


**FACULTY OF SCIENCE AND EDUCATION**

**DEPARTMENT OF MATHEMATICS**

**FINAL YEAR PROJECT REPORT**

# IMPACT OF ICT INTERGRATION ON STUDENTS' PERFORMANCE IN MATHEMATICS IN NAGONGERA CAMPUS

**By**

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This Final Year Project Is Submitted to The Department of Mathematics in Partial Fulfillment of the Requirement for The Award of Degree of Bachelor of Science Education of Busitema University

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# Abstract

The impact of Information and Communication Technology (ICT) integration on students' performance in Mathematics at Busitema University, Nagongera Campus was considered. The study, guided by three objectives namely; assess to the level of ICT integration in mathematics teaching and learning, determine its effect on students' understanding and performance, and identify challenges affecting its effective implementation.

A descriptive and correlational research design was employed, involving a sample of 80 respondents, including 78 students and 2 lecturers. Data was collected using questionnaires, interviews, and document analysis, and analyzed using SPSS 26.

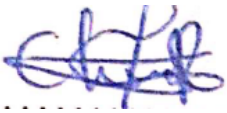
Findings revealed that ICT integration has a positive impact on students' performance in Mathematics. There was a strong positive correlation ($r = 0.61$, $p = 0.003$) between ICT use and students' performance, indicating that increased use of ICT tools is associated with improved academic outcomes. Students reported that ICT enhances understanding of mathematical concepts, improves grades, simplifies problem-solving, and increases interest in learning. Additionally, a larger proportion of students who frequently used ICT performed better compared to those who rarely used it.

However, the study also identified several challenges hindering effective ICT integration, including poor internet connectivity, high cost of internet, unreliable electricity, and limited access to ICT resources. These challenges limit the full potential of ICT in improving learning outcomes.

it is evident that ICT integration significantly enhances students' performance in Mathematics, but its effectiveness depends on the availability of adequate infrastructure, training, and institutional support. It is recommended that the university invest more in ICT facilities, improve internet connectivity, provide continuous training for both students and lecturers, and promote the use of ICT-based teaching methods to enhance mathematics education.

# DECLARATION

I **Cheptoris Rebecca** declare that the work presented in this research report is my original work and has not been submitted to any university or institution of higher learning for any academic award. Each contribution to, and quotation in, this report from the work of other people has been attributed, cited and referenced.

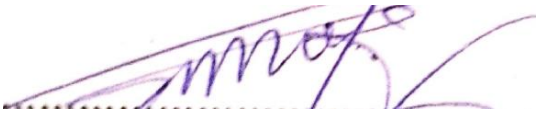
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BU/UP/2023/1646

# APPROVAL

This is to certify that this research has been done under my close supervision and is now ready for submission with my approval.

Signature 

Date 04 July 2026

Dr. Anselm O. Oyem

# Dedication

This research report is dedicated to my lovely mother Mrs. Chemutai Catherine, my beloved father Mr. Chemutai Moses who have supported me in every area of my academic journey, my siblings, my friends and families, my sponsors FAWE Uganda and Rebecca Byamukama, my administrators, and lecturers in the mathematics department, challengers and the cheerleaders during my graduate studies.

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I thank God Almighty for helping me to complete my research, which is a great achievement to me for my academic career. I would like to thank Dr. Anselm O. Oyem my supervisor for his inspiring and motivating words of advice and support during my journey. You constantly appreciated my efforts and pushed me to perform at my highest level. I value how you challenged me to keep improving and moving forward during our professional interaction. I really appreciate you and may the good Almighty God bless you abundantly.

To the Head of Department. Dr. Mwasa Abubakar and entire staff of Mathematics department, Busitema University, Nagongera Campus, I say thank you for moulding me into the best I am today.

To my parents Mr. Chemutai Moses and Mrs. Chemutai Catherine, you made every effort to see all work out for my best. God bless you all.

To my friends, our journey together has been wonderful. I love you all.

To FAWE Uganda, you made me see a life I had lost hope for, may the Almighty God richly bless you. I am indebted to you. I cherish you.

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# CHAPTER ONE

## 1.0 INTRODUCTION

## 1.1 BACKGROUND

The integration of information and communication technology (ICT) in education has revolutionized teaching and learning globally. ICT encompasses a broad range of tools and resources, including computers, the internet, multimedia, educational software, and mobile devices (Wilbrod, 2025). These technologies have transformed how education is delivered and accessed, offering opportunities for enhanced learning experiences, improved access to resources and more effective teaching methods. Over the past few decades, there has been increasing interest in incorporating ICT in classrooms, with numerous studies highlighting its positive impact on student engagement, academic performance, and access to educational resource(Eyyam et al., 2014).

According to the UNESCO Institute for Statistics (2018), the global digital divide is reducing, with many learners benefiting from ICT-integrated education initiatives. Digital tools such as e-learning platforms, interactive white boards, and tablets have been shown to facilitate active learning, improve knowledge retention and create personalized learning environments among learners in various institutions. However, the adoption of ICT in education is still facing several challenges (Nteziryimana & Niyobuhungiro, 2020). Many countries still face barriers to effective ICT integration, including inadequate infrastructure, lack of teacher training, and socio-economic disparities (Lavicza, 2010). For example, in low-income regions, access to technology remains limited and the digital divide persists between urban and rural areas. However, global organizations like UNESCO, the World Bank and the International Society for Technology in Education (ISTE) have been at frontline of advocating for ICT in education, aiming to bridge these gaps and ensure equitable access to technology for all students in different institutions regardless of their locations (Chowdhury, 2018).

In Africa, the integration of ICT in education has seen significant growth through progress varies widely across countries(Afolake et al., 2005).According to a report by the African Development Bank (2020), over 80% of African countries have implemented some form of ICT policy aimed

at enhancing educational systems. However, the success of ICT adoption has been inconsistent, with some countries achieving remarkable results, while others struggle with implementation challenges (Rogers, 2025). In many African nations, the lack of adequate infrastructure, insufficient funding and limited teacher training hinder the effective use of ICT tools in universities (Chapman, 2016) Moreover, the affordability of ICT devices such as tablets, smartphones and computers remains a major problem for many students and teachers. Despite these challenges, there are several success stories in Africa. Countries like Kenya, south Africa and Rwanda have made notable efforts in incorporating ICT into their educational systems. For instance, Kenya's Digital Literacy Program, launched in 2016, aims to provide every child in primary and secondary schools with a tablet to aid learning.

Uganda, in particular, has made strides in integrating ICT into its education system (Rogers, 2025)The government has recognized the importance of technology in improving educational quality and accessibility.

According to the Uganda Bureau of Statistics (2022), the education sector in Uganda has seen improvements in both enrollment rates and access to basic education. These initiatives recognize the potential of ICT to address challenges in education such as limited resources, large class sizes, and the need for more interactive and engaging earning experiences.

Busitema University, a public university in Uganda, is part of this movement. The university has been working to incorporate ICT into its teaching and learning processes including Nagongera Campus (Busitema University, 2020). The campus offers various programs including a Bachelor of science in Mathematics and serves a diverse student population.

However, many students struggle with Mathematics, citing difficulties with abstract concepts, lack of engagement and inadequate teaching methods

The use of ICT in teaching Mathematics has been shown to be of great importance, including student engagement, better understanding of complex concepts through visualization and increased accessibility to learning resources(Maharjan & Dahal, 2022). For example, studies have shown that GeoGebra, a dynamic mathematics software, enhances students' understanding of geometry(*USE OF GEOGEBRA AND ITS EFFECT ON PERFORMANCE IN GEOMETRY*, 2023).

## 1.2 STATEMENT OF THE PROBLEM

Despite the potential benefits of ICT integration in mathematics education in various educational institutions, including Busitema University, Nagongera campus still faces challenges in integrating ICT into teaching and learning. However, there are concerns about the impact of ICT integration on the performance of students at Nagongera campus. The study focused on the impact of ICT integration on students' performance in Mathematics at Nagongera Campus. This involved assessing the current state of ICT integration, as well as its impact on students' performance in Mathematics.

## 1.3 PURPOSE OF THE STUDY

To investigate the impact of ICT integration on students' performance in Mathematics at Busitema University, Nagongera Campus.

## 1.4 SPECIFIC OBJECTIVES

1. To assess the current level of ICT integration in Mathematics teaching and learning;
2. To determine the effect of ICT integration on students' understanding of mathematics concepts; and
3. To identify challenges and avenues for improving ICT integration in Mathematics education at Nagongera Campus.

## 1.5 RESEARCH QUESTIONS

1. What is the current level of ICT integration in Mathematics teaching and learning at Busitema University Nagongera Campus?
2. How does ICT integration affect student's understanding of abstract concepts?
3. What are the challenges and avenues for improving ICT integration in Mathematics education at Nagongera campus?

## 1.6 SIGNIFICANCE OF THE STUDY

This study will inform educators and policymakers about the impact of ICT integration on Mathematics education.

This study will contribute to the development of effective strategies for improving Mathematics learning outcomes.

This study will benefit students by potentially enhancing their understanding of abstract Mathematics concepts through ICT integration

## 1.7 SCOPE OF THE STUDY

The scope of the study focused on the impact of ICT integration on the performance of students in mathematics at Busitema university, Nagongera Campus. the study was limited to Nagongera campus located in Tororo Town along Tororo-Busolwe road, Tororo district, Uganda. The study specifically targeted undergraduate students in the current first year, second year and third year Mathematics students of Nagongera Campus in the faculty of Science and Education who offer Mathematics related combinations including Math/Phy, Math/ICT, Math/Chem, Math/Geo, Math/Ent and Math/Econ as well as Mathematics lecturers.

## 1.8 DEFINITION OF KEY TERMS

**ICT (Information and Communication Technology)**

Refers to different forms of technologies used to create, manage and share information. They include computers, internet, multimedia, educational software, mobile devices among other digital tools.

**Integration**

This means incorporating ICT tools and resources into the teaching and learning process to enhance educational outcomes.

**Performance**

Performance refers to the demonstration of skills, abilities, or competences in a particular educational context, performance can be seen through tests, projects, presentations, practical activities, examinations among others.

# CHAPTER TWO

## 2.0 LITERATURE REVIEW

Studies have been conducted to investigate how ICT integration affects students' performance in mathematics courses(Kumar et al., 2021). The use of ICT enables avenues for learning environments and practices that need interaction among individuals, cooperation with chances to experience and learn various principles supported by constructivism (Bucyedusenge & Ndacyayisaba, 2024). Many educational settings especially at the universities are working on supporting integrating technology into the teaching and learning process. (Bindu, 2016) provides an example on how to integrate internet for teaching, as learners use the internet and explore more of the things in their studies in different ways and directions.

ICT integration in education forms a very serious and critical entry point (Damien, 2024). Studies in various countries, such as the USA and Malaysia have incorporated ICT into their teaching and learning processes(Zakaria & Khalid, 2016). This has indeed increased on students' interest for mathematics.

### Mathematics and ICT

ICT integration has been highly adopted in various educational institutions and settings including Mathematics courses. ICT as a new technology provides students with a very flexible and engaging learning experience during teaching and learning process. Students use ICT in different ways for different activities during the teaching and learning Mathematics for instance they use ICT in calculations, graphing and solving problems. Other than that, computer algebra systems, spreadsheets and graphical calculators can be used to solve problems through tests and improvement methods. Drawing an image in a dynamic geometry package can help students to grasp content and understand then come out with a solution of a given problem. When students use ICT in their process of learning mathematics especially in solving abstract problems, their skill in Mathematics becomes much more developed(Kumar et al., 2021).

### Effectiveness of ICT integration in teaching and learning Mathematics.

Several research studies have investigated the impact of ICT integration on students' performance in Mathematics courses. The key findings from these studies include, it was found that ICT can permit both Mathematics teachers and students in a way that it may transform the

teaching and learning process where ICT is integrated into Mathematics. With the integration of ICT, it was found that the students become more engaged in their effort and provide different occasions to make it more enjoyable in terms of teaching the same things in different ways and providing students an opportunity to develop creativity and different skills (Macharia, 2022). It was also revealed that the use of ICT improved students' problem-solving skills and increased their motivation to learn Mathematics. These findings suggest that ICT integration can positively impact students' performance in Mathematics.

**Relationship between ICT integration and student performance in Mathematics.**

Nagongera campus is a higher education institution in Uganda. The campus offers various programs including Mathematics courses to its students. In the recent, there has been a serious interest in comparing ICT integration and student performance at Nagongera campus especially in Mathematics.

ICT integration in Nagongera campus has shown to enhance student engagement, motivation and conceptual understanding in Mathematics(Kasirye, 2023). When leveraged effectively, ICT tools like GeoGebra can transform abstract Mathematical concepts into very interactive, visual experiences leading to improved academic achievement and retention (Macharia, 2022). For instance, research indicates that students using digital tools to explore geometric principles demonstrate greater spatial reasoning and problem solving skills compared to other traditional methods (Agyei & Voogt, 2011). ICT integration for example use of online teaching and learning provide greater accessibility to educational resources for students at Nagongera campus(Kasirye, 2023). It allows for asynchronous learning, which can benefit those who have other responsibilities outside their studies.

When relating ICT integration and student performance in Nagongera campus, there are significant challenges that can undermine the potential of ICT in Mathematics education. Inadequate infrastructure, insufficient teacher training, and classroom distractions often limit ICT effectiveness (Lavicza, 2010). In Nagongera, these issues are compounded by limited access to reliable internet and technical support, which disrupt lessons and hinder learning (Kasirye, 2023).

The assessment of learning outcomes is crucial (Jonson, Aragon et al. 2000). However, the structure and delivery of content using ICT plays a significant role in determining learning outcomes.

One key advantage of ICT integration is its flexibility. Students have access to course resource materials and lectures at their convenience which can be particularly for those students with diverse commitments.

The overall learning experience encompasses various aspects like interactivity, adaptability to different learning styles and integration of ICT. And the integration of ICT during teaching and learning can contribute to a positive learning experience when implemented effectively.

In conclusion, the relationship between ICT integration and student performance in Mathematics at Nagongera campus involves evaluating factors such as student engagement, learning outcomes, accessibility, flexibility and the overall learning experience.

# CHAPTER THREE

## 3.0 RESEARCH METHODOLOGY

This chapter describes how research was carried out. It discusses the research design, study area, study population, sampling strategies, data collection instruments, research procedure and data analysis techniques to be employed in the study.

### 3.1 Research Design

The study was conducted using a descriptive and correlational research design. This is because its intention is to investigate the relationship between ICT integration and student performance in Nagongera campus.

### 3.2 Study Area

Research was carried out at Nagongera campus located in Tororo Town along Tororo- Busolwe road, Tororo district, Uganda.

### 3.3 Study population

The study targeted undergraduate students in the faculty of science and Education at Nagongera campus who take Mathematics and Mathematics lecturers.

### 3.4 Sample size and selection

Students and lecturers will make up the study's sample. The main target category included the three entry years that is 2023/2023, 2024/2025 and 2025/2026 respectively, where by 78 students from year one, year two and year three from the different subject combinations and 2 lecturers were directly included in the research process using questionnaire and interview.

*Table 1: sample size and techniques for data collection*

| Categories | Target population | Sample size | Sampling technique | Data collection method |
|---|---|---|---|---|
| **Lecturers** | 03 | 02 | Purposive sampling | interview |
| **Students** | 100 | 78 | Simple random sampling | questionnaires |
| **Total** | **103** | **80** | | |

**Source**: primary data (2026)

## 3.5 Sampling Techniques

The sampling techniques are processes of selecting a sample from a population (Bucyedusenge & Ndacyayisaba, 2024). A sample is a subset of a population and sampling is the act of selecting a sufficient number of participants from a given population in order to make a study's generalizations(Taherdoost et al., 2016).

### 3.5.1 Purposive sampling

Purposive sampling was used in conjunction with non-probability sampling in order to select students in mathematics related programs.

### 3.5.2 Stratified sampling

In this study, stratified sampling was used to ensure that students from different year groups were selected.

## 3.6 Data Collection Methods

The following are the methods of collecting data on the impact of ICT integration on student's performance in Mathematics at Nagongera Campus.

### 3.6.1 Questionnaire survey

A survey employing standardized and structured questionnaires was conducted to gather data from a chosen group of students. The strategy aimed to assess their ICT usage, access to tools, and perceptions regarding ICT integration as they learn Mathematics. For this group of respondents, a questionnaire was employed to save time.

### 3.6.2 Interview guide

key informant interview with the lecturers and technical staff regarding the challenges faced during the implementation of ICT like online learning and the teaching methods.

### 3.6.3 Document analysis

This is where the academic records of the students are reviewed that is to say comparing the performance of students who were not taught using ICT and those who experienced ICT integration in their teaching and learning of Mathematics at Nagongera campus and this helped the researcher to analyze differences in the overall performances and this was carried out by the

researcher by interviewing the lecturers on how the performance has been improved by ICT integration usage.

## 3.7 Data Collection procedure

This refers to step by step plan on how data was gathered.

Permission and consent were obtained from each participant in order to collect the necessary information.

In this study questionnaires were used and they were distributed with a mix of closed ended and open-ended questions. This was aimed to help the researcher to collect a large amount of data in a structured and standardized form.

## 3.8 Data Analysis

### 3.8.1 Quantitative data

Descriptive statistics like mean, frequencies and inferential statistics like correlation were the major components of quantitative analysis. to determine the relationship between ICT usage and students' performance.

### 3.8.2 Qualitative data

Thematic analysis method was used to analyze qualitative data in themes, categories and patterns.

### 3.9 Ethical considerations

Informed consent was obtained from all the participants in order to get the necessary information.

Confidentiality and anonymity of student grades and personal information was highly maintained.

# CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND INTERPRETATION.

## 4.1 INTRODUCTION

This chapter presents, analyzes and interprets data collected on the impact of ICT integration on students' performance in Mathematics at Nagongera campus. Data was obtained using questionnaires administered to students and interview guides to lecturers.

Quantitative data from questionnaires was analyzed using frequencies, percentages, mean scores and correlation.

Qualitative data from interviews was analyzed using themes and explanations.

Results are presented in tables and supported with interpretations.

## 4.2 Response rate

### 4.2.1 showing response rate

All the sampled 80 respondents were given either questionnaires or interviews, and no one failed to answer. Therefore, the respondents participated at 100% rate.

*Table 2: The rate of responses*

| Response rate | Frequency | Percentage (%) |
|---|---|---|
| **Replied** | 80 | 100 |
| **Not replied** | 0 | 0 |
| **Total** | 80 | 100 |

**Source**: Rebecca 2026

According to table 2 above, the response rate is excellent, indicating high participation and reliability of the findings.

## 4.3 Demographic characteristics of students

### 4.3.1 Gender distribution

*Table 3: Gender*

| Gender | frequency | Percentage (%) |
|---|---|---|
| **Male** | 41 | 52.6 |
| **Female** | 37 | 47.4 |
| **Total** | 78 | 100 |

**Source**: Rebecca 2026

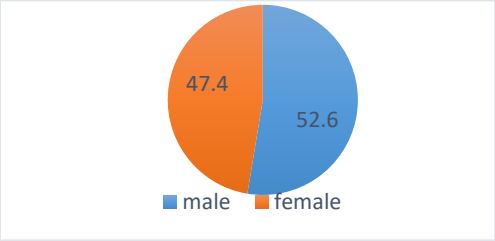



*Figure 1: shows the Gender of Respondents.*

According to data presented in table 3, the study shows a nearly balanced gender distribution among respondents, with male which constituted (52.6%) while female constituted (47.4%). This indicates fair participation of both genders in the study.

*Table 4: Age of the respondents*

| Age bracket | Number | Percentage (%) |
|---|---|---|
| Below 20 | 0 | 0 |
| 20-25 | 75 | 93.8 |
| 26-30 | 3 | 3.7 |
| Above 30 | 2 | 2.5 |

**Source:** Rebecca 2026

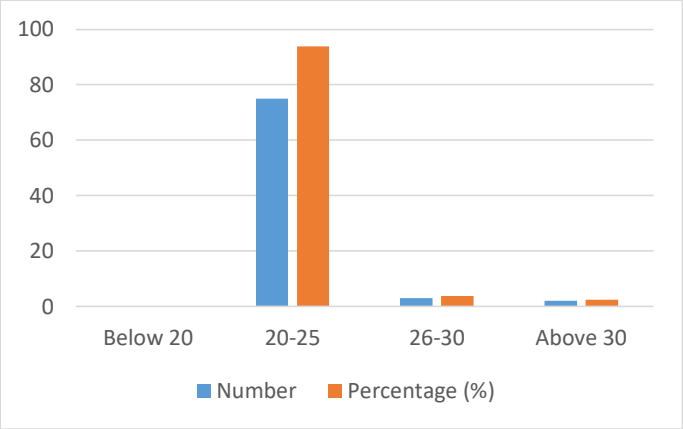



*Figure 2: shows the age of respondents.*

Out of the 80 participants, majority 75(93.8%) were between 20-25 years, 3(3.7%) were between 26-30 years, 2(2.5%) were above 30 years and none of the participants were under 20 years of age.

The findings indicate that none of the participants were below 20 years, the largest number was between 20 and 25 years, this means that most of the students at campus come on direct entry from A-level, and a few come to upgrade.

*Table 5: Subject combination of the respondents.*

| Subject combination | Number of students | Percentage (%) |
|---|---|---|
| **Math/Chem** | 25 | 32.1 |
| **Math/ICT** | 18 | 23.1 |
| **Math/Phy** | 20 | 25.6 |
| **Math/Econ** | 5 | 6.4 |
| **Math/Geo** | 4 | 5.1 |
| **Math/Ent** | 6 | 7.7 |
| **Total** | 78 | 100 |

**Source**: Rebecca 2026

From table 5, out of 78 participants, the number of those who did Math/Chem emerged the highest 25(32.1%), 20(25.6%) of the participants offered Math/Phy, 18(23.1%) of the participants offered Math/ICT, 6(7.7%) Math/Ent, 5(6.4%) offered Math/Econ and 4(5.1%) offered Math/Geo.

*Table 6: Respondent's number of years that they had spent studying Mathematics at Nagongera campus.*

| Years of studying Math | Number | percentage |
|---|---|---|
| 1 | 20 | 25.6 |
| 2 | 25 | 32.1 |
| 3 | 33 | 42.3 |
| Total | 78 | 100 |

**Source:** Rebecca 2026

From table 6, out of 78 respondents, 33(42.3%) had spent three years studying mathematics meaning they were in year three, 25(32.1%) had taken two years, and 20(25.6%) had taken one year studying mathematic

*Table 7: ICT tools available for use by respondents.*

| ICT tools | Frequency | Percentage (%) |
|---|---|---|
| **Computers/laptops** | 20 | 25.6 |
| **Smartphones** | 45 | 57.7 |
| **Internet** | 8 | 10.3 |
| **Mathematical software** | 0 | 0 |
| **Projectors** | 5 | 6.4 |
| **Total** | 78 | 100 |

**Source:** Rebecca 2026

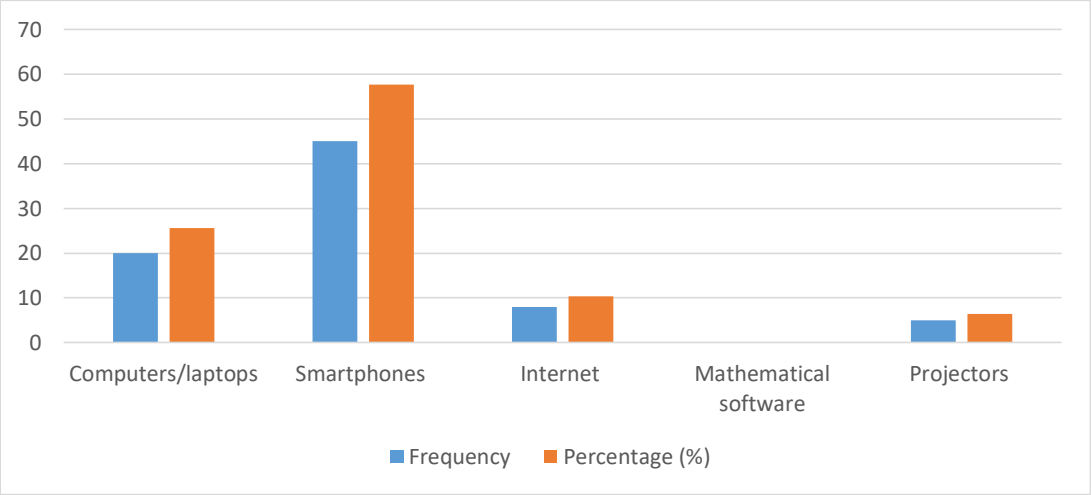



*Figure 3: shows ICT tools available for use by respondents.*

According to table 7, smartphones were registered with high number (57.7%) used by respondents as one of the ICT tools available, (25.6%) of respondents used laptops/computers, (10.3%) of the respondents had access to internet, (6.4%) of respondents had access to projectors and none of the respondents accessed mathematical software like GeoGebra.

### 4.4 ICT usage Frequency

*Table 8: The access and ICT usage*

| Responses | Frequency | Percentage (%) |
|---|---|---|
| **Always** | 23 | 29.5 |
| **Often** | 30 | 38.5 |
| **Sometimes** | 16 | 20.5 |
| **Rarely** | 9 | 11.5 |
| **Never** | 0 | 0 |
| **total** | 78 | 100 |

**Source**: Rebecca 2026

According to table 8 above, it has been found that 68% of students frequently use ICT tools always and often. It also indicates that 20.5% of students use ICT tools sometimes while 11.5% students rarely use ICT tools and 0% students never uses ICT tools. This suggests that ICT usage among students at Nagongera campus is relatively high providing a strong basis for examining its impact on students' performance.

### 4.5 ICT resource availability

*Table 9: The availability of ICT*

| Responses | Frequency | Percentages (%) |
|---|---|---|
| **Very adequate** | 14 | 17.9 |
| **Adequate** | 28 | 35.9 |
| **Inadequate** | 24 | 30.8 |
| **Very inadequate** | 12 | 15.4 |
| **Total** | 78 | 100 |

**Source**: Rebecca 2026

According to table 9, results indicate that 17.9% of the ICT resources are very adequately available, 35.9% of the ICT resources are adequately available, 30.8% are inadequately available while 15.4% of the ICT resources are very inadequate. This suggests that ICT facilities are present, with 53.8% of ICT resource availability reported to be adequate.

## 4.6 Impact of ICT on students' performance.

*Table 10: Descriptive statistics.*

| Variable | Mean | Standard deviation |
|---|---|---|
| **Improves understanding** | 4.32 | 0.71 |
| **Improves grades** | 4.18 | 0.78 |
| **Simplifies problem solving** | 4.06 | 0.82 |
| **Increases interest** | 3.94 | 0.89 |
| **Supports independent learning** | 3.87 | 0.94 |

**Source**: Rebecca 2026

The results in Table 10 present the mean scores on students' perception of the impact of ICT integration on students' performance in learning mathematics. The mean score of 4.32 indicates that students agree that ICT improves their understanding of mathematics, implying that the use of ICT tools like videos and other interactive applications makes it easy to understand, mean score 4.18 shows that students agree that ICT improves their grades, mean score 4.06 indicates that ICT simplifies problem solving in mathematics, mean score 3.94 shows that ICT increases students' interest in mathematics implying that ICT makes learning more engaging and interesting and mean score 3.87 indicates that students agree that ICT supports independent learning, and this suggests that ICT enables students to learn at their own pace through the online resources, tutorials and personal practice gadgets.

The results indicate that ICT integration has a positive influence on students' learning of mathematics. It enhances understanding, improves performance, increases interest, and supports independent learning, although some challenges limit its full effectiveness.

## 4.7 students' performance in mathematics.

*Table 11: students' performance*

| Grade | Frequency | Percentage (%) |
|---|---|---|
| **A** | 15 | 19.3 |
| **B** | 33 | 42.3 |
| **C** | 20 | 25.6 |
| **D** | 10 | 12.8 |
| **Below D** | 0 | 0 |
| **Total** | 78 | 100 |

**Source**: Rebecca 2026

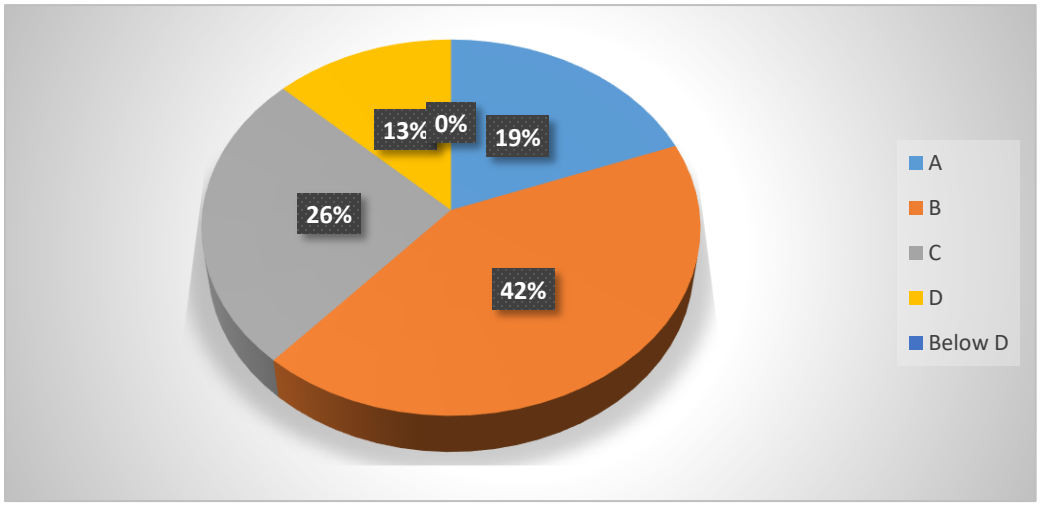



*Figure 4: Shows students' performance*

According to table 9, it indicated that most students scored B (42.3%), 25.6% scored C,19.3% scored A, 12.8% scored D and none of the students scored below D indicating a moderate performance of students in Mathematics and a smaller percentage of students performed poorly (12.8%), suggesting that mathematics performance has a room for improvement since most of the students' performance is moderate.

## 4.8 challenges affecting ICT integration

*Table 12: The challenges of ICT use*

| Challenges | Yes (%) | No (%) |
|---|---|---|
| **Limited computers** | 64 | 36 |
| **Poor internet connectivity** | 76 | 24 |
| **Limited ICT skills** | 38 | 62 |
| **Shortage of power/electricity** | 70 | 30 |
| **Limited access time** | 71 | 29 |
| **High cost of internet** | 74 | 26 |

**Source**: Rebecca 2026

According to table 12, the major challenges identified were poor internet connectivity (76%), high cost of internet (74%), limited access time (71%) and shortage of power/electricity (70%). These challenges significantly hinder effective ICT integration in Mathematics, negatively impacting student participation, concentration, and performance (Zakaria & Khalid, 2016). Other challenges such as limited access to computers and ICT skills also reduce the effective use of technology in mathematics education(Zakaria & Khalid, 2016).

## 4.9 Relationship between ICT use and students' performance

*Table 13: Table showing correlation analysis.*

| Variables | ICT Use | Performance |
|---|---|---|
| **ICT use** | 1 | 0.61 |
| **performance** | 0.61 | 1 |

**P=0.003**

**Source**: Rebecca 2026

The results in table 13 show a correlation coefficient indicating a strong positive correlation (r=0.61) between ICT use and students' performance in mathematics. This means that as level of ICT usage increases, students' performance also tends to improve. The correlation's significance

(p=0.003) is less than the significance level of (0.05) indicating that the relationship is statistically significant.

The positive correlation suggests that students who use ICT tools frequently such as computers/laptops, smartphones, and internet tend to achieve higher grades compared to those who rarely use ICT. However, correlation does not imply causation. While ICT use is strongly associated with improved performance, there are other factors such as teaching methods, student motivation and resource availability may also influence academic performance. The findings indicate that ICT integration is an important factor associated with improved students' performance in mathematics.

## 4.10 ICT use and performance

*Table 14: crosstab analysis.*

| ICT usage | High performance | Low performance | Total |
|---|---|---|---|
| **Frequent** | 36 | 16 | 52 |
| **Rare** | 14 | 12 | 26 |
| **Total** | 50 | 28 | 78 |

**Source**: Rebecca 2026

The results in table 14 show the relationship between ICT usage and students' performance in mathematics. Among students who frequently use ICT, a larger proportion (36/52) achieved high performance, while only (16/52) recorded low performance. On the other hand, among students who rarely use ICT, (14/26) achieved high performance while (11/26) recorded low performance.

This indicates that students who frequently use ICT are most likely to perform better in mathematics compared to those who rarely use ICT. The higher number of high-performing students in the frequent ICT group suggests that regular exposure to ICT tools enhances understanding, problem-solving skills, interest and academic performance.

On the other hand, the relatively higher proportion of low performing students among those who rarely use ICT suggests limited access to the use of ICT may negatively affect learning outcomes. This could be due to reduced access to learning resources and lower engagement in learning.

The findings from table 10 are consistent with the correlation results which also showed a strong positive relationship between ICT use and performance. This therefore strengthens the evidence that ICT integration plays a significant role in improving students' performance in mathematics.

### 4.11 ICT enhances understanding

Research indicated that ICT helps simplify mathematical concepts and improves students' understanding of Mathematics and suggested that ICT improves academic performances and enable the students get better results when used well.

It's also reported that ICT increases student engagement and participation in class since ICT gives the learners opportunities to read further and understand better like use of libraries, YouTube for tutorials, and online learning.

However, there are some challenges that hinders ICT integration and its effectiveness and they include, inadequate ICT facilities, poor internet connectivity, limited ICT skills, power interruptions and emphasized the need for training and institutional support to enhance ICT integration.

The findings from students and lecturers indicate that ICT integration positively influences students' performance in Mathematics. Quantitative data showed high mean scores and a strong correlation while qualitative findings confirmed improved understanding and engagement.

# CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

## 5.0 CONCLUSIONS

Based on the above results, the study suggests that ICT integration plays a significant and positive role in enhancing students' performance in mathematics at Nagongera campus. The findings indicate that students who frequently use ICT tools tend to understand mathematical concepts better, perform better academically and show higher interest in the subject compared to those students who rarely use ICT. In addition, ICT has simplified problem-solving in mathematics.

However, despite this positive impact of ICT, the effectiveness of ICT integration is limited by several institutional and infrastructural challenges. Poor internet connectivity, inadequate ICT resources, unreliable power supply and limited technical skills among users reduce the potential of ICT in improving Mathematics learning outcome.

Therefore, while ICT integration is a strong predictor of improved performance in Mathematics, its impact is maximized only when supporting systems such as infrastructure, training, and accessibility are adequately strengthened.

## 5.1 RECOMMENDATIONS

Based on the findings, several recommendations are made to improve ICT integration and enhances students' performance in mathematics at Nagongera campus.

The university administration should increase investment in ICT infrastructure by providing more computers, improving internet connectivity and ensuring stable electricity supply within learning environments. This will ensure that students have consistent access to ICT tools during learning sessions.

There is also a need for regular and continuous training, and retooling, capacity building for both students and lecturers. Workshops and training programs should be organized to ICT literacy and enhance the effective use of digital tools in teaching and learning Mathematics.

Lecturers should be encouraged to integrate ICT-based teaching methods such as mathematical software and online learning platforms to make mathematics more interactive and understandable to students.

ICT should be included in Mathematics course units at all levels in the University in order to ensure that students and lecturers interact oftenly with the ICT tools and avoids wastage of paper for example use of Learner Management System(LMS), Zoom lectures hence living sustainably.

Further studies should focus on examining the long-term effects of ICT integration on Mathematics performance across different universities.

Further research could also investigate specific ICT tools that are most effective in improving conceptual understanding in advanced Mathematics topics.

# APPENDICES

## APPENDIX I: ICT INTEGRATION ASSESSMENT FORM

My name is **Cheptoris Rebecca**, A third year student of Busitema University, Faculty of Science and Education. Your input will be of a very great contribution to my research study.

**IMPACT OF ICT INTEGRATION ON STUDENT'S PERFORMANCE IN MATHEMATICS AT NAGONGERA CAMPUS.**

I request you to help answer the following questions to the best of your ability. All information provided will be kept confidential and anonymous.

**Section A: Respondent background.**

1. What is your Gender:
   - ☐ Male
   - ☐ Female
2. What is your Age

   ☐ Below 20 ☐ 20-25 ☐ 26-30 ☐ Above 30
3. What is your Subject combination?
   A. Math/Chem
   B. Math/ICT
   C. Math/Phy
   D. Math/Econ
   E. Math/Geo
   F. Math/Ent
4. How many Years have you been studying Mathematics at Nagongera campus?
   A. 1
   B. 2
   C. 3

**Section B: Access to ICT tools.**

5. Which ICT tools do you use when learning Mathematics? (tick all that apply)

☐ Computers/Laptops

☐ Smartphones

☐ Internet

☐ Mathematical software

☐ Projectors

6. How often do you access ICT tools for Mathematics?

☐Always☐ Often☐ Sometime☐ Rare☐ Never

7. ICT facilities at Campus are:

☐Very adequate☐ Adequate ☐ Inadequate ☐ Very inadequate

**Section C: ICT usage in Mathematics learning**

(Tick one option per each statement)

| **Statement** | **Strongly Agree** | **Agree** | **Neutral** | **Disagree** | **Strongly disagree** |
|---|---|---|---|---|---|
| 8.ICT is regularly used in Mathematics lectures | | | | | |
| 9.I use ICT tools to complete Mathematics assignments | | | | | |
| 10.Lecturers encourage the use of ICT in Mathematics | | | | | |
| 11.ICT helps visualize Mathematical concepts | | | | | |

**Section D: Impact of ICT integration on student performance.**

(Tick one option in every statement)

| Statement | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| 12. ICT improves my understanding of mathematics. | | | | | |
| 13. My grades of mathematics have improved due to ICT use. | | | | | |
| 14. ICT makes solving mathematical problems easier. | | | | | |
| 15. ICT increases my interest in Mathematics. | | | | | |
| 16.ICT supports independent learning in mathematics. | | | | | |

**Section E: Challenges affecting ICT use**

17. What challenges limit your use of ICT in Mathematics? (Tick all that apply)

☐ Limited ICT equipment

☐ Poor internet connectivity

☐ Limited of ICT skills

☐ shortage of electricity

☐ Limited time access

☐ High cost of internet/data

18. How serious are these challenges

☐ Very serious ☐ serious ☐ Moderate ☐ Minor

**Section F: student performance indicators**

19. what is your average performance in mathematics?

☐ A ☐ B ☐ C ☐ D Below D

20. How do you rate your performance in mathematics after using ICT?

☐ Excellent ☐ Good ☐ Fair ☐ Poor

**Section G: Suggestions and opinions.**

21. ICT integration should be increased in mathematics teaching.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ strongly disagree

22. What improvements would you suggest to enhance ICT use in Mathematics

***Thanks for your time***

***APPENDIX II: INTERVIEW GUIDE***

My name is **CHEPTORIS REBECCA** a third-year student at Nagongera Campus. I am conducting study research that focuses on **the impact of ICT integration on students' performance in Mathematics**. I kindly request your participation in answering a few questions. Your responses will remain confidential and will only be used for academic purposes.

**Section A: Background**

1. Gender

☐ Male ☐ female

2. How long have you been teaching at Nagongera Campus?

☐ 0-2 years

☐ 3-5 years

☐ 6-10 years

☐ Above 10 years

**Section B: ICT integration in teaching**

3. Do you use ICT in your teaching of Mathematics?

☐ Yes ☐ No

4. What ICT tools do you use when teaching Mathematics?

☐ Computer/laptop

☐ Projector

☐ Internet resources

☐ Mathematical software

☐ smartphone

5. How often do you integrate ICT into your teaching?

☐ Always

☐ Often

☐ Sometimes

☐ Rarely

☐ never

**Section C: Impact of ICT on students' performance**

**Tick one option per statement**

| statement | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| 6. ICT improves students' understanding of mathematics. | | | | | |
| 7.ICT improves students' performance in mathematics. | | | | | |
| 8.ICT increases students' interest in mathematics. | | | | | |
| 9.ICT enhances students' participation and motivation in class. | | | | | |

**Section D: challenges in ICT integration**

10. Do you face challenges when using ICT in the teaching of Mathematics?

☐ Yes ☐ No

11. If yes, what challenges do you face? (Tick all that apply)

☐ Shortage of ICT equipment

☐ Poor internet connectivity

☐ Inadequate of ICT skills.

☐ Power interruptions

☐ Limited time

**Section E: Training and support**

12. Have you received training in ICT integration?

☐ Yes ☐ No

13. Do you need more training?

☐ Yes ☐ No

**Section F: suggestions**

14. ICT integration should be increased in Mathematics teaching. (Tick one option)

☐ Strongly agree

☐ Agree

☐ Neutral

☐ Disagree

☐ Strongly disagree

15. What suggestions do you have to improve ICT use in Mathematics?

***Thank you for your time***

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