The Influences of Information and Communication Technology on Teaching and Learning in Public Secondary Schools in Bagamoyo District, Tanzania

Zaituni Abdallah Shekwavi[1] and Karoli John Mrema[2]
[1]Bagamoyo District, Tanzania
zaishekwavi@gmail.com
[2]The Open University of Tanzania
karol.mrema@out.ac.tz

Abstract
The study examined the impact of information and communication technology (ICT) on teaching and learning in public secondary schools in Bagamoyo District, Tanzania. The study took place in Bagamoyo District, involving seven secondary schools. Three specific objectives guided the study: examining the context of ICT policy integration in the teaching process, exploring teachers' perspectives on ICT application in public secondary schools, and identifying challenges that hinder ICT use in teaching public secondary schools in Bagamoyo District. The study included 83 respondents from various levels, such as secondary school teachers, school academic officers, ward education officers, and district education officers. The study employed a mixed-methods research approach. Moreover, the study employed a convergent parallel design. The sampling strategies were purposive and simple random sampling. Data collection methods were questionnaires, semi-structured interviews, and documentary reviews. As a mixed-methods study, the researcher analysed quantitative data using descriptive statistics and subjected qualitative data to content analysis. The findings suggest that integrating ICT policy into teaching requires a thorough understanding of its use. It also revealed that teachers had positive perceptions regarding ICT policy integration teaching. The study highlighted the challenges affecting ICT integration in teaching: lack of ICT skills among teachers, ICT unsupportive infrastructures, and unstable power supply. Lastly, the study concluded that the perception of teachers in the ICT integration process is positive. It thus recommends that the government should ensure the availability of electrical power to support teaching using ICT. Also, the government should invest in teachers' training, as most of them have little knowledge of ICT use.

Keywords: *Information and Communication Technology, Teaching and learning process, public secondary schools*

Introduction

Globally, modernisation of the teaching and learning process heavily depends on the use of information and communication technology (ICT) in classrooms (Minga & Ghosh, 2024). Nadhif et al. (2024) have established that the incorporation of ICT in teaching and learning is crucial in enabling teachers to replace traditional methods in the classroom. The maturity of new educational results and the modelling of educational systems that allow the use of ICT in teaching and learning determine the quality of education (Musokhonovna, 2021). Furthermore, a pilot study involving ten respondents evaluated the constructs prior to the primary data collection. We examined the acquired field data, conducted discussions on their validity and reliability, and made modifications to ensure the constructs accurately measured their intended variables. The reason is that communication and technology have a significant association with effective teaching and learning in the classroom (Nadhif et al., 2024). The use of ICT can improve teaching and learning in schools, but understanding the contexts in which it is intended to be integrated for its effectiveness is limited (Ngodu et al., 2024). However, in developing countries, the education systems face several challenges that hinder the effective administration of ICT in secondary schools. These challenges include a lack of ICT facilities, unstable power supply, high cost of ICT facilities, poor implementation of two government policies, poor network and coverage services, and low ICT literacy (Roshid & Haider, 2024). Tiba and Condy (2021) argue that there are substantial benefits to using ICT in the teaching and learning process if teachers understand the relationship between ICT use and the overall curriculum.

Educational systems are embracing new techniques and incorporating ICT into the teaching and learning processes. This assists in preparing students for the skills and information required in the twenty-first century. It is impossible to imagine a world without the Internet and other high-tech services and products that have revolutionised civilisation. These include the internet, increased bandwidth, robust web-based apps, wireless handhelds, quick tablets, and powerful desktops (Almalki, 2016). Torres (2021) emphasises that various ICTs do provide some beneficial contributions to various aspects of educational growth and effective learning by increasing access, encouraging efficiency, improving learning quality, enhancing quality teaching, and improving management systems. According to Ezeodo and Aroh (2024), there is limited availability and utilisation of ICT devices in senior secondary schools in developing countries. This situation contributes to low academic performance and

hinders effective teaching and learning, while little is known about how teachers' ICT skill deficiencies can be addressed (Adu & Zondo, 2024). In Tanzania, understanding students' perceptions about the integration of ICT in their education is essential for the implementation and enhancement of educational approaches (Minga & Ghosh, 2024).

On the other hand, Ngodu et al. (2024) identified a lack of ICT facilities, limited ICT training opportunities, and digital content as context-relevant challenges for ICT integration in teaching and learning. Bebbington (2018) asserts that teachers can utilise computers and the internet to enhance their basic skills and subject mastery, access resources for use in the classroom, and gain familiarity with specific instructional approaches (Bhattacharjee, 2016). ICT aims to enhance education by bolstering more effective pedagogy to provide learners with knowledge and by enhancing communication, thereby fostering learning. Furthermore, the increasing prevalence of ICT leads to the integration of computer-based equipment into all aspects of school operations, thereby influencing students' performance. Several researchers, including De Aldama et al. (2017), argue that using ICT in teaching and learning can help students become more knowledgeable. In addition to initiatives to increase learning using ICT, the advent of the knowledge economy has resulted in a considerably higher emphasis on education (Enu, 2019).

In most developed countries, such as the UK, schools have embedded ICT in teaching and learning into the curriculum and demonstrate a high level of effective and appropriate use to support teaching and learning (OECD, 2004). The use of information and communication technology (ICT) in education and training has been a priority in most Western and European countries during the last decade. However, progress has been uneven (Stuckey, 2016). In the U.S., public schools now provide at least one computer for every five students (Santos et al., 2019). In a recent study of 3,667 science teachers, nearly all (98.6%) of the respondents indicated that they currently use digital media to support science instruction (Stuckey, 2016). On the contrary, many developing countries live in a world of technical insufficiency, that is, lack of internet-based knowledge (OECD, 2006). Furthermore, suppose Africa is to properly prepare its inhabitants for the challenges of the twenty-first century. In that case, it must promote comprehensive ICT integration to harness its fresh, appealing, promising, and diverse potential. Recognising the vital opportunities ICT provides for service delivery as well as teaching and learning, the governments of several African countries have invested heavily in the necessary ICT infrastructure throughout the years. Roopa

and Rani (2022) argue that technologies may play a key role in enabling students to gain skills and information in the teaching and learning processes.

The use of ICT in the teaching and learning process in secondary schools in Sub-Saharan Africa is dependent on access to ICT resources such as hardware, software, and communications infrastructure. Hennessy, Harrison, and Wamakote (2010) identified key barriers to the use of ICT in secondary schools, including lack of funding, inadequate ICT facilities, low confidence levels, and pedagogical expertise in technology use. In Tanzania, Chirwa (2018) revealed that the benefits of using ICT tools include immediate access to information, access to a variety of learning resources, access to courses, individual topics, and performance support resources that can be accessed anytime from the office, at home, or while travelling. Additionally, the use of ICT tools reduces associated costs such as transport costs, provides multiple communication channels such as e-mails, chat, forums, and bogs, promotes collaborative learning, facilitates contact and information exchange, alters the learning process and learning outcome, and increases flexibility

Additionally, Kira and Mahumbwe (2015) posited that the effective teaching and learning process benefits greatly from the implementation of ICT, as it enhances the knowledge and skills of both teachers and students, enhances the effectiveness of lessons, fosters student-centred and self-directed learning, creates a conducive teaching and learning environment, and enhances the critical thinking abilities of both students and teachers. This implies that ICT improves learners' motivation and concentration span, allows them to interact more effectively while helping them with concept understanding, and reduces barriers to learning (Hafifah, 2020). Teachers exhibit positive attitudes towards the use of ICT as a pedagogical tool, yet they often fail to effectively integrate it into their teaching due to a lack of knowledge (Ali, 2018). Chrirwa (2018) disclosed that ICT infrastructures (unavailability of tools and poor power supply), language and content (mistrust of their information content), a lack of skills to use the tools (teachers with ICT skills), high costs of accessing and using ICT tools, change management, a lack of adequate access, and leadership are all factors that pose challenges in using ICT tools in distance education. However, Mazoya (2015) added that one of the most difficult challenges in using ICT in education is reconciling instructional goals with economic realities.

In Tanzania, ICT use in secondary schools is not a new phenomenon. In the late 1960s and early 1970s, the Ministry of Education provided radios to secondary schools, enabling pupils to listen to educational programs (UNESCO, 2015). Previously, the Tanzanian government sought to reintroduce ICT into Tanzania's education sector. The first phase of ICT adoption in secondary schools began in 2005 as a cooperative initiative between MoEVT and SIDA (Hare, 2007). The MoEVT began using ICT in fewer secondary schools as a pilot program of 400 schools across the country, with the goal of reaching all secondary schools by 2015 (URT, 2007). The 2007 ICT and educational policy stresses the use of ICT facilities in secondary schools for curriculum, content, training, capacity building, planning, procurement, and administration. It also considers management, support, and sustainability, as well as monitoring and evaluation (Hare, 2007). The policy recommends teaching ICT as a subject and using it as a pedagogical tool in other subjects in secondary schools (URT, 2007). Pima (2019) discovered that the most prevalent uses of ICT for teaching among Tanzanian teachers included creating lesson notes, teaching and learning resources, and tests. As a result, the use of ICT in the teaching-learning process became mandatory in secondary schools. This is because its adoption and implementation in secondary schools improves the effectiveness of teaching and learning. Mutisya (2020) asserts that the integration of various ICTs, such as computers, the internet, video, television, compact discs (CDs), digital video discs (DVDs), video players, and so on, into education can enhance teaching and learning methods. Despite the government of Tanzania's efforts in ICT adoption and use in teaching and learning, there are inadequate ICT facilities, a lack of ICT training for teachers, a lack of internet access, and power fluctuations (Ndibalema, 2014). This situation prevents teachers from using ICT as a pedagogical instrument in education and learning. Research indicates that secondary schools are not effectively integrating ICT as a pedagogical tool to transform teaching and learning practices (Ngeze, 2017).

Like any other developing country, Tanzania has been insisting on integrating ICT into teaching and learning processes. However, the efforts have not produced the required results. The government has made significant efforts to insist on integrating ICT in instruction provision and learning. This approach offers significant benefits, including lesson preparation, knowledge dissemination, assessment, and evaluation. However, some setbacks face these contributions. Despite all the efforts the government and other stakeholders have been making towards integration of ICT in the teaching and learning process (such as the

establishment of the ICT policy and provision of gadgets, tablets, and computers and the promotion of the policy in designing curriculum), the integration and use of the ICT are still low. Mutisya (2016) asserts that Tanzania embraces the contributions of ICT in teaching and learning, but these contributions suffer from limitations in technological knowledge, infrastructure, and attitudes.

Currently, numerous secondary schools in Tanzania use ICT in teaching and learning. Nevertheless, Ali (2018) disclosed that most teachers lacked the pedagogical skills required to integrate ICT resources into classroom instruction and improve learner-centred learning. Tanzania's aspirations to incorporate ICT into education persist, as evidenced by the allocation of all gadgets (Tablets) to all public secondary school teachers following the 2020 population census, aimed at enhancing teaching and learning. Currently, more than 498 gadgets are in the hands of all teachers working in public secondary schools in Bagamoyo (Daily News, 2022). Despite this, the use of ICT in secondary schools in Tanzania, particularly in Bagamoyo, remains relatively low. Despite equipping all teachers with ICT-supporting devices, the significance of incorporating ICT into teaching and learning and student performance remains a matter of concern. Therefore, the purpose of this study was to assess teachers' adoption of ICT to improve teaching and learning in government secondary schools in the Bagamoyo district

Methodology

The philosophy of pragmatism guided the methodology of this study. The study utilised a mixed methodology approach and a sequential explanatory design. The study was conducted in the Pwani region, focusing on seven public secondary schools. This study collected data through closed-ended questionnaires from 60 respondents and semi-structured interviews with 21 respondents. Purposive and simple random sampling techniques were employed to select the respondents. The questionnaire items are based on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Furthermore, we evaluated the constructs in a pilot study involving ten (10) respondents prior to the primary data collection. The acquired field data were examined, discussions on their validity and reliability were conducted, and modifications were made to ensure the constructs accurately measured their intended variables. The researcher requested and received a clearance letter from the vice chancellor of the Open University of Tanzania. The district authority then received the clearance and introduced the researcher to the public secondary school administrations. The researcher sought respondents'

consent before engaging them in the data collection exercise. The Statistical Package for Social Science version 21 computer software assisted in the descriptive analysis of the quantitative data. Qualitative data were analysed through content analysis, considering these three stages: assembling, coding, and assigning. The researcher compiled all the data collected from each research method during the data analysis process. During the coding stage, the researcher categorised the data received from each study method based on its themes (thematic analysis). The first, second, and third objectives employed thematic analysis. The findings were given in the form of summarised and presentable tables.

Results

Results were presented based on three objectives: to identify the context under which ICT policy is integrated into teaching and learning processes; to examine teachers' perceptions on the application of ICT in teaching and learning processes in public secondary schools in Bagamoyo; and to examine the challenges affecting the use of ICT in teaching and learning processes in public secondary schools in Bagamoyo.

Context under which ICT Policy is integrated in Teaching and Learning Processes

This subsection concerns the first objective of the study, which aimed to identify the context under which ICT policy was integrated in teaching and learning processes. Data for this object were collected using a questionnaire covering 60 randomly selected participants. The results obtained were presented as follows.

Good Understanding about ICT

The respondents were asked to give their opinion as to whether teachers in public secondary schools had a good understanding of ICT in teaching and learning. Their responses are shown in Table 1.

Table 1: Good Understanding of ICT

Good Understanding of ICT	Frequency	Percent
Strongly agree	12	20.0
Agreed	21	35.0
Undecided	9	15.0
Disagree	18	30.0
Total	60	100.0

Source: Field Data (2024)

The results in Table 3.1 above indicate that 21 (35.0%) respondents involved in the study agreed with the above contention that there was a good understanding of ICT in teaching and learning amongst teachers in public secondary schools. On the other hand, 18 (30.0%) respondents simply disagreed, while 12 (20.0%) strongly agreed that public secondary school teachers understood ICT in teaching and learning. Finally, yet importantly, 9 (15.0%) respondents involved in the study were undecided.

Availability of ICT Policy fostering teaching and learning process
The respondents were asked to give their opinions on whether teachers were aware of the availability of ICT policies fostering teaching and learning in public secondary schools. Their responses shown in Table 2.

Table 2: Availability of ICT Policy fostering teaching and learning process

Responses	Frequency	Percent
Strongly agree	21	35.0
Agree	9	15.0
Undecided	15	25.0
Disagree	12	20.0
Strongly disagree	3	5.0
Total	60	100.0

Source: Field Data (2024)

According to the study results in Table 3.2, 21 (35.0%) of the respondents strongly agreed that teachers were aware of the availability of an ICT policy that was fostering teaching and learning processes in public secondary schools. Furthermore, 15 (25.0%) respondents were undecided, and 12 (20.0%) disagreed with the contention above. On the other hand, 9 (15.0%) respondents agreed, and 3 (5.0%) strongly disagreed.

Available infrastructures supporting the policy
Furthermore, the respondents were asked their opinions on whether there were available infrastructures supporting policy integration practices in public secondary schools.

Table 3: Available Infrastructures Supporting the Policy

Responses	Frequency	Percent
Strongly agree	9	15.0
Agree	6	10.0
Undecided	6	10.0
Disagree	30	50.0
Strongly disagree	9	15.0
Total	60	100.0

Source: Field Data (2024)

Table 3.3 above indicates that 30 (50.0%) respondents in the study disagreed that there were no available infrastructures supporting policy integration practices in public secondary schools. Moreover, 9 (15.0%) respondents strongly disagreed with the above contention, while 9 (15.0%) respondents involved in the study strongly agreed that there were available infrastructures supporting policy integration practices in public secondary schools. On the other hand, 6(10.0%) respondents agreed, and the remaining 6 (10.0%) were uncertain about their opinions by being neutral.

Adequate Infrastructures in supporting ICT policy

Respondents were asked to give their opinion on whether the available infrastructures were adequate in supporting ICT policy in the teaching and learning processes. The results are shown in Table 4.

Table 4: Adequate Infrastructures in supporting ICT policy

Adequate Infrastructures in supporting ICT policy	**Frequency**	**Percent**
Strongly agree	9	15.0
Agree	12	20.0
Undecided	18	30.0
Disagree	18	30.0
Strongly disagree	3	5.0
Total	60	100.0

Source: Field Data (2024)

Table 3.4 above indicates that 18 (30.0%) respondents involved in the study were undecided on the available infrastructures and whether they were adequate in supporting ICT policy in the teaching and learning processes. On the other hand, 18 (30.0%) respondents simply disagreed that there were no adequate infrastructures to support ICT policy. Furthermore, 12(20.0%) participants agreed with the contention that the available infrastructures were adequate in supporting ICT policy in the teaching and learning processes, and 9 (15.0%) participants strongly agreed. Finally, 3(5.0%) strongly disagreed with the contention above.

Teachers effectively use ICT available Infrastructure

It was assumed that teachers' effective use of available ICT infrastructure would influence the teaching and learning process. On this, the respondents were asked to share their opinions on whether teachers effectively used the available ICT infrastructure in implementing teaching and learning processes. The results of this are presented in Table 5.

Table 5: Teachers effectively use ICT's available Infrastructure

Responses	Frequency	Percent
Strongly agree	6	10.0
Agree	6	10.0
Undecided	18	30.0
Disagree	27	45.0
Strongly disagree	3	5.0
Total	60	100.0

Source: Field Data (2024)

The findings in Table 3.5 indicate that 27 (45.0%) simply disagreed that teachers did not effectively use the available infrastructures. On the other hand, 18 (30.0%) respondents were undecided while 6 (10.0%) respondents agreed that teachers used the available infrastructures effectively. In addition, 6 (10.0%) respondents strongly agreed, while 3 (5.0%) strongly disagreed that teachers were not effectively using the available ICT infrastructure.

Teachers are well Conversant with the use of ICT

The respondents were asked to give their opinion as to whether teachers were well conversant with the use of ICT in the teaching and learning process. Their responses are shown in Table 6.

Table 6: Teachers are well Conversant with the use of ICT

Responses	Frequency	Percent
Strongly agree	3	5.0
Agree	12	20.0
Undecided	15	25.0
Disagree	27	45.0
Strongly disagree	3	5.0
Total	60	100.0

Source: Field Data (2024).

As the findings reveal, out of the 60 respondents involved in the study, 27 (45.0%) of them disagreed that teachers were conversant with the use of ICT in the teaching and learning process. Moreover, 15 (25.0%) respondents were undecided, and 12 (20.0%) of them simply agreed that teachers were conversant with the use of ICT in the teaching and learning process. Furthermore, 3 (5.0%) respondents strongly agreed to be conversant, and 3 (5.0%) strongly disagreed.

Strong Emphasis from the School Administration

The study results as to whether there was a strong emphasis from the school administration encouraging teachers to use ICT in the teaching and learning processes are shown in Table 7.

Table 7: Strong Emphasis from the School Administration

Responses	**Frequency**	Percent
Strongly agree	24	40.0
Agree	21	35.0
Undecided	9	15.0
Disagree	6	10.0
Strongly disagree	0	0.00
Total	60	100.0

Source: Field Data (2024)

As revealed in Table 7 the findings show that 24 (40. %) respondents strongly agreed that there was strong emphasis from school administration encouraging teachers to use ICT in the teaching and learning processes. Furthermore, 21 (35.0%) respondents agreed and 9 (15.0%) of them were undecided. Moreover, 6 (10.0%) respondents involved in the study simply disagreed with the contention that there was strong emphasis from the school administration encouraging teachers to use ICT in the teaching and learning process. Last and least, 0 (0.00%) respondents strongly disagreed with the contention above.

Teachers' perceptions of the application of ICT in the teaching and learning processes

This subsection presents results based on the second objective of the study, which aimed at examining teachers' perceptions of the application of ICT in the teaching and learning process in public secondary schools in Bagamoyo. Data regarding teachers' perception on the application of ICT in the teaching and learning process were gathered using the semi-structured interview schedule. The interviews were conducted with heads of schools, district educational officers, ward educational officers, and academic heads of departments. The results were as follows.

The first interview question aimed to determine whether the policy was being implemented in public secondary schools. The question was asked with the assumption that all education stakeholders were well informed about the Government's ICT policy. How would you describe the country's ICT policy with regard to teaching and learning?

The responses to the questions were as follows

> The perception of teachers is positive in the use of ICT in the teaching and learning processes. ICT use helps teachers to prepare teaching and learning materials. It also gives students room to explore more materials and information sources. (Semi-structured interview with the Academic Head of Department (AHD), A.19th of January, 2024)

Another participant in School B had this to say,

> "…Teachers view ICT as the helping hand towards dissemination of materials in a much better way to their students.". (Semi-structured interview, AHD, B.19th January 2024).

Furthermore, the Ward Education Officer (WEOs) was asked the same question and their responses were as follows:

> Teachers perceive ICT integration positively since it enhances the quality of the teaching-learning process . Most teachers consider it to have a significant correlation between teachers' technological pedagogical and content knowledge (TPACK) and their technological competencies (semi-structured interview with the WEO A, 22 January 2024).

On the same issue, another respondent had these to say:

> Teachers perceive that, effective integration of ICT helps in meeting the learners' educational needs by providing creative solutions to different types of learning inquiries. (Semi-structured interview conducted with Head of School (HOS) A, 23rd January 2024).

Again, another HOS B said the following:

> ICT integration is essential to students since there is a significant relationship between technology usage in educational practices and students' academic achievement. However, that is not enough because ICT enhances students' creative thinking and academic performance in the most effective possible way (Semi-structured interview with the HOS B, 23rd of January 2024).

Another positive perception was evidenced by the District Education Officer (DEO), who had these to say:

> The application of ICT in classrooms provides a motivating environment for students and keeps them engaged in educational activities. The utilisation of ICT for teaching-learning purposes enables teachers and students to stay connected and facilitates learners irrespective of their location and time (Semi-structured interview with the DEO, 26th of January, 2024).

Challenges affecting the use of ICT in the Teaching and Learning Processes

This subsection presents the findings based on the third objective of the study, which aimed to examine challenges affecting the use of ICT in the teaching and learning process in public secondary schools in Bagamoyo. Data for this objective were collected using questionnaires covering 60 randomly selected participants. The obtained results were as follows.

Unavailability of ICT Infrastructures

The respondents were asked to respond to whether the unavailability of ICT infrastructures and tools and poor power supply were slowing ICT

integration in public secondary schools. The findings are presented in Table 8 below.

Table 8: Unavailability of ICT Infrastructures

Responses	Frequency	Percent
Strongly agree	42	70.0
Agree	3	5.0
Undecided	3	5.0
Disagree	6	10.0
Strongly disagree	6	10.0
Total	60	100.0

Source: Field Data (2024)

Table 8 above shows that, out of 60 respondents involved in the study, 42 (70.0%) respondents strongly agreed, while 6 (10.0%) respondents strongly disagreed that the unavailability of ICT infrastructures and tools and poor power supply was slowing the ICT integration in public secondary schools. On the other hand, 6 (10.0%) respondents disagreed, and 3 (5.0%) of the respondents simply agreed, while the other 3(5.0%) respondents were undecided. The findings above indicate that most respondents considered that the unavailability of ICT infrastructures and tools and poor power supply were slowing the ICT integration in public secondary schools.

Lack of Knowledge on the Use of ICT

Furthermore, the respondents were asked to give their opinions on whether a lack of knowledge on the use of ICT Teachers was hindering the use of ICT in teaching and learning. Regarding this, the responses were as follows:

Table 9: Lack of Knowledge on the Use of ICT

Responses	Frequency	Percent
Strongly agree	27	45.0
Agree	21	35.0
Undecided	3	5.0
Disagree	9	15.0
Strongly disagree	0	0.00
Total	60	100.0

Source: Field Data (2024)

Table 9 indicates that 27 (45.0%) respondents strongly agreed that lack of knowledge on the use of ICT Teachers as pedagogical tools was hindering the use of ICT in teaching and learning. In addition to that, 21(35.0%) respondents agreed, while 9 (15.0%) respondents disagreed with the

contention above. Furthermore, 3(5.0%) respondents involved in the study were undecided or with no opinions. Last, but not least, 0(00%) respondents strongly disagreed with the contention above. The findings indicate that the majority of the respondents considered a lack of knowledge with the use of ICT Teachers as a pedagogical tool that was hindering the use of ICT in teaching and learning.

Critical Condition of ICT as an Educational Tool among Teachers

The respondents' opinions on whether the usage of ICT as an educational tool appeared to be a serious problem among teachers are shown in Table 10 below

Table 10: Seriousness of the Problem of Not Using ICT as an Educational Tool among Teachers

Responses	Frequency	Percent
Strongly agree	30	50.0
Agree	9	15.0
Undecided	9	15.0
Disagree	12	20.0
Strongly disagree	0	0.00
Total	60	100.0

Source: Field Data (2024)

Table 10 shows that 30 (50.0%) respondents strongly agreed with the claim that not using ICT as an educational tool was a serious problem among teachers. On the other hand, 12 (20.0%) respondents disagreed with the above contention, and 9 (15.0%) respondents were undecided. Furthermore, 9 (15.0%) respondents agreed, while no respondent strongly disagreed, shown by 0 (00%) of all respondents involved in the study. According to the study results, most respondents considered the lack of using ICT as an educational tool was a serious problem among teachers.

Public Secondary School Teachers Lack of Skills

The respondents' opinions on whether the majority of public secondary school teachers lacked skills in using the tools affected the integration process, as shown in Table 11.

Table 11: Public Secondary School Teachers Lack of Skills

Responses	Frequency	Percent
Strongly agree	33	55.0
Agree	27	45.0
Undecided	0	00.0
Disagree	0	00.0
Strongly disagree	0	00.0
Total	60	100.0

Source: Field Data (2024)

Out of 60 respondents involved in the study,33 (55.0%) respondents strongly agreed with the contention above that the majority of the public secondary school teachers' lack of skills on how to use ICT tools was affecting its integration process. Furthermore, 27 (45.0%) respondents involved in the study agreed. These findings indicate that all the 60 respondents involved in this objective considered that the majority of the public secondary school teachers' lack of skills to use ICT was affecting its integration process.

High Costs of Accessing and Using ICT Tools

Another assumption was that the integration of ICT in the teaching and learning processes was being affected by the high costs of accessing and using ICT tools. The results of this are shown in Table 11.

Table 11: High Costs of Accessing and Using ICT Tools

Responses	Frequency	Percent
Strongly agree	42	70.0
Agree	12	20.0
Undecided	6	10.0
Disagree	0	00.0
Strongly disagree	0	00.0
Total	60	100.0

Source: Field Data (2024)

The results in Table 11 indicate that 42 (70.0%) respondents strongly agreed with the assumption above that the integration of ICT in the teaching and learning process was affected by the high costs of accessing and using ICT tools. On the other hand, 12 (20.0%) respondents agreed, while 6 (10.0%) were undecided. The fewest respondents, 0 (00.0%), disagreed, and 0 (00.0%) strongly disagreed. The results indicate that the majority of the respondents involved in the study considered the high cost of accessing and using ICT tools to be a challenge hindering the integration of ICT in teaching and learning processes.

Public Secondary Schools Lack Basic ICT Facilities
Another challenge was that most public secondary schools lacked basic ICT facilities, making it impossible to incorporate ICT into teaching and learning activities. The analysis of this challenge is shown in Table 12.

Table 12: Public Secondary Schools Lack Basic ICT Facilities

Responses	Frequency	Percent
Strongly agree	42	70.0
Agree	6	10.0
Undecided	9	15.0
Disagree	3	5.0
Strongly disagree	0	00.0
Total	60	100.0

Source: Field Data (2024)

According to the study results, 42 (70.0%) respondents strongly agreed that most public secondary schools lacked basic ICT facilities, thus making it impossible to incorporate ICT into teaching and learning activities. On the other hand, nine respondents (15.0%) in the study had a neutral opinion, while six (10.0%) agreed. Furthermore, 3 (5.0%) respondents disagreed, while 0(00.0%) strongly disagreed that public secondary schools did not lack basic ICT facilities.

3.3.7 Unavailability of Educational Programmes or Internet Access

The respondents were asked to give their opinions as to whether the unavailability of educational programmes or internet access was hindering the integration of ICT in the teaching and learning process in public secondary schools. The responses are presented in Table 13.

Table 13: Unavailability of Educational Programmes or Internet Access

Responses	Frequency	Percent
Strongly agree	45	75.0
Agree	12	20.0
Undecided	3	5.0
Disagree	0	00.0
Strongly disagree	0	00.0
Total	60	100.0

Source: Field Data (2024)

Out of the 60 respondents involved in the study, 45 (75.0%) strongly agreed with the contention that the unavailability of educational programmes or internet access was hindering the integration of ICT in the teaching and learning process in public secondary schools. Moreover, 12 (20.0%) respondents simply agreed and 3 (5.0%) respondents had neutral opinions. On the other hand, 0 (00.0%) respondents disagreed, and the

other 0 (00.0%) strongly disagreed. According to the study findings, most respondents believed that lack of educational programmes or internet access hindered the integration of ICT in the teaching and learning process in public secondary schools.

Shortage of Power Supply

The respondents' opinions on whether the shortage of power supply was necessary to facilitate the installation and operation facilities are shown in Table 14.

Table 14: Shortage of Power Supply Facilities Affects the Integration Process

Responses	Frequency	Percent
Strongly agree	51	85.0
Agree	3	5.0
Undecided	3	5.0
Disagree	3	5.0
Total	60	100.0

Source: Field Data (2024)

The results show that 51 (85.0%) respondents strongly agreed that the shortage of power supply affected the integration process, and 3 (5.0%) respondents agreed. On the other hand, 3 (5.0%) respondents disagreed, while 3 (5.0%) were undecided. Thus, the findings indicated that the majority of the respondents believed that the lack of power supply affected the integration process.

Discussion

Currently, numerous secondary schools in Tanzania are using ICT in the teaching and learning processes. This paper assessed teachers' adoption of ICT to improve teaching and learning in government secondary schools in Bagamoyo District. ICT is potential to play a significant role in improving teaching and learning in schools, as well as training students to gain skills, knowledge, and competences that will allow them to participate in the rising global 'knowledge' economy. The data gathered in this study will hopefully be utilised to inform various educational stakeholders that ICT integration in schools holds enormous promise in developing economies such as Tanzania. The findings could also assist the Ministry of Education and Vocational Training (MOEVT) in developing policies and initiatives to improve academic standards in our schools. The study may also yield recommendations for boosting the use of ICTs in improving teaching and learning processes. The findings were obtained by questionnaires filled by 60 teachers and 21 respondents involved in the interviews including, DEO, WEO, Heads of Schools and

Heads of the Academic Department. The respondents had the working experience of 6 and above years and with the degree level of education. The data that were collected through questionnaires were systematically coded and then transferred to a computer sheet prepared by using a Statistical Package for Social Sciences (SPSS) version 21, and were analysed based on frequency and percentages.

The Context under which ICT Policy is Integrated into Teaching and Learning Processes

The findings indicated that there was a good understanding of ICT in teaching and learning among teachers in public secondary schools. It also indicated that teachers considered ICT an important aspect of improving teaching and learning. However, the question of integration will remain to be discussed in other sections to follow. The findings are supported by the study of Chirwa (2018), who postulates that teachers most often use ICTs for 'routine tasks' (record keeping, lesson plan development, information presentation, basic information searches on the Internet). Teachers with greater ICT knowledge used computer-assisted instruction more frequently than their less-exposed counterparts. Additionally, over 50% of respondents indicated that teachers were aware of the ICT Policy designed to enhance the teaching and learning process in public secondary schools.The results further signify that, regardless of the challenges teachers might face, they acknowledged the importance of integrating ICT in teaching and learning.

Regarding with the availability of infrastructures supporting policy integration practices in public secondary schools, the study showed the following: the majority of the respondents were of the opinion that there were no available infrastructures supporting the policy integration practices in public secondary schools. This indicates that regardless of the well-stipulated policy, vision and mission of the government, the integration would stumble. It also implies that the available infrastructures are not supportive. Therefore, the policy was deemed to fail unless there was improvement in the areas of infrastructures necessary for the integration process. The findings further showed that teachers did not effectively use ICT's available Infrastructure. This was raised under the assumption that if the limited infrastructure available were utilised, the integration could have been easy. However, this is contrary to the findings, as it was found that the majority of the respondents perceived that ICT infrastructure was not effectively utilised. This study signifies that, regardless of the limited infrastructure available,

teachers still not making use of them. It also implies that there is a lot to be done before the ICT policy can be fully integrated. The study by Enu and Nkum (2019) suggests that despite the teachers' ambitions to use ICT in teaching and learning, the major barriers were a lack of genuine software, inadequate computers in the classroom, and low-speed internet. Others are the lack of motivation from both teachers and students to use ICT, lack of proper training skills, unavailability of the latest ICT equipment, lack of expert technical staff, poor administrative support and poor course training.

Furthermore, the findings indicate that teachers were not well conversant with the use of ICT. This resounds with the literature by Almalki (2018), who found a significant relationship between teachers' perceptions of ICT integration in the teaching-learning processes and their actual use of ICT. The results also indicate that little effort has been made by the government to establish the ICT policy, and the limited infrastructures would hold no water if the main implementers of the policy were left behind. It also indicates that the policy would move nowhere unless teachers were being given priority. Finally, the study indicated that there was a strong emphasis from school administration encouraging teachers to use ICT in the teaching and learning processes. The findings align with Chirwa (2018), who suggests that teachers primarily use ICTs for 'routine tasks' such as record keeping, lesson plan development, information presentation, and basic Internet searches.

Teachers' perceptions on the application of ICT in the teaching and learning process

Teachers perceived that ICT was important in teaching and learning processes in the public secondary schools in Bagamoyo. It was found that teachers considered ICT important since it helped them in the preparation of teaching and learning materials and gave students a room to explore more sources of materials and information. The findings also show that ICT integration is important as it helps teachers in the dissemination of materials in a much better way to their students. ICT integration is important as it helps teachers in the dissemination of materials in a much better way to their students, which is effective. The findings above are in connection with Agbo (2015), who postulates that ICT Technology is important in the teaching-learning process, and the perception of teachers about ICT usage was very positively.

Also, teachers believed that the use of ICT enhanced the quality of the teaching-learning process; most teachers considered it to have a

significant correlation between teachers' technological, pedagogical, and content knowledge (TPACK) and their technological competencies. Another interesting finding is that, teachers perceived that ICT integration in teaching and learning was an effective since it enabled students to acquire the educational needs by providing them with creative solutions to different types of learning inquiries. These findings are linked to the study of Ali (2018), who is of the view that there is a significant relationship between teachers' perception towards ICT integration into the teaching-learning process and the factors that encourage ICT usage. This indicates that the teachers' perception towards ICT integration into the teaching-learning process increases if ICT usage is encouraged, and vice versa is also true.

The findings also show that ICT integration is essential as it helps improve creative thinking and academic performance in the most effective possible way. The integration was found to be positive by teachers since it provided a motivating environment for students and keeping them engaged in educational activities. According to the UNDP's (2001) statistics, almost 80% of the teachers in developing countries felt that they were not prepared to use the technology. Thus, integrating information and communication technologies into the curriculum is a crucial process in ensuring the quality of education (Hue & Jalil, 2013). However, the presence of technology alone may not stimulate significant changes in a school. Teachers are an important ingredient in the implementation of ICT in education. This indicates that the teachers' productiveness is realised if ICT is integrated to the course they teach. However, majority of the teachers pointed out that one of the barriers to technology implementation was lack of teachers' technical knowledge and shortage of resources. The study findings are linked to the study of Almalki (2018), who reported a significant relationship between the perception of teachers towards the integration of ICT in teaching-learning process and the use of ICT. They are also connected to the findings of Bebbington and Unerman (2018), who maintain that the association is motivated by several other factors in schools such as staff motivation, willingness to use ICTs and availability of resources

Challenges affecting the use of ICT in the Teaching and Learning Process

With a focus on the challenges, the findings showed that one among the challenges facing the public secondary school ICT integration was the unavailability of ICT Infrastructures. The study also indicates that the unavailability of ICT infrastructures, the unavailability of tools, and the

poor power supply were slowing the integration of ICT in public secondary schools. This implies that, regardless of of teacher's willingness and positive perception towards using ICT, their hands were tight to implement the policy. Furthermore, the study showed that most of the respondents involved agreed that lack of knowledge in the use of ICT was a challenge amongst many challenges. These findings indicate that, teachers' technology know how was a challenge towards the implementation of the policy. It also implies that the majority of the teachers had little knowledge regarding ICT. It can also be argued that the government has put effort into the infrastructures but little attention to the policy implementers. Moreover, the study findings showed that all the respondents involved in the study agreed that the majority of public secondary school teachers lacked skills on how to use the ICT tools, thus affecting the integration process. This finding suggests that most teachers did not know how to use the ICT devices, which also implies that it was rarely being used or being used or was being used by very few teachers. The results above resound the findings of Hakim's (2021) study, which posits that installing ICT devices like laptops, tablets, and routers for internet connections, Internet fibres, and ICT laboratories can be costly for both the government and individuals. They need a lot of investment, which the majority of the tutors find challenging to commit to. It also concurs with Kawulich (2018) who argued that the cost of installing ICT in public secondary schools in most developing countries is high. As a result, most schools end up with only a few devices, which they use individually for office work.

The study findings indicate that the high cost of accessing the ICT tool was another challenge hindering the integration process in the teaching and learning in public secondary schools in the Bagamoyo district. This result indicates that most teachers were not capable of purchasing the ICT devices necessary for the teaching and learning process. It also implies that the devices were expensive compared to what teachers were earning, and thus, it is the government's responsibility to cater for this need. The findings of the study are linked with the study of another challenge that most of the public secondary schools lack basic ICT facilities, thus making it impossible to incorporate ICT into teaching and learning activities. This study is linked to the previous result, where it was evident that the cost of establishing the ICT infrastructures was high compared to individual (teachers) and institutional capacity. Another challenge identified in the study was the unavailability of Educational Programmes or Internet Access. The study responses showed that the majority of the respondents involved in the study agreed that the unavailability of

educational programmes or internet access was hindering the integration of ICT in the teaching and learning process in public secondary schools.

It was also found out that the shortage of power supply was affecting the integration of ICT in the teaching and learning process in public secondary schools. This was shown by more than ninety percent of all the respondents involved in the study. This finding signifies that most of the public secondary schools did not have assurance of power supply. It also signifies that most challenges were heavily linked or associated with the power supply problems. These results support Almalki (2016), who postulates that, in the absence of a stable power supply, the use of ICT remains delusion. This is because of where they are; all ICT tools require constant supply regardless of the size and place of where they will be used. Hakim (2021) suggested that ICT devices such as Laptops, Tablets and Routers for internet connection, Internet cables, and ICT laboratories are costly for both the government and individuals to install. They need of investment, which the majority of the tutors find hard to commit to. In the same regard, Kawulich (2018) argues that the cost of installing ICT in public secondary schools in most developing countries is high. As a result, most of the schools end up having only a few devices, which are literally for office work and being used individually. The study findings are supported by the study of Kisirkoi (2018), who argues that the unavailability of educational programmes or internet access hinders the integration of ICT in public schools.

Conclusions and Recommendations

Considering the findings above, ICT in the teaching and learning process is known, but it is seldom used in school. Based on this study, most teachers were aware of the policy since it was being emphasised at the school level by the school administration. However, it was rarely implemented in practice, so very few teachers integrated it into the teaching and learning processes. Moreover, considering the findings of this study, it is evident that teachers had a positive perception of the integration of ICT in the teaching and learning process. They perceived that ICT integration was helping in the preparation of teaching and learning tools. It was reported that students were benefiting from ICT since it helped them reach so many various sources of information easily compared to the conventional approach. The use of ICT was perceived to have a positive and effective impact on both teachers and students since it created a friendly and interesting environment for learning. Furthermore, even though the integration of ICT in teaching and learning had a positive perception amongst teachers, it was still facing a lot of challenges, which

included a shortage of power supply, unsupportive ICT infrastructures, and the unavailability of ICT tools. Another challenge identified was the technical know-how, where most teachers were found to have little knowledge of the use of ICT tools in teaching and learning processes. Therefore, based on these findings, this paper recommends that teachers need to be given the necessary training so that they master the use of ICT, more specifically in the teaching and learning process. This training can be on-the-job training, so it does not affect the year calendar. Once teachers are well conversant with the use of ICT, it would be easy for the government to inject a budget into the proper supply of ICT facilities in schools. Additionally, the government should invest in ICT facilities such that they are adequate and relevant for the teaching and learning processes. Moreover, the government should build enough ICT laboratories and provide schools with enough ICT gears.

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