readiness and literacy in early learning environments.
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Dr. Joseph Kirugua is the Dean of the Faculty of Education at Tharaka University. He holds a Doctor of Philosophy (PhD) in Educational Foundations and has extensive experience in teaching, research, and academic administration. His scholarly interests focus on curriculum studies, philosophy and sociology of education, foundational learning, and educational management, with a particular emphasis on improving

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