Perception of Students on ICT Use in Teaching and Learning to Public Secondary Schools in Mbeya District, Tanzania

Comment [Comments1]: The title is succinct and managed to effectively capture the essence of the study. However, it can be rephrased a bit to enhance clarity. Suggested alternative title: Student Perceptions on ICT Use in Teaching and Learning in Public Secondary Schools in Mbeya District, Tanzania

1.0 Abstract:

Global teaching and learning process modernization heavily depends on the use of information and communication technology (ICT) in the classroom. For educational methods to be implemented and improved in Tanzania, particularly in the Mbeya District, it is critical to comprehend how students view the incorporation of ICT in their education. This study explores how students in public secondary schools feel about using ICT for teaching and learning, as well as their experiences and preferences in this area.

Students at public secondary schools in the Mbeya District participated in interviews and questionnaires that were used to gather data for this study. It's possible that surveys were designed to collect quantitative information about students' ICT usage habits, frequency of use, and general satisfaction. In the meantime, interviews gave students a forum to share their thoughts, experiences, and difficulties using ICT for learning. The combination of these techniques provides a thorough comprehension of the viewpoints of pupils on ICT integration.

The study highlights both challenges and opportunities for implementing ICT in Tanzanian education. Challenges include limited access to computers and the internet, insufficient teacher training, and disparities in digital literacy among students. Financial constraints and outdated technology may also hinder effective implementation.

Conversely, the study probably reveals several advantages brought about by ICT integration, including better access to learning materials, increased involvement via interactive learning environments, and the possibility of customised learning experiences. Policymakers, educators, and stakeholders may address these issues and seize chances to improve education using ICT by having a thorough understanding of students' viewpoints.

In the end, this study offers useful data about the dynamics of ICT use in Tanzanian education, helping to shape methods for successful integration and promoting creativity in the processes of teaching and learning in public secondary schools in the Mbeya District and elsewhere. Tanzania can get closer to a future that is both more technologically inclusive and has a stronger educational foundation by tackling the issues that have been highlighted and taking advantage of the opportunities that ICT presents.

Comment [Comments2]: The abstract summarizes the key aspects of the study. However, it could benefit from a brief inclusion of other key methodological details, such as study design and sample size. The methodology section explains that 20 teachers were interviewed, but the abstract says students were interviewed. Please clarify that.

Furthermore, the abstract currently contains 334 words, which exceeds the 300-word limit specified by the journal. Perhaps a brief revision is needed for it to adhere to the journal's word limit requirement for submission.

Keywords: *Perception, ICT Use, Public Secondary Schools*

1.1Introduction:

Information and Communication Technology (ICT) refers to the convergence of telecommunications and computing technologies, including those used in telecommunications, broadcast media, intelligent building management systems, audiovisual processing, and transmission systems such as the Internet and satellites(Majeed & Ayub, 2018).

Like many other developing countries, Tanzania has seen a rise in efforts recently to incorporate information and communication technology (ICT) into its educational framework (Barakabitze et al., 2017). This trend indicates a global understanding of ICT's revolutionary power to improve teaching and

learning procedures and give students the critical digital skills they need to succeed in the modern world (Lase, 2019).

ICT integration in education has the potential to provide dynamic and interesting learning settings, accommodate a range of learning preferences, and increase access to educational resources outside of conventional limits (Alenezi et al., 2023). Tanzania is committed to closing the digital divide and giving pupils the resources they need to succeed in the increasingly digitalized global environment, which is why they are placing such a high priority on ICT adoption (Ndibalema, 2022).

However, the effectiveness of ICT integration in education depends not only on the application of technology but also on the comprehension and consideration of the views and experiences of the main participants, namely the students (Barzani, 2020). Their viewpoints provide priceless insights into both the difficulties involved in using ICT tools and resources and their efficacy in promoting learning.

Examining how students view ICT in the classroom can provide insight into a variety of experiences and viewpoints. ICT may be welcomed with enthusiasm by certain students who see it as a means of achieving improved learning outcomes, increased interactivity, and easy access to a multitude of educational resources (Ungerer, 2016). For them, ICT is a chance to work with classmates, interact with the material in new and interesting ways, and acquire digital literacy skills that will be useful in their future undertakings.

On the other hand, some students could be hesitant or face difficulties when utilising ICT in their academic pursuits (Saikat et al., 2021). ICT resources can be effectively utilised, but enthusiasm can be dampened by problems including restricted access to technology infrastructure, poor training or assistance, digital divide discrepancies between urban and rural areas, and worries about the relevancy and quality of digital material (Chao, 2015).

Comprehending these diverse viewpoints is imperative to guarantee the fair and efficient incorporation of ICT in Tanzanian education (Ladyshewsky & Pettapiece, 2015). It calls for focused approaches to remove obstacles to usage and access, improve teachers' and students' digital literacy, and modify ICT programmes to fit regional settings and curricula (Chinapah & Odero, 2016).

Additionally, encouraging a participatory strategy that incorporates students in ICT adoption decision-making processes can enhance ownership, empowerment, as well as a feeling of autonomy in their schoolwork (Caen & Redecker, 2019). Tanzania may develop an active feedback loop, modify ICT interventions in response to student feedback, and promote a culture of experimentation and innovation to create a flexible and responsive educational ecosystem that is ready to use ICT to its fullest potential for the good of all students (Hassler et al., 2018).

Generally, the incorporation of ICT into Tanzanian education has great potential to improve student learning outcomes and equip them for success in the digital era. Tanzania can guarantee that ICT programmes are customised to fit students' requirements, successfully solve obstacles, and open the door for a more inclusive, equitable, and powerful educational landscape by placing a high priority on understanding students' perspectives and experiences.

1.2Objectives:

i. To assess students' attitudes towards the integration of ICT in teaching and learning.
ii. To examine students' experiences with ICT use in their educational environment.
iii. To identify the challenges that students face in utilizing ICT for academic purposes.
iv. To explore the suggestions for improving the integration of ICT in education.

Comment [Comments3]: Please standardize the spelling to either US English or UK English throughout the document to ensure consistency

2.0 Literature Review:

This section focuses on the theoretical and empirical literature review.

2.1 Theoretical framework

This study applied constructivist theory**.**Constructivism is an educational and psychological paradigm that proposes that learners build their understanding of the world via experiences and reflections. It draws on the work of psychologists including Jean Piaget, Lev Vygotsky, Jerome Bruner, and Seymour Papert (Nkhata et al., 2019). Piaget's theory of cognitive development emphasises the learner's active role in comprehending the world (Veliz, 2017). Vygotsky's social constructivism focuses on the social and cultural dimensions of learning. Bruner's "spiral curriculum" focuses on active learning and discovery. Papert's constructionism extends constructivist principles into technology, proposing that learners construct knowledge through concrete artefacts (Butler & Leahy, 2021). Constructivist pedagogy is frequently used in educational settings through approaches such as inquiry-based learning, problem-based learning, and project-based learning (Matriano, 2020).

2.2 Empirical literature review

To offer a thorough grasp of the subject, empirical literature reviews examine, assess, and summarise research findings as well as working papers on the perception of students on ICT use in teaching and learning.

2.2.1 Students' attitudes towards the integration of ICT in teaching and learning

The factors influencing Tanzanian students' views towards ICT integration in education include the availability of technology, competence with ICT tools, cultural attitudes, and the quality of ICT integration in educational institutions (Mwila, 2018). Students in cities have greater access to technology, but those in rural regions may have little or no access (Tadesse & Muluye, 2020).According to a Tanzanian survey, although students acknowledged limitations on computer programmes and personal devices, they largely supported ICT integration in public secondary schools. The paper recommends changing these limitations and offering instruction to ICT users (Daudi & Nzilano, 2021). A study conducted in Kuala Lumpur, Malaysia, discovered that professional development training programmes and teachers with the necessary preparation greatly increase the efficacy of technology-based teaching and learning. Managing difficulties should be the main focus of future research (Ghavifekr & Rosdy, 2015).

2.2.2 Students' experiences with ICT use in their educational environment

The experiences of secondary school pupils with information and communication technology (ICT) have been the subject of research during the last ten years. Research has looked into the digital divide, how well ICT training programmes work, and how well ICT tools are incorporated into the curriculum. The digital gap, however, continues to be a problem and affects students' capacity to utilise ICT resources to the fullest. Furthermore, research has examined the connection between ICT use and student engagement, emphasising the need for teacher assistance and instructional design (Ertmer & Ottenbreit-Leftwich, 2017), (Sang et al., 2024).

2.2.3 The challenges students face in utilizing ICT for academic purposes

Tanzanian students confront several problems while using information and communication technology (ICT) for academic purposes (Kayanda & Busagala, 2020). These include limited access to ICT infrastructure, high device and service costs, digital literacy gaps, language barriers, limited ICT integration into the education curriculum, power outages and infrastructure issues, digital content

Comment [Comments4]: So, is there any gaps in the literature that could be addressed or explored further in this study?

Comment [Comments5]: Provide more critical analysis and synthesis of the findings from reviewed studies. Discuss the potential gaps which have not been explicitly addressed in the current literature.

Comment [Comments6]: The referencing style used does not conform to the journal's requirements. It is advisable to check through the whole paper and revise accordingly. Kindly refer to Author Guidelines https://journaljesbs.com/index.php/JESBS/about/submissions- in the text, citations should be indicated by the reference number in brackets.

relevance, unreliable internet connectivity, security and privacy concerns, and cultural and socioeconomic factors (Serhan, 2020),(Sinaga & Pustika, 2021). These difficulties may impede students' ability to access online resources, participate in virtual classrooms, and engage in collaborative online activities. Furthermore, students may be hesitant to fully utilise ICT resources due to fears about online security and privacy. Addressing these difficulties is critical to encouraging effective ICT use in Tanzanian education.

2.2.4 The suggestions for improving the integration of ICT in education

Tanzania's education system can be considerably improved by incorporating information and communication technology (ICT) into the curriculum (Rumanyika & Galan, 2015). This includes ensuring that every student has access to devices and the internet, improving ICT infrastructure in schools, providing comprehensive teacher training, revising the curriculum to include ICT-related topics, developing interactive digital learning resources, creating online learning platforms, encouraging ICT clubs and competitions, fostering community involvement, monitoring and evaluating ICT initiatives, and incorporating digital citizenship education (Rana & Rana, 2020). These measures are intended to improve learning outcomes, prepare students for the digital age, and prepare them for the challenges of the twenty-first century. By implementing these recommendations, Tanzania may use ICT to transform education and empower its youth for the twenty-first century.

Comment [Comments7]: As these have been highlighted in other studies, could you please elaborate on the unique contributions or novel aspects of your study? Providing specific details on how your research addresses the gaps would strengthen your argument. Perhaps, you can consider relating it to the specific context of your research to emphasize its relevance and significance.

3. Methods

Search engines such as Google Scholar and the Internet were used to conduct a literature review and physical visit was done by the researcher to collect primary data.

Comment [Comments8]: This extensive explanation on how to conduct a literature review, may be unnecessary. Consider focusing this section more on the specific methods and processes used to collect data in your study.

3.1 Research design and context

The study used a descriptive design method. The descriptive surveyis an efficient way to acquire information about students' perceptions of ICT use in Tanzanian education (Daudi & Nzilano, ICT integration in teaching and learning: perceptions and practices of secondary school students in Tanzania, 2019). This survey is appropriate for a broad audience, as access to technology and internet connectivity vary by geography and demographic. Itprovides quantifiable information about students' perceptions of ICT resources, including frequency of use, preferred tools, and perceived benefits and obstacles. Descriptive surveysare both cost-effective and time-efficient, making them appropriate for resource-constrained environments such as Tanzania. It also provides anonymity, promoting open replies on delicate themes. Data collection andstandardisationensure uniformity, making it easier to analyse and compare data across student groups. Descriptive survey results can be generalised to a larger population, providing insights into broader educational policies and activities. It also provides opportunities for follow-up research.

Comment [Comments9]: Not a common way of doing in-text citation. According to the Author Guidelines https://journaljesbs.com/index.php/JESBS/about/submissionsin-text citations should be indicated by the reference number in brackets. Please revise all the other in-text citations accordingly.

3.2 Sampling and Sample Size

Sampling is a technique used by researchers to pick a subset of a predefined population as subjects for observation or investigation. For example, if 100 undergraduates are chosen from 1000 college rolls for physical fitness testing, they represent a desired sample of a given group(Sharma, 2017).

Selecting a sample allowed the researcher to get data from a smaller group that was more relevant to the study. The study used both purposive sampling and stratified sampling methods to describe purposeful sampling as a method of selecting persons who are educated and instructive about the topic being studied. The study employed purposive sampling because the population of the research was educated, thus purposive sampling was used. The intended audience included teaching staff and students.

Comment [W10]: Please clarify how stratified sampling methods were employed in this study? The description of the stratified sampling process is not provided. Kindly provide sufficient detail to help readers understand how different strata were identified and sampled.

Comment [Comments11]: Please consider rephrasing it for better clarity and readability.The justification for the use of purposive sampling is unclear. Please clarify it with a more concise explanation.

Purposive sampling is a valid method for choosing schools that wereIsuto and Ilembo secondary schools and school administrators. These administrators hold key roles within the organisation and are likely to provide unique insights and views relevant to the study objectives

The study selecteda sample sizeby usingSharma's formula (2020) suggestion of 30%. According to the authors, a 30% research sample is frequently sufficient to offer a suitably representative sample of the community. While it does not cover every unit, it may capture a wide range of features, providing useful insights and generalisations. In this scenario, the sample of staff and students was included in the research sample and was distributed as described in Table 1.

Table 1. Sample size of the respondents

Division	Target Population	Sample Size
Students	120	40
Teachers	60	20
Total	117	60

Source: Research 2024

3.3Tools and Techniques

This study utilised two ~~sorts of~~ data collection tools: questionnaires and interviews. Using a combination of these methods prevents over-reliance on a single instrument, assuring the authenticity and dependability of the data acquired. The use of more than one instrument of procedures is required to assure the authenticity and dependability of the obtained data. Questionnaires are useful for gathering quantitative primary data, although they have limitations such as low response rates, potential bias, and inflexibility. To address these difficulties, a pilot research wasconducted to test the questionnaires, which werethen sent to 40studentsto collect data on all four study objectives. The interview is a research approach in which two or more persons converse verbally about a topic of mutual interest. It can be utilised in both personal and telephone interviews. Personal interviews use structured questions and recording techniques, whereas telephone interviews are more flexible, faster, and cheaper. The study usedrestricted and unrestricted interviews with 20 teachersfrom 2 public secondary schools in Mbeya district. Restricted interviews allow researchers to ask follow-up questions and clarify obscure ones, whereas unrestricted interviews explain the study's objective and subject area. Likewise, 40 questionnaires were distributed to advanced and junior secondary school students in selected schools found in Mbeya district, Tanzania.

3.4 Data Analysis

This study employed both quantitative and qualitative approaches, with quantitative analysis conducted using the IBM Statistical Package for Social Science (SPSS). Results were displayed using descriptive statistics, charts, and tables, and information was gathered from students and teachers at two Mbeya district schools using closed and open-ended questions.

4.0 Results of the study

Comment [Comments12]: The sentence has grammatical and structural issues that make it difficult to understand. Consider revising it for clarity.

Comment [W13]: This source (Sharma, 2020) is missing from reference list. Please check through and ensure all cited sources are accurately listed in the reference section

Comment [W14]: It would be beneficial to elaborate on why this specific sample size technique was chosen. For example, explain the rationale for not selecting Krejcie and Morgan's (1970) formula for determining sample size

Comment [W15]: Perhaps can consider: data collection instrument

Comment [Comments16]: Perhaps can consider: a pilot study

Comment [Comments17]: Provide insights into any adjustments made based on pilot study findings. What are the questions prepared in your questionnaire? How many questions? Including the questionnaire items would allow readers to better understand how the variables were operationalized and this will also ensure clarity in interpreting the reported findings. How about the response rate?

Comment [Comments18]: for

Comment [Comments19]: Perhaps it is necessary to clarify why some interviews were conducted using a restricted format while others used an unrestricted format. How many rounds of interview were conducted? 20? Individually? Or group interviews? Did it involve the use of audio or video recording during interviews? Details on transcription methods and any software used would add clarity. How about the interview questions? These details can help demonstrate the validity and reliability of the data collection process.

Comment [W20]: But the abstract says students were also interviewed. Please clarify that

Comment [Comments21]: So how about the analysis of qualitative data? What software/ tool was used? There is a need to detail the procedures for data management, including coding, categorization processes and identification of themes/ patterns.

Comment [W22]: Perhaps, readers are interested in knowing specifically which research questions were addressed using closed-ended questions/open-ended questionsto understand the data collection approach better

4.1 Students' attitudes towards the integration of ICT in teaching and learning

The respondents (students and teachers had different views when they were asked about how positivethey were towards the integration of ICT in teaching and learning. Using four Likertscales to measure respondents' level of agreement, four ~~indicated~~indicates astrong level of agreement, three ~~indicated~~indicates agreement, two ~~indicated~~indicatesdisagreement, and one strongly disagree~~d~~.

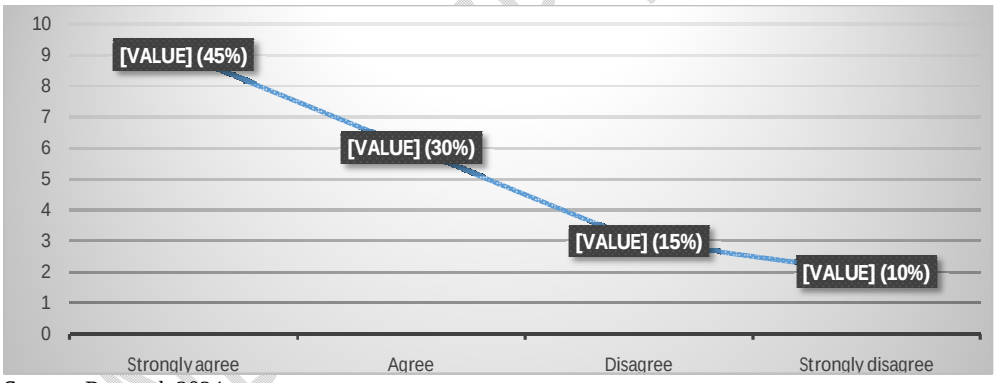
Table 2. Students' positive perception towards ICTuseas identified by the students

Positive perception towards ICT (N=40)	Frequency	Percent (%)
Strongly agree	27	67
Agree	10	25
Disagree	2	5
Strongly disagree	1	3
Total	40	100

Source: Research 2024

The results from the study area disclosed that 67% ~~out~~ of the 40 respondents mentioned strongly agree, 25% ~~out~~ of the 40 respondents listed agree, 5% ~~out~~ of the 40 identified disagree and 3% ~~out~~ of the 40 respondents listed strongly disagree.These results revealthat most pupils had a favourable opinion of ICT integration in the classroom setting (see Table2).

Figure 1. Students' positive perception towards ICT, as identified by the teachers



Source: Research 2024

The results as shown in ~~figure~~ Figure 1 revealed that 45% ~~out~~ of the 20 respondents mentioned strongly agree,30% ~~out~~ of the 20 respondents listed 30%,15% ~~out~~ of the 20 respondents outlined disagree and 10% ~~out~~ of the 20 respondents ~~identified~~strongly disagree~~d~~. The data revealed that very few respondents (teachers) hada negative attitude towards the integration of ICT in teaching and learning(see Figure 1).

4.2The students' experiences with ICT use in their educational environment

The respondents (students and teachers) had different responses when they were asked about their experiences with ICT use in the education environment. There were four main options given to the

Comment [W23]: Readers might want to know what statements were included in the questionnaires. How did you measure student attitudes?

Comment [W24]: Lack of consistency in presenting the results. Students' responses were presented using table only while Figure 1 was used to present the responses from teachers. Is there any rationale for that?

Comment [W25]: Rephrase: What do you mean?

Comment [W26]: So does that mean that the 20 teachers were also required to answer the questionnaires? The methodology part only mentioned that 40 questionnaires have been distributed. Please clarify that.

Comment [W27]: Consider rephrasing: indicated disagreement

Comment [W28]: Are you using the same questionnaire as distributed to all the students? Are you measuring the teachers' level of agreement with the statements or teachers' perception on students' attitude? Please make it clear. Bear in mind, the wording and context of questions may need to be adjusted for students versus teachers.

Comment [W29]: A bit confusing here. The title for Figure 1 is Students' perception towards ICT, but this statement explains that it is the teachers' perception. Please clarify that.

Comment [W30]: Let's reflect on the research objectives, RQ2 is focusing on STUDENTS' experiences, why is there a need to collect information on teachers' experiences with ICT use?

respondents.Number one was rarely used, two occasionally used, three frequently used and four always used.

Table 3.Experiences with ICT use as identified by the students

Experience with ICT Use (N=40)	Frequency	Percent (%)
Rarely	9	22
Occasionally	11	28
Frequently	2	5
Always	18	45
Total	40	100

Source: Research 2024

The results of the study area, as presented by the respondents (students), indicated that 45%~~out~~ of the 40 respondents mentioned they use ICTalways which was followed by 28% ~~out~~ of the 40 respondents who mentioned occasionally, then 22% ~~out~~ of the 40 respondents listed rarely and 5 % ~~out~~ of the 20 respondents traced frequently, therefore the results are revealing that the experience of the respondents on the use of the computer is dominated by the aspect of always use which is equivalent to 45% (see table 3).

Picture: 1 Students filling questionnaires in the study area

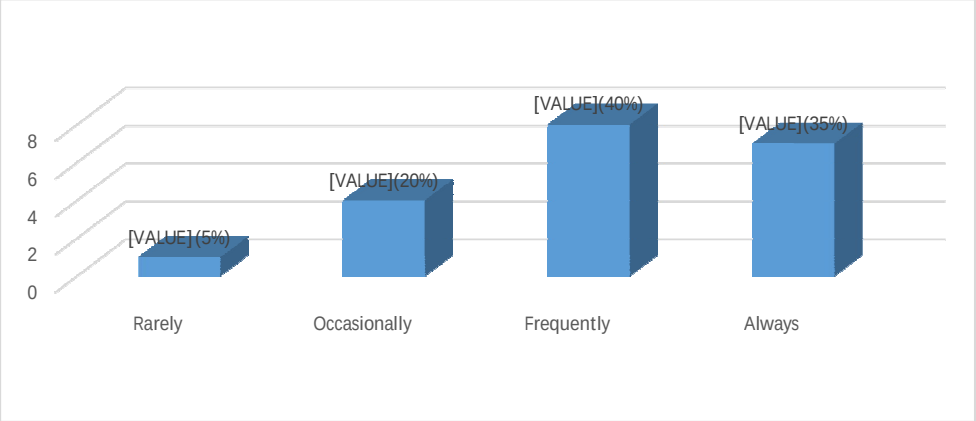
Source: Field data 2024

Figure 2 Experiences with ICT use as identified by the teachers

Comment [W31]: Rephrase: what do you mean?

Comment [W32]: More interpretation is needed to contextualize the findings

Comment [W33]: Rephrase: do you mean the classroom?



Source: Research 2024

The results of the study on the use of ICT as presented by the respondents (teachers) revealed that 40% ~~out~~ of the 20 respondents mentioned frequently followed by 35%~~out~~ of the 20 respondents who listed always, 20% ~~out~~ of the 20 respondents identified occasionally and finally 5% ~~out~~ of the 20 respondents equivalent to one respondent mentioned rarely use. This signifies that the use of ICT in teaching and learning in the study area is very high.

Comment [W34]: Again, it is unclear as how the questions were asked. Frequency-based items with the terms such as "rarely," "occasionally," "frequently," and "always" can be subjective and interpreted differently by different respondents. Are there any efforts to address the reliability and validity of the data collected using these frequency-based response categories?

4.3 The challenges students face in utilizing ICT for academic purposes

The respondents (students and teachers) had varying viewpoints on the challenges that pupils experience when using ICT for academic reasons. Slow internet connections, a lack of access to appropriate hardware/software, and insufficient ICT and technical skills were among the most common issues.

Table 4. Challenges as identified by students

Challenges of using ICT (N=40)	**Frequency**	**Percent (%)**
Slow internet connection	20	50
Insufficient ICT skills/Knowledge	10	25
Lack of access to necessary hardware/software	6	15
Technical issues with ICT tools	4	10
Total	40	100

Source: Research 2024

The respondents (students) presented various challenges facing students when using ICT for academic purposes. The results revealed that 50% ~~out~~ of the 40 respondents mentioned slow internet connection, 25% ~~out~~ of the 40 respondents listed insufficient ICT skills/knowledge, 15% ~~out~~ of the 40 respondents identified a lack of access to necessary hardware/software and 10% ~~out~~ of the 40 respondents pointed out technical issues with ICT tools.

Comment [W35]: faced by

Table 5. Challengesas identified by the teachers

Challenges of using ICT (N=40)	**Frequency**	**Percent (%)**

Comment [W36]: 40 OR 20? Please double check as the total says 20 there

Slow internet connection	8	40
Insufficient ICT skills/Knowledge	6	30
Lack of access to necessary hardware/software	4	20
Technical issues with ICT tools	2	10
Total	20	100

Source: Research 2024

The respondents, who were the students, addressed the several difficulties they have when utilising ICT for educational purposes. The findings showed that among the 40 respondents, 40% mentioned having a slow internet connection, 30% mentioned having insufficient ICT knowledge or skills, 20% mentioned not having access to the required hardware or software, and 10% mentioned having technical problems with ICT tools.

Comment [W37]: Students? OR teachers? The title of Table 5 says 'teachers'

Comment [W38]: Again, it's 40 OR 20 respondents here?

4.4 The suggestions for improving the integration of ICT in education.

The study explored students' and teachers'perceptions on how to improve the use of information and communication technology (ICT) in teaching and learning. Key recommendations included professional development programmes for teachers, student training sessions, improved access to ICT resources, and investments in high-quality software. The study also recommended introducing ICT into a broader range of subjects and courses, implementing project-based learning activities, and enhancing infrastructure dependability and speed.

Table 6. Suggestionsas identified by the students

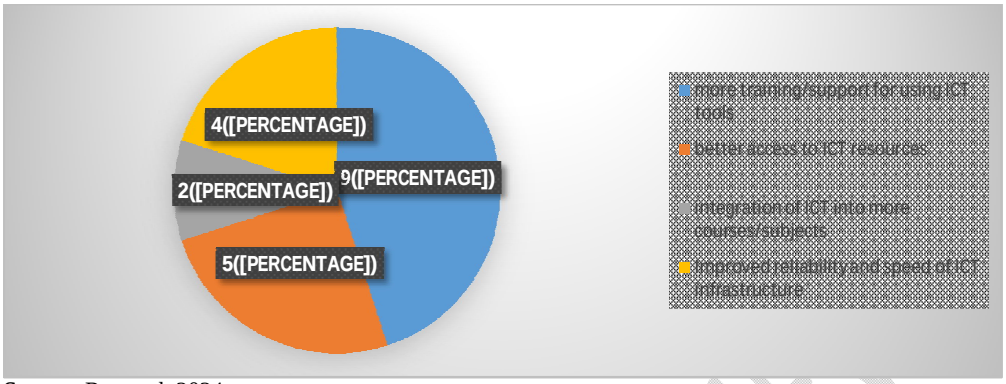
Experience with ICT Use (N=40)	**Frequency**	**Percent (%)**
more training/support for using ICT tools	25	62
integration of ICT into more courses/subjects	8	20
Improved reliability and speed of ICT infrastructure	4	10
better access to ICT resources	3	8
Total	40	100

Source: Research 2024

Several recommendations are made in light of the results to enhance ~~the~~ ICT integration in Mbeya District education. The results in the study area revealed that 62% ~~out~~ of the 40 respondents mentioned more training for using ICT to teachers and students, 20% ~~out~~ of the 40 respondents listed integration of ICT into more courses/subjects, 10% ~~out~~ of the 40 respondents identified improved reliability and speed of ICT infrastructure and 8% ~~out~~ of the 40 respondents pointed out better access to ICT resources.

Comment [W39]: Rephrase: what do you mean?

Figure 3. Suggestions as identified by the teachers



Source: Research 2024

5.0 Findings of the study

Comment [W40]: Rephrase: Discussion of findings

5.1 Students' attitudes towards the integration of ICT in teaching and learning

The survey demonstrates a mixed viewpoint on the use of information and communication technology (ICT) in teaching and learning. The respondents ~~with~~ who strongly agreed and agreed believed that ICT facilitates smooth ~~learning~~ teaching and learning for better understanding of both teachers and students while the respondents with disagree and strongly disagree attitudes conceived that ICT is difficult to apply in teaching and learning and thus not a good way of applying in teaching and learning to students and teachers as well in the study area.

The majority of respondents see ICT as a good force that can improve understanding and educational outcomes. However, a minority see it as difficult and problematic, emphasising the obstacles connected with using technology in educational settings. This group argues that the problems of deploying technology outweigh the potential benefits of ICT in education. The majority of respondents acknowledge the benefits of ICT in education,but the minority's objections indicate that successful integration necessitates addressing specific issues, such as providing enough training and resources to enable effective technology use by both instructors and students.

"The discussion with one of the respondents (teachers) in the study area revealedthat technology is good as it makes easy setting and moderation of the examinations, in this way there is no way you can get rid of the modern technology in this contemporary world"

Comment [W41]: Why is the text here placed in quotation marks? Is it a direct quote from the interview? If so, please provide more context before presenting the quote.

The findings presented above correlate with the study done by (Eickelmann & Vennemann, 2017) who argued that Teachers' attitudes and ideas have a major role in the integration of information and communication technology (ICT) in the classroom. According to a 2013 IEA survey, different nations' instructors have different opinions about the educational benefits of ICT.

5.2The students' experiences with ICT use in their educational environment

A survey or questionnaire assessing the frequency of use of specific items, services, or behaviours can be classified into four categories: rarely used (option 1), indicating infrequent usage, occasionally used, frequently used (option 2), regular and consistent use (option 3), and always used (option 4). These options quantify respondents' engagement or frequency of usage and are commonly utilised in a variety of research disciplines, including market research, health surveys, educational assessments, and technology adoption studies. The study revealed that the majority of the respondents (students) are always using ICT in the study areaand the other respondents (teachers) were observed to use ICT frequently in teaching and learning.

The findings of the study relate to the study done by (Kozlova & Pikhart, 2021) who viewed that students react favourably to the use of ICT in the classroom, mostly because of the materials' accessibility and availability as well as the opportunity to adapt the curriculum to fit their schedules. When the study was compared to classroom instruction, mostof the students did not report feeling less motivated, and there is less evidence that the use of ICT affects comprehension or the efficiency of learning.

The discussion with one of the respondents in the study area revealed that I have experience using projectors for a long time as it makes students more attentive and interested in teaching using projector.

Comment [W42]: Is this a direct quote from the interview? If so, please provide more context before presenting the quote.

5.3 The challenges that the students face in ~~utilizing~~ utilisingICT for academic purposes

A survey of students and teachers showed various issues that students experience when using Information and Communication Technology (ICT) for academic reasons. The main challenges are poor internet connections, a lack of access to proper hardware/software, insufficient ICT and technical skills, and frequent technical faults and maintenance. Slow internet connections make it difficult for students to access online resources, engage in virtual classes, and complete assignments on time, especially in rural or underprivileged locations. Many students lack access to necessary devices and software, and schools may not have enough ICT equipment to accommodate all pupils. Inadequate ICT and technical abilities are also a big barrier, with students frequently suffering with basic computer skills and teachers struggling to integrate ICT successfully into their teaching due to limited training and assistance. Technical faults and maintenance can also disturb the learning process, as schools sometimes lack dedicated technical support workers to solve these issues quickly.

The findings of the study correlate with the study done by (Al-Mamary, 2020) conceiving that teachers may not receive the technical help they need, which can result in a lack of happiness with using technology and a fear of equipment failure.

5.4 The suggestions for improving the integration of ICT in education.

The study sought to improve the use of information and communication technology (ICT) in educational settings, with a focus on both students and teachers. It proposed a variety of initiatives, including teacher professional development programmes, workshops and seminars, peer learning, and certification programmes.

Student training sessions were also suggested, with ICT literacy classes covering both fundamental and advanced ICT skills. The curriculum was integrated to create context-based learning experiences, and interactive learning approaches such as gamification and coding clubs were employed to increase students' interest and competency in information and communication technology.

Comment [W43]: Are these suggestions derived from the study? If so, please consider using present tense

Improved access to ICT resources was also proposed, which included investments in strong infrastructure, equitable resource distribution, and regular maintenance and support. High-quality educational software

was emphasised, with customisable tools to satisfy a variety of classroom requirements. Regular updates were released to include new features and security patches.

Invest in high-quality educational software that complements the curriculum and improves learning outcomes. Choose customisable tools to match a variety of teaching needs and topics. Update software on a regular basis to include new features, and security patches, and to ensure that it meets the most recent educational standards.

The project sought to considerably increase the integration of ICT in teaching and learning, hence improving educational outcomes and preparing students for a technologically driven world.

6.0 Conclusions

6.1 Students' attitudes towards the integration of ICT in teaching and learning

Using four Likert scales to measure respondents' agreement, four indicated strong agreement, three indicated agreement, two indicated disagree, and one strongly disagreed. The respondents had both positive and negative attitude towards the integration of ICT in teaching and learning. Majority of the respondents supported the integration of ICT in teaching and learning in the study area.

6.2The students' experiences with ICT use in their educational environment

There were four main options given to the respondents. Number one was rarely used, two occasionally used, three frequently used and four always used. Most of the respondents were identified to using ICT occasionally and fluently in the field of study.

6.3 The challenges students face in utilizing ICT for academic purposes

The major challenges identified by the respondents in ~~utilizing~~ utilisingICT were in the study area namely, ~~were~~slow internet connections, a lack of access to appropriate hardware/software, and insufficient ICT and technical skills were among the most common issues.

6.4 The suggestions for improving the integration of ICT in education.

The respondents (teachers and students) proposed different strategies for improving the integration of ICT in education. The major suggestions presented were more training for using ICT tools,integration of ICT into more courses/subjects,Improvereliability and speed of ICT infrastructure and provide better access to ICT resources.

7.0 Recommendation

7.1 Students' attitudes towards the integration of ICT in teaching and learning

It is advised to hold interactive training sessions, put in place a strong feedback mechanism, and highlight effective case studies of ICT integration in education to boost student involvement and favourable perception. These techniques will enable students to voice their concerns, show them the possible advantages of adopting technology, and assist them in understanding the advantages and useful applications of ICT in their studies.

7.2The students' experiences with ICT use in their educational environment

Comment [W44]: Are these suggestions derived from the study? If so, please consider using present tense

Comment [W45]: Too many subheadings (eg. 6.1 -6.4) within a short span. Revising the conclusion with fewer subheadings could strengthen its impact and cohesion.

Comment [W46]: Rephrase: what do you mean?

Comment [W47]: Improvement of

Comment [W48]: provision of

It is suggested to enhance accessibility and user experience by supplying clear and easy-to-use ICT platforms and tools, offering documentation and other support materials, and routinely updating the ICT infrastructure. Additionally, providing a variety of learning resources helps accommodate various learning preferences and styles, guaranteeing a smooth learning experience for students. Some examples of these resources are interactive simulations, multimedia, and collaborative platforms.

7.3 The challenges students face in utilizing ICT for academic purposes

It is recommended that students be provided with focused technical support and resources, such as a helpdesk specifically for technical problems, access to required hardware and software via school resources or collaborations with neighbourhoodorganisations, and all-encompassing digital literacy initiatives to give them the know-how to use ICT for learning.

8.1 Future Scope

~~The study "Perception of Students on ICT Use in Teaching and Learning at Public Secondary Schools in Mbeya District, Tanzania"~~This studyseeks to investigate the impact of ICT integration on learning outcomes and student perceptions. Future study directions include long-term investigations to better understand technology utilisation trends comparative studies, tool-specific research, teacher education and development, access and equity, parental and community involvement, policy and implementation, emerging technology, and long-term solutions. The study also investigated the effect of emerging technologies in improving learning experiences and student views. The study also looked into the link between technological advancements, and the impact of STEM disciplines on student views and performance.

Comment [W49]: This is beyond the scope of this study. How did this study explore the impact of ICT? The research questions only focus on attitude, experience, challenges and suggestion. Kindly refine it to align closely with the study's defined scope/ objectives

Comment [W50]: This is also beyond the scope of this study. There is a need to refine it to align closely with the study's defined scope/ objectives

References

Comment [W51]: According to the Author Guidelines https://journaljesbs.com/index.php/JESBS/about/submissions, references must be numbered in the order that they appear in the text. Please revise all the references here accordingly

Barzani, S. H. (2020). The Perceptions of EFL Teachers and Students on the use of Short Stories to Enhance Reading Comprehension. *Asian EFL Journal Research Articles, 27*(3), 325-341.

Mwila, P. (2018). Assessing the attitudes of secondary school teachers towards the integration of ICT in the teaching process in Kilimanjaro, Tanzania. *International Journal of Education and Development using Information and Communication Technology, 14*(3), 223-238.

Veliz, L. (2017). The Role of Awareness of Metaphor in Learners' Lexical Learning. *Language Teaching and Research, 8*(5), 835-846. http://dx.doi.org/10.17507/jltr.0805.01

Alenezi, M., Wardat, S., & Akour, M. (2023). The Need of Integrating Digital Education in Higher Education:Challenges and Opportunities. *Sustainability, 15*, 1-12. https://doi.org/10.3390/su15064782

Al-Mamary, Y. H. (2020). Examining the factors affecting the use of ICT in teaching in Yemen schools. *Academic Paper, 22*(1), 1-13. https://doi.org/10.1002/pa.2330

Barakabitze, A. A., Fue, K. G., & Sanga, C. A. (2017). The Use of Participatory Approaches in Developing ICT-Based Systems for Disseminating Agricultural Knowledge and Information for Farmers in

Developing Countries: The Case of Tanzania. *The Electronic Journal of Information Systems in Developing Countries, 78*(8), 1-23. https://doi.org/10.1002/j.1681-4835.2017.tb00576.x

Butler, D., & Leahy, M. (2021). Developing preservice teachers' understanding of computational thinking: A constructionist approach. *British Journal of Educational Technology, 52*, 1060–1077. https://doi.org/10.1111/bjet.13090

Caen, F., & Redecker, C. (2019). Aligning teacher competence frameworks to 21st century challenges: The case for the European Digital Competence Framework for Educators. *European Journal of Education, 54*, 356–369. https://doi.org/10.1111/ejed.12345

Chao, G. M. (2015). Impact of Teacher Training on Information Communication Technology Integration in Public Secondary Schools in Mombasa County. *Human Resource Management Research, 5*(4), 77-94. https://doi.org/10.5923/j.hrmr.20150504.01

Chinapah, V., & Odero, J. O. (2016). Towards Inclusive, Quality ICT-Based Learning for Rural Transformation. *Education and Research, 5/6*(2/1), 107-125. http://dx.doi.org/10.3126/jer.v5i2.15729

Daudi, Y., & Nzilano, J. L. (2019). ICT integration in teaching and learning: perceptions and practices of secondary school students in Tanzania. *14*(2), 38-52.

Daudi, Y., & Nzilano, J. L. (2021). ICT integration in teaching and learning: perceptions and practices of secondary school students in Tanzania . *Library Journal, 14*(2), 38-52.

Eickelmann, B., & Vennemann, M. (2017). Teachers' attitudes and beliefs regarding ICT in teaching and learning in European countries. *European educational research, 16*(6), 733–761. https://doi.org/10.1177/1474904117725899

Ertmer , P. A., & Ottenbreit-Leftwich, A. T. (2017). Pedagogical practices and instructional uses of technology: Profiles of exemplary teachers. *Research on Technology in Education, 49*(4/5), 301-314.

Ghavifekr, S., & Rosdy, W. A. (2015). Teaching and Learning with Technology: Effectiveness of ICT Integration in Schools. *Research in Education and Science, 1*(2), 175-191.

Hassler, B., Hennessy, S., & Hofmann, R. (2018). Sustaining and Scaling Pedagogic Innovation in Sub-Saharan Africa: Grounded Insights For Teacher Professional Development. *Journal of Learning for Developments, 5*(1). https://doi.org/10.56059/jl4d.v5i1.264

Kayanda, A., & Busagala, L. (2020). User perceptions on the use of Academic Information Systems for decision making support in the context of Tanzanian Higher Education. *International Journal of Education and Development using Information and Communication Technology, 16*(1), 72-87.

Kozlova, D., & Pikhart, M. (2021). The Use of ICT in Higher Education from the Perspective of the University Students. *25th International Conference on Knowledge-Based and Intelligent Information & Engineering Systems.* Hradec Kralove,Czech Republic: Elsevier B.V.

Ladyshewsky, R., & Pettapiece, R. G. (2015). Exploring Adult Learners Usage of Information Communication Technology during a Virtual Peer Coaching Experience. *Online Learning, 19*(2), 1-15.

Lase, D. (2019). Education and Industrial Revolution. *Jurnal Handayani (JH), 10*(1), 48-62.

Majeed, M. T., & Ayub, T. (2018). Information and communication technology (ICT) and economic growth nexus: A comparative global analysis. *Pakistan Journal of Commerce and Social Sciences (PJCSS), 12*(2), 443-476.

Matriano, E. A. (2020). Ensuring student-centered constructivist and project-based experiential earning applying the Exploration, Research,Interaction and Creation (ERIC) Learning Model. *International Online Journal of Education and Teaching (IOJET), 7*(1), 214-227. https://doi.org/index.php/IOJET/article/view/727

Ndibalema, P. (2022). A Paradox in the Accessibility of Basic Education among Minority Pastoralist Communities in Tanzania. *Ethnopolitics and Minority Issues in Europe, 21*(1), 44-68. https://doi.orcid.org/0000-0002-9119-4255

Nkhata, B., Mkandawire, S. B., Nachiyunde, K., Phiri-Nalube, P., Kaani, B., Mulenga, I. M., Phiri, C., & Chileshe, B. (2019). Exploring Selected Theories Applicable to Educational Disciplines and Social Sciences Research. *International Journal of Humanities Social Sciences and Education (IJHSSE), 6*(12), 97-116. http://dx.doi.org/10.20431/2349-0381.0612008

Rana, K., & Rana, K. (2020). ICT integration in teaching and learning activities in higher education: A case study of Nepal's teacher education. *Educational Technology, 8*(1), 36-47. https://doi.org/http://dx.doi.org/10.17220/mojet.2020.01.003

Rumanyika, J. D., & Galan, R. M. (2015). Challenges for Teaching and Learning Information and Communication Technology Courses in Higher Learning Institutions in Tanzania: A Review. *Information and Knowledge Management, 5*(2), 1-13.

Saikat, S., Dhillon, J. S., Ahmad, W. F., & Jamaluddin, R. A. (2021). A Systematic Review of the Benefits and Challenges of Mobile Learning during the COVID-19 Pandemic. *Education Sciences, 11*(9), 1-14. https://doi.org/; https://doi.org/10.3390/educsci11090459

Sang, G., Valcke, M., van Braak, J., & Tondeur, J. (2024). The role of educational technology in promoting student-centered pedagogies: A review. *Educational Technology Research and Development, 72*(1), 119-140.

Serhan, D. (2020). Transitioning from face-to-face to remote learning: Students' attitudes and perceptions of using Zoom during COVID-19 pandemic. *International Journal of Technology in Education and Science (IJTES), 4*(4), 335-342.

Sharma, G. (2017). Pros and cons of different sampling techniques. *Applied Research, 3*(7), 749-752.

Sinaga, R. R., & Pustika, R. (2021). Exploring Students' Attitude Towards English Online Learning Using Moodle During Covid -19 Pandemic at SMK Bandarlampung. *English Language Teaching and Learning (JELTL), 2*(1), 8-15.

Tadesse, S., & Muluye, W. (2020). The Impact of COVID-19 Pandemic on Education System in Developing Countries:A Review. *Open Journal of Social Sciences, 8*, 159-170. https://doi.org/10.4236/jss.2020.810011

Ungerer, L. M. (2016). Digital Curation as a Core Competency in Current Learning and Literacy: A Higher Education Perspective. *The International Review of Research in Open and Distributed Learning, 17*(5), 1-27. https://doi.org/10.19173/irrodl.v17i5.2566