



## Digital Literacy Training: Its Impact on Teachers in Busoga Region, Eastern Uganda

Martin Okoed<sup>1\*</sup>, Emmanuel Acidri Bileti<sup>2</sup>

<sup>1</sup>Uganda Technology and Management University, Kampala, Uganda

<sup>2</sup>Uganda Christian University, Arua, Uganda



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### ABSTRACT

**Objective:** This study evaluated the impact of digital literacy training on teachers in Busoga region, Eastern Uganda. Specifically, it assessed the impact of digital literacy training on teachers' skills and knowledge, evaluated facilitators' effectiveness in delivering the training program, and investigated teachers' proposals for promoting ICT integration in secondary schools. **Method:** A convergent parallel mixed methods design was used; data was collected from 300 teachers through online questionnaires and focus group discussions. **Results:** It was revealed that the digital literacy training very positively impacted the skills/knowledge of teachers in the Busoga Region. Furthermore, the result indicated high satisfaction with the facilitators' skills and responsiveness. Finally, teachers proposed the need for infrastructure enhancement, capacity building, resource provision, connectivity, and incorporation of ICT tools like smartphones, laptops, and projectors in teaching and learning. **Novelty:** This study contributes valuable empirical insights to the discourse on digital literacy training, stressing its role in fostering effective teaching practices. As technology continues to evolve, understanding its nuanced impact on teachers becomes increasingly crucial for shaping the future of education.

## INTRODUCTION

Digital literacy refers to the ability of teachers to access, manage, understand, integrate, communicate, evaluate, and create information safely and appropriately through digital technologies for teaching and learning. Many secondary school teachers must focus more on integrating technology into teaching frameworks (Abendan et al., 2023; Deping & Burhanudeen, 2023). It is imperative to note that the importance of digital literacy training for teachers has been recognized since the invention of digital technologies in the 1940s, and this has resulted in a paradigm shift, redefining the skills teachers need to equip students for the digital age (Divakar, 2024; Pattnayak et al., 2024; Yu, 2024). Since then, digital literacy training has become teachers' global professional development component. Several scholars have reported that the integration of digital tools and resources into teaching methodologies has become essential to meet the evolving needs of 21st-century learners (Bondarenko & Gudkova, 2023; Danca et al., 2023; Hafeez, 2021; McWhorter, 2021; Nikolova & Evtimova, 2022; Ng et al., 2022; Shuhidan et al., 2020).

In the context of countries in Sub-Saharan Africa, challenges such as limited access to technology, inadequate infrastructure, and disparities in digital literacy levels are enormous and pose significant barriers to effective teaching (Kilag et al., 2023; Okoed, 2023). It should be noted that where digital disparities are prevalent, digital literacy training programs have the potential to bridge gaps and empower teachers to deliver quality teaching (Rodriguez et al., 2023). However, the effectiveness of these programs

It hinges on various factors, including the quality of facilitation, the relevance of content, and the alignment with teachers' needs and contexts (Kilag et al., 2023a; Balta et al., 2023). Similarly, recent studies have highlighted the profound impact of such initiatives on enhancing teachers' digital competencies and promoting student engagement (Aldhaen, 2024; Quraishi et al., 2024).

In the context of the Busoga region, digital literacy among teachers remains a topic for analysis. Studies carried out in secondary schools by several authors in the early 1990s in the Busoga region suggested that many teachers in the region lack adequate digital skills, and this has been attributed to factors like inadequate infrastructure, such as stable power supply and computer labs. There were very few schools with ICT clubs, and teachers lacked essential ICT gadgets such as tablets, laptops, and desktop computers, and there were enormous challenges of connectivity to the internet (Abedi, 2023; Baluku & Kasujja, 2020; Mbabazi et al., 2022; Ulanova, 2021). None of the studies focused on digital literacy training for teachers.

However, more studies need to show how digital literacy training impacts teachers in the Busoga region in Eastern Uganda. Therefore, this study's attention was drawn to evaluating digital literacy training and its impact on teachers in the Busoga region in Eastern Uganda. More specifically, the objectives of this study were to 1) assess the impact of digital literacy training on teachers' skills and knowledge, 2) evaluate the effectiveness of facilitators in delivering the training program, and 3) investigate teachers' proposals for promoting ICT integration in schools.

## RESEARCH METHOD

This study was guided by a convergent parallel mixed-methods research design to comprehensively investigate the impact of digital literacy training on teachers in the Busoga sub-region, Eastern Uganda. They integrated quantitative and qualitative approaches to data collection and analysis (Ahangarana & Behnam, 2024; Fiel'ardh et al., 2023). Three hundred participants were sampled using a simple random sampling technique guided by Krejcie and Morgan's table of 1970. These participants comprised secondary school teachers sampled during a digital literacy workshop at National Teachers' College Kaliro, which ensured diverse representation. The data collection tools were subjected to a reliability test whose index was 0.963 for the impact of digital literacy training on teachers' skills and knowledge construct and 0.987 for the effectiveness of facilitators in delivering the training program construct, indicating strong reliability (Cronbach, 1951). Additionally, the data collection tools were treated to expert opinion validation, the index of which was 0.938, suggesting a high level of validity for the tools (Kaiser, 1981). Changes recommended by the validation panel and those identified as needed during the pilot test were incorporated into the instruments.

Quantitative data were collected through an online questionnaire distributed via a link. The questionnaire covered demographic details, participants' perceptions of training impact, and the effectiveness of facilitators. Qualitative data was obtained through focus group discussions, with each cohort's participants (n=150) engaging in open discussions about proposals for promoting ICT integration in schools. The description analysis technique was used to analyze quantitative data, while the thematic analysis technique was employed to analyze qualitative data (Cernasev & Axon, 2023; Majumdar, 2022; Ozuem et al., 2022).

### **Research Procedure**

First, the researchers identified the research problem and reviewed the literature to learn more about it. They then formulated objectives and came up with the research design. Later, they described the study population, developed data collection tools, and then researchers acquired data collection permission from the District Education Officers and headteachers of the secondary schools and then embarked on data collection. Later, data analysis was conducted. Lastly, the researchers wrote the report and published the findings.

### **Ethical considerations**

This study adhered to ethical standards, ensuring participant confidentiality and voluntary participation, with informed consent from all participants. Rigorous validation processes were employed to enhance the reliability and validity of the research instruments, contributing to the robustness of the findings (Creswell & Creswell, 2017).

## **RESULTS AND DISCUSSION**

### **Results**

#### **Demographics of the participants**

The study involved teachers with diverse backgrounds, which helped us understand differences in their digital skills, ICT training, and smartphone use. We collected data on demographics, including gender, smartphone ownership, prior ICT training, and digital literacy levels, as shown in Table 1.

**Table 1.** Demographics of the participants (N=300).

<b>Item</b>		<b>Percentage (%)</b>
Gender	Female	34.000 (102)
	Male	66.000 (198)
Owned smartphone	No	3.000 (9)
	Yes	97.000 (291)
Had previous ICT training	No	27.000 (81)
	Yes	73.000 (219)
Digital literacy level	Low	30.000 (90)
	Moderate	57.000 (171)
	High	13.000 (39)

Table 1 shows more demographically male participants (66.000%) than females (34.000%). Additionally, nearly all participants (97.000%) reported owning a smartphone, and a significant proportion (73.000%) had prior formal training in ICT. Participants exhibited varied literacy levels before the workshop, with more than half (57.000%) reporting moderate literacy, followed by low (30.000%) and high literacy (13.000%) levels.

#### **Impact of digital literacy training on teachers' skills and knowledge.**

The results are presented in Table 2.

**Table 2.** Impact on teachers' skills and knowledge

<b>Item</b>	<b>Poor</b>	<b>Fair</b>	<b>Satisfactory</b>	<b>Very Good</b>	<b>Excellent</b>

Item	Poor		Fair	Satisfactory	Very Good	Excellent
Level of skill/knowledge at the start of training	6.000% (18)	73	24.330% (73)	36.670% (110)	21.670% (65)	11.330% (34)
Level of skill/knowledge at the end of training	1.000% (3)	29	9.670% (29)	37.670% (113)	31.330% (94)	20.330% (65)
Contribution of training to your skill/knowledge	1.670% (5)	29	9.670% (29)	25.330% (76)	36.330% (109)	27.000% (81)

Table 2. Analysis of the post-training assessment revealed a noteworthy improvement in teachers' skills and knowledge. At the beginning of the training, 36.670% of participants rated their skills and knowledge as satisfactory, with an additional 24.330% rating them as fair. After the training, a notable transformation transpired: a substantial majority (37.670%) of participants rated their skills/knowledge as satisfactory, while a substantial majority (36.520%) reported that the training contributed very positively to their skills/knowledge.

During the focus group discussions with some participants, many expressed satisfaction with how the training impacted their ICT skills and knowledge. One teacher reported that "before the digital literacy training, I could not open a computer and type information, but I could do so with the help of the training." Another participant meanwhile said, "Digital literacy training has excellently contributed to improving his ICT skills and knowledge." Therefore, this qualitative finding also agrees with the quantitative finding that most participants reported that the training was excellent and positively impacted their skills and knowledge of ICT.

### The effectiveness of facilitators in delivering the training program

Additionally, the study evaluated the effectiveness of the facilitators during the training sessions, as depicted in Table 3.

**Table 3.** Skills and responsiveness of facilitators

Item	Not Effective	Somewhat effective	Moderately effective	Effective	Highly effective
Facilitators were influential during the training	3.330% (10)	1.000% (3)	15.670% (47)	35.670% (107)	44.330% (133)
Presentations were clear and organized	1.000% (3)	1.670% (5)	16.670% (50)	37.330% (112)	43.330% (130)
Facilitators stimulated participant interest	1.670% (5)	0.000% (0)	17.330% (52)	35.670% (107)	45.330% (136)
Facilitators effectively used the time allocated to them	1.000% (3)	1.670% (5)	21.670% (65)	38.330% (115)	37.330% (112)
Facilitators were available and helpful	1.670% (5)	1.000% (3)	14.670% (44)	32.330% (97)	50.330% (151)
Feedback was prompt and useful	1.670% (5)	1.670% (5)	14.670% (44)	38.670% (116)	43.330% (130)

Table 3. Participants overwhelmingly expressed satisfaction with the facilitators, with 44.330% stating they were highly effective. Additionally, 45.330% mentioned that

the facilitators stimulated interest highly effectively, and 50.330% found them available and helpful. The majority (43.330%) also praised the clarity and organization of the presentations, while an equal percentage found feedback to be prompt and valuable. These results indicate high satisfaction with the facilitators' skills and responsiveness.

In the focus group discussions with some participants, many expressed satisfaction with the facilitators' skills and responsiveness. One teacher reported that "the training facilitators had clear and organized presentations." However, another participant said, "Our facilitators effectively managed time." Therefore, this qualitative finding also agrees with the quantitative finding that most participants were delighted with the facilitators' skills and responsiveness in delivering training content.

### **Investigate teachers' proposals for promoting ICT integration in schools**

Furthermore, the study explored the teachers' proposals for incorporating ICT into schools. During focus group discussions, participants articulated various proposals for promoting ICT in schools:

**Infrastructure enhancement.** Participants emphasized the critical need to improve school infrastructure, particularly the electricity supply. They proposed establishing stable power sources to support consistent ICT usage. Additionally, participants advocated for the creation of dedicated computer labs equipped with essential devices such as computers, ensuring accessibility for both teachers and students.

**Capacity building.** To address teachers' deficiency in ICT skills, participants suggested forming school-based ICT clubs to foster peer learning and skill development. Furthermore, they recommended implementing regular ICT training sessions tailored specifically for teachers. These sessions aim to enhance their proficiency in utilizing ICT tools effectively within the educational context.

**Resource provision.** Participants acknowledged the scarcity of ICT resources among teachers and highlighted the necessity for government intervention. They proposed the provision of essential ICT gadgets such as tablets, laptops, and desktop computers to teachers. Participants also advocated for incorporating ICT as a compulsory subject in teacher education programs, ensuring comprehensive training in ICT integration.

**Internet connectivity.** Participants identified the lack of reliable internet connectivity as a significant barrier to effective school ICT utilization. They suggested that the government and school management provide free Wi-Fi access with internet connectivity to address this issue. Additionally, participants emphasized the importance of encouraging the ownership and utilization of personal ICT tools among teachers, facilitating access to online resources and e-learning platforms.

**Integration of ICT in teaching.** Recognizing the hesitancy among administrators and teachers towards ICT integration, participants proposed various strategies to promote its adoption in teaching practices. They advocated consistently using ICT tools such as smartphones, laptops, and projectors during instructional sessions. Furthermore, participants recommended assigning tasks requiring ICT to students, fostering their digital literacy skills. Finally, they emphasized the importance of providing timely feedback to learners, motivating them to engage actively with ICT-enabled learning experiences.

These proposals emphasized the participants' awareness of the manifold approach required to integrate ICT in schools successfully.

## **Discussion**

This study evaluated digital literacy training and its impact on teachers in the Busoga region in Eastern Uganda. The study results are discussed under the following sub-sections:

### **Demographics of the participants**

The study revealed that there were more male participants than females. Additionally, nearly all participants reported owning a smartphone, and a significant proportion had prior formal training in ICT. Participants exhibited varied literacy levels before the workshop, with more than half reporting moderate literacy, followed by low and high literacy levels. This implies that most of the views were from males who owned smartphones of different models and had some basic and prior knowledge of ICT. Such an observation is in line with the findings of Aldhaen (2024) and Wang et al. (2024). Furthermore, understanding the demographic profile of participants is crucial for tailoring digital literacy training programs to meet the specific needs of teachers in Busoga, Eastern Uganda. The higher representation of male participants (66.000%), smartphone ownership (97.000%), and prior ICT training (73.000%) underscore existing interest and exposure to technology. Attention must be paid to the gender gap, ensuring that future initiatives actively encourage female participation. The dominance of smartphone ownership suggests a readiness for mobile-based approaches, and the pre-existing ICT training background can serve as a foundation for more advanced programs.

### **Impact of digital literacy training on teachers' skills and knowledge**

Additionally, the noteworthy shift in participants' self-assessment of skills and knowledge from satisfactory to very good post-training indicates a tangible impact on teachers' skills and knowledge. This improvement aligns with broader research emphasizing the positive outcomes of teacher professional development programs (Mahmood et al., 2022; Martin & Mulvihill, 2023; Quilapio & Callo, 2022). The study provides evidence that well-designed digital literacy training can enhance teachers' capabilities, potentially translating into improved teaching practices and, consequently, student outcomes (Oktay & Eryilmaz, 2022; Sarva et al., 2023; Wallace & Abel, 2021; Zayas & Rofi'ah, 2022).

### **Effectiveness of facilitators in delivering the training program**

Regarding the effectiveness of facilitators in delivering the training program, both the qualitative and quantitative findings revealed positive feedback on facilitators' effectiveness, stimulation of interest, availability, and helpfulness as strengths of the training program. This implied that effective facilitation is a cornerstone of successful professional development. This is also in consonant with recent studies (e.g., Corlu et al., 2023; Karsenty et al., 2021; Reznitskaya & Wilkinson, 2019), contending that good facilitation is vital for any training and professional development program. The clarity and organization of presentations, coupled with prompt and helpful feedback, contribute to a positive learning environment. This highlights the importance of investing in skilled facilitators to ensure the success of future training initiatives (Kim et al., 2023; Provvidenza et al., 2020; Ritchie et al., 2020; Tistad et al., 2023).

### **Teachers' proposals for promoting ICT integration in schools**

The results from qualitative studies revealed a variety of proposals for promoting ICT integration in schools in the Busoga region. The proposals articulated by teachers

provide valuable insights into the many-sided approach required to promote ICT in schools. The emphasis on infrastructure enhancement, capacity building, resource provision, connectivity, and integration in teaching aligns with global best practices in educational technology integration (Agyei, 2021; Habib, 2023). These proposals reflect the participants' understanding of the challenges and their proactive stance in contributing to potential solutions. The findings of this study hold practical implications for policymakers and teachers in Busoga, Eastern Uganda. Policymakers can use the insights into participants' needs, preferences, and proposed strategies to develop comprehensive digital literacy policies. Investing in infrastructure, supporting capacity-building initiatives, providing necessary resources, and fostering connectivity aligns with the proposed strategies and can contribute to the successful integration of ICT in schools (Agyei, 2021; Habib, 2023). Teachers can leverage the positive impact of digital literacy training on skills and knowledge to enhance their teaching practices. The proposals for promoting ICT in schools can guide teachers to actively engage in initiatives that foster a technology-friendly learning environment (Palacios-Hidalgo & Huertas-Abril, 2023).

One strength of this study is its mixed-methods approach, combining quantitative and qualitative data to understand the training program's impact comprehensively. However, limitations include the lack of a pre-training assessment, which could have provided a baseline for comparison. Additionally, the self-reported nature of the data introduces the possibility of bias, as participants may have provided socially desirable responses. Long-term follow-up studies could address these limitations by assessing the sustainability of the observed impacts (Creswell & Creswell, 2017).

## CONCLUSION

**Fundamental Finding:** This study sheds light on the impact of the digital literacy training program on Busoga, Eastern Uganda teachers. The demographic profile of participants reveals a strong interest and exposure to technology, with notable gender disparities that warrant attention in future initiatives. The positive impact on teachers' skills and knowledge and facilitators' effectiveness underscores the program's success in enhancing teachers' capabilities. The proposals articulated by teachers provide actionable insights for promoting ICT in schools, aligning with global best practices.

**Implication:** The study advocates for continued investment in effective and context-specific professional development initiatives, emphasizing the role of skilled facilitators. Policymakers can leverage these findings to inform the development of comprehensive digital literacy policies, emphasizing infrastructure enhancement, capacity building, resource provision, and connectivity. Teachers can capitalize on the positive outcomes of digital literacy training to enhance their teaching practices, fostering a technology-friendly learning environment. The implications for policymakers and teachers extend beyond Busoga, offering insights applicable to diverse educational settings grappling with digital integration challenges. **Limitation:** The absence of a pre-training assessment and self-reported data should be considered. **Future Research:** Future research could address these limitations with long-term follow-up studies to assess the sustainability of the observed impacts. Additionally, exploring the specific challenges and opportunities in other Ugandan contexts and similar regions could provide a broader understanding of digital literacy training's effectiveness.

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**\*Martin Okoed (Corresponding Author)**

School of Computing and Engineering,  
Uganda Technology and Management University,  
Plot 2 Erisa Rd, Kiswa Bugolobi, PO Box 7330, Kampala, Uganda  
Email: [martin.okoed@aol.com](mailto:martin.okoed@aol.com)

**Emmanuel Acidri Bileti**

School of Education,  
Uganda Christian University, Arua Campus,  
P O Box 356, Arua, Uganda  
Email: [emmabileti@rocketmail.com](mailto:emmabileti@rocketmail.com)

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