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Examining Teachers attitude toward ICT Integration in Teaching and Learning in Public Secondary Schools in Tanzania: A Case of Dodoma City Council

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ABSTRACT

This study focused on examining teachers' attitude on ICT integration in teaching and learning in public secondary schools in Tanzania. The purpose of the study was to examine teachers' attitude on ICT integration in teaching and learning. The study employed concurrent parallel research design to collect both qualitative and quantitative data from participants. Five public secondary schools were involved in this study with 80 classroom teachers, five heads of school, five academic teachers and four Ward Education Officers. The study was guided by Technological Pedagogical and Content Knowledge (TPACK). Qualitative data were analyzed through narrative technique. The finding of this study reveals that teachers had positive attitude on ICT integration in teaching and learning. Teachers agreed that ICT was the best method to facilitate improved teaching and learning in schools. Moreover, the findings show that teachers had insufficient knowledge and skills on using ICT in teaching and learning. The teachers lacked ICT instrument and facilities that enhance teaching and learning process. The study recommends that the government should impart ICT skills to teachers through establishment of sufficient ICT training and professional development.

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1. INTRODUCTION

Globally, using ICT in education has been emphasized because it makes great changes in teaching and learning in various countries. For example, in New Zealand study conducted by (Minga and Ghosh, 2024) reported that teachers use ICT facilities during instruction and learning process, this was witnessed by great abilities and confidence of learners. The study conducted in United Kingdom by (Msambwa and Daniel, 2024) reported that ICT integration in secondary schools enabled students to access, integrate and create information. Also the use of ICT in school has great impact upon children and nation at large and also that learners engage actively in learning while using ICT during teaching and learning to generate new experience, skills and knowledge that lead to independent learning. This proves that ICT is vital important for supporting both teachers and students during teaching and learning in secondary schools.

Various scholars identified challenges of using ICT in teaching and learning. For example, (Hamoud and Nzilano, 2024) found that there were challenges of inadequate ICT skills and knowledge which hinders the teaching and learning processes among teachers in secondary schools in Nigeria. (Mwaluko et al., 2023) revealed teachers in schools did not use ICT in teaching and learning. The reason for not using ICT was lack of awareness, inadequate ICT literacy and ineffective integration of the teachers themselves. Study conducted in Malaysia found that negative attitudes towards using ICT tools and poor teaching techniques are among the factors that affect using ICT in education. This implies that using ICT tools is not easy task for developing countries like Tanzania. Therefore, this study focused to explore teachers' attitudes and factors affect them on using technology in teaching and learning process. The study contributed to find out that teachers' negative attitude caused by lack of facilities and unreliable internet connectivity in secondary schools. Moreover, study conducted in Tanzania by (Hamad et al., 2024) found that teachers' negative attitude on using digital tools in teaching and learning in secondary schools caused low experiences on using digital tools for teaching and learning in descriptive writing in English subject. This draws the picture that, teachers' negative attitude of using digital tools is a challenge and it caused by various factors, therefore, this study focused to contribute for assessing teachers' attitude integrating ICT in teaching and learning secondary schools in all subjects.

Initiatives have been done in various countries. For example, government of Ghana established ICT policy for effective ICT integration in both public and private primary and secondary schools. The government of Tanzania (GoT) has emphasized the integration of ICT in teaching and learning. Education and Training Policy points out that teachers should be prepared to use ICT in order to raise learners who are independent and dynamic in solving community problems, indeed most of the syllabus compiled encouraged teachers to be ICT literate (Jibril and Adedokun-Shittu, 2024). Tanzania previous curricular and even the current ones insists on using ICT in education in order to support both teachers and students. This indicates that Tanzania government expected to use ICT in education but teachers' negative attitude and lack of awareness are among the challenges that face secondary education. Therefore, this study focused to examining teachers' attitude and factors that may hinders to integrate ICT in secondary schools in Tanzania. The study found that teachers' negative attitudes caused

by lack of ICT facilities, unreliable internet connectivity and power supply as well as irregular training. The study guided by two specific objectives; examined teachers' attitude on ICT integration in teaching and learning in public secondary schools in Dodoma city and explore factors that hinder implementation of ICT in secondary schools in Dodoma city.

(Mabalane Junior, 2025) identify three forms of knowledge; Pedagogical Knowledge (PK), Content Knowledge (CK) and Technological Pedagogical Knowledge (TPK). More details in **Figure 1**.

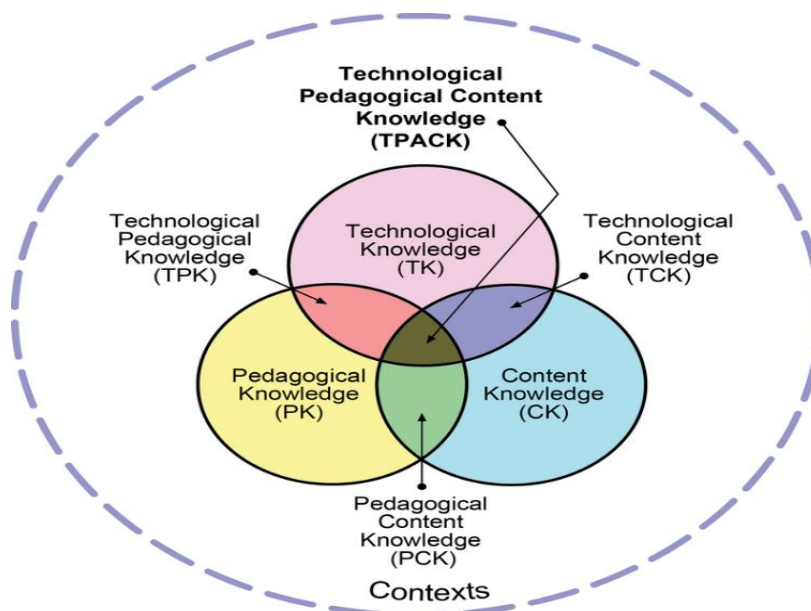


Figure 1. The model of TPACK showing the interaction of TK, PK, and CK

Source: https://en.wikipedia.org/wiki/Technological_pedagogical_content_knowledge /Taken on 13 Oct 2025

Usefulness of this model to this study. TPACK helps to understand that technology is just part of effective teaching. Through grouping content pedagogy, technology acts as advanced teaching and learning. Good teaching and learning with technology integration need high knowledge of understanding of the concept of technology use (Nyangas, 2024). TPACK model shows us good teaching and learning method that applies technology in practical way to teach students, knowledge that enables teachers to teach subject whether simple or difficult. TPACK helps to understand that every classroom setting varies because of differences in skills advancement, school climate and available properties. The model helps teachers to recall to begin with their content and pedagogy and then shift to technology before enhancing teaching and learning pedagogy in classrooms. Having good content knowledge, using effective teaching and knowledge what and how to use technology increase student's inspiration and behavior to increase

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learning situation that encourages positive social collaboration and active commitment in learning. Lastly, TPACK enables teachers to understand that classroom teaching and learning is most effective when conducted with technology.

2. METHOD

The study guided by mixed method approach (both quantitative and qualitative) was used. Mixed approach allowed the researcher to take advantage of the strengths of each approach without compromising the procedures of data collection. The use of mixed approach helps a researcher to get more vigorous conclusion by applying different methods in the way that strength of qualitative methods offsets the weakness of quantitative and vice versa. Concurrent research design was employed because it enables the researcher to collect both types of data and integrate information and communication in the interpretation of all results data from public secondary school teachers. Simple random sampling used to select 85 secondary school teachers and purposive sampling used to select 5 heads of schools and 4 Ward Educational Officers (WEOs) in Dodoma City Council.

Survey methods used through five point's Likert scale questioners whereby 85 teachers were given one week before collected. And interview methods were used by 5 heads of schools and 4 WEOs. Data from survey questionnaires were analyzed by using thematic analysis through six stages, including; familiarization, coding, generating themes, reviewing themes, defining and naming the themes and lastly was writing up the data analysis report. However, data from the Likert Scale questionnaires were analyzed by descriptive statistics (mean distribution tables, frequencies, and percentages) together with inferential statistics by using t-test and chi-square test with the support of Statistical Package for Social Sciences (SPSS) version 21. Questionnaire items were ranked using 5-point Likert scales translated into the highest 5 Strongly Agree, Agree, Neutral, Strongly Disagree, and the lowest Disagree. Through these levels of frequencies, percentages and mean of each question and in each level were calculated. Attitudes, challenges and strategies were calculated by finding the percentage and mean in each question asked to the respondents. The researcher before going to the field obtained research clearance and submitted the letter from the University of Dodoma, the Regional Administrative Secretary (RAS) of Dodoma, and the Director of Dodoma City.

The data of this study were analyzed using six stages proposed by Braun and Clark (Braun and Clark, 2023). The stages were familiarized the data, generating the codes, creating initial themes and sub-themes, reviewing the sub-themes, naming and defining sub-themes and report writing.

Ethical considerations concern what the researcher did to protect the respondents from possible harm because of taking part in the study. These considerations comprise measures taken to ensure that the respondents were comfortable to take part in the study voluntarily. Some of the considerations include obtaining research clearance (research permit) from the University of Dodoma. The researcher also obtained introduction letters from the Regional Administrative Secretary (RAS) of Dodoma and the District Administrative Secretary (DAS) and City Director of Dodoma. The letters introduced the researcher to respondents in schools where data were collected. Before

the interviews, the respondents participated in the study voluntarily after discussion with the researcher about time and day of interviews and that data were collected after the respondents signed the informed consent. The researcher also asked for the permission to audio-record their conversation promising that data obtained were to be used for the purpose of this research only. The researcher promised the respondents not to disclose their identities and that their names would not appear in the thesis. The participants were allowed to choose not to answer certain questions and even to stop continuing with interviews at any time – this provided for maximum flexibility in the process of data collection. It should as well be noted that all interviews took place in offices to maintain privacy.

3. RESULTS AND DISCUSSION

3.1. The attitude of teachers towards ICT integration in teaching and learning secondary schools

The first objective of this study was to find out the perception of teachers towards the integration of ICT in implementing the school curriculum; that is, teaching and learning. Data for this objective were obtained from questionnaire items that demanded the respondents to rank responses about their attitudes. The summary of the ranking is presented in **Table 1**.

Table 1. Teachers' attitude toward ICT integration in schools.

S/N	STATEMENTS	Strong Agree	Agree	Neutral	Disagree	Strong Disagree	Mean
1	Ability to use ICT tools as instructional aid in my teaching.	23	51	1	5	0	4.2
2	Using ICT improves job satisfaction.	21	48	2	7	2	4.0
3	Using ICT in teaching and learning is more helpful and enjoyable.	39	33	0	6	1	4.3
4	Using ICT tools in teaching requires high administrative support and time.	29	34	1	16	0	4.0
5	Teachers are not ready to use ICT in teaching and learning unless they have been motivated.	6	20	2	31	20	2.5

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6	Due to my perspective, my fellow teachers are ready to use ICT in teaching and learning	31	39	7	3	0	4.2
7	The Head of School is ready to assist the use of ICT in teaching and learning.	20	35	13	10	2	3.8
8	Availability of ICT facilities in my school enhances willingness of using them in teaching and learning.	20	33	9	15	3	3.7
9	ICT application in teaching and learning need high administrative support and time factor	37	39	1	3	0	4.4
10	Am ready to use ICT as a tool in facilitating my teaching and learning.	41	30	1	7	1	4.3
11	Using video clips in teaching leads to students' involvement in the lesson	47	20	3	8	2	4.3

Source: Masenha and Ndibalema, 2025.

Key guide to interpret the average in a Likert scale. More details in **Table 2**.

Table 2. Key guide to interpret the average in a Likert scale.

Likert item average score	<1.5	1.5-2.4	2.5-3.4	3.5-4.4	4.5-5
Range	Strong disagree	Disagree	Neutral	Agree	Strong agree

Source: Masenha and Ndibalema, 2025.

Table 1 reveal that the average mean for teachers attitudes towards ICT integration in teaching and learning. This indicates that most respondents in the visited schools had positive attitudes towards ICT. These respondents considered ICT an important tool to facilitate effective teaching and learning. However, from the last attitude level as indicated in descriptive statistics the statement that has highest mean score was 4.4 state that ICT application in teaching and learning need high administrative support and time factor. This shows that most of teachers agreed to have positive attitude towards ICT integration in teaching and learning.

The statement with lowest mean score in the teachers' attitudes on ICT integration in teaching and learning stated that teachers are not ready to use ICT in teaching and learning unless they have been motivated. This shows that teachers disagreed that they were not ready to use ICT in teaching and learning.

3.2. Ability to use ICT tools as my instruction aid in my school

The findings show that teachers had insufficient ICT knowledge. Only a handful of teachers could use computer applications like Microsoft Word, Excel, and PowerPoint to prepare lesson notes and process test results. The study found that teachers use their tablets and smartphones to search material in the internet. But on the issue of using computers and tablets to facilitate teaching and learning, teachers have insufficient knowledge. One academic teacher had the following.

Our teachers lack sufficient skills to use ICT in teaching and learning. School management has established evening program that trains all teachers to use computers and to share knowledge among themselves.

The quotes above show that teachers have insufficient skills and knowledge to integrate ICT in teaching and learning. Also, the study reveals that some of teachers were using ICT equipment like computers for their personal use and not in teaching and learning. ETP (2014) requires teachers to be able to engage students using ICT in classrooms (2014). However, the study reveals to the contrary, that is, teachers fail to implement ICT in teaching and learning due to insufficient ICT knowledge. Observation reveal that schools lack requisite equipment to effectively make teachers use ICT. The findings concur with (Shekwavi and Mrema, 2024) who shows that most of public secondary school teachers have insufficient ICT equipment like computers to facilitate teaching and learning. In contrast, (Frawley and Campbell, 2025) show that teachers have insufficient knowledge and skills for ICT integration in their teaching and learning activities, though teachers were proud to use ICT (Kambona, 2024) in teaching and learning. Generally, the ability to use ICT equipment as an instructional aid is very essential in this technological era. This study adopted TPACK model which need teachers to be conversant with ICT knowledge and skills to use it in teaching and learning.

3.3. Using ICT in teaching and learning is more helpful and enjoyable

The data show that teachers perceived that teaching by using ICT is more helpful, enjoyable, and facilitates collaborative learning where students are equally motivated to stud. This finding concurs with (Kaur, 2023) who revealed that the use of ICT in teaching and learning adds a dimension to learning that was not available previously, also the use of ICT becomes a motivation among students in learning and supporting students' engagements, especially in collaborative learning. Also, the findings concur with the Education Training Policy (ETP) of 2014 which shows that ICT is very important in teaching and learning because it improves teaching among teachers. (Tashtoush et al., 2023) in Austria shows that the use of ICT in teaching and learning is more helpful since it is improving knowledge retention among students. Also, ICT helps teachers to improve learning via downloading online materials to use in teaching and ensure collegial collaboration.

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3.4. Challenges facing ICT integration in teaching and learning

The respondents used the questionnaire to rank their preferences that are summarized in **Table 3**.

Table 3. The table showing mean score of challenges that hinder effective ICT integration in teaching and learning

S/N	Statement	Strong Agree %	Agree %	Neutral %	Disagree %	Strong Disagree %	Mean
1	Lack of social networks facilities such as computer and projector for teaching and learning	31	39	0	8	2	4.1
2	Teachers cannot use computers and projectors for teaching and learning	3	29	2	34	12	2.7
3	Internet connectivity is not around in our school	11	26	4	23	16	2.9
4	Lack of reliable electricity and alternative power that are used in my ICT facilities.	11	19	5	34	9	2.9
5	Lack of technical support for teachers	20	28	2	23	5	3.4
6	Limited time to get training of ICT for professional development	15	30	2	26	5	3.3
7	No training of staff for using ICT in teaching and learning	19	42	3	10	4	3.8
8	Teachers' unwillingness to accept technological changes	7	18	2	30	21	2.5
9	Teachers are overloaded because of larger number of periods hence they are tired using ICT	13	19	3	30	13	2.9
10	Teachers have no confidence in teaching and learning using ICT	11	14	0	35	18	2.6
11	Teachers are not interested on the using of ICT in teaching and learning.	5	16	1	35	21	2.3
12	Teachers have no skills to use ICT in teaching and learning.	9	27	1	29	12	2.9

13	Lack of management willingness to support ICT integration	13	30	1	24	10	3.2
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Source: Masenha and Ndibalema, 2025.

Key guide to interpret the average mean in a Likert scale. More details in **Table 4**.

Table 4. Key guide to interpret the average mean in a Likert scale.

Likert item average score	<1.5	1.5-2.4	2.5-3.4	3.5-4.4	4.5-5
Range	Strong disagree	Disagree	Neutral	Agree	Strong agree

Source: Masenha and Ndibalema, 2025.

Table 3 and Table 4 shows mean score of the challenges that hinders effective ICT integration in teaching and learning. The table shows that the school lacks ICT facilities such as computers and projectors, lack of ICT training and internet connection. These facts are described in sub-sections below.

3.5. Lack of social network facilities

The findings in Table 4.2 reveal that there are inadequate facilities in several schools, despite having functional ICT tools like desktop computers, laptops, projectors findings reveal that teachers lack sufficient facilities to integrate ICT in teaching and learning. The head of school D had commented that:

Our teachers are not comfortable to use ICT in teaching and learning because of few computers available in the school. The school has only three desktops while the number of students in the class are 55. Therefore, ICT cannot be integrated to large number of students.

The above quotes show that public secondary school teachers do not effectively use ICT in teaching and learning due to inadequate ICT facilities. Furthermore, the researcher hardly observed ICT facilities such as computers and projectors in schools visited. This was due to limitations in a number of students who could be accommodated to enhance learner centered learning. According to the ICT-CST, the government of Tanzania has been reporting improvement of ICT infrastructure in schools (URT, 2023). Moreover, the number of computers found were too small to accommodate large number of students; about 65 students in one class (Ndibalema and Mrosso, 2024) shows that teachers' ICT perception, skills and knowledge are more meaningful when the ICT facilities and materials are made adequate. Again, UNICEF reports that in Tanzania, student-teacher ratio in public secondary schools is 168:1 and the class size is 70 students. The target number based on sustainable development goals is 27-28 students per class. This shows that the use of ICT in teaching and learning is insufficient

in public secondary schools studied. These findings align with (Magembe, 2025) who revealed that to effectively integrate ICT in teaching teachers need access to ICT equipment such as computers and projectors and reliable internet connection. Based on the findings of this study, ICT facilities in most schools visited were insufficient to implement ICT integration in teaching and learning.

3.6. Unreliable internet connectivity and power supply

Respondents complained of cost of internet connectivity saying they could not afford. In addition, teachers blamed the speed of connectivity for being slow even when they use their own smart phones to connect. One academic teacher made the following remarks. Our internet connection is inactive and teachers cannot access online teaching materials. Even when teacher decide to use their own smart phones, the internet speed here is slow; and, electricity or power supply that leads great challenge to many teachers.

The quote above shows that the school had an internet connection but the problem was the speed of the internet was low the fact that makes most of public secondary school teachers fail to download materials and integrate ICT in their teaching. These findings concur with (Kambona, 2024) who show that poor internet connectivity was one of the challenges that faced most of public secondary school teachers when attempting to integrate their classroom instruction with ICT. Again, (Almasri, 2024) investigated teachers' integration of ICT in South Africa's rural secondary schools. show that most public secondary schools are connected to power supply. All schools that the researcher visited were connected to power supply. (Egara and Mosimege, 2024) had similar findings revealing that insufficient power supply, inadequate teacher training, lack of computers, poor internet connectivity, and poor infrastructure facilities hindered the implementation of ICT in secondary schools. It was revealed that schools in the U.S afforded the cost of the internet and teachers readily integrated their teaching with ICT facilities. However, schools' broadband cost has diminished to meet the growing demand for broadband to support online education. The inquiry of internet out of school remained a problem despite the fact that the plan was to have internet access at schools and home, the challenge remains at homes of disadvantaged families. This implies that developed countries are far better off than developing countries in this case.

Therefore, this study concludes that government and education stakeholders should invest in secondary education for improving internet connectivity or Wi-Fi and power supply to reach millennium goals. (Saha, 2023) who showed that ICT integration was clouded with insufficient electricity supply, poor infrastructure, high cost of ICT equipment like computers, printers, projectors that support integration of ICT in teaching and learning.

3.7. Insufficient teachers' training in ICT

This study revealed that most of the teachers in public secondary schools had limited in-service training opportunities the fact that hinders the implementation of ICT policy in secondary schools. The findings show that some teachers were trained in 2022 and were able to assimilate ICT in their teaching while others were not trained and had difficulties in implementing ICT policy in their classroom delivery. The findings also

reveal that teachers who were trained used to share knowledge with colleagues who were not trained to teach using technologies. One can observe that training is a very important ingredient to ensure effective integration of ICT in teaching and learning. One teacher said the following during face-to-face interview.

Teachers did not receive ICT based training that could enable them to integrate technologies in their teaching. Also, teachers have only basic knowledge of using ICT tools to search materials and store them for independent learning, this is the kind of training they received when they were at university.

The above quotes show that teachers were rarely given training in opportunities that could equip them with ICT knowledge sufficient to implement the integration of technologies in teaching. These findings in line with study conducted in South Africa by (Afari et al., 2023) who found that many ICT training did not necessarily support teachers to acquire competence in using ICT. However, as the findings reveal, only a few teachers had chances of training. Again, (Ait Ali et al., 2024) conducted a study in India on the impact of in-service training on teacher attitudes towards ICT in teaching and learning. Moreover, UNESCO 2023 established that in Sub-Sahara countries lack requirement and training in secondary school teachers had received minimum training. However, if there were teachers with knowledge and skills of ICT use in teaching, the closure of the schools would have not been necessary. Therefore, this situation calls for the need for in-service training to improve their ICT skills. (Haerazi, 2024) revealed that there was a closer association between teachers' ICT literacy and training experiences, the more teacher implements ICT the more ICT literacy they become. Therefore, training experience generates teacher ICT literacy. This study general concludes presence of regular training, projects, and workshops would model them with skills to integrate ICT in education.

3.8. Insufficient pedagogical knowledge and skills

Due to insufficient ICT equipment in public secondary schools most of public secondary schools cannot use ICT in teaching and learning but few of them who got ICT knowledge in universities forgot how to use ICT in teaching and learning. Our teachers can't use ICT in teaching and learning because they have insufficient ICT knowledge. This is caused by insufficient ICT training that could impart knowledge and skills of using computers and projectors in teaching.

These findings are similar to the findings of (Saha, 2023) who showed that there was lack of trained teachers to integrate ICT in teaching and learning. Likewise, (Eze et al., 2023) found that teachers in public secondary schools could not use ICT equipment like computers and projectors due to insufficient ICT knowledge and skills as well as negative attitude. These findings are similar to the ICT policy of 2016 which addresses challenges such as lack of appropriate frameworks for the deployment and utilization of ICT infrastructures including data centers, right way, e-readiness infrastructure; high investment cost of infrastructure and lack of reliable power supply. In addition, data

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from BEST 2016 reveal that most of public secondary schools in Tanzania have insufficient power supply; therefore, in such kind of environment, it is difficult to effectively use ICT facilities. This study found that ICT in secondary education still has many challenges, the government should invest in education to get quality and better education in our country.

Therefore, Tanzania Communication Regulatory Authority board (TCRA) and the government at large should provide technical support to teachers to enable teachers to utilize the benefit of technology.

4. CONCLUSION

The study found that teachers had positive attitude on ICT integration in teaching and learning. Teachers were ready to use ICT in teaching and learning if ICT tools were available and they had requisite ICT knowledge. They perceived that the use of ICT tools was good and best methods of teaching. This study concludes that teachers' positive attitudes is vital important to use ICT tools in education matters. Therefore, regular training and distributions of technological tools are important for encouraged teachers to use ICT in the teaching and learning in secondary schools. The study recommends that teachers need to be given ICT training on the regular basis to equip them with skills and knowledge to integrate ICT in teaching. Moreover, the government through the ministry of education should reform the curriculum to make computer science subject compulsory. The public secondary school teachers should receive regular in-service training from the Ministry of Education, Science, and Technology that focuses on developing ICT knowledge and skills. This training will enable teachers to effectively integrate ICT into their teaching practices and enhance the effectiveness of teaching and learning in schools.

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