The Use of ICT In Tanzanian Secondary Schools: Experienced Obstacles in the Teaching and Learning Processes

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Abstract
This study investigated the obstacles to using ICT in Tanzanian secondary schools' teaching and learning process. A mixed-methods approach and descriptive research were employed, whereas questionnaires, interviews and observation guides were used for information gathering. The study applied simple random sampling to obtain 18 schools from a population of 36 secondary schools in Magu district. Data were collected from 154 respondents (100 teachers, 36 students, and 18 parents) who were selected from the sampled schools. The findings revealed that there is a challenge for most teachers to integrate ICT into secondary education. Likewise, inadequate technical support is a limitation to using ICT in the teaching and learning process. Moreover, most respondents indicated that there are insufficient ICT resources and inadequate ICT training, which hinder the use of ICT. The study concludes that a low level of teachers' ICT competence, lack of technical support, insufficient ICT resources and inadequate ICT training are the major challenges that hinder teachers from employing ICT in the teaching and learning process. The study suggested that investment in ICT training of teachers and cultivating a positive mindset towards ICT is crucial for the better future of ICT in education. Additionally, school administrators should empower teachers towards basic ICT skills by supporting ICT in-service training and allocating sufficient ICT resources. The government must allocate and provide sufficient funds to the schools to facilitate in-service teacher training. In addition, the government's support in terms of funds provision and other incentives will ensure the promising future of ICT in schools. Other education stakeholders, such as parents, in collaboration with school management, should spearhead the school efforts to facilitate in-service training for teachers and students. Likewise, for a better future of ICT, the provision of technical support to schools and supporting maintenance of ICT infrastructures is inevitable.

Keywords: *ICT, Teaching Process, Learning Process, Pre-service training, In-service training.*

Introduction

The integration of Information and Communication Technology (ICT) in education has been a significant focus of educational reforms worldwide. The promise of ICT to enhance the quality and accessibility of education is widely recognized, and its potential to transform teaching and learning processes has been a subject of considerable optimism (Dúo-Terrón et al., 2022). ICT resources, including computers, tablets, interactive whiteboards and educational software, present a wealth of chances to advance teaching and learning processes (Sahlin et al., 2017). ICT for education has become more popular because of its ability to engage students, encourage creativity and give them access to a wide range of digital resources (Haleem et al., 2022).

Teachers can use interactive simulations, online learning environments, and multimedia presentations to create more dynamic and engaging lessons. Conversely, students stand to gain from tailored learning opportunities, prompt feedback, and exposure to concepts in practical settings (Haleem et al., 2022). In Tanzania, the government has made significant investments in ICT infrastructure in schools to enhance the quality of education and prepare students for the digital age (Barakabitze et al., 2015). ICT is a current focus in Tanzania's education system, with the implementation of numerous training programmes being a noticeable development. Research indicates that teachers' training, both at the beginning of their careers and ongoing, is crucial for the successful integration of ICT in education systems (URT, 2014). In 2005, the Ministry of Education, Science and Technology (MOEST) implemented ICT pedagogy in Tanzanian Teachers' Colleges (TTCs) to ensure teachers were prepared with the necessary skills and knowledge for incorporating ICT into education (URT, 2019). Three levels of teacher ICT proficiency that is curriculum training, pedagogical skills and ICT skills were targeted (URT, 2016). Despite the government efforts, research studies indicate that several obstacles prevent ICT from being successfully implemented in schools. The absence of proper infrastructure and resources is one of the main issues with ICT utilisation in secondary schools (Kweka & Ndibalema, 2018). Additionally, most schools have inadequate internet connectivity, which hinders instructors and students from finding information and tools they need online. Consequently, it lowers the standard of instruction (Sedoyeka & Gafufen, 2013).

Also, the majority of teachers lack the necessary expertise to integrate technology into their lessons in an efficient manner. This limits the

quality of their lessons and hinders the successful integration of ICT into their teaching methods (Tarus et al., 2015). However, there are still ongoing efforts by the government to ensure a better future for ICT, particularly in the education sector, in order to facilitate quality teaching and learning processes in schools. Despite the ongoing efforts to equip secondary schools with ICT resources, there are insufficient reviews about the obstacles to using ICT in the teaching and learning process in secondary schools, particularly the availability, accessibility, and adequacy of these resources. The limitations in the availability and accessibility of ICT infrastructure is still an area where further research is needed. Therefore, this study investigated the obstacles to using ICT in the teaching and learning process in secondary schools.

The Lifelong Learning Theory

This study was guided by the lifelong learning theory. The lifelong learning theory is an approach to learning which is continuous and self-motivated, be it in a personal or professional context. Lifelong learning is a process of learning throughout a person's life – from the cradle to the grave – regardless of time, space, gender, or status (Findsen & Formosa, 2011; Laal, 2011; Msoroka, 2018). Lifelong learning embraces all forms of learning (formal, non-formal, and informal learning). The major assumption of lifelong learning is that each individual has a learning potential. Therefore, lifelong learning is expected to enable people to develop awareness of themselves and their environment while encouraging them to play their social role at work and in the community. The basic idea of the theory is that learning is an active and constructive process where the learner is viewed as the information developer who can actively construct their subjective representations of objective reality.

Lifelong learning has "four key themes: economic development (for a learning economy), personal fulfilment, active citizenship, and social inclusion" (Msoroka, 2018, p. 46). In economic development, lifelong learning provides people with skills and knowledge for vocational purposes. This helps individuals to compete and become more productive in the labour market. Most teachers who currently serve children in schools do not have a background in ICT. Considering that on-the-job ICT training for teachers is important for better implementation of ICT in teaching, this aspect of lifelong learning becomes more relevant to the current study. Teachers are expected to engage in ICT learning programmes to gain skills and abilities that can help them improve their

use of ICT in teaching. The lifelong learning, therefore, is relevant in addressing the acquisition of new technology as well as difficulties associated with integrating ICT into education (Lawrence & Tar, 2018).

Empirical Literature Review

The study by Ndume et al. (2021) demonstrated that even with obstacles like inadequate ICT resources, a lack of knowledge and skills among teachers, and a shortage of computers for students, certain schools have successfully incorporated ICT education at the high school level. Some teachers have developed proficiency in using computers and the Internet for lesson planning. Additionally, the research found that in every school, at least one teacher is proficient in using ICT tools. Ngeze (2017) examined the preparedness of secondary schools in Tanzania to incorporate ICT into their teaching and learning practices. The study revealed that a significant number of high schools lack sufficient ICT tools for efficient incorporation. For instance, in the surveyed 16 schools in Tanzania, student-to-computer ratios ranged from 20:10 to 110:1, indicating that computers are insufficient to meet the student's educational requirements efficiently.

Additionally, this information aligns with URT (2016b) data indicating the availability of 60,451 desktop computers in both public and private Tanzanian secondary schools. The data indicates that there is one desktop computer for every 26 secondary school pupils in the nation, with a total enrollment of 1,562,770. However, the current trend indicates that Tanzania's computer-to-student ratio is getting better, whereas one ICT equipment of any kind is shared by 85 secondary school students (URT, 2022). Sedoyeka and Gafufen (2013) remarked that some secondary schools that were given computers could not even turn them on, demonstrating how poorly certain schools have adapted to ICT. Similarly, Banele (2019) discovered that faulty desktop computers were being discarded behind computer labs in certain secondary schools due to technical issues. This could be because of a lack of expertise, fear of technology, or a negative outlook towards ICT. The technical issue requires immediate attention as the number of secondary schools in the country is steadily growing. Technical problems can also disrupt teaching and learning activities. These problems can include software or hardware malfunctions, network connectivity issues, or power outages. These disruptions may impact the overall efficacy of ICT integration, which can cause annoyance and a loss of instructional time. To successfully

incorporate ICT into their teaching practices, educators need to receive sufficient training and professional development (Malero et al., 2015). The study by Kweka and Ndibalema (2018) found that the majority of secondary school teachers had a basic understanding of how to incorporate ICT into the teaching and learning process. The findings revealed that the situation was caused by various factors such as inappropriate ICT resources, lack of well-furnished school computer labs and poor pre-service and in-service teacher preparation.

Likewise, the study by Malekani (2018) showed that secondary schools' use of ICTs is not promising. Although it appears that both students and teachers are aware of ICTs, there are not enough ICT facilities in schools, and those available are not properly used. Additionally, teachers claimed that they do not receive in-service training on using ICTs in the classroom. It was also mentioned that the usage of ICTs in the chosen schools was hampered by limited bandwidth (which results in slow internet access or bad speed), a lack of backup power, and inadequate training programmes. Other studies further identified that lack of support and insufficient training opportunities can make it more difficult for teachers to use ICT to improve the teaching and learning process. The study by Chirwa (2018), for instance, found that not all teachers were equipped with the abilities and know-how skills needed to use ICT tools efficiently. The study suggested further training for the teachers to enable them to integrate the ICT facilities into the teaching and learning process. On the other side, students were occasionally seen to misuse ICT devices such as smartphones and tablets. The study suggested that students should pay more attention to making sure they are using ICT tools for beneficial learning purposes (Kira & Mahumbwe, 2015). Tanzanian secondary schools' infrastructure challenges for supporting ICTs have also been documented in a number of studies. Studies by Chirwa, (2018); Banele, (2019); Malero et al. (2015); Malekani, (2018); Kihoza et al. (2016); Kira & Mahumbwe (2015) suggested that a great deal of work needs to be done for the better future of ICT in Tanzanian secondary schools. The review of different studies, therefore, suggests that more studies be conducted in the ICT area in the education sector, particularly with regard to the challenges of ICT in the teaching and learning process.

Methodology

The study employed a mixed-methods approach and a descriptive research design. Data collection techniques included questionnaires, interviews and observations. Through the guidance of the observation

guide, the researcher observed the availability of ICT facilities as well as the way they were integrated into the teaching and learning processes. Quantitative data were collected through questionnaires, while qualitative data were collected through interviews and observation. The study was conducted in the Magu district, Mwanza region. The district shows considerable growth in terms of ICT facilities in various schools (DEO office, July 2023), hence motivating the researcher to conduct this study. The district has about 36 secondary schools, including the community secondary schools (DEO office, September 2023). The study sampled 18 secondary schools from a population of 36 secondary schools with the aim of capturing at least half of the secondary schools in the district while considering the geographical distribution of the schools. A total of 154 respondents (100 teachers, including heads of schools in each of the sampled schools, 36 students, and 18 parents who were also school board members) were involved in the study. In each school, at least 5 teachers were selected to make a total of 100 teachers. In addition, 36 students were selected, at least two from each school where, as one board member was selected from each school. Teachers responded to the questionnaires, while heads of schools in each school were interviewed. Likewise, 36 students, as well as 18 board members, were interviewed.

The students who were involved in the study were mainly form four students, and the assumption was that they were more knowledgeable than their counterparts as they had learned ICT since form one. The study considered the parents who were also the school board members, as they had the ability to participate in various decision-making in the sampled schools, hence being more knowledgeable about the day-to-day activities in schools. Quantitative data were coded, entered into the computer, and analyzed using SPSS Version 20, considering both descriptive and inferential statistics. Under the descriptive statistics, the Mean, Standard Deviation (SD), tables, and graphs were generated. The collected qualitative data were analysed via content analysis after being organized into broad themes. Then, the data were labelled, coded, and then analyzed qualitatively.

Findings

Demographic Information of the Respondents

This section shows the respondents' demographic information, including gender, education, working experience, and ICT training. Table 1 summarizes the findings.

Table 1: Demographic Information of Teachers' Respondents (n=100)

Demography	Category	Frequency	Percentages (%)
Gender	Male	65	65%
	Female	35	35%
	Total	**100**	**100**
Age	30 years and below	35	35
	31-40 years	38	38
	41-50 years	15	15
	51 years and above	12	12
	Total	**100**	**100**
Education Level	Certificate	20	20
	Diploma	27	27
	Bachelor Degree	44	44
	Postgraduate	9	9
	Total	**100**	**100**
Working Experience	1-5 years	31	31
	6-10 years	44	44
	More than 11 years	25	25
	Total	**100**	**100**
ICT Training	Trained	4	4
	Not trained	96	96
		100	**100**

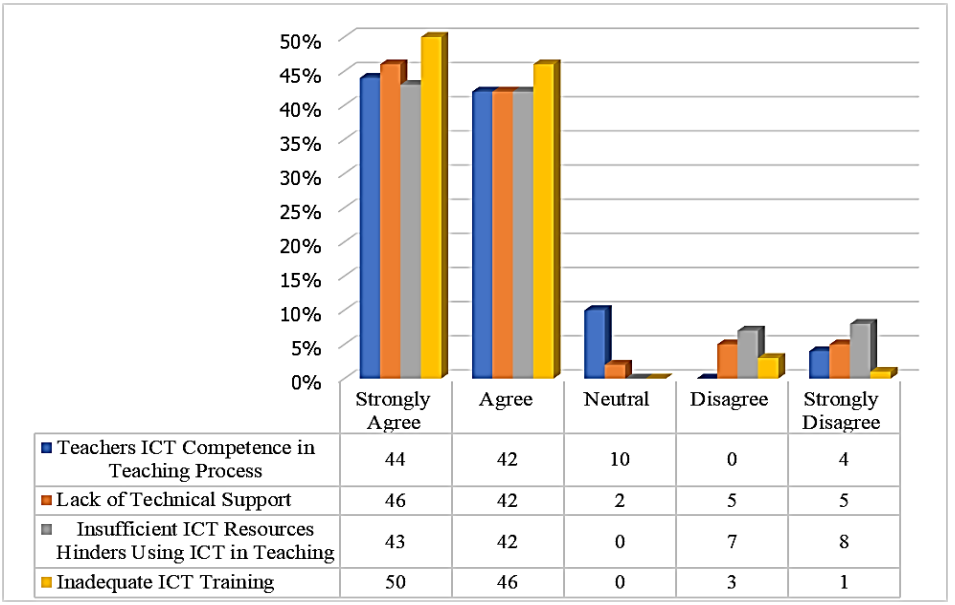
Source: Field Data, (2023).

As Table 1 indicates, the majority of teachers' respondents were males (65%), and 35% were females. The data collected are considered unbiased with a mix of viewpoints from both genders. The study also examined the diversity of ages among the teachers. The data in Table 1 show that 38% were aged between 31 and 40 years, 35% were under 30 years, 15% were between 41 and 50 years, and 12% were over 51 years. Majority of teachers who were involved in the study were below 41 years old. This implies that most of the teachers' respondents were young and were expected to be more vibrant in the utilization of ICT resources. Moreover, the study found that a small portion (9%) of the teachers had postgraduate qualifications, while the majority (44%) held bachelor's degrees (Table 1). The remaining had diploma qualifications (27%) or certificates (20%). It is also clear that 44% of teachers had working experience of between 6-10 years, 31% of teachers had experience between 1-5 years, and 25% of teachers had working experience of more than 11 years (Table 1). The findings suggest that most of the teachers who participated in the study had at least 6-10 years of working experience. The findings also indicate that 96% of the participants lacked formal training in the use of ICT in the classroom.

Alternatively, 4% reported that they received ICT training either during their in-service training or through their self-directed efforts.

Obstacles that hinder the Use of ICT in the Teaching and Learning Process

One issue that the study explored was the obstacles to using ICT in teaching and learning processes in secondary schools. All teachers (N=100) responded to questionnaires. The findings from the questionnaires are presented using four parameters, as indicated in Figure 2.



	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Teachers ICT Competence in Teaching Process	44	42	10	0	4
Lack of Technical Support	46	42	2	5	5
Insufficient ICT Resources Hinders Using ICT in Teaching	43	42	0	7	8
Inadequate ICT Training	50	46	0	3	1

Figure 2: The Obstacles of Using ICT in Teaching and Learning Processes in Secondary Schools

(Source: Field Data, 2023)

Teachers' ICT Competence in the Teaching Process

The study investigated whether teachers' ICT competence in the teaching process is a limitation to using ICT in the teaching and learning processes in secondary schools. As observed in Figure 2 above, 86% of respondents had the opinion that teachers' ICT incompetence was a limitation in the teaching and learning process, whereas 10% were neutral, and 4% strongly disagreed. Therefore, the findings revealed that inadequate teachers' ICT competence in the teaching process is a limitation to the integration of ICT into secondary schools' teaching and learning processes. The findings are similar to the research conducted by Chirwa (2018), who found that insufficient training opportunities can

make it more difficult for teachers to use ICT to advance teaching and learning (Chirwa, 2018). Furthermore, a few teachers were observed to use ICT resources competently during the teaching and learning process. Findings from observations revealed that teachers might be lacking some crucial ICT-related abilities to facilitate them during these processes. In addition, the interviews suggest that teachers did not receive the necessary support to improve their ICT competence in the classroom.

One head teacher had this to comment

> *At our school, teachers might lack crucial ICT-related abilities to facilitate them during the teaching and learning process. Therefore, ICT competence is necessary to enhance teachers' use of ICT facilities in this process* (Head of School, 2023).

On the other hand, a school board member had this to suggest:

> *Teachers' ICT competence is necessary to facilitate teachers' use of ICT facilities in teaching and learning. However, some of the teachers have a challenge in using ICT facilities in the teaching and learning process, hence a need to address these challenges, particularly at the school level.''* (School Board Member respondent, 2023).

Lack of Technical Support

The study also studied whether a lack of technical support restricts using ICT for teaching and learning in secondary schools. The findings presented in Figure 2 indicate that 88% of respondents had the opinion that inadequate technical support is a limitation towards using ICT in the teaching and learning process. However, 10% of respondents had the opinion that technical support is not a limitation; 2% of respondents were neutral. Based on the data, it is argued that inadequate technical support is a limitation to using ICT in secondary schools' teaching and learning processes.

One of the interviewed heads of schools had this comment:

> *In our school, we don't have the ICT technical staff to assist teachers in using ICT facilities in teaching and learning processes. Teachers should be assisted with technical support, particularly when they want to use ICT facilities. However, sometimes, very little support is provided to teachers when they want to use ICT facilities in the classroom* (Head Teacher respondent, 2023).

Likewise, the other head teacher suggested that:

> *Since in our school, we don't have ICT technical support, I suggest both teachers and students be enhanced with basic ICT skills to enable them to participate well in the teaching and learning processes.* (Head Teacher respondent, 2023).

Insufficient ICT Resources

In this study, the researcher also wanted to know whether insufficient ICT resources hinder the use of ICT in teaching and learning processes. The findings in Figure 2 show that 85% of teachers had the opinion that insufficient ICT resources hinder the use of ICT resources in teaching and learning processes; 15% disagreed with the statement. With such data, one would argue that insufficient ICT resources hinder the use of ICT in teaching and learning processes. Insufficient access to technology resources such as internet connectivity, computers, software, and digital content hinders teachers' ability to develop their ICT competence. Without proper resources, it is challenging for teachers to experiment with the technology and explore innovative teaching methods. On the other hand, the observed few ICT facilities were not frequently used for teaching and learning processes. The available facilities were mainly television and computers, which were used as teaching aids and not as teaching facilities. The findings also revealed that other ICT facilities, such as interactive whiteboards, projectors and powerpoint that could have been used to facilitate teaching and learning processes were not found in any of the sampled schools.

One of the interviewed respondents had this comment

> *The available ICT facilities at our school are not sufficient. We have a few computers in our school computer laboratory. Our teachers are, therefore, trying their level best using the available little ICT facilities to facilitate the teaching and learning process.* (Student respondent, 2023).

Inadequate ICT Training

The current study also examined whether inadequate ICT training hinders the use of ICT in teaching and learning processes. Findings in Figure 2 show that 96% of teachers believed that inadequate ICT training hinders the use of ICT facilities in teaching and learning processes; 4% considered it not a problem. A similar pattern of views was observed during interviews.

For instance, one of the interviewees commented:

> *Many teachers did not receive adequate training to enhance their ICT skills. As a result, they may feel unconfident and ill-prepared to integrate technology effectively into their teaching0practices. Therefore, school administration should expedite the improvement of teachers' ICT knowledge by assisting teachers in getting the basic ICT knowledge* (Head Teacher respondent, 2023)

The presented data suggest that inadequate ICT training hindered the use of ICT in the teaching and learning process. Therefore, for effective teaching to take place, one may consider effective ICT training for the teachers.

Discussion of Findings

The findings indicate that teachers of ICT capability hinder the use of technology in secondary school education. This implies that more efforts should be committed towards enhancing the bright future of ICT in secondary schools. Insufficient training in using ICT is a major obstacle and calls for more emphasis on enhancing educators with pedagogical guidance in integrating technology into their lesson preparations. The study highlights how crucial it is for educators to have the abilities and information needed to integrate ICT tools into their lessons successfully. One of the findings of this study indicates that the absence of technical support hinders the integration of ICT in secondary schools.

This finding is in connection with Bingimlas (2009) and Pelgrum (2001), who revealed that lack of technical assistance is a significant obstacle to utilising ICT in primary and secondary education. The findings suggest that the presence of ICT support staff in schools is crucial for enhancing the use of ICT in teaching and learning process (Lewis, 2003). Without technical assistance, the maintenance and repair of computers may be neglected, leading to teachers being hesitant to incorporate technology in their lessons due to concerns about equipment malfunction. It is argued here that the lack of technical support may result in teacher frustration and reluctance to utilise ICT. Having access to technical support in schools may encourage teachers to seamlessly integrate ICT into their curriculum without being burdened by troubleshooting hardware and software. Teachers may struggle to adapt their instructional methods to leverage technology for enhanced learning experiences without this support. In this study, most respondents stated that there were insufficient ICT resources, which hindered the use of ICT in secondary schools. This implies that deliberate efforts need to be committed towards the supply as well as the use of ICT facilities in facilitating the teaching and learning process in schools. The current findings are aligned with the previous studies by Eze and Olusola (2013), who noted that insufficient computers in schools hindered the use of ICT facilities in Botswana's teaching and learning processes. Similar findings were also reported by White (2018), Kivuli (2013) and Kiwonde (2018), who

found that there is a lack of ICT facilities for instruction and learning in the majority of Tanzanian schools. It should be noted that the successful implementation of ICT in teaching relies on the availability of resources, qualified teachers and other factors that impact teachers' well-being. The study also found that teachers generally have a positive attitude towards ICT, but limited availability and accessibility of ICT resources remain a significant issue.

Furthermore, the findings show that most participants mentioned lack of ICT training as a barrier to effective utilisation of ICT in the teaching-learning processes. This is in line with a study conducted by Mwalongo (2011), who discovered that the degree of ICT integration competency among teachers in the educational process was impacted by computer training programmes lasting anywhere from two weeks to six months. It is from this perspective, the current study holds that teachers are not only required to be ICT literate but also to acquire the abilities required to incorporate ICT into their pedagogical approaches (Newhouse et al., 2002). Teachers ought to be trained in instructional technology as well as technology education to support their teaching abilities within the classroom; this is in connection with lifelong learning theory (Msoroka, 2018). This study holds that teachers should be provided with relevant training so that they become competent in the use of ICT in teaching. This is in connection with the lifelong learning theory used in this study, which gives an opportunity to teachers to undergo on-the-job training so that they can use ICT in teaching accordingly. One may argue that a bright future of ICT in secondary schools depends on how teachers are trained and encouraged to use and implement the new technology at the school level. The proper implementation of any new technology may enhance the effectiveness of teaching and learning, which in turn may improve students' learning. The theory of lifelong learning can be linked with this argument in the sense that there is a need to ensure that all teachers are ICT literate by offering pre and in-service training. Finally, the findings revealed that there are inadequate ICT facilities in secondary schools, hence a need to expedite the presence of ICT facilities, particularly the computer laboratories in schools. Similarly, the mentioned shortage of technical staff suggests the need for a technical team to be laced at the school level to assist teachers in using the ICT facilities in the teaching and learning process. The findings of the study imply that, for the better future of ICT, the government and other education stakeholders should work together to ensure smooth ICT

implementation strategies. The improvement of ICT in the teaching and learning processes will facilitate quality education in secondary schools.

Conclusion

This study investigated the experienced obstacles in the use of ICT in the teaching and learning processes in secondary schools. The study was guided by the lifelong learning theory. Four parameters guided the teachers' respondents towards identifying the obstacles in the study. The parameters included teachers' ICT competence in the teaching process, availability of technical support, ICT resources and ICT training. From the findings, one may conclude that there are various obstacles towards effectively using ICT in secondary schools' teaching and learning processes. The challenges include low teachers' ICT competence, lack of technical support, insufficient ICT resources, and inadequate ICT training. Therefore, stakeholders such as the government, school administrators, teachers, and parents must collaborate in addressing these challenges and strategise on how to overcome them. It is envisaged that the successful integration of ICT in teaching and learning processes can develop the quality of education and overall academic performance in secondary schools.

Recommendations

The research suggests that for the bright future of ICT in the education sector, there should be the training of teachers in utilizing ICT for the teaching process and adopt a favourable attitude towards it. According to the lifelong learning used in this study, the proper implementation of any new technology may enhance the effectiveness of teaching and learning, which, in turn, may improve students' performance. School administrators, therefore, should be enthusiastic to support teachers by organising local ICT in-service training at their schools and by ensuring sufficient ICT resources are available. Heads of schools can liaise with the school boards to involve other stakeholders in the suggestions for improving ICT at the school level. Additionally, the government must allocate adequate funds to MoEST in order to facilitate more effective ICT training for secondary school teachers. Government assistance is crucial for improving teachers' training in ICT. Adequate funding and incentives to enhance the improvement in teaching and learning processes will eventually facilitate quality education as well as student's academic achievement. Since there is a paucity of research

studies in the ICT area, it is suggested that further studies should be conducted in other parts of the country, especially in rural areas.

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