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# The Perception of Students on the Use of ICT Tools to Learn Mathematics in Gasabo Selected Public Secondary Schools

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***Abstract***: *Studying students' perception toward the use of ICT tools to learn mathematics is significant for improving education, informing policy decisions, and ensuring that students are adequately prepared for the digital age. It can contribute to more effective teaching and learning strategies. Within the purpose of determining how students felt about using ICT tools to learn mathematics, the present investigation was carried out in two public secondary schools in Rwanda's Gasabo District. A survey design was used for the investigation. The population of the study was 241 students. A simple random sampling technique was employed to select the sample of 150 students in the senior six who participated in this study. Questionnaires were used to collect the data that was displayed. The collected data was weighed using the mean. The 136 students who handed back the questionnaires for the current study had an average mean of 3.66, indicating that they had an overall positive perception of using ICT tools to learn mathematics. Nevertheless, the ability to learn mathematics using ICT tools remained below baseline. The results of this study add to the body of knowledge on the efficient use of ICT tools in mathematics teaching and learning.*

***Keywords***: *ICT tools, Learning Mathematics, Perception of students, Secondary schools*

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## 1. Introduction

The primary objective of teaching and learning is to create successful learners. It is essential for making the process of gathering, integrating, and exchanging information easier, all of which enhance a person's quality of life. In addition to improving financial resources and manufacturing effectiveness, learning serves as a crucial tool for building interpersonal relationships in all spheres of daily life, such as social, political, and economic. In other words, progress has been speeding up thanks to ICT for a century now. Technology keeps influencing and improving our lifestyles while becoming more pervasive, approachable, and accessible. As a result, the education sector cannot completely resist it. Additionally, it appears that information is updated on the internet and made easily accessible to anyone who wants to understand too much. Some of the ICT tools used in the educational process include computers, projectors, technological whiteboards, and other technological equipment (Babajide & Bolaji, 2003; Rani & Anisha, 2017; Essuman, Korda, Essigyan, Febiri, & Aboagye, 2022). Although each of the three approaches can improve performance, they also

produce different results. For instance, learners learn more successfully when utilizing the integrated technique because they are presented with difficulties that extend beyond the confines of their previous knowledge and aid in their quest for a deeper comprehension of the subject they are investigating. Contrarily, the improvement method enables pupils to create their own arguments. On the other hand, the complementary approach liberates the students to complete specific tasks in a more efficient manner.

# 2. Literature Review

## 2.1. ICT tools in Mathematics learning

The teaching and learning of mathematics have been greatly enhanced by the integration of ICT technologies, such as smartphones, tablets, laptops, internet access, smartboards, projectors for overhead use, mobile phones, and portable calculators, into the system of schooling (Aribasala, 2006; Rubagiza, Were, & Sutherland, 2011; Alkahtani, 2017; Essuman, Korda, Essigyan, Febiri, & Aboagye, 2022; Mati & Haruna, 2020; Osondu, Ogbonna, & Umeh, 2022; Munyengabe, Haiyan, & Yiyi, 2018; Tella, Toyobo, Adika, & Adeyinka, 2007; Turinumukiza, Mbanzabugabo, & Uwamahoro, 2021) ICT integration in mathematics teaching and learning is the most effective technique to increase students' comprehension of the many mathematical concepts because mathematics is crucial to science and technology. Educators ought to be ready to work with a range of technologies during instruction in order to make the learning process enjoyable, but technology ought to be used merely to overcome difficulties and challenges in the current environment given that learning is built on a child-centric approach. The advantages of incorporating technology into the teaching of a number of subjects in both primary and secondary schools have become the subject of several research studies. According to the research, using technology enhanced student academic performance, which raised the level of information provided to students. Additionally, it has been observed that a large number of students lack motivation to learn mathematics and struggle to comprehend and evaluate mathematical problems (Nawzad, Rahim, & Wakil, 2018). Mathematical concepts and competencies such as numerals, fractions, the four operations, geometric forms, problem-solving, and measurements are included in the learning environment to help pupils operate independently in society (Baglama, Yikmis, & Demirok, 2017). Therefore, Galligan, Loch, McDonald, and Taylor (2010) highlighted that students must develop an atmosphere that optimizes their learning opportunities in order to gain these abilities. Thus, in order to create such an atmosphere, technology is viewed as one of the most effective instruments for motivating and supporting students in comprehending the practical uses of mathematical activities (Scharaldi, 2020).

The problem addressed by this study was the gap in knowledge about students' perception of using ICT tools to learn mathematics. The success of such integration depend heavily on students' willingness and competency. The motivation behind this study lies in the potential of ICT tools to improve teaching and learning, particularly in subject of mathematics. This study seeks to delve into the perception of students regarding the use of ICT tools to learn mathematics. By exploring their viewpoints, the research contributes to the effective integration of technology in mathematics education, leading to enhanced teaching and learning practices and improved learning experiences for students in perspective of the following objective: To study the perception of students on the use of ICT tools to learn mathematics subject in secondary schools.

## 2.2. Theoretical Groundworks

This study used the Technology Acceptance Model (TAM). TAM describes how and why people use technology. The two primary parts of the technology acceptance model are as follows: Perceived Usefulness (PU): PU is the extent to which a person believes that using a given or specific technology will enhance their everyday activities or professional performance. Perceived ease of use: Reported simplicity of use is an individual's opinion on how straightforward they think it is to utilize an item of technology. The TAM was utilized in this study to better understand the aspects that affect how students use and embrace technology while learning mathematics. This approach tackles a variety of issues, such as whether or not students find it simple to utilize ICT tools or instructional technologies. Are ICT tools and instructional technology effective in capturing the attention of students? In this study, TAM offers a crucial, practical, and helpful framework to answer the aforementioned problems. It additionally helps in or serves as a guide for the creation of successful ICT-related learning techniques.

# 3. Methodology

## 3.1. Research Design

The researchers employed a descriptive research methodology. With the goal of describing and interpreting present-day occurrences or circumstances, descriptive research focuses on gathering data, according to Aggarwal (2008), referenced in Salar (2012). In this study, the descriptive method was employed to gauge students' perception of utilizing ICT tools to learn mathematics. The researchers made the decision to use this strategy since the objective of the study is to gather trustworthy and first-hand information in order to produce a real conclusion and suggestions.

## 3.2. Population of the study

The population of the study were 241 senior six students of two public selected secondary schools of Gasabo District in Rwanda who are enrolled in the present academic year 2022-2023.

## 3.3. Sampling technique and Sample size

Data from the respondents was collected using a simple random sampling. The purpose of using this approach was to guarantee that the research sample accurately represented the whole population and that the findings could be generalized to the entire population. Due to the target population's equal opportunity to participate in the study, this strategy is also helpful in reducing bias. Respondents from two different public secondary schools made up the sampling unit for the current study using Slovin's formula (1967) to determine the sample size, $n = \frac{N}{1+Ne^2}$ where n is the essential sample size from the population in study, N is the whole population size in study and e is the confidence interval. Therefore, linking Slovin's formula, $n = \frac{241}{1+241(0.05)^2} \approx 150$ would be the lowest allowable entire to uphold a 95% confidence interval. The final sample for the study consisted of 150 students; however, only 136 returned the questionnaire. Of these 136 respondents, 84 were men and 52 were women.

## 3.4. Instrument Used

The main research instrument is a questionnaire for a survey. The survey questionnaire included two parts. In the first part, the main personality characteristics of the students are displayed. In the second part, their degree of perspective on utilizing ICT tools to learn mathematics was assessed.

## 3.5. Data Collection Method

The study team received clearance from the research unit before starting data collection. Following the clearance, the researchers wrote a letter to the city of Kigali asking permission to carry out the study and distribute the questionnaires to the participants. After receiving approval, the researchers gave the questionnaires to the participants. Before responding to the questionnaire, the respondents received guidelines. The respondents have a week to complete the aforementioned questionnaire. The data collection was then completed. However, the researchers did not force respondents to respond if they were unable to for one reason or another, and only those replies that were gathered were taken into account for the analysis and interpretation of the data.

## 3.6. Validity and Reliability

Validity is the degree to which a concept is exactly quantified in a quantitative investigation. A supervisor went over the questionnaire to make sure that there were no unclear questions. Grammar and typographical problems were fixed, and the statement's clarity was improved thanks to the feedback. The degree to which a phenomenon can be measured and the result is stable and consistent is referred to as reliability. This study employed a pilot test to gauge the reliability of the questionnaire.

## 3.7. Data Collection

In this study, the primary data was gathered using uniform surveys. There were ten items in the study instrument, omitting demographic characteristics. The responses were graded on a 5-point Likert scale, and the questions were closed-ended. The purpose of the survey was to gauge how students felt about using ICT tools to study mathematics.

## 3.8. Data analysis

As a reference for analyzing the data, the study's objective was used. Data gathered from these instruments was arranged into data entry sheets, and they were then input into the Statistical Package for Social Science (SPSS) 21.0 computer. In order to analyze the quantitative data, descriptive statistics were used, and a table was created to list the responses provided by the participants' answers. Therefore, the mean was used to indicate adjustments to the student's perception of how much ICT tools were being used to study mathematics.

# 4. Results and Discussion

Understanding students' perception of ICT usage in mathematics learning provides a deeper understanding of how technology enhances the learning experience. The data were examined under the direction of the mean. Respondents' opinions on how students perceive using ICT tools to learn mathematics were divided into a total of five categories using questionnaires, including very uncomfortable (1), uncomfortable (2), neutral (3), comfortable (4), and very comfortable (5). Additionally, to accomplish the study's research objective, the average replies from the respondents were interpreted as follows in order to meet the objective of the study: According to a questionnaire, responses ranging from 1.00 to 2.49 show a negative perception of using ICT tools to study mathematics, 2.50 to 3.49 indicate a neutral perspective, and 3.50 to 5.00 indicate a positive perception of using ICT tools to study mathematics.

**Table 1: Students' perception towards the use of ICT facilities in learning mathematics**

| Students' views | Mean score | Analysis |
|---|---|---|
| Comfortable of using ICT tools to learn mathematics | 4.23 | Positive |
| Regularly use ICT tools to learn mathematics | 2.67 | Neutral |
| Understanding of mathematics concepts through the use of ICT tools | 4.64 | Positive |
| ICT tools are helpful in visualizing complex mathematical concepts | 4.14 | Positive |
| Technical difficulties while using ICT tools to learn mathematics | 2.37 | Negative |
| ICT tools make learning mathematics more engaging | 4.02 | Positive |
| ICT tools help practice mathematics more effective | 3.56 | Positive |
| Adequate training on how to use ICT tools for learning mathematics | 2.47 | Negative |
| ICT tools are essential for preparing students for the digital age | 3.98 | Positive |
| Incorporating ICT tools to learn mathematics are more beneficial | 4.53 | Positive |
| Overall mean | 3.66 | Positive |

Table 1 results indicates that the negative range generated on the items was as follows: Technical difficulties while using ICT tools to learn mathematics (M = 2.37) and training on how to use ICT tools for learning mathematics (M = 2.47) indicate a negative perception toward the use of ICT tools to learn mathematics. On the item Regularly use ICT tools to learn mathematics (M = 2.67), neutral was indicated. Moreover, comfort with using ICT tools to learn mathematics (M = 4.23), understanding of mathematics concepts through the use of ICT tools (M = 4.64), ICT tools being helpful in visualizing complex mathematical concepts (M = 4.14), ICT tools making learning mathematics more engaging (M = 4.02), ICT tools helping practice mathematics more effectively (M = 3.56), ICT tools being essential for preparing students for the digital age (M = 3.98), and incorporating ICT tools to learn mathematics being more beneficial (M = 4.53) also indicated a positive perception toward the use of ICT tools to learn mathematics. According to Table 1, the overall mean (M = 3.66) showed that the selected students had a positive perception toward the use of ICT tools to learn mathematics in two public secondary schools of the Gasabo District in Rwanda. In general, the responses given to the items were similar and closely placed around the positive scale interval (3.50-5.00). According to the Technological Acceptance Model (TAM), which claims that the TAM has been extensively utilized to assess each participant's choices in relation to just two variables: perceived utility and perceived ease of use, the results were completely in line with the TAM. According to Essuman, Korda, Essigyan, Febiri, and Aboagye (2022); Mati and Haruna (2020); Osondu, Ogbonna, and Umeh (2022), ICT-based learning in mathematics is crucial because it enhances cooperation between teachers and students. The studies cited above were in line with the current findings.

# 5. Conclusion

## 5.1 Conclusion

Based on the study findings, the researchers drew the following conclusion: students have a positive perception of using ICT tools to learn mathematics at selected public secondary schools in Rwanda's Gasabo District.

# 5.2 Recommendations

The study recommends that students in Rwanda's public secondary schools have access to ICT tools to learn mathematics, the schools are encouraged to collaborate to ensure the availability and accessibility of ICT tools for students.

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