

Investigation on Perception of the Utilization of ICT Tools for Instructional Material Delivery in Schools: Case Study of Selected Tanzanian Secondary Schools

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Abstract The purpose of this study is to investigate the perception of the utilization of Information and Communication Technology (ICT) tools for instructional material delivery in secondary schools in the Eastern South Tanzania regions. The study explores perceptions regarding secondary school students' utilization of ICT. The target population was extracted from two districts in five regions. Both probability and non-probability sampling procedures were used to select the sample. Headteachers were carefully chosen, while teachers were selected through stratified and simple random sampling. A total of 300 respondents from six secondary schools in Tanzania participated in this study. Primary data were collected using a questionnaire. With the help of statistical software, inferential and descriptive analyses were done. The findings of the study revealed that most of the respondents have positive attitudes toward utilizing ICT in delivering secondary school. Strategies on how to improve the utilization of ICT in the school have been suggested. The greatest result of utilizing ICT in the secondary education system will finally be the economic appliance of Tanzania by preparing students for the innovative technological knowledge-based economy. Recommendations on issues relating to ICT infrastructure and use have been given.

Keywords ICT Tools, Perception, Education,

Teachers, Students

1. Introduction

The application of ICT tools in teaching and learning is now growing rapidly [1]. Due to unavoidable circumstances, technology has been integrated into the curriculum design and its implementation to provide a teaching and learning platform that functions for both educators and learners across the globe [2]. Technology has played a greater role to enhance students' performance at school [3]. Educators now have an access to a world of new technological tools, transforming the way people teach, learn, and work. Furthermore, it has not only made education more accessible but even more meaningful and customized. An important factor that determines whether or not teachers will use technology to supplement teaching and learning is the way they perceive their teaching.

The effective utilization of ICT tools as instructional materials delivery medium to be incorporated in teaching and learning for secondary school subjects is the most critical factor toward students' better performance. The government of Tanzania has taken a step forward in considering the potential of digital technologies to improve

instructional material delivery and the quality of education to cope with the world. The government introduced the first National ICT Policy in 2003 to support the adoption of digital technologies in the education sector [3]. Effective utilization of ICT tools in many rural and urban secondary schools in Tanzania faces multiple challenges.

The study conducted in India [4] reported the challenges facing most third-world countries concerning ICT and education. The challenges include; ICT infrastructure in education, power supply as well as the low number of ICT trainers. About 61% of schools in Tanzania have an access to ICT tools [5].

This study relies on addressing the perception of the effective utilization of ICT tools for instructional material delivery in selected secondary schools.

1.1. Objectives of the Study

- (i). To identify the type of ICT tools and their effectiveness in instructional material delivery in selected secondary schools.
- (ii). To determine the perception of both teacher and students on the utilization of ICT tools in instructional material delivery toward academic performance in school.
- (iii). To find out the challenge that arises and suggest possible solutions from the applications of ICT tools as a medium for instructional material in school's/classrooms secondary schools.

2. Related Work

2.1. ICT in Education

Computers started to be used in schools and university classrooms in the early 1980s. The government of the United States of America was the first country to have the financial plan of the country for the use of technology in schools. The US Section of Training has capitalized up to US\$ 1 billion in the use of technology in public schools [1]. The use of ICT in schools improved teaching and learning in schools thus other countries were influenced to integrate ICT in schools. For example, in 2008/2009 the government of the United Kingdom used about £2.5 billion to invest in educational ICT [6]. The use of ICT tools for delivering has improved, from gaining basic computer skills to computer-aided teaching, communications and research. This has been enhanced by the junction of computer and telecommunication technologies, particularly the use of software, e-mail, and the Internet. The expansion has resulted from various efforts, and a wide variation in levels of ICT integration into education syllabus, as persistent by social and economic situations of individual countries and regions [7].

2.2. Perceptions of Using ICT in Secondary School

The reason for ICT tools to be applied in school or not, remains a undecided phenomenon [8]. There are many perceptions reported about this situation. The author of the article [9] reported that teachers' perception of ICT tools has influenced their acceptance of the application of ICT tools in the process of teaching and learning. Teachers' attitudes and beliefs have been playing a vital role in of application of ICT tools as well as the implemented ICT curriculum in schools to make easy learning [10,11]. Authors [6,1,12] present the Teacher' negative attitudes towards the application of ICT technology in education because it has led to massive failure, mismanagement of time, and poor handwriting.

2.3. Importance of ICT in Secondary School

Many studies have been conducted on using ICT in secondary school and currently examined how ICT if implemented effectively, can have a positive impact on both students and teachers, according to [13] who presents that the position of ICT tools can raise educational goals, such as the development of knowledge, increasing innovation and creation among individually increase cooperation between teachers and students, and facilitation of reflection during the whole process of teaching and learning. The article [7] indicates the use of ICT can make lessons or programs more interesting and more enjoyable for both teachers and students, more different, more motivating, and more supportive of productive learning and teaching." The author [5,14,15], reported the opportunities resulted by the use of ICT for learning, which makes it become a more interactive and cooperative process. When ICT tools are used for delivery, it makes enjoyable learning activities, promotes learners' autonomy, and increases motivation among students and teachers [5,15-16] present four advantages of using ICT in the classroom for gifted students as: the ability to control the presentation visually; the creativity and innovation increasing between teacher and student; the fast response to both teacher and students, if the item is well defined in the computer, then the response is given in no time. Teachers and students can adapt and use ICT tools and software that suit their needs and levels of knowledge.

3. Methodology

The total of 30 public and private secondary schools from six regions was selected. The choice of schools followed the ICT policy from the Ministry of Education and Technology student-computer ratio [17]. In each region, three public secondary schools and two private secondary schools were chosen from urban and rural area. A total of 360 questionnaires were received, 60 from teachers and 300 from students as shown in Table 1.

Table 1. Targeted Sample Size from Selected Secondary Schools

Name of Schools	Number Schools	Number of Respondents
Morogoro	5	60
Pwani	5	60
Dar es Salaam	5	60
Dodoma	5	60
Tanga	5	60
Singida	5	60
Total	30	360

3.1. Data Analysis

The analysis of the data was done through the use of computer software IBM-SPSS v19, which is capable of analyzing descriptive data as well as numerical data. Descriptive analysis used the demographics of the participants, then Analyses of Variance (ANOVA) presented the differences in perceptions.

Table 2. Demography of respondents (age range of students)

	Frequency	Percent
Valid 10-13	53	18.9
13-16	69	23.3
Valid 16-19	99	31.7
19-22	79	26.1
Total	300	100.0

Table 3. Demography of respondents (age ranges of teachers)

	Frequency	Percent
Valid 22-26	28	46.7
26-30	12	20.0
Valid 30-34	10	16.7
34-38	8	13.3
38-42	2	3.3
Total	60	100.0

4. Data Findings and Discussion

The table includes prior information of the respondents (both students and teachers as educational stakeholders), as a selected sample population, particularly their Gender, Age, such data is often collected, to meet the

specification/appropriateness of the sample population as presented in Tables 2 and 3.

4.1. Identification of ICT Tools

The availability of ICT tools and the effectiveness of those materials might enhance the utilization of these tools as the media for instructional materials delivery during the implementation of the teaching and learning process since such technological tools arouse morale among students as research employed different techniques on particularly Questionnaire that was directed to both educational stakeholders (teachers and students) on identifying the available and effective ICT tools in secondary schools and the results from various sample population presented in Tables 4, 5 and 6.

Table 4. Response to availability of ICT equipment in school

	Frequency	Percent
Valid Desktop computer	40	11.1
Laptops	100	27.8
Printer	32	8.9
Scanner	40	11.1
Tv	60	16.7
LCD projector	30	8.3
Radio	58	16.1
Total	360	100.0

Table 5. The number of equipment available

	Frequency	Percent
Valid Less than 5	160	44.4
About 10	120	33.3
Greater than 10	80	22.2
Total	360	100.0

Table 6. School having enough ICT materials

	Frequency	Percent
Valid Yes	40	11.1
No	200	55.6
Satisfy	120	33.3
Total	360	100.0

Table 7. Perception of using ICT towards the academic performance of students

	Frequency	Percent
Valid		
Raise students' awareness of the subject	62	20.0
Simplify the learning process for the students	56	15.6
Contribute to the development of new knowledge for the students	72	14.4
Source of employment opportunity	80	22.2
Reduce the thinking capacity of the students	40	11.1
Provide learning material to the students	60	16.7
Total	360	100.0

Table 8. Challenges associated with the use of ICT instruction material in schools/ classroom in secondary school

	Frequency	Percent
Valid		
Lack of trained/skilled teachers	14	23.3
Financial problem	16	26.7
Shortage of power source	12	20.0
Inadequate ICT materials like computers	8	13.3
Poor network in some areas	10	16.7
Total	60	100.0

Table 9. Possible solutions to improve ICT practices in your school

	Frequency	Percent
Valid		
Facilitation of ICT materials like computers and network	14	23.3
Establishment of ICT as a subject like other subjects	12	20.0
Availability of power sources in school	16	26.7
Government support through employing many ICT teachers	10	16.7
Rewards and provision of funds to the teachers and students who study ICT	8	13.3
Total	60	100.0

Also, the researcher went through Direct observation to identify the type of available ICT tools while assessing its effectiveness in the implementation of teaching and learning process as the modern advisable means of instructional material delivery in secondary schools since widening the understanding capability as well enabling students' memorialization of the contents whereby in a school where there are enough and effective (Functioning) ICT tools shows quite different strategic teaching and learning skills compared to schools with little or no ICT tools, as the schools with enough and effective ICT tools in which both teachers and students engage much on their duties, as a result, developing the well-adapted implementation of teaching and learning process but it is less for schools with few or no ICT tools.

Thus, the researcher realized that the availability of ICT tools in schools is of high necessity for rising morale and developing well-adopted strategic skills for both educational stakeholders (Teachers and Students) in a school-based context.

4.2. Perception of Both Teacher and Students on the Utilization of ICT Tools

The perceptions of educational stakeholders (both teachers and students) toward the utilization of ICT tools for instructional materials delivery in secondary schools vary a lot based on the factual realities among those educational stakeholders, such factual differences assisted the researcher to undertake the study to fulfill the study's

main objectives. After being asked to give their perception, a sample response was “The utilization of ICT tools toward instructional material delivery in secondary schools is much better and crucial for the enhancement of educational achievement since it affects the concentration of both teachers and students during implementation of curricular objectives”.

Another respondent representing the head of the particular Secondary reported “The application of ICT tools as the medium for instructional material delivery in schools (secondary) should be implemented by all schools at rural and urban schools while policy should be made on consideration of technological innovation as far as to increase market competition of educational product as the ICT tools application reduces digital divide for both educational stakeholders (teachers and students)”.

The situation granted the chance for the researcher to go further and employed another research tool for data gathering which is a questionnaire coined for both teachers and students to assess their factual perception of the utilization of ICT tools on instructional material delivery in secondary schools where the results pertained from the analyzed data are presented in Table 7.

Therefore both teachers and students as educational stakeholders perceive both positively and negatively the utilization of ICT tools for instructional material delivery that is based on the fact that positive perception is highly guided by many benefits of its application such as easy attendance of curricular objectives, ensures students’ participation into the whole process while negative perception toward the utilization of ICT tools for instructional material delivery based on some challenges is associated with its application such as less or (un) promising competence of operations of those ICT tools by teachers and students and also inadequate man powers.

4.3. Challenges Arise from the Applications of ICT Tools and the Possible Solution to Improve ICT Tools Application

The study also aimed at finding out the challenges that arise from the application of ICT tools as medium for instructional material delivery in secondary schools and suggestions on possible solutions to improve ICT tools application for instructional material delivery for better academic improvements whereby researcher went through different data gathering tools. Primary data concerned with fulfillment of this objective was a direct observation from the field areas as the researcher observed several challenges such as poor organization of contents shown by both teachers and students due to ICT tool incompetence, also time consuming since the exposure of many unrealistic/ irrelevant teaching and learning resources as a result of poor understanding by students. From such kind of challenges, a researcher suggests the possible solution is retraining of teachers on the operations of those ICT tools, also more emphasis on the remarkable relevant teaching

and learning resource lastly. A researcher employed questionnaire as a tool for secondary data source where educational stakeholders exposed objective questions so as to fulfill the study key objective as questions aimed to examine the challenges arising from and the possibility of such associative challenges, as analyzed and represented in tables 8 and 9.

However, there are several problems associated with the application/ utilization of ICT tools as the medium for instructional material delivery in secondary schools. There are more benefits of utilizing ICT tools for achieving better academic performance by students when implemented as the instructional material delivery means to secondary schools as far as recommended on the next chapter.

5. Summary of Findings

The main purpose of this study was to investigate the perception of the utilization of information communication technological tools for instructional material delivery in secondary school. The study was guided by five specific objectives and five research questions which lead to the answers to the findings. The literature review was based on ICT in education, perception of using ICT in secondary school, and the importance of ICT in secondary school, which makes the literature review complete.

Many methods of data collection were used, but the questionnaire was the most used for both teachers and students whereby they can respond very politely with good cooperation, because it was the simplest method of data collection and easy for a collection of data. The question was an open-ended question which simplifies easily a collection of data.

The study used research design methods both qualitative and quantitative techniques. Quantitative data was analyzed by SPSS and summarized using descriptive statistics such as frequencies, percentages, mean, and standard deviation, and presented in tables, graphs, and charts. Qualitative data was presented in narratives.

The study findings show that the key ICT equipment found in secondary school was laptops followed by TV and radio as well as desktop computer. There are many ICT equipment found in many secondary schools. But the ICT equipment remains a big problem in our school because there are very few.

Also, the finding shows that the perception of both teachers and students towards academic performance indicates negative and positive perceptions toward academic achievement but many of the respondents, from both teachers and students, show a positive perception of their academic performance.

Teachers have shown a positive impact towards using ICT equipment because it is believed that it will be able to increase motivation and interest in the students to learn, save time, and improve critical thinking of students. It also facilitates the easy search of materials for the students.

Finally, it shows the challenges and possible solutions towards using ICT materials for the attainment of student academic performance, and findings show how the use of ICT equipment plays a big role in students' performance.

6. Conclusions

This conclusion was made based on the findings of the study, which was guided by five specific objectives and research questions.

Regarding the availability of ICT equipment in schools, it was concluded that the laptop was the most common ICT facility found in many schools but many of them are owned by the teachers and not the school. It seems that there are inadequate ICT facilities in many schools, and this is because there are schools that have no electricity, so it's difficult to run different equipment. Furthermore, some remoteness of some schools made it fail to own different ICT equipment. Also, most of the schools were not able to utilize the available facilities due to the absence of appropriate software.

Perception of students on using ICT materials towards their academic performance is generally positive because the use of facilities can play a big role in their side, for example, it simplifies the process of learning through easy searching of materials online, develops knowledge from the low level of thinking to a higher level of thinking, making learning to be more familiar to them also it provides learning materials to them.

Perception of teachers on using ICT materials towards the academic performance of students is also generally positive because they believe that the use of ICT tool motivates students and makes learning active, concept easy to be understood, and it saves time, especially during media preparation, also helps in the accessibility of teaching and learning materials.

About challenges associated with the use of ICT instruction material in schools/classrooms in secondary school, many challenges hinder students and teachers to fail to use facilities in secondary school such as a lack of skilled and trained teachers which will make it easy for them to use facilities, financial problems, shortage of source power, poor network in some areas and also inadequate ICT materials like the computer in many schools.

There are several possible solutions to improve the use of ICT materials in a secondary school which are the availability of power sources in school, government support through employing many ICT teachers, the establishment of ICT subjects in school like another subject, provision of fund which will help to buy many ICT tools, facilitation of ICT materials and software.

Generally, it was concluded that the utilization of ICT materials in secondary school can be improved by handling challenges related to availability, adequacy, and utilization

of ICT materials in the respective school.

7. Recommendation

The following recommendation was made to various relevant stakeholders concerning the perception of the utilization of information communication technological tools for instructional material delivery in secondary school. The stakeholders which are involved are teachers and students.

Government should ensure that they employ many ICT teachers in school, also they should provide enough ICT equipment to different schools to increase student performance as well as increase skills and knowledge to the student.

The establishment of an ICT subject in school like another subject will enable students to acquire skills and knowledge; it also will make the student more familiar with ICT issues and be able to solve problems by themselves.

Also, the government should provide funds or money to their school so that they will be able to buy as many ICT materials as possible they can. If the school has enough ICT tools, it will enable the student to engage themselves in using those facilities which will make them acquire more skills and knowledge.

Teacher's willingness on using ICT tools in the whole process of teaching and learning process means that teachers should be ready to use the facilities which are found in their school because this will also enable them to use them in different activities such as registration of students, preparing students results, preparing school budgets and other activities.

Another recommendation is that schools should include the purchase of ICT hardware and software facilities in their budgets to avoid inadequate hardware and software facilities in their schools.

Another recommendation is that government should create a conducive environment for both teachers and students toward implementation of ICT in secondary school through the establishment of power source (electricity) in schools. Finally, the teacher should develop creativities at an individual level to improve their ICT skills by joining computer classes privately. This will enable them to be more competent on utilization of ICT tools to increase students' academic performance.

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REFERENCES

- [1] D. Levy, D. Navon, and R. Shapira, "Computers and Class," *Urban Educ.*, vol. 25, no. 4, pp. 483–499, 1991, doi: 10.1177/0042085991025004010.
- [2] N. M. Khan and K. Kuddus, "Integrating ICT in English language teaching in bangladesh: teachers' perceptions and challenges," *Rupkatha J. Interdiscip. Stud. Humanit.*, vol. 12, no. 5, pp. 1–10, 2020, doi: 10.21659/RUPKATHA.V12N5.RIOC1S23N1.
- [3] P. R. Manyengo, "Digitalization in teaching and education in the United Republic of Tanzania and the teaching profession project Digitalization in teaching and education in the United Republic of Tanzania."
- [4] Charania, P. Yadav, D. Sarkar, R. Avadhanam, and S. Sen, "ICT and Education interventions in India: Teachers' perspectives on challenges in government schools," no. 95.
- [5] M. Selemani, V. A. Ndume, and D. H. Kisanga, "Integrating ICT in Tanzania Secondary Schools: Experience of Tanzania as it Grows to Second World Economy," no. December, 2021, doi: 10.47310/ajel.2021.v02i05.010.
- [6] M. Jakubowski, "Computers At Schools: It'S Not Enough To Have Them and It'S Not Enough To Use Them," no. May, 2014, [Online]. Available: www.ibs.org.pl.
- [7] K. A. Nihuka, "Information and Communication Technology (ICTs) in Education: The contribution of communities of practice," *Huria - J. Open Univ. Tanzania*, vol. 12, no. 1, pp. 1–14, 2012.
- [8] T. M. Silviyanti and Y. Q. Yusuf, "EFL teachers' perceptions on using ICT in their teaching: To use or to reject?," *Teach. English with Technol.*, vol. 15, no. 4, pp. 29–43, 2015.
- [9] P. Pardede, "EFL Secondary School Students' Perception of ICT Use in EFL Classroom," *J. English Teach.*, vol. 6, no. 3, pp. 246–259, 2020, [Online]. Available: <https://ucc.idm.oclc.org/login?URL=http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1273051&site=ehost-live>.
- [10] A. A. Barakabitze, E. J. Kitindi, C. Sanga, G. Kibirige, and N. Makwinya, "Exploring Students' Skills and Attitudes on Effective Use of ICTs: Case Study of Selected Tanzanian Public Secondary Schools," *Univers. J. Educ. Res.*, vol. 3, no. 6, pp. 407–425, 2015, doi: 10.13189/ujer.2015.030609.
- [11] Y. Daudi and J. L. Nzilano, "ICT integration in teaching and learning : perceptions and practices of secondary school students in Tanzania," *Univ. Dar es Salaam Libr. J.*, vol. 14, no. 2, pp. 38–52, 2019.
- [12] P. A. Ertmer, "Addressing first- and second-order barriers to change: Strategies for technology integration," *Educ. Technol. Res. Dev.*, vol. 47, no. 4, pp. 47–61, 1999, doi: 10.1007/BF02299597.
- [13] UNESCO, "Information and Communication Technologies in Secondary Education. Position paper.," *UNESCO Inst. Inf. Technol. Educ.*, pp. 1–24, 2004.
- [14] L. V. Ngeze, "ICT Integration in Teaching and Learning in Secondary Schools in Tanzania: Readiness and Way Forward," *Int. J. Inf. Educ. Technol.*, vol. 7, no. 6, pp. 424–427, 2017, doi: 10.18178/ijiet.2017.7.6.905.
- [15] S. Kaur and Meenu, "Importance of ICT in Education for Gifted Students," *Issues Ideas Educ.*, vol. 1, no. 2, pp. 211–219, 2013, doi: 10.15415/ie.2013.12016.
- [16] S. Ghavifekr and W. A. W. Rosdy, "Teaching and learning with technology: Effectiveness of ICT integration in schools," *Int. J. Res. Educ. Sci.*, vol. 1, no. 2, pp. 175–191, 2015, doi: 10.21890/ijres.23596.
- [17] URT, "Information & Communication Technology (ICT) Policy for Basic Education," *Minist. Educ. ad Vocat. Training(MoEVT)*, pp. 1–30, 2007, [Online]. Available: <http://www.moe.go.tz>.