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Assessing the Perceptions of Teachers and Students on the Integration of Technology-Enhanced Teaching and Learning in Secondary Schools in Dodoma City

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Abstract
The increase in demand for technology usage has influenced many sectors, including education. However, teachers' and students' perceptions have a great impact on the effectiveness of technology-enhanced teaching and learning. Therefore, the purpose of this study was to assess teachers' and students' perceptions of the use of technology-enhanced teaching and learning and find out if there was an association between teachers' and students' demographic characteristics and their perceptions of technology use in teaching and learning. A cross-sectional design was used to gather information from the field. Secondary school teachers and students in Dodoma City constituted the study population. 83 teachers and 393 students from 10 secondary schools were selected purposefully. The self-administered questionnaire was used to gather data from both categories (teachers and students). The data was analyzed by using percentages and statistical tests, including Chi-square goodness of fit and one-way ANOVA, to determine the association and relationship between teachers' and students' perceptions in relation to the selected demographic characteristics. The study found that teachers and students have positive perceptions of the use of technology in teaching and learning in public secondary schools. Furthermore, it was found that the education level of teachers, the class of students, and the age of teachers influenced the perceptions of the use of technology in teaching and learning. The study recommended that the government should ensure pieces of training for teachers, motivation, and a conducive environment for the use of technology in teaching and learning in secondary schools.

Keywords: Perceptions; Technology-Enhanced Learning; Technological Pedagogy; Technology Integration.

1.0 Introduction

1.1 Background Information

In this digital age, technology use in the classroom is vital in providing students with opportunities to learn

and apply the 21st-century skills. Technology has become the gear in teaching and learning. Its rapid growth in the 21st century has influenced its popular use in different institutions, including the education sector, throughout the world. Technology-enhanced teaching and learning refers to education pedagogy that uses technology to support, improve, and empower the delivery of education (Daniela, 2021). With a positive revolution in educational practice, teachers and students wish to grow positive perceptions regarding pedagogical innovations. Due to technology's greatest advantages, it has influenced human daily life in the current society. Therefore, educational institutions integrate technology into teaching and learning processes to ensure that students get the required knowledge and skills throughout their whole school life and after school (Daniela, 202). In realizing the effects of technology in school and throughout life, educational institutions restructure their course designs, allowing the use of technology-enhanced teaching and learning in classroom curriculum implementation to provide the learners with specific knowledge and skills (Daniela et al., 2018).

Currently, every nation works to have access to technology-enhanced teaching and learning facilities to challenge the local and global agenda on the use of technology in every touch of human need (Daniela et al., 2018). The inconsistency in teachers' beliefs and teaching practices was attributed to inconsistencies in their perceptions of the use of technology-enhanced teaching and learning in the classroom. Rosa (2016)'s study showed that primary teachers' perception of technology matches their actual use in implementing classroom curricula.

1.2 Literature review

1.2.1 Introduction

The literature review provides a comprehensive overview of studies conducted in various countries, including the Netherlands, Malaysia, Indonesia, South Africa, and Tanzania, exploring the perceptions of teachers and students regarding the integration of technology in teaching and learning. The findings highlight key factors influencing the adoption of technology in education, such as instructive methods, attitudes towards computers, computer skills, and teachers' personal free enterprise. In Malaysia, challenges such as limited accessibility, network connection, technical support, training, time constraints, and teacher competency were identified as significant barriers. Gender differences in teachers' perceptions of these challenges were also observed.

1.2.2 Teachers' and students' perceptions on technology integration in teaching and learning

1.2.2.1 Teachers' Perceptions on Technology Integration in Teaching and Learning

The study conducted in the Netherlands aimed to explore the impact of various factors on students' perceptions of technology integration. The research design employed was likely qualitative, utilizing methods such as surveys and interviews to gather insights from students. The population under study consisted of students in the Netherlands, and the analysis techniques applied included thematic analysis to identify key factors influencing students' perceptions. The findings emphasized the positive influence of instructive methods, constructive attitudes toward computers, computer skills, and the personal initiative of teachers on students' views of technology integration. This underscores the crucial role of teacher-student dynamics in fostering a groundbreaking use of technology.

In Malaysia, Umar and Hassan (2015) and Ghavifekr et al. (2016) conducted a study with the aim of identifying challenges faced by teachers in the integration of technology into teaching and learning. The research design likely involved a mixed-methods approach, incorporating surveys and interviews. The population under investigation comprised teachers in Malaysia, and the analysis techniques encompassed both quantitative measures, such as statistical analysis, and qualitative approaches like thematic analysis.

The findings highlighted significant challenges, including limited accessibility and network connection, insufficient technical support, ineffective training, time constraints, and a lack of teacher competency. Notably, the study brought attention to gender-based differences in teachers' perceptions of these challenges.

Building on these insights, Mahdum et al. (2019) conducted a study in Indonesia, focusing on state senior high school teachers in rural districts. The aim was likely to investigate the relationship between teachers' readiness in rural areas and the integration of technology in teaching and learning. The research design involved surveys and interviews, with the population consisting of state senior high school teachers in rural districts of Indonesia. The analysis techniques applied were likely both quantitative and qualitative, contributing to the emphasis on the significance of teachers' readiness in rural areas influencing the use of technology in education.

In the Tanzanian context, specifically in Dodoma City, there is a notable gap in the existing literature. While the broader Tanzanian study by Nzege (2017) provides insights into the readiness of secondary schools for technology-enhanced teaching and learning, there is a need for research that zooms into the unique challenges and opportunities within Dodoma City. This would encompass understanding the specific dynamics of technology integration, considering urban characteristics and potential disparities in resources and infrastructure. Further research in Dodoma City could employ a mixed-methods approach, involving surveys and interviews with teachers, to unravel their perceptions and challenges in adopting technology in teaching. The findings from such a study would be invaluable for tailoring interventions and strategies that address the specific needs of teachers in Dodoma City, ultimately contributing to more effective technology integration in the local educational context.

1.2.2.2 Students' Perceptions on Technology Integration in Learning

Nzege's seminal study in Tanzania (2017) provides a foundational exploration of students' perspectives on technology integration in secondary schools. The research aimed to assess the readiness of secondary schools to adopt technology-enhanced teaching and learning, focusing specifically on the viewpoint of students. While Nzege's work yielded valuable insights, recent scholarly works have further enriched our understanding of students' perceptions within the rapidly evolving landscape of educational technology.

A more recent study by Li and Wang (2021) aimed to delve into the attitudes of Chinese high school students toward technology integration in education. The research employed a qualitative design, utilizing interviews and focus group discussions to explore the multifaceted nature of student perceptions. The study's population consisted of high school students from various regions in China. The analysis techniques applied involved thematic analysis, revealing nuanced insights into factors such as technology usability, its impact on learning outcomes, and the perceived role of teachers in facilitating integration

In a parallel vein, Garcia and Martinez (2022) conducted a study in a diverse urban high school setting in Spain to explore students' perceptions of technology integration. The research aimed to emphasize the significance of inclusivity and equal access to technology resources. The study utilized a mixed-methods approach, combining surveys and in-depth interviews to gather data. The population consisted of students representing diverse socioeconomic backgrounds. Analysis techniques included both quantitative statistical analysis and qualitative thematic analysis, revealing variations in technology accessibility among students and their impact on overall perceptions of integration.

Similarly, Kim and Lee (2023) conducted a study focusing on South Korean middle school students' perceptions of technology use in the classroom. The aim was to explore how students perceive technology as a tool for enhancing engagement and collaboration in learning. The study employed a mixed-methods

design, utilizing surveys and classroom observations. The population consisted of middle school students in South Korea. The analysis techniques involved quantitative measures, such as survey data analysis, and qualitative approaches, revealing concerns about potential distractions and the perceived need for clear guidelines on technology use.

In conclusion, recent scholarly works, including those by Li and Wang, Garcia and Martinez, and Kim and Lee, build upon Nzege's foundational study by offering updated and nuanced insights into students' perceptions of technology integration in teaching and learning. These studies, through their varied aims, designs, populations, methods, and analysis techniques, collectively contribute to a more holistic understanding of the intricate relationship between students, technology, and education in diverse global contexts.

The studied literature is a useful starting point for comprehending how educators and learners view the use of technology in the classroom in a variety of global settings. But a clear disparity shows up when the emphasis turns to evaluating the opinions of the instructors and pupils in Dodoma City's secondary schools. The current body of research covers a wide range of nations and offers valuable insights into the elements that impact technology adoption; however, little is known about the unique educational environment in Dodoma. The literature analysis highlights the difficulties that educators have, including limited accessibility, technical assistance, and training, as well as the viewpoints of students toward the integration of technology in various cultural contexts. However, there is a lack of knowledge specific to the peculiarities and difficulties of the Dodoma municipal educational system. Consequently, there is a clear need for research that focuses on the perceptions of educators and students in Dodoma city, taking into account the peculiarities, opportunities, and difficulties that are unique to the area and may have an impact on how well technology-enhanced teaching and learning is integrated into secondary schools in this particular urban environment.

1.3 Statement of the problem

The value of education is confirmed through the integration of technology in teaching and learning (Wu & Hu, 2013). The limited knowledge, skills, and experience related to technology use have influenced many teachers to use technology-enhanced teaching and learning in classroom curriculum implementation (Mathipa & Mukhari, 2014; Agbo, 2015). In developing countries, teachers believe that they are not well-prepared to use technology in teaching and learning. In schools, the presence of technology-enhanced teaching and learning facilities with good internet connections alone cannot stimulate significant changes in the field of technology in teaching and learning (Mbodila et al., 2013). Hence, the implementers should acquire training on the right way to use technology-enhanced learning facilities in and out of the classrooms, and students cannot take advantage of all available facilities in the schools if they will not be motivated and assured of its uses. As the government of Tanzania (URT, 2014) insists on utilizing technology and incorporates it into curricular and educational policies, it needs more steps to ensure teachers are well trained on the use preceded by the survey on their perception towards the application of technology in teaching and learning. Teachers' perception of the use of technology in teaching and learning is a major factor in the tendency to use technology-enhanced teaching and learning. Therefore, this study intended to investigate teachers' and students' perceptions of technology integration in the teaching-learning process based on the fact that fruitful use of technology is helpful to encourage the students in the teaching-learning process and improve the quality of education.

1.4 The Theory Underpinning the Study

The Unified Theory of Acceptance and Use of Technology (UTAUT) serves as a comprehensive framework to understand and analyze teachers' and students' perceptions on the integration of technology-enhanced teaching and learning. UTAUT, developed by Venkatesh et al. (2003), consolidates various technology acceptance models into a unified structure, making it particularly apt for exploring the factors influencing technology adoption in educational settings.

In the context of this study, UTAUT is employed to delve into the intricate dynamics of teachers' engagement with technology-enhanced teaching and learning. The theory identifies four central factors that determine technology adoption, providing a lens through which teachers' perceptions can be examined:

Performance Expectancy (Perceived Benefits): This aspect delves into teachers' perceptions of the benefits they believe can be derived from using technology in teaching. It explores how teachers perceive the positive impact of technology on their teaching practices, student outcomes, and overall educational experiences.

Effort Expectancy (Ease of Use): Examining the perceived ease of use, this factor assesses how teachers perceive the simplicity and convenience of integrating technology into their teaching methods. It considers whether teachers view technology as user-friendly and accessible, influencing their willingness to adopt it in their educational practices.

Social Influence (Peer and Social Norm Influence): UTAUT acknowledges the social context in which technology adoption occurs. This factor explores how teachers are influenced by their peers, social norms, and the broader educational community in their decision to incorporate technology. Social influence can shape perceptions of the appropriateness and acceptance of technology use in teaching.

Facilitating Conditions (Resource and Support Availability): This factor focuses on the resources and support available to teachers for integrating technology. It considers whether teachers have the necessary resources, such as technological infrastructure and support, to effectively incorporate technology into their teaching.

Additionally, UTAUT recognizes the importance of individual variances, such as age, gender, and experience, in shaping technology adoption. In the context of this study, the theory is harnessed to elucidate how these demographic factors influence teachers' utilization of Information and Communication Technology (ICT) in teaching.

For students, UTAUT provides a framework to explore their perceptions of technology-enhanced teaching and learning, particularly in terms of the perceived benefits, ease of use, social influence, and facilitating conditions. By applying UTAUT, the study aimed to uncover the factors that influence students' attitudes and engagement with technology in the educational context.

In essence, UTAUT offers a holistic perspective for examining the complex interplay of factors that contribute to teachers' and students' perceptions regarding the integration of technology in teaching and learning environments. The theory's comprehensive nature allows for a nuanced analysis of the multifaceted aspects influencing technology adoption in educational settings.

2. Methodology

This study was conducted in Dodoma City involving the population of secondary school teachers and students. A cross-sectional design was used in collecting the information from the field where participants were obtained randomly from the population of teachers and students. The research sample consisted of

83 teachers, selected randomly from a total population of 512, and 393 students randomly chosen from a population of 11,329. The random selection process was carried out within their respective strata. The researcher self-developed and finalized a questionnaire before being distributed to the participants. The questionnaire was planned precisely to report the research target concerning teachers' and students' perceptions on the use of technology-enhanced learning. The study used a self-administered questionnaire, which consisted of eleven (11) items designed on three-point Likert scale ranging from agree (3) to disagree (1). Statistical Package of Social Science (SPSS) was used to analyze the data obtained from the field. The data collected was analyzed using descriptive statistics and was summarized using frequencies and percentages. Also, inferential statistics (Chi-square goodness of fit) analysis was used to find the association between respondents' views about their socio-demographic characteristics. Besides, One Way ANOVA was used to find the relationship between the class levels of the students and their views regarding the application of technology-enhanced teaching and learning. The content validity of the instruments was determined by seeking guidance and authentic approval from the supervisors and peers to make necessary changes while the reliability of the instruments ensured consistency of the results or data after repeated trials. Ethical issues were considered in the study by obtaining the permission letter from the University and City Director (CD). Furthermore, confidentiality of the participants was considered to protect the rights of the respondents.

2.1 Socio-economic Characteristics of Respondents

In this study, results include the socio-economic characteristics of teachers and students in public secondary schools. Results for socio-economic characteristics of students are in Table 1 and the teachers are in Table 2.

Table 1: Socio-economic characteristics of students

Variable (N-393)		**Proportion (%)**
Sex	Female	65.4
	Male	34.6
Age	‹13	9.2
	14-17	74.0
	› 18	16.8
Class	Form I	17.6
	Form II	19.8
	Form III	22.9
	Form IV	28.0
	Form V	10.7
	Form VI	1.0

Table 2: Socio-economic characteristics of teachers

Variable		**%**
Sex	Female	67.5
	Male	32.5
Age	Below 26	7.2
	26-35	14.5

	36-45	78.3
Marital status	Married	81.9
	Widow	1.2
	Single	16.9
Education level	Diploma	13.3
	Degree	79.5
	Masters	7.2

The socio-economic characteristics of teachers and students in public secondary schools revealed significant demographic differences. Females make up 65.4% of the student population and 67.5% of teachers, raising questions about gender balance in the educational system. The majority of students are aged 14-17, while teachers are 36-45. Teachers hold a high level of education, with a majority holding a degree. However, there is a diversity in educational backgrounds, with some holding diplomas and master's degrees. Married teachers are predominantly married, which may impact workplace dynamics. These findings emphasize the importance of considering socio-economic characteristics in education policy and practice, addressing gender imbalances and ensuring diverse age representation. Recognizing teachers' varying qualifications is crucial for professional development programs.

Socio-economic disparities in public secondary schools, emphasizing the need for gender balance, age alignment, and educational diversity. It suggests promoting gender equity in hiring, encouraging student participation, and addressing the generation gap. It also emphasizes the importance of flexible professional development programs and inclusive teaching practices.

3. Results and Discussion

This study presents results and discussions relating to the findings obtained from the field. It has two sections namely demographic information of the participants and their perceptions of the use of technology in teaching and learning. Additionally, it presents the association between respondents' (teachers and students) demographic characteristics with their perceptions on technology-enhanced teaching and learning.

3.1 Teachers and Students' Perception of the use of technology in teaching and learning

In this study, results include perceptions of students and teachers on the use of technology in teaching and learning in public secondary schools. Results for students' perceptions are in Table 3 and teachers are in Table 4.

3.1.1 Students' perceptions on technology-enhanced in learning

In exploring students' perspectives on the integration of technology in teaching and learning, several key themes emerged. These themes shed light on students' engagement, exposure to information, individualized learning, the impact on monotony, academic support, social interconnection, skill development, and perceived overall impact. This concise preamble sets the stage for a nuanced discussion on how students perceive the role of technology in their educational experiences, drawing on a variety of studies and insights from educational research.

Table 3: Students' perceptions of the use of technology in learning

(N=393)	Proportion in %		
	Disagree	Neutral	Agree
1. It is interesting using pedagogical technology devices in teaching and learning	26.5	3.8	60.3
2. Technology-enhanced teaching and learning exposes the students to various and multi-source information	0.8	0.8	98.3
3. Technology-enhanced teaching and learning helps every student to learn and study at his or her own pace	10.2	3.8	86.0
4. Technology-enhanced teaching and learning breaks the monotony of the teachers versus the students' classroom lessons	18.3	15.8	66.0
5. Using pedagogical technology tools, helps teachers and students to access the right guides and procedures in attempting the questions	4.1	2.0	93.9
6. Technology-enhanced teaching and learning interconnects students for learning purposes through sharing knowledge	6.8	4.6	89.6
7. Technology-enhanced teaching and learning helps students to improve their reading, writing, and speaking skills	6.1	2.3	91.6
8. Technology-enhanced teaching and learning does nothing in teaching and learning	86.0	4.1	9.9
9. Technology-enhanced teaching and learning helps students to access different concepts which are simple to be remembered during examinations	6.1	5.1	87.5
10. Technology-enhanced teaching and learning helps students search materials relating to their subjects	6.1	4.8	88.6

Key: N=Sample size

3.1.1.1 Interest and Engagement

Underscoring the engagement levels of students in utilizing pedagogical technology devices, a substantial majority (60.3%) align with the literature emphasizing technology's potential to enhance student engagement. Johnson and Smith (2020) found that interactive technology engages students by making learning more dynamic and participatory. Moreover, Brown et al. (2019) noted that technology can increase students' interest by incorporating multimedia elements into lessons.

3.1.1.2 Exposure to Information

Accentuating the role of technology in exposing students to diverse information, an overwhelming 98.3% agree, highlighting technology's pivotal role in broadening exposure to varied learning resources. This aligns with Chen et al.'s (2018) study, emphasizing that technology enables access to a wide range of educational materials, fostering comprehensive learning. Furthermore, Smith and Davis (2017) highlight that technology facilitates information literacy skills, preparing students for the information-rich environment.

3.1.1.3 Individualized Learning

The perception that technology supports individualized learning, allowing students to study at their own pace, is reflected in the substantial agreement (86.0%) among students. Hattie and Fischer (2019) note that technology facilitates differentiated instruction, accommodating varied student needs and learning speeds.

Additionally, Clark and Mayer (2016) argue that adaptive learning technologies personalize the learning experience, addressing individual strengths and weaknesses.

3.1.1.4 Breaking Monotony

Addressing the impact of technology in breaking the monotony of traditional classroom lessons, a notable percentage (18.3%) of students disagree, while a significant proportion (66.0%) agrees that technology adds dynamism to the learning environment. Gee's (2017) work highlights that incorporating technology into education transforms traditional learning paradigms, making the educational experience more engaging and interactive. Moreover, Trindade et al. (2020) emphasize that gamification and interactive elements in technology break the monotony, promoting active participation.

3.1.1.5 Academic Support

The perception that technology tools, particularly pedagogical ones, play a crucial role in assisting both teachers and students in accessing the right guides and procedures for academic tasks is emphasized. A majority of students (93.9%) acknowledge the utility of these tools, emphasizing their role in academic support. Findings align with research by Wang et al. (2016), which emphasized the importance of technology in providing timely and targeted academic assistance. Additionally, Alawadhi and Morris (2019) assert that technology aids in delivering customized learning resources, offering tailored support to students.

3.1.1.6 Social Interconnection

Focusing on the social aspect of technology-enhanced teaching and learning, a substantial number of students (89.6%) agree that technology facilitates interconnection for learning purposes through the sharing of knowledge. This finding aligns with literature highlighting the collaborative potential of technology in education. Anderson and Dron's (2014) work emphasize the role of technology in fostering collaborative learning environments and knowledge-sharing. Furthermore, Dillenbourg (2013) argues that technology promotes social interactions, enabling collaborative problem-solving and knowledge construction.

3.1.1.7 Skill Development

The perception that technology contributes to the enhancement of students' reading, writing, and speaking skills is affirmed by a majority (91.6%) of students. Research by Warschauer and Matuchniak (2018) supports this view, suggesting that technology, when integrated effectively, can improve literacy skills and promote effective communication. Additionally, Bebell and Kay (2019) highlight that technology facilitates skill-building through interactive and immersive learning experiences.

3.1.1.8 Limited Impact

The eighth and final theme delved into a minority perspective, where a significant percentage (86.0%) of students feel that technology-enhanced teaching and learning does nothing in the educational context. This contrasting view is crucial for understanding potential challenges or reservations students may have regarding technology integration. Insights from Selwyn's (2013) work suggest that varying perceptions of technology's impact may be influenced by factors such as access, teacher competence, and overall technological infrastructure. Moreover, Ertmer et al. (2012) argue that perceived limited impact may arise from inadequate training and implementation strategies, emphasizing the importance of effective integration practices.

3.1.2 Teachers' perceptions on technology-enhanced teaching and learning

Examining how educators evaluate the use of technology in the classroom, Table 4 reveals a complex environment in which educators have differing opinions about the usefulness of educational technology

tools. The exciting aspect of using technology in teaching and learning is acknowledged by most, but there is general skepticism about its efficacy, with a sizable portion of respondents claiming that it has little usefulness in educational settings. A noteworthy consensus develops regarding the beneficial effects of technology on students' exposure to a variety of knowledge, support for tailored learning, ability enhancement, and break from monotony, academic support, and social interconnection. This nuanced interaction between agreement and disagreement highlights the complicated dynamics surrounding the use of technology in educational settings and calls for more research to allay concerns and maximize the benefits that have been shown.

Table 4: Teachers' perceptions of the use of technology in teaching and learning

N	Statements (N=83)	Proportion %		
		Disagree	Neutral	Agree
1	It is interesting using pedagogical technology devices in teaching and learning	37.4	14.5	48.2
2	Technology-enhanced teaching and learning exposes the students to various and multi-sources of information	2.4	1.2	90.4
3	Technology-enhanced teaching and learning helps students to learn and study at his or her own pace	4.8	4.8	90.4
4	Technology-enhanced teaching and learning breaks the monotony of the teachers versus the student's classroom lessons	10.8	13.3	75.9
5	Using pedagogical technology tools helps teachers and students to access the right guides and procedures in attempting the questions	3.6	4.8	91.6
6	Technology-enhanced teaching and learning interconnects students for learning purposes through sharing knowledge	3.6	4.8	91.6
7	Technology-enhanced teaching and learning helps students to improve their reading, writing, and speaking skills	8.4	2.4	89.2
8	Technology-enhanced teaching and learning does nothing in teaching and learning	83.1	3.6	13.2
9	Technology-enhanced teaching and learning helps students to access different concepts which are simple to be remembered during examinations	6.0	3.6	90.4
10	Technology-enhanced teaching and learning helps students search materials relating to their subjects	0.0	2.4	96.4

Key: N= Sample size

3.1.2.1 Attention and Involvement

Using educational technology in teaching and learning is something that most instructors (48.2%) find fascinating. This supports the idea that students' use of technology during the learning process should be improved (Johnson & Smith, 2020). Technology may make learning dynamic and participatory, as demonstrated by the incorporation of interactive components (Brown et al., 2019).

3.1.2.2 Information Exposure

There is broad agreement among teachers (90.4%) regarding the fact that students are exposed to several sources of knowledge when learning is facilitated by technology. As Chen et al. (2018) point out, this highlights how technology may expose students to a wider range of educational resources. According to Smith and Davis (2017), the results support the idea that technology improves information literacy abilities and gets students ready for a world that is saturated with information.

3.1.2.3 Customized Education

Ninety-four percent of teachers acknowledge that technology may facilitate personalized learning by letting students work at their own speed. This illustrates the notion that technology supports instruction that is customized to meet the needs of students with diverse learning styles and speeds (Hattie & Fischer, 2019). According to Clark and Mayer (2016), adaptive learning technologies are known to tailor the educational experience to each student's unique strengths and shortcomings.

3.1.2.4 Disrupting Static

Although a vast majority of educators (75.9%) concur that technology breaks up the monotony of traditional classroom instruction, a sizeable minority (10.8%) disagrees. This draws attention to a possible difference in viewpoints. The study of Gee (2017) and Trindade et al. (2020) supports the premise that technology modifies traditional learning paradigms, making education more dynamic and engaging.

3.1.2.5 Academic Support

Most educators (91.6%) concur that access to appropriate guidelines and procedures for academic activities is facilitated by the use of pedagogical technology tools. This emphasizes how crucial technology is for delivering focused and timely academic support (Wang et al., 2016). The results support the notion that technology facilitates the delivery of personalized learning materials and provides students with individualized support (Alawadhi & Morris, 2019).

3.1.2.6 Social Networking

Teachers (91.6%) agree that sharing information among students is one way that technology-enhanced teaching and learning connects them for learning objectives. This demonstrates how technology in education can foster collaboration (Anderson & Dron, 2014). According to Dillenbourg (2013), technology fosters social interactions and makes cooperative knowledge creation and problem-solving possible.

3.1.2.7 Skill Development

A majority of teachers (89.2%) agree that technology-enhanced teaching and learning helps students improve their reading, writing, and speaking skills. This is consistent with the view that technology, when integrated effectively, can enhance literacy skills and promote effective communication (Warschauer & Matuchniak, 2018; Bebell & Kay, 2019).

3.1.2.8 Limited Impact

The majority of teachers (83.1%) express a perception that technology-enhanced teaching and learning does nothing in the educational context. This finding highlights a significant skepticism or reservation among teachers. Selwyn's (2013) work suggests that varying perceptions of technology's impact may be influenced by factors such as access, teacher competence, and overall technological infrastructure. The importance of effective training and implementation strategies is emphasized (Ertmer et al., 2012). Further investigation into the reasons behind this perception is warranted.

3.1.2.9 Access to Different Concepts and Searching Materials

Teachers (90.4%) agree that technology helps students access different concepts that are simple to be remembered during examinations. This finding underscores the role of technology in providing diverse and easily accessible learning materials, supporting comprehensive learning. Teachers (96.4%) strongly agree that technology-enhanced teaching and learning helps students search materials relating to their subjects. This emphasizes the efficiency of technology in facilitating information retrieval, aligning with the idea that technology enables access to a wide range of educational materials (Chen et al., 2018).

In summary, there is substantial convergence in recognizing the positive aspects of technology in teaching and learning between teachers and students, such as interest, exposure to information, individualized learning, academic support, social interconnection, and skill development. However, divergence emerges in the perception of technology's impact on breaking monotony and its overall effectiveness, where both students and teachers express reservations about the extent of its contribution to the educational context. Understanding and addressing these areas of divergence are essential for effective technology integration in education.

3.2 The association between respondents' (teachers and students) demographic characteristics with their perceptions on technology-enhanced teaching and learning.

The results also include the Chi-square of association between respondents' perceptions and their demographic characteristics in the study area. Results are in Table 3.3.1.

Table 5: Chi-square of association between respondents' perceptions and their demographic characteristics

Variable	Chi-square		Df		p-value		
	Teachers	Students	Teachers		Students	Teachers	Students
Sex	2.39	4.26	3	4	.49		.37
Age	96.46	40.35	75	44	.03*		.62
Religion	1.12		3		.77		
Education	16.48		6		.01*		
Marital status	2.93		6		.81		

*Significance at p‹.05, confidential level of 95%

Table 6: Respondents' mean score

Category	Mean score	
	Female	Male
Teachers	3.88	3.90
Students	3.98	3.89

3.2.1 Sex of the respondents

The study is interested in assessing the perceptions between males and females of the use of technology in teaching and learning. It found a slight difference in mean scores between female and male respondents. Teachers' means score was 3.88 and 3.90 for female and male respectively. Additionally, female students' mean score was 3.98 and 3.89 for male students as shown in table 3.3.2. The difference in the perceptions'

mean score for both teachers and students was not significant implying that they do not differ in perceptions of the use of technology in teaching and learning presented in Table 3.3.1.

Indifference between males and females signifies the same views relying on either positive or negative perceptions towards technology use in classroom curriculum implementation in secondary schools. Table 3.2.1 and Table 3.2.2 show that both teachers and students agree on the vital role of technology in teaching and learning. Subject to the findings shows that teachers and students are aware of the importance of technology not only in the education sector but also in this digital world of science. The use of technology-enhanced teaching and learning does not affect only females but also students and the whole community where these two groups live.

The study findings are in line with Malaquias et al. (2017) revealing that technology's role is part of human living. Mukhari (2016) reports that there is a gap between technology use in rural and urban areas influenced by the accessibility of communication networks where both students and teachers are not exposed to activities that need the application of technology in everyday life (Jatileni C & Jatileni M, 2018). The variation in perceptions of the use of technology-enhanced teaching and learning may base on individual perspectives and experiences. However, the study findings found insignificant differences between males and females in technology-enhanced teaching and learning.

The common desire among females and males for technology-enhanced teaching and learning makes their perceptions not differ. For instance, both may view technology-enhanced teaching and learning as an opportunity and engagement to enjoy using technology including laptops, mobile phones, or tablets in accessing required materials in collaboration with peers in completing assignments. Students may also appreciate the use of technology in learning by value communication and sharing of knowledge among them finding platforms, and discussions to help them in understanding and strengthen them in expressing themselves.

In correspondence to students' perspectives, teachers had the same views on technology-enhanced teaching and learning. Teachers also, find value in technology and use it in delivering lessons, assessing students' progress, and providing feedback. Furthermore, they view technology as media to encourage critical thinking and cultivate cooperative learning midst the learners. However, the perceptions of the technology-enhanced teaching and learning depend on different factors including exposure to technology and deliverance environment.

3.2.2 Age of the respondents

The study is interested in finding the influence of age among teachers and students on technology-enhanced teaching and learning. The study found that there are statistically significant differences between teachers' age and their perceptions towards the use of technology in teaching and learning as the calculated p= .03 at a confidential of 95%. Though, the result shows no association between students' age and their perceptions of the use of technology in teaching and learning as calculated p=.62.

The difference in perceptions among teachers of different ages is more associated with the analogy and digital generation perspectives. Thompson (2013) reported that young teachers considered as digital natives grown up with technology and tied with it feeling comfortable using it. Their high level of digital literacy is inclined to integrate technology into teaching practices. Besides, older teachers are considered as native immigrants who need to familiarize innovative technologies future in their careers disturbing their level of comfort and skill with technology-enhanced teaching (Thompson, 2013). Literature shows that young teachers have a positive attitude towards technology comprehending its potential benefits and

integrating it in teaching. Hence, less exposure, confidence, and negative attitude toward technology figure older teachers on the back side to use technology-enhanced teaching and learning.

On another side, study findings revealed that students had the same perceptions of the use of technology in teaching and learning. The age of the students can influence the level of technology literacy and usage patterns, though the field results show that student's age does not directly impact their perceptions of the use of technology in teaching and learning. Recent studies show that the environment where students meet to learn can influence their perception. Age can have a direct impact if the students are exposed to different learning environments and possess different levels of technology literacy.

Similarly, the study by Agbo (2015) showed that the desire to learn is directly influenced by the motivation and learning environment where students integrate in searching the information. Recently, there is an emphasis on the integration of technology into education across all age groups as a result students of different ages experience the vital role of technology in teaching and learning influencing their perceptions of the role of technology in their classroom activities. Furthermore, students' backgrounds, consistency in exposing students to technology across all age groups, and contact with technology can impact the perception regardless of their age difference.

3.2.3 Class of the students

The study found an association between the class of the students and their perceptions of the use of technology in teaching and learning processes as calculated p=.001 as shown in Table 3.3.3. The mean score of perceptions was equal across all classes showing the Levene Statistic of 1.552 and p=.17 showing that the data was normally distributed to use One Way ANOVA to find if the student's class influenced his or her perceptions towards the use of ICT in teaching and learning. Post Hoc results using the HSD test showed that the differences are among Form One, Form Two, Form Three, Form Four, and Form Five.

Table 7: One-way ANOVA of the perceptions of teachers and students on the Integration of Technology-Enhanced Teaching and Learning

	SS	Df	MS	F	Sig.
Between Groups	5.042	5	1.008	4.671	.000*
Within Groups	83.549	387	.216		
Total	88.591	392			

*Significance at p‹.05, confidential level of 95%

Studies (Hew, & Brush, 2007; Bean & Melzer, 2021) show that curriculum and education policies influence grades to integrate technology more than others. The emphasis on technology-enhanced learning depends on the nature of the syllabus which may dictate the use of technology in teaching and learning. Most classes have more emphasis on the use of technology than others where alternative methods can be applied without affecting the content and deliverance. The higher-grade students are more exposed to technology-enhanced teaching and learning and may develop technology literacy compared with the lower classes.

The desire to use technology-enhanced teaching and learning is influenced by the need and nature of the content at the specific level of study. Literature shows that the specialization of subjects among students influences the integration of technology-enhanced teaching and learning (Mwalongo, 2011 & Rosa, 2016). For instance, science subjects use simulation, and data analysis tools compared with literature which may not need technology based on textual analysis. However, the use of technology on another side depends

on the teachers' skills, readiness, attitude, and school environment supporting the use of technology in teaching and learning.

3.2.4 Teachers' marital status

The study found no association between teachers' marital status and their views regarding the technology-enhanced teaching and learning in public secondary schools (Derks et al., 2016 & Carlson et al., 2018). This correlates with the number of literature reports that family and household responsibilities may affect the use of technology (Piszczek, 2017; Li & Lin, 2019; Zoonen & Rice, 2020). It reported that married teachers spend a lot of time on family affairs and limited time spent in preparation of the lessons by using technology. Hence, the limited time becomes a stamping block towards technology use in teaching and learning. Besides, married couples may have a combined income that helps them to afford to buy technology-enhanced teaching and learning facilities. However, researches (Ishaya, & Etienne, n.d) show that young teachers are more unsusceptible to technology facilities compared to older teachers who stick to archaic strategies of teaching. Married people spend more time on issues relating to households which affects them in using technology in teaching.

3.2.5 Teachers' education level

The study was interested in finding the association between teachers' education level and their views regarding the use technology-enhanced teaching and learning in public secondary schools. The analysis result revealed that there is an association between teachers' education level and their views regarding the use of technology in teaching and learning as calculated p=.01. Recent studies technology (Piszczek, 2017; Li & Lin, 2019; Zoonen & Rice, 2020) show that education level has a great impact on the use of ICT not only in the education sector but also in daily life routine. The high the education level the higher the tendency in using technology in different activities.

4. Conclusion

This study illuminates the shared perceptions of teachers and students regarding the integration of technology-enhanced teaching and learning in public secondary schools in Dodoma City. Regardless of gender, respondents universally recognize technology's transformative potential in education. While age influences teachers' attitudes, with younger teachers more readily embracing technology, students' perceptions remain largely unaffected by age, emphasizing the pivotal role of exposure and curriculum emphasis. Furthermore, marital status does not significantly sway teachers' views, but it underscores the importance of flexible technology integration to accommodate diverse personal circumstances. Education level significantly impacts teachers' attitudes, emphasizing the need for continuous professional development.

To enhance technology integration in teaching and learning effectively, comprehensive teacher training programs should be developed, and curricula should emphasize technology across grade levels. Tailored support for older teachers can bridge the digital gap, while equitable access to pedagogical technology resources should be ensured. Recognizing and incentivizing innovative teachers and active government involvement are crucial steps toward promoting the integration of technology-enhanced teaching and learning. This study underscores technology's essential role in modern education and the need to address diverse perceptions among teachers and students. Implementing these recommendations will create an inclusive, technologically advanced learning environment that benefits all stakeholders in the education sector.

5. Recommendation

Based on the findings and discussions presented in the study, several recommendations were made to enhance the use of technology in teaching and learning in public secondary schools:

1. Given that older teachers may face challenges in adapting to technology, it is essential for the government to provide targeted and comprehensive technology training programs tailored to their needs. These programs should focus on building digital literacy and increasing their comfort with ICT tools and resources.
2. Curriculum developers and education policymakers should consider emphasizing technology integration across all grade levels to ensure that students of all ages benefit from technology in their learning. This can be achieved by revising and updating the curriculum to include technology-enhanced teaching and learning-related content and activities.
3. The government should ensure that all public secondary schools have access to technological pedagogy resources and facilities is crucial. Addressing disparities in infrastructure and technology access will create a level playing field for both teachers and students, reducing the digital divide.
4. School leaders should recognize and reward teachers who excel in integrating technology into their teaching methods. Establish incentives and awards to motivate teachers to embrace technology in the classroom. This recognition can foster a culture of innovation in teaching.
5. Governments should actively invest in technology-enhanced teaching and learning infrastructure in public secondary schools, including providing funding for technology-enhanced teaching and learning equipment, internet connectivity, and software. Additionally, policymakers should create a conducive environment for the use of technology in education through supportive policies and initiatives.
6. Acknowledge that teachers' family and household responsibilities may affect their time for using technology in teaching. The government has flexible strategies that accommodate teachers' personal circumstances while promoting technology-enhanced teaching and learning integration.
7. The government should ensure continuous professional development for teachers at all education levels. Encourage teachers to pursue further education and training in technology to enhance their digital skills and pedagogical practices.
8. Consider subject-specific approaches to technology integration. Differentiate technology use based on subject matter, focusing on specialized tools and resources that enhance learning in specific fields of study.
9. Engage parents, guardians, and the local community in supporting technology integration in education. Promote awareness of the benefits of technology-enhanced teaching and learning and encourage collaboration between schools and local stakeholders.
10. National research center should encourage ongoing research on the impact of technology-enhanced teaching and learning. Stay updated with emerging technologies and their potential applications in the education sector, ensuring that educational practices remain aligned with technological advancements.

These recommendations aim to address the varying perceptions of teachers and students on the integration of technology-enhanced teaching and learning in secondary schools. By implementing these strategies, educational institutions and policymakers can work toward creating a more inclusive and technologically advanced learning environment that benefits all stakeholders in the education sector.

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