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Empowering education through technology: Strategies for seamless integration in secondary schools, Tanzania

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Abstract

The disparity between the availability of ICT infrastructure and its effective use in classrooms raises questions about whether existing strategies adequately address the challenges teachers face in integrating technology into teaching and learning. Thus, the purpose of the study was to explore supportive strategies for promoting the use of technology in the teaching and learning process so as to bridge the existing gap. To gain a thorough grasp of the phenomenon being studied, the study employed a qualitative research approach and a case study design. A sample of forty-four (44) participants from four secondary schools was formed through the purposeful sampling of four (4) heads of schools, twenty (20) teachers, and twenty (20) students. Focus groups, observations, and interviews were the methods used to collect data. The obtained data were analysed using thematic analysis technique. The six steps that Braun and Clarke (2022) created served as the basis for the theme analysis. The results showed that teachers should be supported with ICT resources, computer literacy programs, teachers' motivation, technical and administrative support in order to promote technology integration in the teaching and learning process. The study recommends government and schools to provide encouragement, clear guidance, and incentives for teachers to adopt and integrate technology in instructional practices.

Key words: *Teaching and Learning; Technology Integration*

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Introduction

The development and application of electronic learning resources to raise the standard of secondary school instruction and learning has gained more attention in recent years. Examples of technological learning tools include textual, graphical, audio-visual, and animated materials (Kalinga and Ndibalema, 2023). Software consists of computer instructions or data categorized into systems software, such as operating systems, and applications software. Hardware refers to the physical components of computers. The purpose of technology integration in the classroom is to increase student engagement and to liven up the teaching and learning process (Mtebe, 2020). Teachers can more effectively explain and communicate complex ideas and misconceptions that are hard to express in words when they employ technology in teaching and learning (Mtebe *et al.*, 2016). Accordingly, learning occurs when both the teacher and the students enthusiastically and fully contribute in the creation of knowledge using a range of accessible tools. Thomas and Israel (2013) found that when technology is used effectively in instruction it offers more chances to cultivate an independent learning style, students' interest and focus. This bolsters the claim made by Timus and Hana (2019) that a projector-based audiovisual presentation of the content is more successful in ensuring long-term learning and retention. In addition, when discussing nature and natural occurrences in scientific classes, abstract notions like molecules, atoms, electrons, principles, and laws are frequently used; for this reason, multimedia presentations are essential when presenting abstract ideas (Mtebe, 2016). Similarly, teachers can use computers and projectors to display animations, simulations, and movies that highlight different concepts in the subject matter and then spark discussion (Mabiki, 2017). The benefits of integrating ICT into the classroom encourage collaboration, responsibility, and customization of learning. Integrating technology in instructions improves teacher-student interaction, provides prompt response, and facilitates effective learning as supported by a study of Kihoza (2016). Furthermore, Budiman, Rahmawati and Ulfa (2018) examined the attitudes and behaviours of teachers concerning the practice of ICT. The study found that, teachers believe that integrating ICT into instruction is essential since it can be used to change all aspects of education in order to accomplish learning goals and enhance the quality of instruction. Moreover, Mboya (2019) found that students are motivated to study more by the captivating presentation that ICT provides during the teaching and learning process. Students may study with authenticity, curiosity, and creativity using ICT tools. Students' comprehension of the lesson is enhanced and real-world processes are simulated when technology is used for educational purpose (Kafyulilo, 2010). For instance, it enables teachers to demonstrate experimentations that are costly and dangerous to carry out in laboratories when teaching science, especially when it comes to subjects like particle movement, diffusion, and atomic bonding (Thomas and Israel, 2013). Teachers can use PowerPoint presentations, computer simulations, and digital movies to motivate and encourage students to learn while also giving them rapid feedback. Teachers' computer use promotes student connection, which leads to meaningful engagement and active learning (Timus and Hana, 2019).

In order to promote meaningful instruction, teachers need ICT training, seminars, and workshops to prepare them for integrating ICT in the classroom (Daudi and Nzilano, 2019). In addition, Kafyulilo, Fisser, and Voogt (2015) pointed out that, for teachers to effectively integrate technology for instruction they require training. Teachers' ambition to innovate technology is significantly impacted by how satisfied they are with the knowledge and abilities they have acquired via professional development (Steinkuehler, 2018). Furthermore, Ovie (2017) pointed out that there are issues that are primarily caused by the school management over motivations, prizes, resource accessibility, and fiscal funding for teachers, as well as individual attributes that include teachers' understanding, skills, and confidence to use technology for instructions. Similarly, Onal (2017) found that there are technological aspects including ease of use and effectiveness of use for teachers' technology adoption in classroom teaching and learning. To guarantee teachers and students access to a range of ICT resources, the Tanzanian government has taken numerous

steps. It guaranteed access to high-quality digital content, reliable and reasonably priced internet service (Almasi and Machumu, 2017). More than 31 percent of government secondary schools have computers, and 20 percent of them have internet connections (MoEST, 2017). Additionally, a number of businesses company provided schools with computers and internet connections (Gongden, 2020). For instance, Tigo and Halotel company connected 400 primary and 700 secondary schools in Tanzania with internet (Kazoka, 2016). Digital content was produced locally by the government and other organizations and disseminated to teachers and students via a variety of e-learning platforms (Mtebe, Mbwilo and Kissaka, 2016). Furthermore, the Ministry of Education, Science, and Technology has estimated that there are around 208395 computers and 14988 projectors used for administrative and instructional purposes nationwide. According to MoEST (2017), 31.4% of government secondary schools (out of 3,601) possessed one to 68 computers and 21% of these schools have Internet connectivity. Secondary schools in Iringa region benefited with these government initiative as it has 19,907 computers and 1494 projectors for teaching and learning. With reference to the aforementioned government initiatives to guarantee integration of technology in instructions, teachers are supposed to harness the available technology to enhance students learning. Accordingly, learning occurs once mutually the teachers and the students vigorously and fully take part in the creation of knowledge using a range of accessible tools (Egbutu and Okeke, 2021). Thus, technology-assisted learning offers students more chances to cultivate an independent learning style (Hicks, 2011). The presence of ICT facilities in schools highlights the potential for integrating technology in instructional process. Despite the increasing presence of ICT facilities in secondary schools, their actual incorporation in instructional process remains a significant challenge. Many teachers face barriers such as limited training, lack of confidence, and inadequate support, which hinder their ability to utilize these technologies to enhance educational outcomes (Benazir, 2020; Belay *et al.*, 2020). While the importance of technology in modern instruction is widely acknowledged, there is a noticeable gap between the availability of resources and their practical application in the classrooms. Therefore, this study seeks to address the need for supportive strategies that can empower and encourage teachers to integrate ICT effectively in Iringa Municipality, Tanzania.

The study was anchored on Technological Pedagogical Content Knowledge (TPACK) model. Since teaching is a complex, multifaceted activity that takes place in a variety of situations, it can be challenging to describe what teachers and students need to know. Teaching is an unstructured problem that necessitates reasoning about a variety of interconnected factors, including the prior knowledge that students bring to the classroom, expectations of teacher concerning the material to be covered, classroom, school policies and procedures (Ortiz Colón *et al.*, 2023). Because technology is evolving so quickly, its usage in the classroom adds complexity and a new set of variables to the teaching environment. In order to develop a body of knowledge that transcends the three distinct knowledge bases, teachers must comprehend the relationships between technology, pedagogy, and content. In order to promote students' learning, teaching with technology necessitates a flexible framework for how technologies can be successfully integrated with a variety of pedagogical techniques and subject areas (Halakeri, 2019). Three main knowledge bases include technology, pedagogy, and content as well as the relationships between and within them define what teachers need to know to effectively teach using technology. According to TPACK framework, technology in the classroom encompasses far more than just specialized hardware or software skills. Instead, the incorporation of technology into educational settings results in the representation of novel ideas and necessitates the development of an awareness of the dynamic, transactional interaction among all three elements (Agustini *et al.*, 2019). Adding a new piece of technology to an existing structure is not enough to provide effective technology-based instruction. Effective technology-assisted instruction necessitates a change in the current pedagogical and content domains. The importance of context in teaching and learning is also emphasized by the TPACK framework. Teachers who have built TPACK employ technology to create

learning experiences that are relevant to pedagogies and content as they are instantiated in particular learning contexts. Teaching is a context-bound activity (Knolton, 2014). There is no uniform or "one-size-fits-all" approach to the teaching challenge because every teaching and learning situation is different and there are many ways that technology, pedagogy, and material interact. Teachers must make a lot of judgments since technology, pedagogy, and curriculum are all linked. As technology, pedagogy, subject matter, and classroom atmosphere are adopted, these choices change. The range of potential answers suggests that in order to improve students' learning; teachers should take an active role and create their own teaching and learning environments.

Materials and methods

Research approach and design

This study used a qualitative research approach in order to identify helpful strategies for promoting technology integration in the teaching and learning process in secondary schools in Iringa Municipality, Tanzania. A qualitative approach was suitable for this study due to its naturalistic methods and interpretive nature which allowed the generation of deeper insights about the supportive strategies for technology integration. In addition, the study used a case study design to describe teachers and students' opinions on helpful strategies for integrating technology into the classroom based on their own experiences in the classroom on a daily basis. Furthermore, rather than just providing descriptions, the case study design permitted interpretations and deductions (Cresswell, 2014). As a result, the subtle differences between the suggested strategies and what is really done in teaching and learning with technology were made clear.

Participants and study area

The study was conducted in Iringa municipality located in Iringa district which is found in Iringa region. The area is situated in the country's farthest southern corner. The Iringa region's economic activities include business, tourism, agriculture, and fishing. The study's municipality were purposefully chosen in the hopes that, in comparison to their rural counterparts, their schools would have adequate resources, including qualified and experienced teachers who knew how to employ contemporary technology. Investigating supportive strategies to promote technological instructions was therefore essential. Four secondary schools were purposively selected to participate in the study due to the availability of technological devices such as computers and projectors. Forty-four (44) participants, comprising four (4) heads of schools, twenty (20) teachers, and twenty (20) students, were chosen through the use of purposeful sampling from four secondary schools in Iringa Municipality. The criteria for selecting teachers were the prior exposure and experience in using technology. In addition, form three students were selected due to fact that they have some exposure to digital tools (phones, computers, or online platforms), making them a relevant group to study how schools support technology usage in learning. These participants were sought to provide sufficient information about the helpful strategies to promote technology integration in their individual schools. Participants' participation in this study was voluntary, and their informed consent was requested. There were eight female teachers and sixteen male teachers among the participants. There were ten male and ten female students. During focus group discussion, each group had 5 students thus forming four (4) focus groups. Regarding their professional credentials, six teachers had diploma and eighteen teachers had bachelor's degrees. When it came to their experiences in the classroom, four teachers had fewer than five years of experience, while twenty had more than five years. Interestingly, none of the study's teachers had ever received training course on integrating technology during instruction.

Data collection methods

To gather data for this study, semi-structured interviews, focus groups, and classroom observations were used. This included twenty-four (24) interviews with teachers and head of schools, four (4) focus group discussion and four (4) classroom observation. In order to create interviews, leading questions were created based on literature that suggested helpful strategies for integrating technology in the classroom. These questions served as a foundation for asking teachers about the usage of technology in their schools. Interviews and focus group instructions were

written in English and translated into Swahili to make it easy for teachers who were all native Swahili speakers to respond. To guarantee that questions stay valid and meaning is not altered, a language specialist read and corrected the translations. After participants gave their verbal consent, audio recordings of forty-five minutes to one-hour sessions were made. Classroom observation was also carried out to depict the technological facilities that is actually used in the teaching and learning processes. Observations were left unstructured in order to obtain more in-depth and first-hand account of the technological facilities used in classroom teaching and learning processes. Four observations in all were made, one for each of the study's participating schools. In-depth explanations of common technology use and helpful strategies for guaranteeing that technology is incorporated into classroom instruction were made possible by the researcher's thorough observation notes.

Data analysis procedures

The study used thematic analysis techniques to analyse data as suggested by Braun and Clarke (2022). To capture accurately the meanings and viewpoints of the participants, the first transcription of the interview and focus group discussion data was done in Swahili. The data from focus groups and interviews that were recorded on tape recorder were listened to multiple times and verbatim transcribed. The transcripts were then translated into English after superfluous words were eliminated. The following step involved including identifying units of analysis, such as phrases and keywords pertaining to helpful strategies for promoting technology integration in classrooms. Ultimately, the information was classified, grouped, and displayed according to themes. An English and education specialist validated the transcripts including the original data, the translated data, and the created themes to make sure they were coherent. The same methods were used to code, classify, and evaluate data from classroom observations about the real-world usage of technology and the available technology facilities. Finally, themes were identified and developed based on the issues that emerged from the data, as outlined in the next section.

Results

Strategies to support teachers' technology integration in the classroom

The findings of the study on how teachers can be persuaded and supported in integrating technology into the teaching and learning process in Tanzanian secondary schools in the Iringa Municipality are presented in this part.

Computer literacy programmes

Findings from teachers' interviews, and students focus group discussion revealed that, in order to encourage students' active learning, teachers should be assisted in using ICT tools particularly computers and projectors in the classroom. This can be done through computer literacy programs offered in schools or through specialized programs held in the area to provide them with the skills they need to run computer-based instruction. For instance, school A's teacher (T1) clarified that:

> *Due to the quick advancement of technology and new teaching techniques, computer training programs are particularly helpful for keeping up with current information. In order to acquire new information and skills for integration in the classroom, we must participate in as many ICT seminars and workshops as we can (Interview, T1 at school A, 21st November, 2024).*

These findings implies that in today's digital age, teachers' computer literacy is essential for enhancing the learning experience, improving administrative tasks, and preparing students for a technology-driven world. Furthermore, school C's head of school (H3) stated that:

> *Since ICT tools like computers and projectors offer more engaging activities that support students' active learning, teachers must receive training to encourage the use of ICT in the classroom, particularly the use of simulations. animations and videos (Interview, H3 at school C, 13th November, 2024).*

Teachers who are computer literate can integrate technology into their lessons, collaborate with peers online, and access educational resources that support their teaching goals. Additionally, during the focus group discussion, school A students stated the following:

> *We lack comprehensive knowledge on how to use the computers that are available, especially when it comes to searching for pertinent documents related to our subject. Training on the use of computers and other technology resources in our school is a better way for our schools and other stakeholders to support us (FGD at school A, 23rd November, 2024).*

These implies that teachers and students with computer skills can use digital tools to create engaging and interactive lessons. They can incorporate multimedia presentations, educational videos, and interactive simulations that cater to various learning styles. Computer literacy enables both teachers and students to make lesson more dynamic and adaptable to different learning needs. Likewise, school D's teacher (T8) added the following:

> *All academic personnel should participate in specialized computer literacy programs in order to expand their use of computers and other ICT resources. Although they are insufficient, we can make the most of the resources available to improve students learning if we are trained (Interview, T8 at school D, 15th November, 2024).*

According to the aforementioned quotations, in order to promote technology integration in the classroom, teachers and learners alike need to receive ICT literacy training. Teachers stated that they would be able to utilize the computers and projectors to their full potential if they could participate in various computer literacy programs. This is because they would be able to involve students in the teaching and learning process by evaluating their knowledge and abilities. Computer literacy for teachers is no longer optional; it is a necessity for modern education. Teachers who are capable in using technology can provide more appealing and interactive lessons, better communicate with students and colleagues, and manage their classrooms more effectively. Moreover, by becoming proficient in digital tools, teachers model the importance of technology for their students and promoting a culture of digital literacy. It is essential for schools, educational policymakers, and teacher training programs to prioritize computer literacy initiatives, ensuring that teachers have the skills and resources they need to thrive in an increasingly digital world.

Teachers' motivation on the use of ICT facilities

Motivating teachers to use Information and Communication Technology (ICT) facilities in their teaching is crucial for the effective integration of technology in education. Despite the growing recognition of the importance of ICT in modern classrooms, many teachers are reluctant or unsure about using these tools effectively. Understanding the factors that influence teachers' motivation is key to addressing these challenges and encouraging the widespread adoption of ICT. Findings from teachers' interviews revealed that, effective technology integration in the classroom depends on motivation. For instance, school B's teacher (T3) said:

> *For us to make the most of technology as a teaching tool to enhance instruction in the classroom, motivation is crucial. Effective class delivery is facilitated by both internal and external incentives for using technology (Interview, T3 at school B, November 14th, 2024).*

Providing incentives for teachers who use ICT in innovative ways can serve as a strong motivator. These incentives may include awards, professional development opportunities, or public recognition. When teachers feel their efforts are appreciated, they are further likely to continue integrating ICT into their teaching practices. Recognition also comes in the form of leadership roles or opportunities to mentor other teachers in the effective use of technology. Furthermore, school C's teacher (T5) said the following:

> *Motivation, in my opinion, is a key tactic for enhancing teaching strategies that use technology in the classroom since it gives teachers and students more learning chances and boosts their interest in the material. In the classroom, motivation fosters a favourable attitude toward computer-based learning (Interview, T5 at school C, 22nd November, 2024).*

Teachers are generally motivated by the desire to improve student outcomes and create engaging learning environments. The use of ICT significantly enhances student motivation and engagement, especially when students have access to interactive, multimedia, and personalized learning experiences. Teachers who see how ICT tools captivate students' attention and make learning more meaningful are more likely to incorporate them into their teaching. Additionally, feedback from students regarding the usefulness of technology encourages teachers to continue using ICT. Additionally, school D's teacher (T4) clarified that:

> *Since ICT is a new technology, teachers require encouragement to use it for instruction. Students' learning will therefore be facilitated by encouraging us to use technology, especially in scientific classes (Interview, T4 at school D, November 11st, 2024).*

Motivation is a critical component of adopting technology for educational purposes as expressed by teachers T3, T4, and T5. According to teachers, motivation propels their mindset and encourages them to employ multimedia teaching methods that actively engage students in the development of scientific ideas. Teachers emphasized that abstract concepts, especially those related to atomic structure, can be taught via technology. It is more challenging to help students visualize such subjects than it is for teachers to employ computer simulations. Teacher motivation is therefore crucial, especially when implementing new tools in the classroom. Teachers can further encourage students' active learning by redesigning assignments and coming up with new ones through motivation. The classroom experience indicates that motivated teachers and students are involved and learn effectively when utilizing ICT technologies. In this environment, teaching and learning are both dynamic processes that call for independence, challenging assignments, imagination, teamwork, and critical thinking.

Increasing the number of ICT facilities in schools

Findings from teacher interviews, students focus group discussion and observation revealed that, more ICT facilities are required in schools so that students can use them to enhance their active learning. This boost will facilitate the shift from antiquated teaching and learning tools (blackboards and chalk) to computer-based instruction. According to teachers, students will gain from computer-assisted instruction designed to increase their understanding of the subject if there are enough computers available. According to the study's participants, having more computers will enable teachers to create lesson plans that are more creative, effective, and captivating, which will encourage students to actively learn. To expand the use of computers for teaching, for instance, a teacher (T1) from school A was cited as stating, *"To be honest, it would be great if donors could enhance the number of ICT resources in our school and assist us to replace the out-of-date ones"*.

Similarly, school A's teacher (T2) was quoted as saying:

> *Our school would benefit from more facilities because there aren't many projectors and computers. Because of this, teachers are compelled to teach theoretically and using conventional teaching techniques like lectures, which deny students the opportunity to engage constructively in the lesson (Interview, T2 at school A, 19th November, 2024).*

These findings implies that when more ICT tools are available, teachers can incorporate a variety of digital resources into their lessons, such as educational videos, online simulations, and interactive whiteboards. These resources make learning more engaging, interactive, and tailored to students' individual needs. Students can also access online learning platforms, digital textbooks, and other materials that enhance their mastery of the subject matter. This leads to improved academic performance and greater motivation to learn. Additionally, after a concentrated group discussion, school D students noted that:

> *More computers, tablets, and projectors are required because our school has little ICT resources. This would allow students to learn in a technologically improved setting and improve their comprehension of the material (FGD at school D, 22nd November, 2024).*

Increasing the number of ICT facilities in schools is a crucial step toward enhancing the learning experience and ensuring that students and teachers are well-prepared for the demands of the modern world. As technology continues to shape the global economy and society, the role of ICT in education has become more important than ever. Likewise, school C's head of school (H3) added the following:

> *Even at school board meetings, I consistently advocate for more computers because there aren't enough of them for educational purposes. Therefore, the complete spectrum of involvement and active learning fuelled by computer-assisted education will benefit both teachers and students if the issue is resolved (Interview, H3 at school C, 10th November, 2024).*

According to the aforementioned statements from teachers T1, T2, and H3, more computers and projectors are required in schools in order to let teachers adapt and restructure learning activities when utilizing them to encourage student participation. Additionally, in order to facilitate the pedagogical integration of ICT and improve the efficiency of teaching and learning, infrastructure capacity must be increased. Schools must work to encourage more teachers to use ICT tools to adapt their lessons.

Additionally, the results of student focus groups indicated that more computers should be installed in schools in order to maintain student engagement and encourage the development of new skills through computer-based training in scientific endeavours. One student (S1) from School A stated the following:

> *Our school should have more computers and other ICT resources. We often study without computers since they are not enough. This forces us to study by memorizing scientific ideas like atomic structure and chemical bonding that could be easily done through computer simulations (FGD, S1 at school A, November 11st, 2024).*

Likewise, a school C students (S3) was alleged to have stated that:

> *Since our school has very few computers and projectors, which restricts teachers' ability to use them for teaching and learning, I suggest that our school should buy more projectors and computers so as to encourage technology-based learning (FGD, S3 at school C, 11th November, 2024).*

According to quotes from student focus groups, Iringa Municipal schools have computers, but not enough of them are available for all students and teachers to take full advantage of them. In order to promote student engagement and active learning, they proposed that it would be better to increase the number of computers and other ICT equipment in order to support computer-based instruction.

Furthermore, observations showed that even though there weren't enough projectors for teaching, the majority of secondary schools possessed computers. One has to make a reservation in advance to use the computer and projector as shown in Table 1.

Table 1

The ICT resources that are accessible in the chosen schools in Iringa Municipality

Name of school	Available ICT resources	Number of available ICT resources
A	Computers and internet	20
	Projectors	4
B	Computers and internet	13
	Projectors	2
C	Computers and internet	16
	Projectors	3
D	Computers and internet	9
	Projectors	1

Source: Field data (2024).

As seen in Table 1 there were more computers than projectors in the schools. There was only one projector at school D. Other teachers are forced to wait or use other conventional teaching techniques when multiple teachers need a projector at the same time.

Administrative and technical assistance for teachers

Interview and focus group discussion data showed that for effective use ICT resources, including computers and other ICT facilities in instructions, teachers require administrative and technical support. Teachers might delay or cease using computers and projectors because they lack administrative and technical assistance. Teachers also exposed that ICT support at school is essential for sustaining both hardware and software because it creates an environment that allows teachers to concentrate on teaching by reducing their technical responsibilities. For instance, school A's teacher (T2) clarified that:

> *We need someone who can troubleshoot when a computer breaks down so that we can use technology in the classroom effectively. This is because technical issues, particularly damage or poor display of a computer or projector, make us uncomfortable utilizing technology (Interview, T2 at school A, 9th November, 2024).*

Providing administrative and technical assistance for teachers is essential to ensure successful integration of ICT tools into teaching practices. While ICT is significant to revolutionize education by making learning more engaging and effective, teachers often face challenges in using these tools effectively without adequate support. Administrative and technical assistance will not only helps overcome these challenges but also ensures that ICT resources are utilized to their full potential, benefiting both teachers and students. Additionally, school D's teacher (T4) stated:

> *I believe that having someone in charge of computer maintenance and administrative assistance will encourage us to use computers in the classroom. Except for a classroom teacher who would have been interested in employing a computer for instruction, many schools in this municipality lack specialized staff (Interview, T8 at school D, 14th November, 2024).*

These findings implies that schools should have IT support personnel who can quickly address any technical issues that arise. This may involve troubleshooting hardware malfunctions, ensuring software compatibility, or resolving connectivity problems. A dedicated IT team or individual support person can help teachers with any technical problems they encounter, allowing them to focus on teaching rather than spending time trying to resolve technical difficulties. The availability of timely and efficient technical support is essential for maintaining smooth ICT

integration in the classroom. Furthermore, teacher T6 from school C shared this opinion and reported that:

> *Troubleshooting issues with computers and projectors during instruction is challenging. For instance, I frequently run into problems when I switch on the projector and it doesn't function. I am unable to identify the issue. In order to operate the projectors without any issues, it is therefore preferable if we have technical support (Interview, T6 at school C, 10th November, 2024).*

These findings imply that providing ongoing technical support goes beyond just solving immediate issues. It involves monitoring the ICT infrastructure and ensuring that the systems are functioning optimally. This includes routine maintenance, updates to software and hardware, and addressing any new challenges that arise as technologies evolve. Regular check-ins with teachers to assess their needs and experiences with ICT tools can help identify gaps in support and areas for improvement. Moreover, students (S6) from school B added that:

> *Sometimes computers misbehave while using during learning but its difficult for us and teachers to make follow-ups on it, thus we suggest that we need experts for troubleshooting and solving those problems related to ICT in the classroom (Interview, S6 at school B, 17th November, 2024).*

According to findings from teacher T2, T4, S6 and T6, a technician with the ability to configure computer systems, diagnose software issues, and handle network issues is needed. To improve the use of computers and projectors for instructional purposes, technicians are crucial. Additionally, the results indicate that if school administrators could promote the technology use in instructions and in everyday tasks, it might be used more successfully in teaching and learning. The improvement may be far more advantageous if there are opportunities for teachers to acquire training. The availability of regular technical assistance and the functionality of ICT facilities should be ensured by school administration. Schools should honour and support teachers who use ICT in the classroom in order to inspire other teachers. To ensure successful technological growth, teachers need help in implementing computer-based instructions.

Discussion

These results corroborate those of Yen (2010), who found that teachers require training in order to properly integrate technology into the classroom. Yen's study focused on educating teachers to use computers for administration and education. Yen claims that trainings improve teachers' perceptions of computer instructions and consequently the application of computers in the classroom to support students' active learning. Additionally, Ngeze (2017) found out that most of secondary school teachers (77 percent) currently have a laptop or smartphone, demonstrating that they are prepared to practice such tools in the teaching and learning process if given instructions on how to use. Similarly, Indriyani (2019) found that in order to integrate technology into the classroom, teachers must receive enough computer skills training. This is because teachers are essential to the adoption of all other educational innovations as well as the integration of computers into the classroom. Teachers must therefore receive training on the hardware and software applications of computers and projectors at both the augmentation and transformation levels in order to facilitate computer-assisted instruction (Ronald and George, 2017). Similar findings were also discovered by Mboya (2019) on their investigation into the variables affecting teachers' use of ICTs. It was observed that motivated teachers find it simpler to use more instructional technology tools to increase student interest and engagement in the learning process. On the other side, teachers who have negative attitudes on the use of technology in the classroom are incapable of benefiting from it or successfully integrate it into their lessons. Teachers' motivation is a major influence in integrating technology into the classroom according to Copriady's (2014) study on self-motivation as a mediator for teachers' readiness to use ICT in teaching and learning. In addition to enhancing flexibility through application of technologies that enable students to learn at any time and from any location, motivation is crucial in the learning process while utilizing ICT. These results are consistent with

studies by Johnson and Jacovina (2016). The authors found that the demands of teachers and students were not adequately met by the computers and projectors in secondary schools. Corrective measures, like increasing their number are required to help teachers deliver lessons. Since widespread access to the equipment required to run educational computer programs is the first step toward effective technology integration, it will be impossible to implement educational technology in a school without a sufficient number of computers or a fast internet connection. Additionally, according to Rosdy's (2015) study on teaching and learning with technology, teachers find it extremely challenging to integrate technology into their current classes due to unequal access to computers in schools. In order to improve students' ability to successfully study scientific material using technology, Rosdy argued for more computers in classrooms. These results corroborate those of Chigona and Davids (2014), who looked into teachers' motivations for integrating ICTs into their lessons. The authors contend that it is crucial for schools to meet students' expectations when utilizing technology in the classroom. This suggests that schools should have easy access to technical support. Without the required assistance, teachers won't be inspired to employ technology in the classroom. Administrators need to understand the technical, curricular, organizational, monetary, and social aspects of ICT use in education in addition to being skilled at integrating technology in the classroom. Ogbomo (2011) asserted that technical support specialists are essential to the long-term viability of ICT use in secondary schools, and the results of this study confirm his assertions. While what and how technology is deployed and used ultimately determines a school's technical support needs, both software and hardware equipment maintenance require general technical assistance. Restricting technical support, on the other hand, limits the frequency of technical maintenance, which raises the risk of technical failure. It could be challenging to incorporate technology into the classroom without a technician present. Lack of technical support hinders teachers' capability to effectively incorporate technology into the classroom.

Conclusion and Recommendations

The study highlights the critical need for a multifaceted approach to encourage the use of technology in secondary schools in Iringa Municipality, Tanzania. While the potential of technology to enhance teaching and learning is evident, its successful integration faces significant barriers, including inadequate computer literacy among teachers, insufficient ICT facilities, and the absence of administrative and technical support. To address these challenges, the study underscores the importance of providing targeted support to teachers, expanding access to technology, and fostering a conducive environment for its effective use. It is essential to implement comprehensive computer literacy programs for teachers. These programs should cover not only the basics of digital literacy but also focus on how technology can be strategically used in the classroom to enhance pedagogy and student engagement. Additionally, there is a pressing need to increase the availability of ICT facilities such as computers, projectors, and reliable internet connectivity. Schools should prioritize the acquisition of these resources through collaborations with government agencies, the private sector, and local communities. Furthermore, administrative and technical support plays a vital role in ensuring that technology is effectively used without disruption. School leadership must provide encouragement, clear guidance, and incentives for teachers to adopt new technologies, while technical support teams should be established to address any technical issues that may arise.

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