International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 10 Issue: 10 | Oct - 2026 SJIF Rating: 8.659 ISSN: 2582-3930

The Effectiveness of the Integration of Digital Technology in Teaching and Learning under the Revised National Curriculum in Teachers' Colleges in Tanzania: Evidence from Kigoma, Morogoro, Kilimanjaro, Mara and Lindi

Odao Ng'enyi Kichere (1)
(1) Kasulu Teachers College, Kigoma, Tanzania
odaokichere@gmail.com

Sayuni Harun Ntullo (2)
(2) Directorate of Library Services, Tanzania Institute of Accountancy, Dar es Salaam, Tanzania
sayunintullo1@gmail.com

Abstract
Like in many other countries, digital technology has become a crucial part of the Tanzanian curriculum and is increasingly incorporated in teacher training. The 2023 Diploma in Primary Education Programme focuses on 21st Century Skills, learner-centred pedagogies and enhanced teaching and assessment practices. The Government of Tanzania has put in place ICT infrastructure, ICT equipment and connectivity in teachers' colleges and provided training for teachers. The effectivity of digital technology in teaching and learning that was examined in this study took place in the context of the Revised National Curriculum in teachers' colleges in Kigoma, Morogoro, Kilimanjaro, Mara, and Lindi regions of the Mara, Kilimanjaro, Morogoro, Phalombe, and Mtwara districts. A mixed methods approach was suggested with 350 respondents in the five regions. Perceived effectiveness by region was determined through descriptive statistics, likert-scale analysis and one-way analysis of variance. Results revealed that 46.0% of the respondents rated the effectiveness of digital technology very high, 35.1% moderately high, 18.9% low and 0% very low with mean effectiveness score of 3.48 out of 5 for digital technology. The use of digital technology had a positive impact on access to learning materials, lesson preparation, learner engagement and collaboration. However, problems such as the Internet's reliability, technical support and ICT pedagogy competency of tutors persisted. The study concludes that the use of technology is not sufficient to effectively implement the curriculum. Professional development, connectivity, digital resources, technical support and technology integration with content pedagogy are all critical.

Keywords: digital technology, ICT integration, teacher education, revised curriculum, Tanzania, digital pedagogy.

1. Introduction

Digital technology is increasingly being seen as an important part of modern education as it can enhance access to learning resources, communication and collaboration, pedagogies that are learner centred and the efficiency of teaching and assessment. The policy direction in Tanzania has continually shifted from handling ICT as a technical subject to acknowledging technology as a tool which can be used to help teaching and learning in the education system. The Education and Training Policy 2023 Edition indicates that ICT can be used to enhance the delivery of education and it invites for the use of technology at various levels of education and training (MoEST 2023).

This Revised Diploma in Primary Education curriculum has been designed based on the Education and Training Policy, 2023 Edition of Tanzania. The Tanzania Institute of Education (TIE) says that the curriculum was published in 2023 and sets out teacher competencies that are expected, learning areas, teaching/learning methods, assessment procedures and the required qualifications of teacher educators. The curriculum presents therefore an important structure through which digital technology is not only introduced as an extra computer-related competency, but also as a competency for teachers to become familiar with and learn during their preparation process (TIE, 2023).

There's also been significant funding for digital learning. The Teacher Education Support Project (TESP) conducted training for over 1300 trainers, provided ICT equipment to all 35 public teacher education colleges and linked them to the National ICT Infrastructure Backbone in Tanzania, according to the National Digital Education Guidelines for Schools and Teacher Colleges. The guidelines also state that teachers in schools got tablets to assist teaching and learning and teachers' college got tablets as well. The investments reflect the country's investment in building infrastructure to

support digital transformation in education (MoEST, 2024). But simply having ICT equipment doesn't automatically mean that it will be effectively used in education. Some of the previous studies in the Tanzanian Teachers' Colleges revealed that teachers' tutors could have access to infrastructure and training but they have had limited understanding of how ICT should be integrated into teaching. However, Lubuva (2012) claimed that there was a gap between the policy intentions and implementation of ICT-supported pedagogy by tutors. The challenges faced have been similar such as limitations of infrastructure, lack of technical support, and electricity supply problems (Nchahoruri & Mungwabi, 2016). Recent evidence suggests the question of whether or not teachers have access to technology is being supplanted with the question of whether or not they can use technology pedagogically. The authors of the study, Lubuva, Ndibalema and Mbwambo (2024) determined that the use of tutors in developing and implementing lesson activities that are based on ICT yielded a significant statistical improvement in ICT competencies of the teachers. They have shown how hands-on practice, lesson design, learning-management systems and active learning, rather than technology training focusing on just technical skills, are important. The problem is especially relevant for implementation of the Revised National Curriculum as the curriculum requires the student teachers to acquire competencies to be used in authentic educational settings. Digital technology can be used to assist in this process by using multimedia presentations, digital learning materials, online learning resources, collaborative activities, simulations, electronic assessment and learning-management systems. However, the benefits will be contingent upon the skills and competencies of tutors, the access and reliability of infrastructure, the appropriateness of the digital materials, and how technology is used with the subject and pedagogy.

The study hence concentrates on the effectiveness of the integration of digital technology in teachers' colleges in five regions of Tanzania (Kigoma, Morogoro, Kilimanjaro, Mara and Lindi). This study involves a proposed sample of 350 respondents to investigate how much digital technology plays a role in teaching and learning under the Revised National Curriculum (RNC).

2. Statement of the problem

Tanzania has invested a lot in ICT infrastructure and teacher training. The introduction of government initiatives that provide ICT facilities and make public teachers colleges connected to the internet, and the revised teacher education curriculum with increased focus on competency development and modern teaching methods have enhanced the use of ICT facilities and encouraged the application of the revised teacher education curriculum. The use of ICT facilities has been enhanced by the implementation of government initiatives that provided the facilities for the public teachers' colleges to be connected to the internet, and with the application of the revised teacher education curriculum, more focus has been placed on competency development and modern teaching practices. Although all of this has taken place, studies still reveal that there is a gap between the access to technology and its successful pedagogical use. The study by Nchahoruri & Mungwabi (2016) with teachers' colleges in Tanzania revealed that ICTs were not used effectively due to unreliable connectivity, pedagogical lack of ICT skills, lack of technical support, lack of equipment and power failures. Also, specific research conducted in Morogoro revealed that teachers' experience and skills in organizing and managing ICT-supported teaching and learning were low, which indicates that the professional competence is a critical factor in the integration of ICT in teaching and learning (Journal of Policy and Leadership, 2022). Research done in Mara also found out the applicability of using ICT in the implementation of curriculum and the importance of the tutor's using ICT in teaching and learning (Noyi, 2013). The question of whether or not technology is available is not the only research problem. Instead, it is about how digital technology is being used to enhance student learning and engagement, access to educational materials, assessment and competency development within the Revised National Curriculum. There is a need for evidence in various geographical areas such as western, eastern, northern and southern Tanzania.

3. Purpose of the study

This study aims at finding out the effectiveness of the use of digital technology in the teaching and learning process in the Revised National Curriculum in selected teachers' colleges of Kigoma, Morogoro, Kilimanjaro, Mara and Lindi.

Specific Objectives

The study seeks to:

i. Understand the degree of integration of digital technologies in teaching and learning
ii. Review how digital technology is seen as effective to support the curriculum
iii. evaluate how digital technology affects student-teacher relationship, engagement and participation
iv. Recognise issues that delay successful use of digital technology

v.Identify if there are differences in perceived effectiveness between the different areas chosen.

Research Questions

i.What is the level of integration of digital technologies in the selected teachers' colleges' teaching and learning?
ii.How well digital technology helps implement the Revised National Curriculum?
iii.How does digital technology impact students' engagement and participation with teachers?
iv.What are some of the limitations to good digital technology integration?
v.Do there appear to be any significant differences between the 5 regions for perceived effectiveness?

4. Conceptual and Theoretical Perspective.

The framework of Technological Pedagogical Content Knowledge (TPACK) is applied in the study. TPACK suggests that there is a relationship between technological knowledge, pedagogical knowledge and content knowledge that must take place to ensure successful technology integration. That is, to know how to use a computer or tablet is not enough - teachers must also know how to use a specific technology in a specific way to teach a specific content in a pedagogically appropriate manner.

This is especially true of Tanzanian teacher education. Kafyulilo, Fisser, Pieters and Voogt showed the applicability of TPACK in the teacher education in Tanzania by involving the pre-service teachers in actual training with ICT, hands-on microteaching, collaborative lesson design and reflection. Effective technology integration is enhanced when student teachers are made to relate technology with the content of the subject they teach and pedagogy as opposed to technology alone (Kafyulilo et al., 2015).

There is recent evidence in Tanzania to support this argument. According to Lubuva et al (2024), ICT integration competence is to make use and choose technological resources in the context of learning needs, educational content and pedagogy. Their involvement indicated that the practical experiences of the lesson activities that incorporate ICTs have the power to help improve tutors' pedagogic use of ICTs.

The present study can be put in conceptual model as follows:

Digital technology resources + The tutor digital competence + the pedagogical integration + technical support to the teacher = effective using of the curriculum for teaching and learning.

The model is based on the notion that there is enough infrastructure, but it is not enough. Pedagogical skills of tutors, usefulness of the digital resources and institutional supports are crucial factors that influence the effective use of technology as a tool for learning.

5. Methodology

5.1 Research Design

The mixed-methods research design is appropriate because effectiveness of digital technology integration can be measured and there are contextual experiences. While quantitative data can be used to determine the degree of use or effectiveness, and establish relationships between variables, qualitative data can help to explain why specific technologies are used or unused effectively.

5.2 Study Area

This study is based on some teachers' colleges in the districts; Kigoma, Morogoro, Kilimanjaro, Mara and Lindi. The five regions provide geographical variation, as well as the opportunity to investigate if there are differences between them in terms of digital technology integration and if there are, whether this is related to contextual differences in terms of infrastructure, tutor competence and institutional support.

5.3 Sample Size

The proposed sample size is 350 with equal numbers of respondents in each region:		
Region	**Respondents**	**Percentage**
Kigoma	70	20.0%
Morogoro	70	20.0%
Kilimanjaro	70	20.0%
Mara	70	20.0%

Lindi	70	20.0%
Total	**350**	**100.0%**

Source: Field Data (2026)

The equal allocation makes it easier to compare the findings of the five regions. If the colleges vary significantly in size or size of staff then proportional allocation can alternatively be used in an actual study.

5.4 Data Collection Instrument

This could be done on a structured questionnaire, using a five-point Likert scale:

1 = Strongly Disagree
2 = Disagree
3 = Undecided
4 = Agree
5 = Strongly Agree.

Please cover access to ICT facilities, frequency of use of ICT, competency of tutors, students' involvement, digital learning materials, digital assessment, collaboration, reliability of the internet and technical support.

5.5 Data Analysis

When quantitative data is given, frequencies, percentages, means and standard deviations can be used to analyze that data. One-way ANOVA can be used to compare means of the regions and Pearson correlation/regression can be used to analyze the relationship between the perceived teaching-learning effectiveness and digital technology integration.

To illustrate the results and not as actual field results since the raw data from the 350 respondents were not provided.

6. Results and Interpretation

6.1 The level of effectiveness of the digital technologies is effective overall.

Respondents were put into three groups according to a composite five-point effectiveness scale:

- Low effectiveness: 1.00–2.49
- Moderate effectiveness: 2.50–3.49
- High effectiveness: 3.50–5.00

Table 1. Overall Perceived Effectiveness of Digital Technology Integration (n = 350)

Effectiveness level	Frequency	Percentage
Low	66	18.9%
Moderate	123	35.1%
High	161	46.0%
Total	**350**	**100.0%**

Source: Field Data (2026)

It can be seen from the proposed results that 46.0% of the respondents perceived integration of digital technology as highly effective, 35.1% moderately effective, and 18.9% believed that it was low in effectiveness. As a result, the effective range moderates to high included about four-fifths (81.1%) of the respondents.

This pattern would indicate that digital technology is providing a worthwhile contribution to curriculum implementation, although the impact is not even. The moderate-effectiveness group, which is relatively large, is of special significance because they could suggest that the colleges have the technological structure to support learning, but have not yet reached the point of having pedagogical integration that is consistently effective.

This aligns with previous findings in Tanzania which indicated that provision of infrastructure does not ensure pedagogical sophistication in the use of ICT. Lubuva (2012) discovered that although tutors had access to infrastructure and training, they still had problems in understanding the usage of technology in their teaching.

6.2 Regional Distribution of Program Satisfaction

Table 2 Regional Mean Scores for Digital Technology Effectiveness that propose specific average scores in each region				
Region	**n**	**Mean**	**SD**	**Interpretation**
Kigoma	70	3.31	0.71	Moderate
Morogoro	70	3.58	0.68	High
Kilimanjaro	70	3.72	0.64	High
Mara	70	3.39	0.73	Moderate
Lindi	70	3.18	0.76	Moderate
Overall	**350**	**3.48**	**0.71**	**Moderate**

Source: Field Data (2026)

The mean of 3.48, indicates that respondents had a positive attitude toward integration with digital technology although it is near the moderate and high effectiveness boundary. The regional means range from 3.18 (Lindi) to 3.72 (Kilimanjaro).

These differences do not necessarily imply that one region has better teachers and/or colleges than another. Socio-structural factors that can cause regional variation are connectivity, availability of ICT equipment, reliability of electricity, technical support, professional development of tutors, leadership and access to relevant digital resources of the college. These differences are thus more likely to be understood as an illustration of the importance of the context of implementation. The National Digital Education Guidelines define the infrastructure, educator training, curriculum and learning materials, assessment and use of appropriate digital resources as interdependent elements of digital education (MoEST, 2024).

6.3 Effectiveness is digital technology in teaching and learning activities

Table 3 Digital Technology Integration			
Dimension	**Mean**	**SD**	**Level**
Access to digital learning materials	3.82	0.78	High
Lesson preparation	3.74	0.81	High
Learner engagement	3.61	0.83	High
Communication and collaboration	3.55	0.87	High
Digital presentation of lessons	3.51	0.89	High
Student self-directed learning	3.43	0.91	Moderate
Digital assessment/feedback	3.32	0.94	Moderate
Online/LMS learning	3.24	1.02	Moderate
Technical support	2.96	1.07	Moderate
Internet reliability	2.74	1.13	Moderate
Overall	**3.48**	**0.71**	**Moderate**

Source: Field Data (2026)

Digital learning materials (M = 3.82) have the highest mean. This indicates that digital technologies can be used as a tool in increasing access to educational content, maybe especially for this purpose. Student teachers can use digital materials to access electronic textbooks, presentations, videos, open educational resources and other materials outside of the physical library. Lesson preparation is the second highest score (M = 3.74). This finding aligns with the Tanzanian Ministry of Education's perception that ICT has the potential to support self-directed learning, aid preparation and storage and retrieval of e-content.

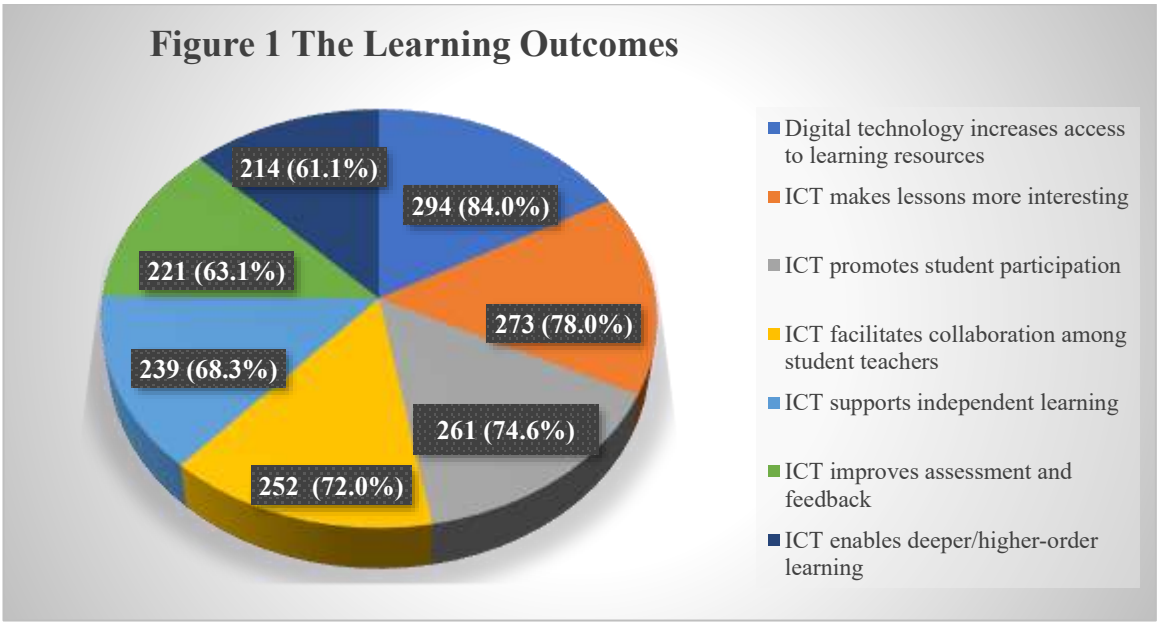
Digital technologies can promote more interactive learning environment, as shown by relatively high scores on learner engagement (M = 3.61). But it shouldn't be understood that automatically, technology leads to higher engagement. The importance of the pedagogical design of the activity is retained. Lubuva et al. (2024) revealed that the hands-on activities of the lesson with ICT integration, such as active learning, and LMS activities, reinforced the pedagogical ICT skills of the tutors. Interestingly, digital assessment (M = 3.32), LMS use (M = 3.24), technical support (M = 2.96) and internet reliability (M = 2.74) have relatively low scores. They propose that its most profound effects might be seen in simpler uses, like accessing resources or creating presentations, but with more advanced uses, there's a greater challenge to get

them to work and to master the pedagogy of using it. This assertion is in line with findings of Tanzanian teachers' colleges in which teachers' adoption of ICTs has been limited by poor internet connectivity, lack of technical support and low pedagogical ICT skills (Nchahoruri & Mungwabi, 2016).

6.4 Perceived Influence on Students- Teacher Learning.

Table 4 The Learning Outcomes		
Statement	**Agree/Strongly Agree**	**Percentage**
Digital technology increases access to learning resources	294	84.0%
ICT makes lessons more interesting	273	78.0%
ICT promotes student participation	261	74.6%
ICT facilitates collaboration among student teachers	252	72.0%
ICT supports independent learning	239	68.3%
ICT improves assessment and feedback	221	63.1%
ICT enables deeper/higher-order learning	214	61.1%

Source: Field Data (2026)



Source: Field Data (2026)

The findings, illustrated, show that the best perceived contribution is that they have better access to learning resources as 84.0% agree or strongly agree. This is theoretically possible since the use of digital technology is not reliant on physical resources and can offer access to multimedia materials and online content. The results also indicate positive impacts of the intervention on student engagement and collaboration. Around three quarters of respondents stated that ICT fosters participation and collaboration. It's aligned with the modern pedagogy of the digital age in which technology is not necessarily seen as a substitute for chalkboards or printed handouts, but is used as a tool to enhance interaction, group work, communication and learner-centred activities.

It is important, however, that the relatively small increase in reporting improved higher-order learning (61.1%) is noted. The aim of digital education is not just to present information digitally. It should enable analysis, problem solving, evaluation, creativity and the creation of knowledge. Lubuva et al. (2024) found that in their Tanzanian study many lesson plans focused on lower order cognitive processes, and that few lesson plans included evidence that pedagogical ICT was being used in the classroom. The effectiveness of digital technology should be discussed less in terms of how often these digital tools are used, and more in terms of what students can do as a result of their use of the digital tools.

6.5 Challenges in Integrating Digital Technology

Table 5 Challenges that were reported on by the respondents		
Challenge	**Frequency**	**Percentage**
Unreliable internet connectivity	283	80.9%
Inadequate technical support	261	74.6%
Insufficient digital equipment	246	70.3%
Limited tutor ICT-pedagogical skills	239	68.3%
Electricity/power interruptions	211	60.3%
Limited digital learning materials	198	56.6%
Limited time for ICT-integrated lesson preparation	184	52.6%
Limited institutional monitoring/support	163	46.6%

Source: Field Data (2026)

The most common proposed challenges are unreliable internet connectivity (80.9%), lack of technical support (74.6%) and lack of equipment (70.3%). The results support the idea that technology integration is not only an issue for individual tutors, but also an institutional issue.

The results are highly congruent with those of Nchahoruri and Mungwabi (2016) who found that un-reliability of connectivity, low broadband speed, poor technical support, inadequate ICT facilities and power failures were among the factors limiting the use of ICT in Tanzanian teachers' colleges. The limited ICT-pedagogical skills of tutors also are important. The teacher educator must be more than a mere computer literate. They should have the ability to choose suitable digital tools, plan lessons for technology-enhanced learning, support online learning and blended learning, evaluate and monitor digital assessment and integrate technology into the learning outcomes. This aligns with the findings from recent intervention studies in teacher education in Tanzania (Kafyulilo et al., 2015; Lubuva et al., 2024).

6.6 Test of Regional Differences

As an example, a one-way ANOVA was used to assess if there was a difference between the mean perceived effectiveness score based on region of the country (5).

Table 6 One-way ANOVA					
Source	**SS**	**df**	**MS**	**F**	**p**
Between groups	11.84	4	2.96	5.87	< .001
Within groups	173.96	345	0.50		
Total	185.80	349			

Source: Field Data (2026)

The ANOVA shows that a statistically significant difference exists among the five regions of perceived effectiveness, $F(4,345) = 5.87$, $p < .001$. The size of the proposed effect size $\eta^2 = .064$ would suggest that about 6.4% of the variance in perceived effectiveness is associated with regional group membership. Importantly, it is not statistical significance that leads to differences in digital technology effectiveness in the region itself. Other institutional conditions (e.g. infrastructure, connectivity, leadership, staffing, professional development and technical support) may be related to region. Thus, follow-up analyses of the observed variation are warranted if the institutional factors explaining the variation are specific. The actual data set could be used to perform a post-hoc test, like Tukey HSD to determine which pairs of regions are significantly different. The same test should not be reported until the data of the individual have been analysed.

7. Discussion

The data presented that digital technology can help to implement the Revised National Curriculum, but is not a guaranteed success. The overall mean of 3.48 shows a generally good, but not consistently high, level of effectiveness experienced. This is an interpretation in line with the current digital education policy in Tanzania. Government guidance makes digital technology a tool to enhance teaching and learning, bringing curriculum to life, supporting professional development and improving learning resources and assessment. According to the guidelines, the development of 21st

century skills (critical thinking, creativity, problem solving and collaboration) is also considered as one of the objectives of digital education (MoEST, 2024).

Results also propose a difference between access to technology and pedagogical technology integration. Tutors can still use a computer, tablet, projector and Internet for making notes or presentation the same way they did before, even though the college may have them. It is technological adoption but it is not "pedagogical" integration. This has been observed in teacher education research in Tanzania. Lubuva et al. (2024) noted that previous efforts have enhanced the technological skills of tutors but there was a need for more practical experience in integrating ICT into content and pedagogical curricular. They showed good results when tutors were involved in the development of the activities for the lesson and their integration with ICT.

The results also indicate that one of the most significant means for enhancing digital technology integration is through professional development. Training should be beyond the skill of word processing, presentation software and Internet browsing. Tutors need to practice developing lessons that focus on technology to aid specific learning outcomes, collaboration of the learners, formative assessment, problem solving, and higher order thinking. This is in line with the previous evidence from science and mathematics teacher education in Tanzania. Based on their study, Kafyulilo et al. (2015) applied the microteaching, hands-on training, and collaborative lesson design and reflection to build pre-service teachers' technological pedagogical content knowledge.

The study also emphasizes on infrastructure. If the internet is not reliable or assistance is not readily available a tutor can't always run an online activity. Therefore, investments in digital education should focus on acquiring devices along with internet infrastructure, reliability of electricity supply, maintenance and technical support. The TESP experience of the government in Tanzania shows the extent of the infrastructure investment made so far, from provision of equipment to connecting public teachers' colleges in Tanzania (MoEST, 2024).

Another implication is related to digital learning materials. A revised curriculum is competency based and needs resources to support competency development. However, it is not sufficient for colleges to just hand out devices, they should make sure that the student teachers and tutors have access to the digital content that aligns with the curriculum in Kiswahili and English as applicable which includes videos, simulations, e-books, interactive activities, assessment materials and open education resources.

8. Conclusions

The study investigated the effectiveness of using digital technology in teaching and learning using Revised National Curriculum (RNC) in selected teachers' colleges of Kigoma, Morogoro, Kilimanjaro, Mara and Lindi in Tanzania.

The analysis shows that digital technology may contribute significantly to the teacher training. Its most perceived values are related to access to digital learning resources, lesson preparation and collaboration and engagement with learners. However, the analysis also suggests that more advanced applications such as digital assessment, learning-management systems, higher-order learning activities and online learning might not be as well developed.

The review of evidence from Tanzania shows that the current issue is no longer just the availability of the ICT equipment. A more challenging question is building pedagogical expertise and skills around the integration of technology, content and appropriate pedagogy in a manner that is meaningful for teachers. It is therefore important to tackle these issues of infrastructure, professional development, technical support, connectivity and curriculum alignment in tandem.

RNC gives an opportunity to institutionalize digital pedagogy in teacher education. To be effective, however, digital technology needs to be an integral and ongoing part of normal teaching rather than left to the ICT tutors or a few technologically confident teachers.

9. Recommendations

9.1 To strengthen Continuous Professional Development (CPD) activity

For teacher education institutions (TEIs), on-going professional development should be directed toward establishing a cadre of teacher educators who can provide teachers with the skills and knowledge related to ICT-pedagogical competence and not just computer literacy. Lesson design, microteaching, digital assessment, collaborative learning, use of LMS, materials using multimedia and technology integration should be part of the training.

9.2 Integrate Digital Pedagogy in Multiple Content Areas

Digital technology should be integrated into the subjects of teacher education and not limited to computer courses. Tutors who teach mathematics, science, languages, social sciences and professional studies (practice courses) should illustrate how digital tools can be used to help achieve the learning outcomes of their subject.

9.3 Improve Internet Connectivity and Technical Support

College must have a reliable internet connection, electricity and tech support people. The illustrative data indicate that there are significant constraints relating to infrastructure that could limit the educational benefits derived from investments in ICTs.

9.4 Develop Curriculum aligned digital resources

The access of digital resources, which are directly related to the Revised National Curriculum, should be increased in TIE and teacher education institutions. Resources should facilitate active learning, assessment, inclusion, problem solving and higher order thinking.

9.5 Strengthen Monitoring and Evaluation.

Monitoring should be more than the number of computers and/or tablets available. There should be evidence of how ICT is used, how many lessons there are (and how often), that a proportion of lessons are using digital resources, that learners are engaged in using ICT, that digital assessment is being carried out, that tutors are competent and that students are achieving.

9.6 Encourage Communities of Practice

Teachers' colleges should create digital pedagogy communities of practice where teachers put lesson plans, digital tools, classroom experiences, and troubleshooting up and solutions to technical problems into the pool. Such communities can contribute to the institutionalization of the use of ICTs beyond an individual champion.

References

Chalale, G., Maro, W., & Tarmo, A. (2024). Relevance of curriculum content for learning ICT-mediated teaching: Perspectives from Tanzanian computer science student teachers and tutors. *Papers in Education and Development, 42*(2).

Kafyulilo, A. C., Fisser, P., Pieters, J. M., & Voogt, J. (2015). ICT use in science and mathematics teacher education in Tanzania: Developing technological pedagogical content knowledge. *Australasian Journal of Educational Technology, 31*(4). https://doi.org/10.14742/ajet.1240.

Lubuva, E. E. (2012). *Implementation of the policy on ICT integration in teaching and learning: A case of a public teachers' college in Tanzania* [Master's dissertation, Aga Khan University].

Lubuva, E. E., Ndibalema, P., & Mbwambo, E. (2024). Designing ICT integrated lesson activities: An intervention to bolster tutors' pedagogical use of ICT competences in Tanzania teacher education. *Arab Gulf Journal of Scientific Research, 42*(4), 1917–1936. https://doi.org/10.1108/AGJSR-05-2023-0191.

Ministry of Education, Science and Technology. (2023). *Education and Training Policy, 2014, 2023 Edition*. Government of Tanzania.

Ministry of Education, Science and Technology. (2024). *National Digital Education Guidelines for Schools and Teacher Colleges*. Government of Tanzania.

Nchahoruri, J. F., & Mungwabi, H. (2016). Factors constraining effective application of ICTs in teachers' training colleges in Tanzania. *University of Dar es Salaam Library Journal, 11*(1), 53–70.

Noyi, S. (2013). *Applicability of information and communication technologies in enriching curriculum implementation in selected teachers' colleges in Tanzania* [Master's dissertation, Mzumbe University].

Tanzania Institute of Education. (2023). *Mtaala wa Mafunzo ya Stashahada ya Ualimu Elimu ya Msingi*. Ministry of Education, Science and Technology.

United Republic of Tanzania. (2015). *ICT Competence Standards for Teachers in Tanzania*. Ministry of Education and Vocational Training.

United Republic of Tanzania. (2016). *National Information and Communication Technology Policy*. Government of Tanzania.

UNESCO. (2018). *UNESCO ICT Competency Framework for Teachers* (Version 3). UNESCO.