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RESEARCH ARTICLE

Teacher Resource Center Professional Development and The Advancement of Digital Teaching Skills Among Public Primary School Teachers: Insights from Kaliua District, Tanzania

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ABSTRACT

This study aimed to investigate how professional development programs offered through Teacher Resource Centers (TRCs) contribute to the advancement of digital teaching skills among public primary school teachers in Kaliua District, Tabora, Tanzania. The Context, Input, Process, and Product (CIPP) Evaluation Model and the Technology Acceptance Model (TAM) guided the study. A mixed-methods approach was adopted, employing an explanatory sequential design. Quantitative data were collected from 98 teachers using structured questionnaires and analyzed using SPSS Version 28, applying descriptive statistics. Qualitative data were gathered from TRC coordinators, Head Teachers, Ward Education Officers, and the District Education Officer through interviews and analyzed thematically. The total sample comprised 109 participants drawn from a target population of 374, using stratified, simple random, and purposive sampling techniques. Validity was ensured through expert reviews and pilot testing, establishing both content and face validity. Reliability was confirmed using Cronbach's Alpha, with acceptable values recorded ($\alpha = 0.704$). The findings revealed that TRC-based professional development was relevant and practical. Yet, irregular training sessions, limited equipment, and the absence of follow-up support hindered its effectiveness. The study concluded that TRC professional development programs effectively enhanced teachers' digital teaching skills through relevant, hands-on training. However, limited resources, irregular sessions, and lack of follow-up reduced sustainability. It is recommended that structured mentoring and refresher programs be introduced, training content be localized, and teacher participation be incentivized through recognition and professional development credits.

Keywords: Teacher resource center; professional development; digital teaching skills

INTRODUCTION

The rapid integration of Information and Communication Technology (ICT) in education has significantly transformed teaching and learning globally. Digital teaching skills, derived from the broader concept of digital competence, encompass the knowledge, abilities, and capacities that teachers require to effectively facilitate learning through technology (Revuelta-Domínguez et al., 2022). The concept has evolved across different countries to meet emerging

educational needs, highlighting that for technology to be meaningfully embedded in instruction, teachers must understand how digital tools function and be able to integrate them into lessons effectively (Karageorgou, 2020). Ongoing professional development is critical for building both foundational and advanced digital skills, emphasizing hands-on training that enables teachers to apply technology in real classroom environments (Demissie et al., 2022). Research indicates that although teachers are expected to possess strong

technological and pedagogical content knowledge (TPACK), many still struggle with the technical competencies necessary to engage learners effectively in technology-rich settings (Timotheou et al., 2023). Continuous training and support are therefore essential to help teachers not only become technically competent but also adapt instructional strategies to integrate technology meaningfully (Michael & Stephen, 2023). Teacher Resource Centers (TRCs) have emerged as key institutions for enhancing teachers' digital teaching skills. They provide access to teaching and learning materials, opportunities for continuous professional development, academic support, and forums for addressing professional challenges (Mwishame, 2018). The concept of TRCs originated in Britain in the 1950s, aimed at providing teachers with access to instructional materials, professional development, and collaborative spaces for continuous improvement (Olofea & Tibyehabwa, 2022). The model spread globally and was adapted to diverse national educational priorities. For instance, in Europe, Greece advanced TRCs through the Erasmus+ LOOP project, emphasizing mentoring and early-career teacher support (Smyrniou, 2023), while Reception Facilities for Refugee Education extended TRC functions to refugee children's education (Mogli et al., 2016). Russia's TRCs, originating in the 1920s, transformed from Soviet-era ideological training into modern lifelong learning hubs influenced by the Bologna Process and national reforms (Щетинина, 2020; Valeeva, 2019). In Asia, Japan integrated TRCs with lesson study and formalized induction programs (Luchenko & Doronina, 2023), while China developed TRCs from its teaching research system following the 1978 reforms (Zhou, 2021). In Sub-Saharan Africa, TRCs were introduced to address disparities in teacher resources and professional development, with South Africa supporting under-resourced schools through TRCs and District Teacher Development Centers despite limited utilization (Ngubane, 2024) and Ghana focusing on rural teacher training though constrained by funding and maintenance challenges (Ahakwa, 2024). In East Africa, Kenya's TRCs expanded with curriculum reforms like the Competency-Based Curriculum into innovation hubs (Ngina, 2024), and Uganda developed TRCs under the Teacher Development and Management System with donor-supported mentoring despite systemic barriers (Okee & Kamugisha, 2024). In Tanzania, TRCs have been central to teachers' professional development since their establishment in 1972 at Kleruu Teachers' College, initially supported by

the Danish government. By 1986, TRCs were mandated in every region and district, and by 1999, there were 283 TRCs in mainland Tanzania and 9 in Zanzibar (Mosha, 2015). Initially focused on curriculum-based training, TRCs have evolved to include digital skills development in response to the growing integration of ICT in education (Ministry of Education, Science and Technology, 2024). By providing access to computers, projectors, and other digital resources, TRCs serve as critical platforms for enhancing teachers' digital competencies (GPE, 2023). Nevertheless, challenges such as limited funding, inadequate infrastructure, and restricted training, particularly in remote areas like Kaliua District, limit teachers' capacity to fully benefit from TRC initiatives (Mwinyi, 2024; Shileringo, 2021; Mayengo, 2021; Mrosso & Ndibalema, 2024). Surveys indicate that many Tanzanian teachers, especially in rural areas, have limited access to digital tools, rarely use technology in teaching, and engage minimally in professional development, creating strong demand for ICT training (Koomar et al., 2022). Given these challenges and opportunities, this study investigates how TRC-based professional development can strengthen digital teaching skills among public primary school teachers in Kaliua District.

LITERATURE REVIEW

Theoretical Review

This study was guided by two complementary theoretical frameworks: the Context, Input, Process, and Product Evaluation Model (CIPP) (Stufflebeam, 1966) and the Technology Acceptance Model (TAM) (Davis, 1989). The CIPP model provides a comprehensive framework for evaluating TRC-based professional development by examining Context (teachers' digital skills needs and challenges), Input (availability of TRC resources, training programs, and staffing), Process (implementation of professional development activities and teacher engagement), and Product (outcomes in terms of enhanced digital competencies) (Karim, 2021; Vo, 2018; Iqbal et al., 2021). Its flexibility enables assessment of both planning and execution of TRC programs, though full application can be complex (Vo, 2018). Complementing this, TAM explains teachers' adoption and effective use of digital tools based on perceived usefulness (PU) and perceived ease of use (PEU), emphasizing how teachers' attitudes and perceptions influence their engagement with technology provided through TRC

training (Davis, 1989; Marikyan & Papagiannidis, 2024).

Empirical Literature Review

Empirical studies underscore the critical role of professional development in enhancing teachers' digital skills and integrating technology into classroom instruction. Flores et al. (2022), in UGEL 12, Canta, highlighted that targeted professional development programs tailored to teachers' specific needs significantly influence the incorporation of digital tools in teaching. Similarly, Kovalchuk et al. (2024) emphasized the importance of integrating digital tools in teacher training in Ukraine to enhance teaching quality. Studies from diverse international contexts further reinforce the impact of professional development on digital teaching competencies. Aksay Aluz (2023) noted that despite technological advancements, gaps persist in Turkey's teacher training programs, with limited practical application of digital competencies. Lin (2024) reported that in China, professional development in digital art instruction positively correlates with instructors' proficiency, though results were limited to art teachers. Similarly, Raagas-Bautista et al. (2024) in the Philippines found strong correlations between media literacy, digital resilience, and professional development, while identifying institutional and resource barriers. In Thailand, Chatmaneerungcharoen (2024) demonstrated that iPad-based professional development enhanced teachers' TPACK in STEM education, though the study was subject-specific, prompting this research to examine digital skill development across various subjects in primary schools.

African-focused studies reveal comparable trends. Ajani (2024) synthesized literature on TPACK implementation in teacher training programs across Africa, concluding that professional development improves digital integration but is constrained by inadequate training, limited institutional support, and lack of context-specific adaptation. Birir et al. (2023) in Kenya found a significant correlation between teacher training and ICT utilization, emphasizing practical training. Tanzanian studies provide a more localized perspective on professional development and digital skills. Malima et al. (2023) identified that while teachers and students possess basic digital competencies, infrastructure gaps and limited technical support hinder effective utilization. Kiwonde (2018) highlighted that ICT training in Musoma District improved digital integration in Environmental Education, but its effectiveness was limited by gaps in practical training.. Building on these

studies, this research examines how TRC-based professional development initiatives influence the acquisition, application, and sustainability of digital teaching skills among public primary school teachers in Kaliua District.

METHODOLOGY

The study employed a mixed-methods research approach using an explanatory sequential design, targeting 374 stakeholders in public primary schools in Kaliua District, Tabora Region, including 330 teachers, 14 school heads, 26 Ward Education Officers (WEOs), 3 Teacher Resource Center (TRC) Coordinators, and 1 District Primary Education Officer (DPEO), all of whom were considered key informants regarding the influence of TRC professional development on teachers' digital skills. A combination of probability and non-probability sampling techniques was used, with stratified and simple random sampling applied to select teachers, and purposive sampling used for school heads, WEOs, TRC Coordinators, and the DPEO, resulting in a total sample of 109 participants (99 teachers, 3 school heads, 3 WEOs, 3 TRC Coordinators, and 1 DPEO). Data were collected through structured questionnaires administered to teachers and semi-structured interviews conducted with school heads, WEOs, TRC Coordinators, and the DPEO. The validity of the instruments was ensured through face and content validity checks by supervisors and education research experts, while reliability was confirmed with Cronbach's Alpha coefficients above 0.70. Quantitative data from the questionnaires were analyzed using descriptive statistics in SPSS version 28, including frequencies, percentages and graphical representations, while qualitative data from interviews were analyzed thematically. Ethical considerations, including informed consent, confidentiality, voluntary participation, and institutional approvals, were strictly observed to protect participants' rights and ensure the integrity of the research process.

RESULTS AND DISCUSSION

The study aimed to examine the Teacher Resource Center Professional Development and the Advancement of Digital Teaching Skills among Public Primary School Teachers in Kaliua district Tabora.

Table 1 presents data indicating that a significant majority of respondents, 82 out of 98 teachers (83.7%), reported having participated in digital skills training organized by Teacher Resource Centers (TRCs), while

only 16 teachers (16.3%) indicated that they had not taken part in such training. These findings suggest that TRCs in Kaliua District actively engage most public primary school teachers in professional development programs to enhance digital competence. This high participation rate demonstrates the accessibility and outreach of TRC-facilitated training initiatives and highlights the growing recognition of the importance of digital literacy in teaching. The widespread involvement also implies that TRCs are strategically addressing the digital skills gap among teachers, thereby supporting the broader goal of integrating ICT in education. The

head of school remarked:

Even those teachers who were initially hesitant are now actively attending because they see how essential these skills are becoming. At first, it was mostly the younger teachers who showed interest, but now everyone wants to participate. The TRC sessions are very practical, and teachers learn how to use tools like Word, Excel, and projectors, which they apply directly in class. It's changing how we approach technology in our school (HoS1 July 2025).

Table 1. Response of teachers' participation in TRC-organized digital skills training (n=98)

Response	Frequency	Percent
Yes	82	83.7%
No	16	16.3%
Total	98	100%
Response	Frequency	Percent

Source: Field Data, 2025

The qualitative findings reinforce the quantitative data by illustrating a noticeable shift in teachers' perceptions and engagement with digital skills training provided by TRCs. Initially, participation was driven primarily by younger or more digitally inclined teachers. However, over time, there has been a broadening of interest and involvement across the teaching staff. This change can be attributed to the practical and contextually relevant nature of the training, which focuses on essential tools such as Microsoft Word, Excel, and projectors skills that can be directly applied within classroom instruction. The growing participation suggests that teachers increasingly recognize the pedagogical value of digital tools, reflecting a gradual institutional transformation toward embracing technology-enhanced teaching. These findings are consistent with the studies by Ajani (2024), who found that teacher engagement in structured digital training significantly contributes to classroom integration of technology. Similarly, Flores et al. (2022) stressed that regular teacher attendance in school-based ICT training initiatives results in long-term professional growth and fosters collaborative learning environments.

Table 2 presents teachers' perceptions of TRC-based professional development for enhancing digital skills, based on responses from 98 teachers. The responses were measured using a five-point Likert scale where SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, and SA = Strongly Agree. The table displays

frequencies and percentages for six items focusing on whether TRC training improves digital teaching skills, offers regular training, is applied in teaching, is relevant to classroom needs, is interactive, and provides follow-up support.

TRC Training Has Improved My Digital Teaching Skills

Table 2 shows that 55 teachers (56.1%) agreed and 25 (25.5%) strongly agreed that TRC training improved their digital teaching skills. In contrast, 8 teachers (8.1%) disagreed, while 10 teachers (10.2%) were neutral. These figures clearly indicate that 80 teachers (81.6%) viewed TRC training positively, compared to only 8 teachers (8.1%) who expressed dissatisfaction. The distribution highlights that the vast majority recognized the training as a significant contributor to their professional growth. This outcome reflects the product domain of the CIPP model, showing that the program achieved its intended outcomes. Interview data also supported this, with school heads attesting to noticeable improvements in digital literacy. For instance, one Head of School stated that:

Teachers now design and present lessons using PowerPoint and integrate video content for science classes. Before, lessons were mostly textbook-based, but the training has boosted teachers' confidence to use digital tools effectively, making lessons more engaging. You can see how much more interactive classrooms have become (HoS2

July 2025)

The interview findings indicate that TRC training has significantly enhanced teachers' digital pedagogical practices. Teachers have moved beyond traditional textbook-based instruction to incorporate tools such as PowerPoint and video content, particularly in subjects like science. This shift demonstrates increased confidence and competence in digital resources, resulting in more interactive and engaging classroom

environments. These practical outcomes align with the Perceived Usefulness concept from the TAM, which posits that users adopt digital tools more readily when they perceive them as enhancing performance. The findings also align with empirical studies by Ajani (2024) and Malima et al. (2023), which found that school-based digital training programs significantly improve teachers' skills and willingness to integrate technology in African classrooms.

Table 2. Teachers' perceptions of TRC-based professional development for enhancing digital skills (n= 98)

No	Statement	SD		D		N		A		SA	
		F	%	F	%	F	%	F	%	F	%
1	TRC training has improved my digital teaching skills	6	6.1	2	2.0	10	10.2	55	56.1	25	25.5
2	TRC offers regular training on digital tools	6	6.1	13	13.3	7	7.1	49	50.0	23	23.5
3	I use the knowledge gained from TRC training in my teaching	2	2.0	5	5.1	20	20.4	54	55.1	17	17.3
4	TRC training is relevant to digital classroom needs	3	3.1	2	2.0	18	18.4	58	59.2	17	17.3
5	TRC training sessions are interactive and hands-on	3	3.1	11	11.2	18	18.4	50	51.0	16	16.3
6	The TRC provides follow-up support after training sessions	10	10.2	20	20.4	17	17.3	42	42.9	9	9.2

Source: Field Data, 2025

TRC Offers Regular Training on Digital Tools

As shown in Table 2, 49 teachers (50.0%) agreed and 23 (23.5%) strongly agreed that TRC offers regular training on digital tools. In contrast, 13 teachers (13.3%) disagreed and 6 teachers (6.1%) strongly disagreed, while 7 teachers (7.1%) remained neutral. This distribution reveals that although 72 teachers (73.5%) acknowledged regular training, 19 (19.4%) held opposing views. Such divergence suggests that the consistency of training delivery may vary across schools and wards, which is a concern under the Process component of the CIPP model. Qualitative responses revealed that while some schools benefited from termly sessions, others were underserved due to trainer shortages and a lack of transport. For instance, one Ward Education Officer mentioned,

In some schools within our ward, the TRC conducts training at least once every month, but others are often left behind. The biggest challenge is the shortage of qualified trainers; we don't have enough personnel to reach every school effectively. Another issue is transport. We don't always have money for fuel or

allowances, so some areas, especially the remote ones, miss out. You'll find that schools near TRC benefit more, while those further out can go a whole term without any sessions. This creates a big gap. Teachers who attend training regularly become more confident with digital tools, but those who don't remain behind and struggle. Honestly, it's frustrating. We really need a decentralized approach, maybe establish smaller hubs and train some teachers locally to support others. Without that, we'll keep seeing the same schools progressing while others are left out (WEO1 July 2025).

The qualitative data underscores a critical implementation gap in the regularity and equitable distribution of TRC digital training sessions. While some schools benefit from consistent, often monthly training, others, particularly those in remote areas, experience limited or no access due to systemic challenges such as a shortage of qualified trainers and insufficient transport resources. These disparities result in unequal opportunities for teachers to build digital competence, with those receiving regular training gaining confidence and practical skills, while others fall behind. This

unevenness in access reflects broader concerns raised in the literature. For example, Birir et al. (2023) observed in their study of Kenyan TRCs that schools in rural or underserved areas often suffer from infrequent training exposure, leading to digital skill disparities among teachers. The implication is that while TRC programs are well-structured, logistical constraints hinder equitable access to their benefits.

I Use the Knowledge Gained from TRC Training in My Teaching

According to Table 2, 54 teachers (55.1%) agreed and 17 (17.3%) strongly agreed that they applied knowledge acquired from TRC training in their teaching practice. Meanwhile, 5 teachers (5.1%) disagreed, 2 teachers (2.0%) strongly disagreed, and 20 teachers (20.4%) were neutral. These results show that 71 teachers (72.4%) actively apply TRC knowledge, with only 7 teachers (7.1%) resisting, while 20 teachers (20.4%) have yet to commit. This demonstrates that training translates effectively into classroom practice, aligning with the Product dimension of the CIPP model and the TAM's Perceived Usefulness construct. Interviews supported this trend. For instance, one Head of School noted,

Teachers now use Microsoft Excel to record student performance and Word to create lesson plans, set examinations and tests, and keep students' records. We've seen a real shift before; many did everything manually, but now they are becoming more comfortable with digital tools. Some even go beyond the basics. For example, they have started designing worksheets and using PowerPoint for classroom presentations. It is not just about knowing the software they are using in ways that make their teaching more efficient. One teacher told me she can track student progress more easily and adjust her teaching accordingly. That's a big improvement. It shows the training is working and making a difference in classroom practices (HoS1 July 2025).

These real-world applications demonstrate how TRC-based professional development is not just theoretical but grounded in classroom realities. This finding corresponds with the Flores et al. (2022) emphasized the importance of localized, practical training in fostering teacher innovation. In short, when training is hands-on and aligned with curriculum delivery, it leads to immediate improvements in digital pedagogy.

TRC Training is Relevant to Digital Classroom

Needs

Table 2 indicates that 58 teachers (59.2%) agreed and 17 (17.3%) strongly agreed that TRC training is relevant to digital classroom needs. Only 2 teachers (2.0%) disagreed, 3 teachers (3.1%) strongly disagreed, and 18 teachers (18.4%) remained neutral. Altogether, 75 teachers (76.5%) affirmed the relevance of training content, reflecting its alignment with actual classroom challenges. This highlights the program's strength in addressing practical instructional needs, resonating with the Context and Input components of the CIPP model. For example, one Head of school explained,

The TRC training sessions focus on practical skills that teachers need every day. They cover how to use digital tools like PDF readers, Excel for record keeping, Word for lesson plans and reports, and PowerPoint for presentations. These tools help them manage their work efficiently and improve their teaching. As a head teacher, I share our specific needs during coordination meetings, and the TRC adapts their training content accordingly. The teachers come back from training ready to apply what they learned, whether it's preparing teaching materials, tracking student performance, or communicating effectively. This relevance makes the training valuable to us (HoS3 July 2025).

Qualitative data reinforces the quantitative findings by highlighting the high relevance and practical applicability of TRC training content to teachers' day-to-day responsibilities. The focus on essential digital tools such as PDF readers, Excel, Word, and PowerPoint demonstrates that the training aligns with teachers' instructional and administrative needs. Moreover, the responsiveness of TRC programs to school-level input, gathered through coordination meetings and needs assessments, reflects a context-sensitive approach. These insights align with the work of Aksay Aluz (2023) and Ajani (2024), who argue that relevant, context-specific training has a higher probability of producing long-term changes in teaching practices. This responsiveness strengthens the legitimacy and credibility of the TRCs as centers of ongoing professional support.

TRC Training Sessions are Interactive and Hands-on

As shown in Table 2, 50 teachers (51.0%) agreed and 16 (16.3%) strongly agreed that TRC training sessions are interactive and hands-on. However, 18 teachers

(18.4%) were neutral, 11 teachers (11.2%) disagreed, and 3 teachers (3.1%) strongly disagreed. Although 66 teachers (67.3%) viewed the sessions as interactive, 29 (29.6%) who were neutral or disagreed suggest that not all sessions achieve full engagement. This uneven distribution points to possible constraints such as limited time, overcrowded sessions, or resource shortages, which can limit hands-on practice. Interviews revealed that although trainers intended for sessions to be practical, structural limitations sometimes led to lecture-based formats. A TRC coordinator admitted,

During sessions, only a few teachers get time on the computers. Often, others observe because the number of devices is too small. Trainers try to make the sessions practical, but the lack of enough computers means many teachers spend more time listening than doing. Teachers have told us that while the training is useful, they want more practice time and less theory. They feel they learn better when they can use the tools themselves instead of just watching (TRC1 July 2025).

The interview insights reveal that although TRC training sessions are intended to be interactive and practice-oriented, their effectiveness is often compromised by logistical challenges, most notably, a lack of sufficient computers. As a result, while some teachers actively engage with the digital tools, others are limited to passive observation due to time constraints and equipment shortages. This imbalance diminishes the experiential value of the training, which is essential for building digital proficiency. These findings echo the conclusions of Lin (2024), who found that interactive training fosters better retention and application of digital tools. Therefore, while TRC training is well-received, its effectiveness would be greatly improved through smaller group sizes, more equipment, and extended training hours to ensure all participants gain practical experience.

The TRC Provides Follow-up Support after Training Sessions

Table 2 shows that 42 teachers (42.9%) agreed and 9 (9.2%) strongly agreed that follow-up support is provided after training. On the other hand, 20 teachers (20.4%) disagreed, 10 teachers (10.2%) strongly disagreed, and 17 teachers (17.3%) were neutral. With only 51 teachers (52.1%) confirming the existence of support, compared to 30 teachers (30.6%) who felt it lacking and 17 undecided, this item reflects the weakest

performance. These findings suggest that many teachers feel unsupported post-training, which undermines both the Process and Product elements of the CIPP model, while negatively affecting the Perceived Ease of Use (PEOU) under TAM. Interviews confirmed this limitation. One Ward Education Officer (WEO) reflected on the lack of formal structures for sustained support after training:

After the training ends, we don't have a formal mechanism for mentoring or classroom observation. Teachers are left to apply the skills independently, and we can't guarantee that they are using the tools correctly or consistently. Ideally, there should be a system where facilitators or inspectors visit classrooms to observe, give feedback, or even assist with real-time challenges. But right now, it's very hands-off. The follow-up is almost non-existent once the training is over (WEO3, July 2025).

This response reveals a systemic weakness in the TRC model's ability to reinforce learning beyond the initial training period. Without consistent follow-up, many teachers are left unsupported, undermining digital integration's long-term goals in teaching and learning. These insights are consistent with the findings of Raagas-Bautista et al. (2024), who argue that without follow-up systems like coaching, peer mentoring, or digital support platforms, the sustainability of professional development efforts is undermined.

CONCLUSION AND RECOMMENDATIONS

This study has concluded that Professional development programs offered through TRCs have been instrumental in building teachers' digital skills, with most teachers actively participating and acknowledging the relevance and practical benefits of the training. The alignment of training content with local instructional needs and the hands-on nature of sessions contributed positively to teachers' ability to apply digital tools in classrooms. However, inconsistencies in training frequency and resource constraints, such as insufficient computers and equipment, limited the overall effectiveness. Furthermore, the absence of structured follow-up mechanisms, including mentoring and refresher sessions, weakened the sustainability of the acquired skills and impeded continuous motivation among teachers. The study suggest that Structured follow-up and mentoring programs should be established to reinforce skills, including classroom visits, peer mentoring, and refresher courses. Teachers

should be incentivized through recognition and professional development credits to increase participation and motivation. Furthermore, training content should be localized and aligned with the specific instructional needs of teachers, making it relevant and applicable to their classroom contexts.

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