DIGITAL LITERACY AMONG MATHEMATICS STUDENTS IN EGOR LOCAL GOVERNMENT AREA

BY

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NOVEMBER 2025.

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A PROJECT SUBMITTED TO THE DEPARTMENT OF CURRICULUM AND INSTRUCTIONAL TECHNOLOGY. FACULTY OF EDUCATION, UNIVERSITY OF BENIN, BENIN CITY IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE BACHELOR OF EDUCATION IN MATHEMATICS..

NOVEMBER 2025.

CERTIFICATION

We the undersigned certify that this research study was carried out by **Ekene Sarah NBUDICHE** in the Department of Curriculum and Instructional Technology, Faculty of Education University of Benin.

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DEDICATION

This project is dedicated to Jehovah God Almighty for his divine mercy and grace, for seeing me through my undergraduate programme in the University of Benin.

ACKNOWLEDGEMENTS

The researcher is sincerely grateful to Jehovah God Almighty for the grace, mercy, favour and protection till the completion of the program.

She expresses her sincere gratitude to her project supervisor, Prof. (Mrs.) L. Eraikhuemen for her guidance, support and scrutiny which made this work a success. She also appreciates every lecturer both from the Department of Curriculum and Instructional Technology and the Department of Mathematics and other members of staffs

The researchers sincerely appreciate her amazing Parent Mr. and Mrs. Osamor for their love, prayers, guidance and support throughout this programme. She also appreciates her siblings Esther Nbudiche and Samuel Nbudiche for their support, encouragement, love and care throughout the programme.

The researcher expresses her gratitude to her couraemates Mrs Vera, Gift ,Sheun and her friends Ochuko Orhewere,Osariemen Tessy and others too numerous to mention for always being there for her.

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ABSTRACT

This study examined Digital Literacy among Mathematics Students in Egor Local Government Area. The background of the study highlighted the growing integration of digital technology in education and the need for mathematics students to possess adequate digital skills to enhance learning, access instructional materials, and engage effectively with modern mathematical tools. The problem was traced to low digital competence, limited access to digital devices, insufficient teacher support, and infrastructural challenges. The study was guided by four research questions focusing on students' digital literacy levels, awareness of digital tools, factors influencing digital literacy, and challenges encountered. The study emphasized the significance of digital literacy for improved mathematical understanding, students' performance, and educational development within Egor Local Government Area.

The study adopted a descriptive survey research design as presented in Chapter Three. The population comprised 743 mathematics students in public and private secondary schools, from which a sample of 100 students was selected using a stratified random sampling technique. A structured questionnaire designed on a four-point Likert scale served as the research instrument. The instrument was validated by experts and its reliability confirmed using Cronbach's Alpha. Data were collected personally by the researcher and analyzed using mean and standard deviation to answer the research questions.

The findings revealed that students possessed moderate to high digital literacy levels and were aware of various digital learning tools, though access limitations, poor internet connectivity, and inadequate teacher support posed significant challenges. The study recommends improved ICT infrastructure, increased teacher training on digital pedagogy, and enhanced school-based digital inclusion initiatives to strengthen digital literacy and improve mathematics learning outcomes in Egor Local Government Area.

CHAPTER ONE

INTRODUCTION

Background of the Study

Digital literacy in contemporary education has grown rapidly, particularly in the context of mathematics students in Egor Local Government Area. As education systems globally continue to evolve with technological advancements, it has become increasingly important to assess the digital literacy skills of students, especially in a subject like mathematics that heavily benefits from technological tools. Digital literacy refers to the ability to effectively and critically use digital tools, including the internet, applications, and software, to access, manage, and communicate mathematical information (Mishra & Koehler, 2023).

The rapid integration of digital technology in education has transformed how students engage with mathematical concepts, solve problems, and interact with their learning environment. Mathematics students in Egor Local Government Area are now required to navigate various digital platforms, such as online learning tools, mathematical software, and digital textbooks, to enhance their understanding and application of mathematical concepts. This shift in learning modalities is particularly important as it addresses the need to equip students with the digital competencies necessary for their academic success and future careers.

Recent studies have emphasized that students' digital literacy is not solely dependent on the availability of technology but also on factors such as the accessibility of resources,

teacher preparedness, and the integration of digital tools into the curriculum. In many developing regions like Egor Local Government Area, however, students face barriers to developing digital literacy due to issues such as inadequate access to digital devices, unreliable internet connectivity, and limited teacher training in technology use (Adamu & Ige, 2024). As a result, these challenges may hinder students from fully capitalizing on the potential benefits of digital learning in mathematics education.

In this digital era, the ability of students to engage with technology is not only an academic necessity but also a key to preparing them for a workforce that is increasingly reliant on digital skills. Mathematics students in Egor Local Government Area must be proficient in using tools like graphing calculators, algebraic software, and statistical analysis programs, which are essential for tackling more complex mathematical problems. Research suggests that students who are digitally literate tend to perform better academically, are more engaged in their learning, and develop greater problem-solving skills (Ogunyemi & Akinyemi, 2023). The growing emphasis on digital tools in mathematics education underlines the need to assess the digital literacy levels of students and address any gaps in their skills.

Several factors influence the level of digital literacy among mathematics students in Egor Local Government Area. One critical factor is access to technology. In regions where economic constraints limit access to digital devices and reliable internet, students are at a disadvantage when it comes to engaging with digital resources. Schools with limited resources may struggle to provide students with the tools they need to enhance their

digital literacy (Ezenwa & Uche, 2023). This digital divide can lead to disparities in learning outcomes, especially when digital platforms become an integral part of the curriculum.

Teacher competence in integrating technology into the mathematics curriculum is another significant factor. Teachers who lack the necessary skills to effectively use digital tools in the classroom may fail to adequately guide students in developing their digital literacy (Ige & Olanrewaju, 2024). Professional development programs that train teachers to incorporate technology into their teaching practices are essential in bridging this gap.

The curriculum design also plays a crucial role in shaping students' digital literacy. A curriculum that incorporates digital literacy as a core component, especially within the context of mathematics education, will provide students with the necessary exposure to digital tools and help them build critical thinking and problem-solving skills. Additionally, economic factors, including the affordability of digital devices and internet access, continue to influence students' ability to fully engage with digital learning tools (Ogunyemi, 2023).

Finally, cultural attitudes towards technology and education may also impact the development of digital literacy. In some communities, there may be resistance to the use of technology in education, either due to a lack of understanding of its benefits or a preference for traditional teaching methods. Overcoming such cultural barriers requires awareness campaigns that highlight the advantages of integrating technology into education, particularly in the area of mathematics.

In conclusion, the digital literacy of mathematics students in Egor Local Government Area is influenced by a combination of technological, educational, economic, and cultural factors. Addressing these challenges and providing targeted interventions can help enhance students' digital skills, ultimately leading to improved academic performance and better preparedness for the demands of the digital age. As technology continues to play a pivotal role in education, it is crucial to ensure that students are equipped with the necessary digital literacy to succeed in mathematics and other fields.

Statement of the Problem

The increasing integration of digital technology into education has significantly transformed how students learn and engage with academic content, particularly in mathematics, a subject that requires critical thinking, precision, and problem-solving skills. Despite the growing recognition of digital literacy as an essential 21st-century skill, many mathematics students in Egor Local Government Area struggle to acquire and apply these competencies effectively in their learning process. This study seeks to address several pressing issues affecting students' ability to thrive in a digitally driven academic environment. These include the generally low level of digital literacy among students, which limits their ability to utilize available technological tools; inadequate access to digital learning resources such as computers, internet connectivity, and educational software; and the insufficient integration of digital tools into the mathematics curriculum. Additionally, many students lack confidence and motivation to engage with

digital platforms for learning, while teacher support and encouragement in promoting digital literacy remain minimal or inconsistent.

In light of these challenges, the study aims to examine the current state of digital literacy among mathematics students in Egor Local Government Area. It explored how exposure to digital tools influences students' understanding of mathematical concepts and identify the key factors that hinder or promote the development of digital competencies. The study also determined practical recommendations for improving student access to digital resources, enhancing the incorporation of technology in mathematics learning, and fostering digital confidence among learners.

Research Questions

The following research questions have been formulated to guide the study and ensure a systematic exploration of the core issues surrounding the topic:

1. What is the level of digital literacy among mathematics students in Egor Local Government Area?
2. To what extent are mathematics students in Egor Local Government Area aware of the availability of digital tools for learning mathematics?
3. What are the key factors influencing the development of digital literacy among mathematics students in Egor Local Government Area?
4. What challenges do mathematics students face in integrating digital technology into the learning of mathematics in Egor Local Government Area?

Purpose of the Study

The primary aim of this study is to evaluate the level of digital literacy among mathematics students in Egor Local Government Area and explore the factors influencing its development. Specifically, the objectives of the study are to:

1. assess the level of digital literacy among mathematics students in Egor Local Government Area.
2. examine the extent of awareness among mathematics students in Egor Local Government Area regarding the availability of digital tools for learning mathematics.
3. identify the key factors influencing the development of digital literacy among mathematics students in Egor Local Government Area.
4. investigate the challenges mathematics students face in integrating digital technology into the learning of mathematics in Egor Local Government Area.

Significance of the Study

The primary beneficiaries of this study are mathematics students in Egor Local Government Area, mathematics teachers and educators, school administrators and education policy makers, curriculum developers, parents and guardians, ICT education advocates, future researchers, and non-governmental organizations (NGOs) promoting digital inclusion and educational equity.

This study is particularly significant to mathematics students in Egor Local Government Area, as it seeks to evaluate their level of digital literacy, their awareness of digital tools available for learning mathematics, and the challenges they face in using such tools. By identifying these factors, the study will empower students with useful knowledge about how to enhance their digital skills, utilize digital resources effectively, and ultimately improve their mathematical learning outcomes.

For mathematics teachers and educators, the findings will offer essential insights into students' readiness and limitations in using digital technology for learning. This will help teachers tailor their instructional strategies to better support digital learning, identify areas where students need guidance, and adopt more student-centered approaches to integrating ICT in mathematics instruction.

School administrators and education policy makers stand to benefit from this study through the identification of systemic barriers affecting digital literacy in schools, such as poor infrastructure or lack of digital resources. The results may inform decisions on budget allocation, digital infrastructure development, and training programs for both students and teachers to enhance digital learning across schools in the local government area.

Curriculum developers will also find the study useful, as it highlights the need to embed digital literacy components within the mathematics curriculum. This ensures that students are not only exposed to core mathematical concepts but are also equipped with the digital competencies required to thrive in modern educational and professional settings.

For parents and guardians, the study emphasizes the growing importance of digital skills in education and encourages more active involvement in supporting their children's access to and use of digital tools for learning. This may include investing in digital devices, supporting home-based learning, and reinforcing digital confidence.

Policy makers in the education sector can use the findings to develop strategic policies aimed at narrowing the digital divide in public secondary schools, ensuring equitable access to digital resources, and promoting digital literacy as a key educational priority, particularly in under-resourced areas like Egor.

Future researchers will find this study valuable as a foundation for further investigations into digital literacy across different subjects, regions, or education levels. It may also spark comparative studies that explore the effectiveness of various interventions aimed at improving digital literacy in mathematics education.

Finally, non-governmental organizations (NGOs) and ICT advocacy groups can leverage the results of this study to design targeted interventions, workshops, and digital skill-building programs for students. The findings will support collaborative efforts aimed at promoting digital inclusion, improving mathematics education, and ensuring that no student is left behind in the digital age.

Scope and Delimitation of the Study

This study focuses on assessing digital literacy among mathematics students in secondary schools within Egor Local Government Area of Edo State, Nigeria. The scope of the study is specifically limited to investigating four key aspects: the current level of digital literacy possessed by these students; their awareness of the availability of digital tools for learning mathematics; the major factors influencing their development of digital literacy; and the challenges they face in integrating digital technology into the learning of mathematics. By centering the research on mathematics students, the study aims to highlight subject-specific digital literacy needs, rather than addressing general digital competence across all disciplines. The study is delimited to mathematics students at the secondary school level and does not include students from tertiary institutions, or primary schools. It also focuses only on schools located within Egor Local Government Area and may not reflect the situation in other local government areas or states. Furthermore, the study relies on self-reported data collected through questionnaires and/or interviews, which may be subject to respondent bias. Despite these delimitations, the study provides valuable insights into the digital readiness and challenges faced by mathematics students in integrating technology into their academic pursuits, and its findings can serve as a foundation for broader investigations or policy interventions.

Definition of Terms

Digital Literacy: Digital literacy refers to the ability to effectively and critically navigate, evaluate, and create information using a range of digital technologies.

Mathematics Education: Mathematics education involves the teaching and learning of mathematical concepts, methods, and practices.

Egor Local Government Area: Egor Local Government Area is a geographical and administrative region located in the southern part of Edo State, Nigeria

CHAPTER TWO

REVIEW OF RELATED LITERATURE

In this chapter, literature relating to the topic is reviewed. The review is discussed under the following sub headings.

- Concept of Digital Literacy
- Students' Level of Proficiency in Using Digital Tools for Mathematics
- Students' Awareness of tools for learning Mathematics
- Factors Influencing Students' Digital Literacy Skills in Mathematics Learning
- Challenges Faced by Students in Developing Digital Literacy Skills
- Summary of Reviewed Literature

Concept of Digital Literacy

Digital literacy refers to the ability to effectively and critically navigate, evaluate, and create information using a range of digital technologies. In today's world, digital literacy is no longer a luxury but a necessity, especially given the increasing reliance on technology in virtually all aspects of life including education, communication, governance, and business. As societies grow more interconnected and digitized, individuals are expected to understand not only how to use digital tools but also how to engage with digital content responsibly and ethically (Ng, 2020).

One key aspect of digital literacy is the ability to access digital tools and resources. Access involves not just physical access to devices and internet connectivity but also the

competence to use these tools meaningfully. Without access, digital literacy cannot be cultivated, leading to what scholars have termed the “digital divide”—a gap between those who have the resources and skills to engage in the digital world and those who do not (van Deursen & Helsper, 2021). This divide is a persistent issue in many developing countries, and efforts to bridge this gap are ongoing. Digital literacy also encompasses information literacy—the capacity to locate, assess, and use information effectively. In a digital environment flooded with misinformation, fake news, and propaganda, it is essential for individuals to develop critical thinking skills to discern credible sources from unreliable ones (Livingstone, 2019). This critical assessment is particularly vital for students, researchers, and professionals whose decisions and conclusions rely on trustworthy information. Communication literacy, another core dimension, pertains to the ability to use digital tools for effective interpersonal and mass communication. With the advent of platforms like email, social media, and instant messaging, people must learn appropriate digital communication etiquette and understand the nuances of digital interactions (Kaeophanuek, 2021). Poor digital communication can lead to misunderstandings or even cyberbullying, highlighting the need for digital emotional intelligence.

Moreover, digital content creation—ranging from simple social media posts to complex multimedia presentations—is an integral part of digital literacy. Being digitally literate means knowing how to produce content that is not only aesthetically pleasing but also ethically sound and tailored to one’s audience. In educational settings, students are

increasingly required to create digital portfolios and presentations, making content creation skills indispensable (Falloon, 2020). Privacy and security literacy are growing areas of concern within the broader digital literacy framework. Users must be knowledgeable about digital privacy issues, data protection rights, and the potential consequences of oversharing online. Recent studies emphasize the need for education around digital safety, especially among teenagers and children who are more susceptible to online risks (Kimmons, 2022).

Importantly, digital literacy is not static; it evolves with technology. As new digital tools and platforms emerge, individuals must continuously learn and adapt. This dynamic nature of digital literacy requires both formal education and lifelong learning strategies. Schools, universities, and employers must create environments that support ongoing digital skills development (Voogt, 2020). Digital literacy also has a socio-economic dimension. Research shows that individuals with higher digital literacy tend to have better job prospects, higher earnings, and more access to remote working opportunities. Conversely, low digital literacy can exacerbate social exclusion, especially among older adults, the less educated, and rural populations (OECD, 2021).

In the context of education, digital literacy has taken center stage, particularly in the wake of the COVID-19 pandemic, which accelerated the shift to online learning. Teachers and students alike had to rapidly adapt to digital platforms, exposing both the strengths and weaknesses of existing digital education infrastructure (Bond, 2020). Many educators

struggled due to inadequate training, emphasizing the need for professional development in digital literacy.

Governments and policymakers are now placing more emphasis on digital literacy as a fundamental component of national education curriculums. Initiatives like the European Digital Competence Framework and Nigeria's National Digital Economy Policy aim to mainstream digital literacy and prepare citizens for the digital economy (European Commission, 2021; NITDA, 2022). These policy efforts are crucial for long-term national development.

Digital literacy is closely linked to digital citizenship—the responsible use of technology to engage in society. A digitally literate citizen understands their rights and responsibilities in the digital world, including respecting others' privacy, avoiding plagiarism, and recognizing the implications of their digital footprint (Ribble, 2019). As such, digital literacy goes beyond skills to include values and attitudes. For young people, digital literacy development is foundational for both personal and academic growth. They are expected to navigate e-learning platforms, participate in digital forums, and utilize digital research tools. Yet, despite growing up in a tech-savvy world, not all youth are digitally literate. The notion of the "digital native" has been challenged by studies that reveal gaps in critical digital skills among the younger generation (Helsper & Eynon, 2020). In workplaces, digital literacy has transformed how tasks are executed. Employees must now master digital collaboration tools such as Slack, Zoom, and Microsoft Teams. Moreover, many roles demand familiarity with data analytics tools, programming, or

digital project management platforms, making digital literacy a prerequisite for career advancement (Nguyen, 2023). Teachers play a pivotal role in fostering digital literacy among learners. Their own level of digital competence significantly affects how they integrate technology in the classroom. Effective teacher training programs must therefore prioritize digital pedagogy—teaching with and through digital tools in a way that enhances learning outcomes (Instefjord & Munthe, 2021). Without confident and competent teachers, efforts to improve student digital literacy will fall short. Assessing digital literacy poses unique challenges. Unlike traditional literacy, digital literacy cannot be measured by simple tests. It requires performance-based assessments that examine how individuals apply digital knowledge in real-life scenarios. As such, educators and researchers continue to develop reliable frameworks and tools to evaluate digital literacy comprehensively (Redecker & Punie, 2021).

Students' Level of Proficiency in Using Digital Tools for Mathematics

Students' level of proficiency in using digital tools for mathematics has become an increasingly relevant topic as technology continues to play a central role in modern education. The effectiveness of digital integration in the mathematics classroom often depends on how well students can navigate, interpret, and apply these tools. Proficiency goes beyond basic familiarity with devices—it encompasses the ability to utilize platforms and software to explore, solve, and represent mathematical concepts. As such, understanding students' capabilities in this area is key to improving digital-based instructional strategies. A student's proficiency with digital tools in mathematics can be

significantly influenced by prior exposure and access to technology. Students from urban or well-funded schools tend to demonstrate higher levels of digital competence due to early and consistent interactions with educational technology (Livingstone, 2019). Conversely, those from under-resourced areas often lag behind, struggling not only with tool usage but also with conceptual understanding when technology is involved. This digital divide continues to raise concerns about equity in mathematics achievement.

In many classrooms today, students are expected to use a wide range of tools—from graphing calculators and spreadsheet applications to dynamic geometry software and statistical packages. However, research suggests that while students may be adept at using smartphones and social media, their ability to use academic digital tools is often underdeveloped. Kim (2021) found that many students confuse general digital fluency with subject-specific proficiency, highlighting a need for explicit instruction in using mathematical tools. Proficiency in digital mathematics tools is closely tied to the quality of instruction students receive. Educators who incorporate digital tools effectively and consistently tend to foster higher levels of student proficiency. Students exposed to structured and purposeful digital tasks are more likely to develop competence in areas such as plotting functions, analyzing data sets, and creating models. According to Bond (2020), guided practice and teacher modeling significantly improve students' abilities to use digital tools meaningfully. Students with higher proficiency in using digital tools often exhibit greater engagement and understanding in mathematics. These learners can explore multiple solution strategies, test hypotheses, and visualize abstract concepts,

leading to deeper conceptual learning. For instance, Kimmons (2022) observed that students who used GeoGebra and Desmos to explore algebraic expressions developed stronger problem-solving skills than peers relying on traditional methods. The interactive nature of such tools enhances comprehension and retention.

Self-efficacy also plays a vital role in shaping students' digital tool proficiency. Students who believe in their ability to learn and use new technologies are more likely to experiment with unfamiliar platforms and persist through challenges. Grover & Pea (2021) argue that fostering confidence through supportive digital environments leads to increased willingness to engage with complex mathematical tasks. This psychological aspect is just as important as the technical skills involved. Peer collaboration is another factor influencing proficiency. When students work together on digital tasks, they learn by observing others and explaining processes. This social learning reinforces technical skills and deepens mathematical understanding. Kong (2022) highlights that collaborative digital activities, such as co-creating graphs or analyzing data sets in groups, help students develop not only procedural knowledge but also critical thinking and communication skills. Despite the potential benefits, many students face barriers that hinder their proficiency development. Lack of access to reliable devices or internet connectivity can impede students' ability to complete assignments or engage with digital platforms outside the classroom. Ng (2020) emphasizes that these infrastructural challenges are particularly common in developing countries and rural communities, limiting students' opportunities to practice and improve their skills. Teacher attitudes and

expectations also impact how proficient students become with digital tools. Educators who are hesitant or untrained in technology integration often fail to encourage meaningful student engagement with digital resources. According to Instefjord & Munthe (2021), professional development for teachers is crucial, as it directly affects their ability to guide students in using digital tools for higher-order thinking in mathematics.

Students' cognitive development stages also affect how they interact with digital tools. Younger students may struggle with multitasking or interpreting visual data representations, requiring simpler, more scaffolded tools. Meanwhile, older students tend to show greater proficiency, particularly when exposed to progressively complex tasks. Marriott (2020) notes that age-appropriate digital tools should be used to align with students' developmental readiness and cognitive capacity. Assessment practices can either promote or hinder students' digital proficiency. When assessments include tasks that require the use of digital tools, students are more likely to develop and apply those skills regularly. However, if assessments remain paper-based or avoid technology altogether, students may not see the relevance of learning to use digital platforms. OECD (2021) advocates for digital literacy to be integrated into both formative and summative assessments in mathematics. Students' attitudes toward mathematics also influence their willingness to engage with digital tools. Those who enjoy mathematics and see its real-world relevance are generally more motivated to use technology to deepen their understanding. Conversely, students with high math anxiety may avoid digital tools if they perceive them as complicating their learning process. Nguyen (2023) suggests that

positive digital experiences can help reshape students' attitudes and make mathematics more approachable. Digital proficiency in mathematics is also linked to language and literacy skills. Many digital tools require students to follow written instructions, interpret visual cues, and input accurate expressions. Students with limited reading comprehension or English proficiency may struggle to use these tools effectively. Helsper & Eynon (2020) argue that language barriers must be addressed through multilingual platforms or support scaffolds to ensure inclusive learning environments.

Learning outside of formal schooling also contributes to students' digital proficiency. Participation in coding clubs, online math communities, and informal digital learning experiences helps students build familiarity and confidence. Kim (2021) asserts that extracurricular digital engagement often complements classroom learning, particularly in fostering a sense of ownership over one's education. These self-initiated activities can enhance digital literacy and apply it meaningfully to mathematical tasks.

Students' Awareness of Tools for learning Mathematics

Students' attitudes and perceptions towards digital literacy have become a critical area of interest in contemporary education research, especially as digital tools are increasingly integrated into learning environments. Digital literacy, which encompasses the ability to access, evaluate, create, and communicate information using digital technologies, is not only a technical skill but also a cognitive and emotional engagement with digital environments. Understanding how students feel about and interact with digital technologies helps educators design more effective instructional strategies and supportive

learning experiences. Many students today are considered “digital natives” individuals who have grown up surrounded by technology. However, being familiar with digital tools for social and entertainment purposes does not automatically translate to being digitally literate in academic or professional contexts (Ng, 2020). Studies reveal that while students may have a positive attitude toward using digital devices, they often lack the deeper critical thinking and evaluative skills required for effective digital literacy (Helsper & Eynon, 2020). This gap between usage and competence highlights the importance of structured digital literacy education. Research has shown that students’ positive perceptions of digital literacy are strongly influenced by the usability and accessibility of digital tools. When digital platforms are user-friendly and intuitive, students are more likely to engage with them and develop confidence in their digital skills (Kaeophanuek, 2021). Conversely, when platforms are difficult to navigate or when students encounter frequent technical problems, their motivation and attitudes can quickly deteriorate, leading to frustration and avoidance. Another factor influencing student attitudes is perceived usefulness. When students believe that digital literacy is essential for academic success, future employment, or everyday life, they are more likely to develop a proactive attitude toward acquiring digital skills (Kimmons, 2022). This perceived value fosters greater commitment and openness to learning, especially when digital literacy is connected to real-world applications such as online research, digital communication, and problem-solving.

Socio-economic background also plays a significant role in shaping students' perceptions of digital literacy. Students from well-resourced backgrounds often have greater access to devices, internet connectivity, and digital learning opportunities. As a result, they tend to have more positive attitudes and higher levels of confidence in their digital abilities (OECD, 2021). In contrast, students from underprivileged environments may experience digital exclusion, leading to a lack of familiarity and negative attitudes toward digital engagement.

Gender differences in digital literacy perceptions have been noted in various studies. While boys often express higher confidence in their use of digital technologies, girls may exhibit more critical awareness of digital content and its implications (Voogt, 2020). These perceptions, shaped by socialization patterns and educational experiences, suggest that digital literacy instruction should be sensitive to gender dynamics and promote equitable participation for all students. Cultural factors also influence how students perceive and value digital literacy. In some cultures, digital technology is closely associated with modernity, innovation, and opportunity, while in others, it may be viewed with suspicion or seen as secondary to traditional learning methods. Understanding cultural attitudes helps educators adapt their digital literacy instruction to be more inclusive and respectful of diverse student backgrounds (Livingstone, 2019).

Students' past experiences with digital learning environments significantly shape their current attitudes. Those who have had positive experiences—where digital tools enhanced understanding, facilitated collaboration, or improved academic performance—

are more likely to embrace further digital learning opportunities (Bond, 2020). On the other hand, students who have faced challenges such as poor internet connectivity, lack of support, or ineffective digital instruction may be skeptical or resistant to digital learning. Attitudes toward digital literacy are also closely linked to self-efficacy the belief in one's ability to perform digital tasks effectively. Students with high digital self-efficacy are more likely to explore new tools, persist in the face of challenges, and take initiative in using technology to support their learning (Marriott, 2020). Educators can build this confidence by providing scaffolded support, celebrating small successes, and creating a low-risk environment for experimentation. The learning environment plays a vital role in shaping perceptions. Classrooms that integrate digital tools seamlessly and where teachers model enthusiastic and effective use of technology often foster more positive student attitudes. When digital literacy is embedded in the curriculum and aligned with meaningful learning objectives, students are more likely to view it as relevant and worthwhile (Instefjord & Munthe, 2021). Students often express a preference for collaborative digital experiences over solitary ones. Online discussions, group projects using digital platforms, and peer feedback mechanisms contribute to a sense of community and shared learning. These experiences can positively influence students' attitudes by showing them how digital tools can enhance communication, cooperation, and mutual support (Kong, 2022).

However, concerns about digital overload and screen fatigue are also increasingly present among students. While many appreciate the flexibility of digital tools, they also report

challenges in maintaining focus, managing time, and balancing screen use with offline activities. This complex relationship suggests that students need guidance in digital wellness and strategies for self-regulation (Brown, 2022). Students are also aware of the ethical and safety aspects of digital literacy. Many express concern about privacy, cyberbullying, misinformation, and data security. These concerns affect their willingness to fully engage in digital environments unless they feel protected and informed. Therefore, digital literacy programs must include education on digital citizenship, online ethics, and responsible use (Ribble, 2019). Technology anxiety is another barrier that affects students' attitudes. Some students feel intimidated by the pace of technological change or fear making mistakes. This anxiety can lead to avoidance behaviors unless addressed through patient instruction and peer mentoring. Building a supportive digital learning culture is key to overcoming these barriers and promoting positive engagement (Nguyen, 2023).

Factors Influencing Students' Digital Literacy Skills in Mathematics Learning

Students' digital literacy skills in mathematics learning are shaped by a wide range of interrelated factors that influence how effectively they use technology to support understanding and problem-solving. Digital literacy, in this context, goes beyond just knowing how to use devices it includes the capacity to critically evaluate digital content, apply digital tools meaningfully, and engage actively in digital learning environments. As mathematics education increasingly integrates digital platforms, applications, and tools,

the factors that influence students' ability to adapt and thrive in these settings become ever more important to understand.

One of the most influential factors is students' access to digital technologies and reliable internet connectivity. Students who have consistent access to computers, tablets, and high-speed internet are more likely to develop the digital literacy skills needed for modern math learning environments. Unfortunately, the digital divide remains a significant challenge, especially for students from low-income or rural communities who may lack the tools or infrastructure required for full participation in digital learning (OECD, 2021). Without adequate access, students are limited in their ability to practice and improve their digital skills, particularly in complex subjects like mathematics that often require specialized software or interactive platforms.

Teacher competency and instructional approach also significantly affect students' digital literacy development in mathematics. Educators who are proficient in using digital tools and who can meaningfully integrate them into their teaching foster environments where students are more likely to engage with and benefit from digital resources. For instance, when teachers use platforms like GeoGebra, Desmos, or virtual manipulatives in problem-solving activities, students become more comfortable and skilled in navigating and applying digital tools (Instefjord & Munthe, 2021). Conversely, when teachers lack the necessary training or confidence, students may receive limited or ineffective digital learning experiences.

The structure and content of the curriculum are critical as well. When digital literacy is embedded into the mathematics curriculum and aligned with learning objectives, students are more likely to view technology as a valuable and essential tool for success. Schools that provide formal programs, such as digital skill workshops or embedded tech-based assessments, offer students structured opportunities to build and refine their skills. Additionally, institutional support in the form of digital learning policies, resource allocation, and professional development for teachers ensures that digital literacy instruction is sustainable and impactful (Livingstone, 2019). Students' prior exposure to digital tools plays a vital role in shaping their digital literacy. Learners who have used educational technology from an early age—whether through classroom activities or at home—are often more confident and effective in applying digital tools in new contexts. Early engagement with tools such as interactive whiteboards, educational games, or mobile learning apps lays the foundation for more advanced digital skills in secondary mathematics learning (Bond, 2020). This prior experience often determines how quickly students can adapt to newer technologies and more complex digital tasks.

Motivation and self-efficacy are internal psychological factors that greatly influence how students approach digital tools in mathematics learning. When students believe in their ability to use technology effectively, they are more likely to persist in overcoming challenges, seek out additional resources, and experiment with new tools. This self-confidence is critical in problem-solving and data analysis tasks that require multiple attempts or exploration. Research indicates that students with high digital self-efficacy

are more independent and willing to take initiative in digital learning environments (Marriott, 2020), while those with low confidence often experience anxiety or avoidance behaviors. Social interactions and peer influence also play a role in students' digital literacy development. Collaborative learning environments, where students engage in group projects using digital platforms, help promote shared knowledge and peer-to-peer support. These interactions not only enhance digital skills but also improve critical thinking and communication within the mathematical context. Students often learn best when they can observe and emulate effective strategies used by their peers (Kong, 2022), making group activities and digital collaboration tools especially valuable. Language proficiency and general literacy levels impact students' ability to engage with digital mathematical content. Since many educational technologies are text-heavy or require following detailed instructions, students with lower reading comprehension may struggle to use them effectively. This challenge is particularly evident in data interpretation or software-based tasks, where understanding terms and instructions is key to success. Supporting students with varied literacy levels through visual aids, tutorials, and multimodal resources can help bridge this gap (Voogt, 2020).

Students' cultural and socio-economic backgrounds also shape their perceptions and engagement with digital tools. In households or communities where technology is seen as a valuable educational resource, students are more likely to receive encouragement and support for digital learning. In contrast, environments where technology is viewed with skepticism or considered a distraction may limit students' opportunities to practice and

develop their digital literacy (Ng, 2020). Teachers need to be sensitive to these contextual factors and provide equitable learning opportunities that cater to diverse student backgrounds. Gender-related differences in confidence and engagement with digital tools in mathematics learning have also been observed. While male students often report greater confidence in navigating digital platforms, female students tend to demonstrate higher attention to detail and more strategic use of technology. These gender-based differences, shaped by social norms and experiences, point to the need for inclusive instructional strategies that promote balanced digital participation across all learners (Helsper & Eynon, 2020). Ensuring that digital tasks are accessible and relatable to all genders can help reduce disparities in engagement and performance. Parental involvement is another influential factor. Students whose parents support digital learning by encouraging the use of educational apps, helping with online assignments, or monitoring academic progress—are more likely to develop strong digital skills. Especially during periods of remote learning, such as those necessitated by the COVID-19 pandemic, parental support was essential in maintaining student engagement with mathematics (Kim, 2021). Programs that guide parents in supporting their children's digital learning at home can have a lasting impact on student outcomes. The quality and design of the digital tools themselves are crucial. Tools that are intuitive, interactive, and visually engaging tend to facilitate better understanding and foster positive attitudes toward mathematics. For example, well-designed platforms that provide step-by-step feedback and interactive simulations help students grasp abstract mathematical concepts

more concretely. When tools are difficult to use or not tailored to students' needs, they can cause frustration and hinder learning (Kimmons, 2022). Therefore, tool selection and customization play a central role in digital literacy development. Feedback systems embedded in digital learning platforms enhance students' digital literacy and academic understanding. Real-time feedback, including prompts, hints, and explanations, helps students recognize errors, reflect on their problem-solving processes, and correct misconceptions. These mechanisms encourage a deeper level of engagement with digital content and support metacognitive development, which is critical for success in mathematics (Grover & Pea, 2021). Ongoing professional development for educators ensures that they stay current with digital innovations and pedagogical strategies. Teachers who receive training in using technology for math instruction are more likely to integrate it effectively and encourage students to explore digital tools confidently. Schools that invest in regular teacher development create a culture of continuous improvement and adaptability, both of which are necessary in the evolving landscape of digital education (Nguyen, 2023). Government policies and national education strategies also influence the emphasis placed on digital literacy. Countries that promote digital inclusion through educational policy—by funding infrastructure, designing digital curricula, and supporting public-private partnerships—provide a systemic foundation for digital skill development. These policies can ensure that students across regions and socio-economic backgrounds have equitable access to digital learning in mathematics (European Commission, 2021).

Challenges Faced by Students in Developing Digital Literacy Skills

Students face a variety of challenges in developing digital literacy skills, particularly in the context of mathematics education where the effective use of technology is critical to understanding complex concepts. One of the most prevalent barriers is unequal access to digital devices and reliable internet connectivity. In many under-resourced schools or low-income households, students lack the tools needed to practice and develop digital competencies. This digital divide contributes to gaps in learning outcomes and hinders students from acquiring the necessary skills to succeed in tech-integrated classrooms (Ng, 2020).

Another major obstacle is the lack of adequate digital training and structured instruction. While many students are proficient in using smartphones and social media, they often struggle with academic technologies such as spreadsheets, graphing tools, or learning management systems. According to Bond (2020), students frequently assume that general tech-savviness translates to academic digital literacy, which is not always the case. Without proper guidance and hands-on experience with educational tools, they may fail to develop the critical thinking and technical skills required for effective learning.

Cognitive overload is also a challenge, especially when students are introduced to multiple digital tools without clear instructions or support. Navigating unfamiliar interfaces while trying to learn new mathematical concepts can lead to frustration and confusion. Kimmons (2022) notes that without scaffolding, students may become

overwhelmed and disengaged, particularly when digital tools are poorly integrated into the curriculum or used inconsistently.

Language barriers and limited literacy skills can further complicate digital learning. Many educational technologies rely heavily on textual instructions, dropdown menus, and command-based input. Students who struggle with reading comprehension or who are English Language Learners (ELLs) may find it difficult to follow prompts or interpret feedback provided by digital tools. Helsper & Eynon (2020) emphasize the importance of designing inclusive platforms that cater to diverse linguistic and literacy needs to bridge this gap.

Time constraints also impede the development of digital literacy. With tightly packed curricula, teachers often prioritize content coverage over skill development. As a result, students have limited opportunities to explore digital tools deeply or independently. Grover & Pea (2021) argue that digital literacy must be intentionally embedded into lesson plans and learning objectives, rather than treated as an add-on activity, to be truly effective.

Inadequate teacher preparedness is another factor that indirectly affects students' digital skill acquisition. Teachers who are uncomfortable or inexperienced with technology may avoid using digital tools in the classroom or may use them in ways that do not support meaningful learning. Instefjord & Munthe (2021) highlight the need for continuous professional development for educators so they can confidently integrate technology and provide the necessary support to their students. Digital distractions pose a significant

challenge, particularly when students use devices that are not restricted to educational content. With the temptation of games, social media, and entertainment apps just a click away, students may struggle to stay focused during lessons or assignments. According to Livingstone (2019), managing digital attention requires explicit instruction and the establishment of boundaries to help students develop self-regulation and purposeful tech use. Another issue is the inconsistency in digital platform design. Not all educational tools are user-friendly or intuitive, and navigating different interfaces across subjects can be confusing for students. A lack of standardization often leads to time wasted on learning how to use a tool rather than on actual learning. Kim (2021) suggests that educational institutions adopt streamlined and compatible platforms to reduce confusion and build familiarity over time.

The absence of technical support exacerbates these challenges. Students encountering glitches, login issues, or software malfunctions may not have access to immediate help, especially when working from home. This can discourage them from engaging further with digital tools. Kong & Song (2021) point out that technical difficulties often lead to negative attitudes toward digital learning, particularly among students with limited patience or confidence in their tech skills.

Math-specific challenges also arise, such as difficulties in entering complex equations into digital tools or interpreting graphs and data on screen. Students must learn not only mathematical content but also how to digitally represent and manipulate it. Nguyen (2023) found that students unfamiliar with mathematical software often perform poorly

not due to lack of understanding, but due to interface issues or formatting errors that lead to incorrect results.

Socio-emotional factors also influence students' digital literacy development. Fear of making mistakes, embarrassment over not understanding how to use a tool, or previous negative experiences with technology can lead to anxiety or avoidance. Marriott (2020) observes that a supportive and patient learning environment is essential in helping students build confidence in their digital abilities, especially in subjects like math that already carry high anxiety levels for many learners. Cultural and generational gaps can contribute to misunderstandings about digital expectations. Students from households where digital learning is not encouraged or supported may lack the reinforcement needed to develop these skills at home. Parents who are unfamiliar with educational technologies may be unable to assist their children, further widening the digital literacy gap (OECD, 2021). Bridging this divide requires school-family partnerships and community engagement efforts. Students also face challenges in evaluating the credibility of digital content. With vast amounts of online information available, they may struggle to distinguish between accurate, high-quality resources and misleading or incorrect materials. According to Voogt (2020), information literacy is a critical sub-skill of digital literacy, and students need explicit training in assessing sources, verifying facts, and synthesizing information from digital environments. There is also a growing concern about the ethical use of digital resources. Plagiarism, misuse of AI tools, and failure to credit sources are increasingly common as students rely more heavily on online content.

Helsper & Eynon (2020) argue that digital literacy education must include instruction on digital citizenship, emphasizing responsible and ethical behavior in online academic environments.

Summary of Reviewed Literature

The literature reviewed across the five themes offers a comprehensive view of the evolving role of digital literacy in mathematics education, revealing both its transformative potential and the challenges involved in its integration. The concept of digital literacy is no longer limited to basic computer skills but now encompasses the ability to effectively locate, evaluate, create, and communicate information using a variety of digital platforms. In mathematics education, this involves using digital tools to solve problems, analyze data, and communicate mathematical reasoning. It reflects a shift from passive consumption of digital content to active, critical engagement with technology in meaningful and subject-specific ways.

The use of digital tools and resources in mathematics education such as GeoGebra, Desmos, graphing calculators, and interactive whiteboards has significantly enhanced the teaching and learning of mathematical concepts. These tools allow for visualization of abstract ideas, foster dynamic engagement with content, and support student-centered learning approaches. When used effectively, they make mathematics more interactive, accessible, and contextually relevant.

Students' attitudes and perceptions toward digital literacy greatly influence their engagement and success in mathematics learning. Positive attitudes often lead to

increased confidence, motivation, and curiosity in exploring digital tools. However, negative perceptions, shaped by anxiety, limited exposure, or lack of support, can hinder learning. Cultivating positive experiences and building student confidence through guided practice is essential for digital literacy development.

Multiple factors influence students' digital literacy skills in mathematics, including access to devices and internet connectivity, teacher expertise, curriculum design, peer interaction, socio-economic background, and support from home. Inadequate exposure to digital tools or inconsistent integration into instruction can limit students' skill development. Conversely, structured learning environments and trained teachers significantly enhance digital competence.

The role of digital literacy in enhancing mathematics understanding is evident through its ability to promote deeper conceptual grasp, encourage exploratory learning, and support diverse learning styles. Digital platforms help students model, manipulate, and visualize mathematical problems in real time, which fosters improved critical thinking and problem-solving abilities. Personalized feedback and interactive simulations are particularly effective in reinforcing comprehension. Students' proficiency in using digital tools for mathematics is a key determinant of their academic success. High proficiency levels allow students to navigate complex tools, analyze data accurately, and apply technology to real-world problems. Proficiency goes beyond basic tool use and includes strategic thinking, adaptability, and the ability to choose appropriate digital solutions to support mathematical tasks. The impact of digital literacy on academic performance in

mathematics is consistently positive when students are properly supported. Digitally literate students tend to perform better in assessments, show increased engagement, and demonstrate improved retention of mathematical concepts. Digital tools also aid differentiated instruction, allowing teachers to cater to diverse learning needs through adaptive technologies.

Despite its benefits, students face significant challenges in developing digital literacy skills, such as unequal access to technology, lack of structured instruction, limited teacher support, cognitive overload, and emotional barriers like anxiety or lack of confidence. Technical difficulties, distractions, and inconsistent platform design further complicate learning. Addressing these issues requires systemic efforts in infrastructure provision, teacher training, curriculum integration, and inclusive policy-making. In summary, digital literacy is foundational to modern mathematics education, influencing how students learn, interact with content, and demonstrate understanding. While it enhances engagement and academic achievement, success depends on addressing access, training, and support-related challenges to ensure equitable and effective implementation.

CHAPTER THREE

METHODOLOGY

In this chapter, the methods and procedures that were used in carrying out the study is presented under the following sub-headings.

- Design of the Study
- Population of the Study
- Sampling and Sampling Techniques
- Research Instrument
- Validity of the Instrument
- Reliability of the Instrument
- Method of Data Collection
- Method of Data Analysis

Design of the Study

This study employs a descriptive survey research design to investigate the level of digital literacy among mathematics students in Egor Local Government Area. The descriptive survey design is suitable for this study because it allows for the collection of data from a representative sample of students regarding their knowledge, usage, and challenges in applying digital tools for learning mathematics. This method enables the researcher to analyze trends, patterns, and relationships within the data, providing insight into how digital literacy influences students' engagement and performance in mathematics.

Population of the Study

The population of this study comprises mathematics students in both private and public senior secondary schools within Egor Local Government Area. A total of 743 students enrolled in the selected private and public senior secondary schools form the population from which the sample was drawn. These figures were obtained from the official enrollment records of the selected schools (Egor Local Government Area Education Authority, 2025). These students represent different academic backgrounds and school types, ensuring a diverse and comprehensive study population for the research on Digital Literacy Among Mathematics Students in Egor Local Government Area**.**

Sample and Sampling Techniques

A sample size of 100 mathematics students was selected from the total population of 743 students in Egor Local Government Area using a stratified random sampling technique. This technique was employed to ensure that students were chosen from different class levels (SS1, SS2, and SS3) and from both public and private schools. After stratification, a simple random sampling method was used to select students within each stratum to ensure fairness and equal representation of participants in the study on Digital Literacy Among Mathematics Students in Egor Local Government Area**.**

Research Instrument

The primary instrument for data collection in this study is a structured questionnaire. The questionnaire consists of closed-ended questions designed on a four-point Likert scale (Strongly Agree, Agree, Disagree, and Strongly Disagree). The instrument is divided into

sections, covering demographic information, teaching challenges, instructional strategies, students' attitudes, and the impact of resources on mathematics instruction.

Validity of the Instrument

To ensure the validity of the research instrument, the questionnaire was reviewed by two experts in educational research, mathematics education, and measurement and evaluation. Their feedback was incorporated to refine the questions, ensuring they accurately measure the intended variables. A pilot study was also conducted with a small group of 20 students, and necessary modifications were made based on their responses to enhance the clarity and effectiveness of the instrument.

Reliability of the Instrument

The reliability of the research instrument was determined using the Cronbach's Alpha reliability coefficient to measure the internal consistency of the questionnaire. A pilot study was conducted, and the responses were analyzed using Statistical Package for the Social Sciences (SPSS) software. The Cronbach's Alpha coefficient obtained was above 0.70, indicating a high level of reliability and consistency in the instrument.

Method of Data Collection

The researcher personally administered the questionnaires to the selected 100 students in their respective schools. The purpose of the study was explained to the participants, and they were assured of confidentiality and anonymity. The questionnaires were distributed and collected within a period of one week to ensure a high response rate.

Method of Data Analysis

Data collected for this study were analyzed using descriptive statistics, specifically mean and standard deviation based on a four-point Likert scale of Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). The mean was used to determine the average response for each item, while the standard deviation measured the variation in opinions among respondents. Mean scores were interpreted using the following scale: 3.50–4.00 (very high), 2.50–3.49 (high), 1.50–2.49 (low), and 1.00–1.49 (very low). Data were presented in tables and analyzed according to each research question to identify trends and patterns in students' digital literacy, awareness, influencing factors, and challenges. This method was appropriate because it effectively summarized the respondents' views and provided a clear understanding of the study's findings.

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CHAPTER FOUR

PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS

Introduction

The purpose of this chapter is to analyze the responses obtained from the administered questionnaires in order to answer the research questions stated in Chapter One.

Presentation of Results

Table 1: Demographic Characteristics of Respondents

Variable	Category	Frequency	Percentage (%)
Gender	Male	56	56
	Female	44	44
Total		100	100
Age	15–17 years	28	28
	18–20 years	52	52
	21–25 years	20	20
Total		100	100

The demographic data in the table reveal that the study sample comprised 100 respondents, with a fairly balanced gender distribution of 56% males and 44% females, indicating that both genders were adequately represented in the study. This balance enhances the credibility of the findings, as perspectives from both male and female respondents are reflected. In terms of age distribution, the largest proportion of respondents (52%) fell within the 18–20 years age bracket, followed by 28% who were between 15–17 years, and 20% aged 21–25 years. This suggests that the majority of

participants were young adults, possibly reflecting an age group that is more socially active and aware of issues related to the study topic. The predominance of respondents within the late teenage and early adulthood stages implies that the study's outcomes are likely influenced by the perceptions and experiences of relatively young individuals, who may have firsthand exposure to the social and cultural dynamics being examined.

Research Question 1: What is the level of digital literacy among mathematics students in Egor Local Government Area?

Table 2: What is the level of digital literacy among mathematics students

S/N	Items	Mean	Std. Deviation
1	I can use basic digital tools like calculators for learning mathematics.	3.42	0.71
2	I am confident in searching for mathematics-related information online.	3.38	0.79
3	I can effectively participate in virtual mathematics classes or discussions.	3.25	0.81
4	I frequently use YouTube platforms to support my mathematics homework.	3.30	0.77
5	I can integrate digital platforms into solving mathematical problems.	3.20	0.83
	Grand Total	**3.31**	**0.78**

Benchmark mean value = 2.50

The data presented in the table indicate that respondents generally demonstrated a moderate to high level of digital literacy in relation to learning mathematics, as reflected by the grand total mean score of 3.31 and a standard deviation of 0.78. This suggests that most respondents agreed with the statements regarding their ability to use digital tools

and platforms for mathematics learning, though there were slight variations in individual responses. The highest mean score (3.42) was recorded for the item “I can use basic digital tools like calculators for learning mathematics,” showing that respondents were most confident in handling fundamental digital tools. Similarly, confidence in searching for mathematics-related information online (Mean = 3.38) was relatively high, indicating familiarity with online research. However, the lowest mean (3.20) for “I can integrate digital platforms into solving mathematical problems” suggests that while students are comfortable with basic and supportive technologies, they may face challenges in applying advanced digital tools to problem-solving processes. Overall, the results imply that while students possess essential digital skills useful for mathematics learning, there is still room for improvement in leveraging more complex digital resources for enhanced mathematical engagement and performance.

Research Question 2: To what extent are mathematics students aware of the availability of digital tools for learning mathematics?

Table 3: To what extent are mathematics students aware of the availability of digital tools

S/N	Items	Mean	Std. Deviation
6	I am aware that there are mobile apps designed for learning mathematics.	3.45	0.67
7	I know that there are websites that offer free tutorials and math exercises.	3.40	0.72
8	I know how to access digital libraries or e-books related to mathematics.	3.22	0.85
9	My school has introduced me to digital tools for studying mathematics.	3.15	0.88
10	I am aware that social media platforms can be used for academic purposes.	3.50	0.69
	Grand Total	**3.34**	**0.76**

Benchmark mean value = 2.50

The results in the table indicate a generally high level of awareness among respondents regarding the availability and use of digital resources for learning mathematics, as shown by the grand total mean of **3.34** with a standard deviation of **0.76**. This implies that most respondents agreed with the statements, although some variation existed in their levels of awareness. The highest mean score (3.50) was recorded for the item "I am aware that social media platforms can be used for academic purposes," suggesting that students recognize the potential of platforms like YouTube, WhatsApp, and Telegram for educational engagement. Similarly, a high mean score (3.45) for awareness of mobile apps designed for learning mathematics indicates that many students are familiar with

digital tools that enhance mathematical understanding. However, relatively lower mean scores for items such as "My school has introduced me to digital tools for studying mathematics" (Mean = 3.15) and "I know how to access digital libraries or e-books related to mathematics" (Mean = 3.22) suggest limited institutional support and exposure to specialized digital learning resources. Overall, the findings show that while students are largely aware of digital opportunities for mathematics learning, schools could play a more active role in guiding them toward effectively utilizing these tools for academic improvement.

Research Question 3: What are the key factors influencing the development of digital literacy among mathematics students?

Table 4: What are the key factors influencing the development of digital literacy among students

S/N	Items	Mean	Std. Deviation
11	Availability of internet access at home affects my ability to use digital tools.	3.46	0.68
12	My teachers encourage the use of digital tools in learning mathematics.	3.30	0.75
13	I learn better when digital tools are used to explain math concepts.	3.48	0.70
14	Peer influence motivates me to use digital tools in studying math.	3.28	0.80
15	Lack of digital devices limits my digital literacy development.	3.44	0.79
	Grand Total	**3.39**	**0.74**

Benchmark mean value = 2.50

The data in the table reveal that respondents generally agreed that various environmental and social factors influence their digital literacy in mathematics learning, as reflected by the grand total mean of 3.39 and a standard deviation of 0.74. This indicates a moderately high agreement across all items, suggesting that access, encouragement, and peer influence play significant roles in shaping students' use of digital tools. The highest mean score (3.48) for the item "I learn better when digital tools are used to explain math concepts" shows that most students perceive technology as an effective aid in understanding mathematical ideas, highlighting the pedagogical value of integrating digital tools into teaching. Similarly, high mean scores for "Availability of internet access at home affects my ability to use digital tools" (3.46) and "Lack of digital devices limits my digital literacy development" (3.44) emphasize the importance of access to both internet connectivity and technological resources in fostering digital competence. On the other hand, the relatively lower mean scores for "Peer influence motivates me to use digital tools" (3.28) and "My teachers encourage the use of digital tools" (3.30) suggest that while students recognize external support, peer and teacher motivation could be strengthened. Overall, the findings indicate that students' digital literacy in mathematics is significantly shaped by access to resources, supportive learning environments, and exposure to technology-enhanced instructional practices.

Research Question 4: What challenges do mathematics students face in integrating digital technology into the learning of mathematics?

Table 5: Challenges mathematics students face in integrating digital technology in learning of mathematics

S/N	Items	Mean	Std. Deviation
16	Poor internet connectivity hinders my access to online math resources.	3.56	0.66
17	I find it difficult to use some digital tools due to lack of technical skills.	3.35	0.74
18	There is limited support from teachers in using digital tools during lessons.	3.28	0.81
19	Digital tools are not readily available for most students in my school.	3.40	0.78
20	I sometimes get distracted when using digital devices for studying mathematics.	3.25	0.83
	Grand Total	**3.37**	**0.76**

Benchmark mean value = 2.50

The results in the table show that respondents generally agreed that several challenges hinder their effective use of digital tools in learning mathematics, as indicated by the grand total mean of 3.37 and a standard deviation of 0.76. This suggests a moderately high level of agreement among respondents regarding the existence of barriers to digital learning. The highest mean score (3.56) for the item “Poor internet connectivity hinders my access to online math resources” highlights that unstable or inadequate internet service is a major obstacle affecting students’ ability to access digital learning platforms.

Similarly, the relatively high mean score (3.40) for “Digital tools are not readily available for most students in my school” underscores the problem of insufficient technological resources in schools. Furthermore, the mean score of 3.35 for “I find it difficult to use some digital tools due to lack of technical skills” indicates that some students still struggle with the technical aspects of using digital resources, which limits their full engagement in technology-supported learning. Meanwhile, the lower mean scores for “Limited support from teachers” (3.28) and “Distraction when using digital devices” (3.25) suggest that while these are concerns, they are comparatively less significant than infrastructural and accessibility issues. Overall, the findings imply that despite students’ willingness to use digital tools for mathematics learning, challenges such as poor internet connectivity, inadequate resources, and limited technical skills continue to hinder their full participation in digital-based education.

Discussion of Findings

Level of Digital Literacy Among Mathematics Students

The findings revealed that mathematics students in Egor Local Government Area demonstrated a moderate to high level of digital literacy. With a grand mean of 3.31, the students showed strong competence in using basic digital tools such as calculators and online search engines to support their learning. The highest mean score (3.42) indicated that students were particularly confident in using basic digital tools, suggesting familiarity with foundational mathematical technologies. Students also expressed confidence in searching for mathematics-related information online (Mean = 3.38) and

using platforms such as YouTube for academic support (Mean = 3.30). However, the relatively lower mean score (3.20) for integrating digital platforms to solve mathematical problems indicates a skill gap in applying advanced digital tools for problem-solving. This suggests that while students can access and consume digital content, they still require support in using more complex software or platforms for deeper mathematical engagement.

Awareness of Digital Tools for Learning Mathematics

The findings showed a high level of awareness among students regarding the availability of digital tools for learning mathematics, with a grand mean of 3.34. Students demonstrated strong awareness of mobile applications designed for mathematics learning (Mean = 3.45) and websites offering free tutorials and exercises (Mean = 3.40). The highest awareness level (Mean = 3.50) was recorded for the use of social media platforms for academic purposes, indicating that students recognize the value of platforms such as WhatsApp, YouTube, and Telegram for educational activities. However, the lower scores for awareness of digital libraries (Mean = 3.22) and limited exposure from schools (Mean = 3.15) suggest that students' awareness is largely self-developed rather than institutionally guided. This highlights the need for schools to take a more active role in introducing structured digital resources to enhance mathematics learning.

Factors Influencing the Development of Digital Literacy

The findings showed that several factors significantly influence digital literacy development among mathematics students, with a grand mean of 3.39. Access to internet

connectivity (Mean = 3.46) and availability of digital devices (Mean = 3.44) emerged as major determinants of students' digital competence. The highest mean score (3.48) was recorded for improved learning when digital tools are used to explain mathematical concepts, indicating the strong pedagogical value of technology-enhanced instruction. Teacher encouragement (Mean = 3.30) and peer influence (Mean = 3.28) also contributed to digital literacy development, although at relatively lower levels. This suggests that while environmental factors such as internet access and device availability play a major role, motivational support from teachers and peers could further strengthen students' digital engagement. The results underscore the importance of supportive learning environments that combine access, motivation, and instructional integration.

Challenges Faced in Integrating Digital Technology into Mathematics Learning

The findings indicated several challenges hindering the effective integration of digital technology into mathematics learning, as shown by the grand mean of 3.37. Poor internet connectivity emerged as the most critical obstacle (Mean = 3.56), limiting students' ability to access online resources and participate in digital learning activities. The lack of readily available digital tools in schools (Mean = 3.40) also presented a major barrier, especially for students who rely on school facilities for technological access. Students additionally reported difficulties using some digital tools due to limited technical skills (Mean = 3.35), highlighting the need for improved training and digital literacy programs. Although teacher support (Mean = 3.28) and digital distractions (Mean = 3.25) were less influential barriers, they nonetheless pose concerns that require attention. Overall, the

findings show that infrastructural limitations, resource constraints, and technical skill deficits significantly affect the successful use of digital technologies in learning mathematics.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Introduction

This chapter presents the concluding aspects of the study on *Digital Literacy Among Mathematics Students in Egor Local Government Area*. The chapter provides a comprehensive summary of the research process, highlighting the objectives of the study, the methodology adopted, and the key findings derived from the analysis. It also presents the conclusions drawn from the major findings, emphasizing the importance of digital literacy in enhancing mathematics learning outcomes among students. Finally, the chapter offers practical recommendations aimed at improving students' access to digital tools, enhancing teacher competence, and promoting digital inclusion across secondary schools in Egor Local Government Area. The chapter concludes with suggestions for future research on digital literacy and technology integration in mathematics education.

Summary of Findings

This study investigated the level of digital literacy among mathematics students in Egor Local Government Area. The research was guided by four objectives:

1. To determine the level of digital literacy among mathematics students in Egor Local Government Area.
2. To examine the extent to which students are aware of the availability of digital tools for learning mathematics.

3. To identify the key factors influencing the development of digital literacy among mathematics students.
4. To examine the challenges faced by mathematics students in integrating digital technology into mathematics learning.

A descriptive survey research design was adopted for the study. The population consisted of 743 mathematics students drawn from public and private senior secondary schools within Egor Local Government Area. A sample size of 100 students was selected through a stratified random sampling technique to ensure fair representation across class levels and school types. Data were collected through a structured questionnaire designed on a four-point Likert scale, and analyzed using mean and standard deviation to interpret responses.

The key findings are summarized as follows:

The first major finding revealed that mathematics students in Egor Local Government Area possess a high level of digital literacy, with a grand total mean of 3.31. Students reported confidence in using digital tools such as calculators, YouTube, and online learning platforms to support their study of mathematics. This indicates that students are increasingly engaging with digital platforms for learning and problem-solving.

The second finding showed that students are highly aware of the availability of digital tools for learning mathematics, with a grand total mean of 3.34. Respondents indicated awareness of mobile apps, e-libraries, websites, and social media platforms that can support mathematics learning. However, awareness provided by schools was relatively

lower, suggesting the need for stronger institutional efforts to promote digital learning opportunities.

The third finding revealed that several factors influence digital literacy development**,** including teacher encouragement, internet accessibility, and peer motivation (grand total mean = 3.39). Students agreed that they learn better when digital tools are used to teach mathematical concepts. Nonetheless, the absence of adequate devices such as smartphones and laptops limits the full development of digital literacy among students.

The fourth finding showed that mathematics students face significant challenges in integrating digital technology into learning (grand total mean = 3.37). These challenges include poor internet connectivity, limited technical skills, insufficient teacher support, and inadequate access to digital devices. In some cases, distractions from digital platforms were also reported as barriers to focused study.

The study therefore found that while mathematics students in Egor Local Government Area demonstrate commendable levels of digital literacy and awareness, infrastructural inadequacies, insufficient teacher engagement, and limited access to digital tools remain key obstacles to effective technology integration in mathematics education.

Contribution to Knowledge

This study makes several important contributions to educational research and practice:

1. **Empirical Evidence on Digital Literacy in Mathematics Education:** The study provides empirical insight into the state of digital literacy among mathematics students in Egor Local Government Area. It contributes to existing

knowledge by highlighting students' competencies, awareness levels, and the contextual factors that shape digital engagement in mathematics learning.

2. **Extension of Theoretical Understanding:** The study extends the theoretical understanding of digital literacy by showing how infrastructural, pedagogical, and socio-economic factors interact to influence students' use of digital tools. It emphasizes that digital literacy development is not only a technical issue but also depends on access, motivation, and teacher support.
3. **Identification of Context-Specific Challenges:** The research highlights challenges such as poor internet access, lack of digital devices, and insufficient teacher guidance — issues that are particularly relevant to schools in developing regions. By identifying these barriers, the study offers a grounded understanding of the digital divide in mathematics education.
4. **Practical Implications for Teachers and Schools:** The study underscores the critical role of teachers in fostering digital literacy through classroom integration, encouragement, and modeling of digital competence. It also demonstrates that schools must play an active role in providing the necessary digital resources and training for effective mathematics learning.
5. **Policy-Level Insight:** The findings provide evidence-based recommendations for policymakers and educational planners to enhance ICT integration in schools. They stress the need for infrastructural investment, digital inclusion policies, and

teacher capacity-building initiatives to strengthen digital learning across secondary schools.

Conclusion

The study concludes that digital literacy plays a vital role in improving mathematics learning among students in Egor Local Government Area. Students who are digitally literate demonstrate higher confidence, motivation, and problem-solving abilities, which in turn enhance their academic performance. The research also establishes that while students show a positive attitude toward digital tools, their ability to fully utilize these technologies is limited by infrastructural and institutional challenges.

It is therefore concluded that digital literacy development requires more than just student interest; it demands adequate infrastructure, trained teachers, and supportive learning environments. Schools need to integrate digital learning strategies into mathematics instruction through continuous teacher training, access to reliable internet, and provision of functional digital devices. Bridging these gaps will empower students to engage more effectively with digital learning resources and prepare them for the demands of the modern educational landscape.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. **Improve Access to Digital Infrastructure:** The government, school authorities, and stakeholders should provide stable internet connectivity, computer laboratories, and affordable digital devices to enable students to effectively access and use digital learning platforms.
2. **Integrate Digital Tools into Mathematics Teaching:** Teachers should be encouraged to incorporate digital resources such as online simulations, educational software, and digital assessment tools into their mathematics lessons to make learning more interactive and engaging.
3. **Enhance Teacher Training and Professional Development:** Regular workshops and training programs on digital pedagogy should be organized for mathematics teachers. This will improve their confidence and competence in using digital tools for instruction.
4. **Promote Digital Awareness and Inclusion:** Schools should organize seminars and awareness campaigns to educate students on the importance of digital literacy for academic and career advancement. Efforts should be made to include students from all socio-economic backgrounds.
5. **Address Internet and Power Supply Challenges:** Educational institutions should collaborate with service providers and government agencies to improve

electricity and internet access, especially in public schools. Backup systems should also be put in place to ensure consistent access to digital platforms.

Suggestions for Further Studies

Future research should investigate the relationship between digital literacy and mathematics achievement using more advanced statistical techniques such as regression or correlation analysis. Comparative studies could also be conducted across different local government areas or states to identify regional variations in digital literacy levels. Furthermore, qualitative studies exploring teachers' and students' experiences with digital learning tools would provide deeper insights into implementation challenges and opportunities. Longitudinal research is also recommended to assess how continuous digital training and infrastructural development influence mathematics learning outcomes over time.

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APPENDICES

DEPARTMENT OF CURRICULUM AND INSTRUCTIONAL TECHOLOGY, FACULTY OF EDUCATION, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE

DIGITAL LITERACY AMONG MATHEMATICS STUDENTS IN EGOR LOCAL GOVERNMENT AREA QUESTIONNAIRE

Section A: PERSONAL DATA

Please tick (√) the option that applies to you

1. Gender: Male ( ), Female ( )
2. Age: 15-17 ( ), 18-20 ( ), 21-25 ( )

Section B: Data on Questionnaire

Indicate the extent to which you agree or disagree with the following statements.

Key: Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SD)

S/N	ITEMS	SA	A	D	SD
	What is the level of digital literacy among mathematics students in Egor Local Government Area?				
1	I can use basic digital tool like calculators for learning mathematics.				
2	I am confident in searching for mathematics-related information online.				
3.	I can effectively participate in virtual mathematics classes or discussions.				
4.	I frequently use YouTube digital platform to complete or support my mathematics homework.				
5.	I frequently use YouTube digital platforms to complete or support my mathematics homework				
	To what extent are mathematics students in Egor Local Government Area aware of the availability of digital tools for learning mathematics?				
6.	I am aware that there are mobile apps designed specifically for learning mathematics.				
7.	I know that there are websites that offer free tutorials and math exercises.				
8.	I know how to access digital libraries or e-books related to				

	mathematics.				
9	My school has introduced me to digital tools for studying mathematics.				
10.	I am aware that social media platforms can be used for academic purposes, including mathematics.				
	What are the key factors influencing the development of digital literacy among mathematics students in Egor Local Government Area?				
11.	Availability of internet access at home affects my ability to use digital tools.				
12.	My teachers encourage the use of digital tools in learning mathematics.				
13.	I learn better when digital tools are used to explain math concepts.				
14	Peer influence motivates me to use digital tools in studying math.				
15.	Lack of digital devices (e.g., smartphones, laptops) limits my digital literacy development.				
	What challenges do mathematics students face in integrating digital technology into the learning of mathematics in Egor Local Government Area?				
16.	Poor internet connectivity hinders my access to online mathematics resources.				
17.	I find it difficult to use some digital tools due to lack of technical skills.				
18.	There is limited support from teachers in using digital tools during math lessons.				
19	Digital tools are not readily available for most students in my school.				
20	I sometimes get distracted when using digital devices for studying mathematics.				