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**EXAMINING THE INFLUENCE OF DIGITAL LITERACY COMPETENCE ON  
ACADEMIC INFORMATION USE BEHAVIOUR AMONG FIRST-YEAR STUDENTS  
AT UENR**

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## CHAPTER ONE: INTRODUCTION

### 1.0 Background

Higher level education has evolved rapidly in the digital transformation globally. Recently, an estimated 264 million students enrolled in higher education worldwide (Pan & Lumbantobing, 2025). In the USA recent data suggests an approximation of 19.4 million student enrolment in the fall of 2025, showing a 1% year-on-year increment from fall 2024 (Batyuk, 2024). This larger enrolment trend denotes the ongoing dependence on digital tools, influencing substantial expansion of the e-learning market towards 665 billion dollars by 2031 (Beebe, 2025). Many of these students depend on online databases, e-journals and online learning sources for basic academics. UNESCO highlighted the importance of effective participation in these digital platforms, which includes all skills to access, evaluate, and the ethical use of digital information. Studies by (Khalid & Owusu-Boateng, 2024) suggests that, about 90.5% of students are confident in basic online navigations in retrieving reliable information. Some uprising digital technologies like AIs amplify these dynamics further. Emerging reports suggest that, 86% of students worldwide uses AI tools for studies increased sharply from 66% in 2024 to 92% in some 2025 surveys (Bouguettaya, Pupo, Chen, & Fortino, 2025).

Despite these digital usage progress, Sub-Saharan African countries, including Ghana are still constrained with digital information accessibility. The accessibility of internet across Africa was approximately 39-40% in the early 2025, with mobile broadband being the commonest driver (Chang et al., 2020). Internet users in Ghana reached 26.3 million at the later part of 2025 achieving an accessibility rate of 74.6%, which is 8.6% yearly increment (Ababa, 2023). This projection suggests that in the middle of 2026 internet accessibility can reach 75% as national infrastructure expands (Baffour Gyau et al., 2025). However, there are gaps in the rural and urban centers, in

addition to the barriers like infrastructural limitations, affordability and uneven prior exposure. Several studies across African universities highlighted that many first-year students in African universities are disadvantaged with limited prior access to computers or advanced internet in many secondary schools, which contributes to the inefficiency in seeking reliable digital information (Oyedemi & Mogano, 2018).

In Ghana, first year students usually experience an advanced digital academic environment for the first time, which is coupled with unreliable internet in some areas, limited device ownerships, inadequate prior ICT training, and insufficient institutional support (Armah, 2019). Research from Ghanaian institutions like the UCC and other universities showed that, many first-year students usually receive introductory library or information literacy sessions (Parbie et al., 2024). But many still show deficiencies in applying those soft skills to real tasks in academia, which usually affects the transition, engagement and the overall performance of the entire academic journey. Phenomenologically, these challenges are usually attributed to personal, parental, institutional and governmental factors, including minimal ICT curriculum integration and barriers like financial and data cost (Guishard, 2024). While many basic skills can be developed for some deficiencies in higher-order competences have hindered the effectiveness of academic information usage behavior (Hoidn & Kärkkäinen, 2014). This has resulted in weaker ambitious national initiatives such as the expansion of the fiber optic network to 100,000 km and the establishment of 25,000 public Wi-Fi hotspots aims to accelerate connectivity, bridge divides and complementary literacy efforts maximize benefits (Owusu & Buron, 2007).

This knowledge gap is particularly important as digital literacy does not only provides assistance to the current academic success but also helps in the facilitation of permanent learning, thinking critically and preparation for digital information. Addressing this through targeted interventions

could enhance student support systems in the universities in Ghana. Therefore, this study seeks to examine how different levels of digital literacy competence shapes academic information usage behavior among first-year students, thereby contributing insights for curriculum design, library programs, and policies to bridge these transitional gaps.

### **1.1 Problem statement**

Digital technologies are now important tools in accessing and evaluating information in this current academic environment. Digital platforms like online databases, electronic journals, institutional repositories and other learning management systems are increasingly becoming prominent in universities, enhancing teaching, learning and research activities. In response, it is an expectation of students to exhibit some level of digital literacy competency for effective searching, evaluation, and adequately utilizing academic digital information. Digital literacy competence is an involvement of the ability to effectively use digital tools like computers to navigate the internet for resources, evaluate the information critically, and use the information ethically (Kumar, 2023).

Students are introduced to more independent learning environment where they must depend mostly on digital resources for their research, assignments, and other academic developments for the first time. But they are hindered by digital literacy skills which limits their ability to effectively have access to use scholarly digital information. Due to this, there has been a dependency of some students to unreliable online sources, to critically evaluate or not use institutional digital resources like the e-library and academic databases.

The UENR library has made a significant effort in investing in the provision of digital library and other electronic learning platforms. But there is no empirical evidence on how the level of digital literacy competence among first-year students influences their academic information usage

behavior. Also, first years are vulnerable since they are still adjusting to the higher education level. Understanding the influence of digital literacy and how it affects the academic information usage, is therefore crucial in the student's information seeking behavior.

### **1.3 General objective**

To examine the relationship between digital literacy competence and academic information use among first-year undergraduate students at the University of Energy and Natural Resources.

### **1.4 Specific objectives**

1. To determine the level of digital literacy competence among first-year students at UENR
2. To assess the nature and patterns of academic information use among first-year undergraduate students at UENR.
3. To determine whether digital literacy competence significantly predicts academic information use behavior.
4. To identify key digital literacy gaps affecting effective academic information use.
5. To propose institutional strategies for strengthening digital literacy among first-year students.

### **1.5 Hypothesis**

**Ho1:** There is no statistically significant relationship between digital literacy competence and academic information use among first-year students at UENR.

**Ho2:** Digital literacy competence does not significantly predict academic information use among first-year students at UENR.

**H<sub>03</sub>:** There is no statistically significant difference in academic information use between students with high and low digital literacy competence.

## 1.6 Justification

In higher education levels, there has been an advancement in the acquisition of information digitally. This rapid change is a result of the advancement in digital technologies, which has transformed how students create, access, and utilize information at higher levels. Most essentially, students in their first year are expected to adapt quickly to this digital advancement that requires effective utilization of academic resources online, databases, and learning management systems. But many first-year students arrived at the university with different digital literacy competence levels. This has brought a critical need to assess the extent to which digital literacy competence is affecting their academic information usage.

Digital information accessibility plays a key role in teaching, learning, and research at the University of Energy and Natural Resources. Usually, it has been a challenge for first-year students to navigate digital platforms to access digital information effectively. Inadequacy in digital literacy competence will lead to poorer seeking of information strategies, relying on non-scholarly sources, and inadequacy in the use of academic databases. As a result, the academic performance of the student may be compromised negatively. Therefore, understanding the relationship between academic information usage behavior and digital literacy competence is essential in identifying gaps and improving the overall academic experience of the student. Also, the study will provide empirical results that will inform institutional policies and interventions. The findings of the study can also help students, librarians, and university administrators to design targeted training programs, orientations, and digital literacy courses to meet the needs of first-year students at the university.

## CHAPTER TWO: LITERATURE

### 2.1 Conceptual foundations

The growing use of digital technologies in research, teaching, and learning has made digital literacy competence an important requirement in higher education. Digital literacy competence according to (Martínez-Bravo et al., 2022) refers to the ability to access, evaluate, manage, create and communicate information effectively by the use of digital technologies and tools. It also includes technical, cognitive, and socio-emotional skills like internet navigation, searching for information and evaluation of sources critically, digital communication, and using information ethically (Nurhasanah & Maksum, 2025). These skills allow academicians to use online learning platforms, scholarly databases, and other academic digital platforms.

Academic information use behavior refers to how students identify, access, evaluate, organize and apply information for learning and research purposes (Lacović, 2014). It involves the use of databases of the library, electronic journals, institutional repositories, and other scholarly resources as well as proper citation and referencing practices. Effective academic information use behaviour supports academic performance, research competence, and lifelong learning, while poor practices can lead to plagiarism and the use of unreliable sources.

Studies by (Noh, 2017) and (Ahmed & Rasheed, 2020) have shown a strong relationship between digital literacy competence and academic information use behaviour. Students with strong digital literacy skills are able to locate evaluate and use credible information effectively. However, it is constrained with limited ICT training, poor internet access, inadequate digital infrastructure and low awareness of scholarly databases, which continue to affect students' competence and information use behaviour (Ndibalema, 2025). Universities are therefore encouraged to integrate

digital literacy training into their curriculum, improve ICT infrastructure and provide institutional support to enhance students' academic and digital skills.

## 2.2 Digital literacy competence among university students

Digital literacy competence has become an essential skill among university students due to the increasing use of digital technologies in higher education. Students are expected to possess the ability to use digital devices, access online learning platforms, search for academic information, and evaluate digital resources effectively (Limniou et al., 2021). Among first-year university students, the level of digital literacy competence often varies significantly. While some students demonstrate adequate skills in using computers, internet resources, and educational technologies, others experience difficulties in navigating academic databases, evaluating the credibility of online information, and utilizing digital tools for research and learning (Zlatkin-Troitschanskaia, Hartig, Goldhammer, & Krstev, 2021). These differences are largely influenced by students' educational experiences and prior exposure to technology before entering university.

Several factors influence digital literacy competence among university students. Educational background is considered one of the major determinants, as students who attended schools with adequate ICT facilities and digital learning opportunities are more likely to possess stronger digital skills (Heinz, 2016). Socio-economic background also plays a significant role because students from financially stable families often have better access to computers, smartphones, and internet connectivity. Additionally, prior exposure to technology through home, school, and social environments contributes greatly to students' confidence and ability to use digital tools effectively for academic purposes. Students with limited access to technology before university may struggle to adapt to digitally intensive learning environments (Delen & Bulut, 2011).

Gender differences in digital literacy competence have also been highlighted in existing literature. Some studies suggest that male students tend to demonstrate higher confidence in technical and operational digital skills, particularly in areas involving computer systems and software applications (Siddiq & Scherer, 2019). However, other studies indicate that female students perform equally well in information searching, communication, and academic use of digital technologies. These mixed findings suggest that gender differences in digital competence are often shaped by socialization, educational opportunities, and access to technology rather than natural ability (West et al., 2019). Consequently, equal access to digital resources and training opportunities remains important in reducing gender-related disparities in digital literacy skills.

Urban–rural disparities continue to influence digital literacy competence among university students (Lembani et al., 2020). Students from urban areas generally have better access to ICT infrastructure, stable internet connectivity, digital devices, and technology-oriented educational systems compared to students from rural communities. In contrast, rural students often face challenges such as inadequate ICT facilities, poor internet access, unstable electricity supply, and limited exposure to digital technologies (Gocotano et al., 2021). These barriers may negatively affect their ability to effectively use academic information resources and participate fully in digital learning environments. Addressing these disparities requires improved ICT infrastructure, affordable internet access, and institutional support aimed at enhancing digital literacy competence among all students (Afzal et al., 2023).

### **2.3 Academic information use behavior of students**

Academic information use behaviour refers to the ways in which students identify, access, evaluate, organize, and utilize information for learning, research, assignments, and academic

decision-making (Afzal et al., 2023). In higher education, students are expected to engage in effective information-seeking behaviour to obtain credible and relevant academic materials (Weber et al., 2019). This behaviour involves the use of libraries, online databases, search engines, electronic journals, and other scholarly resources. Students with strong information-seeking skills are able to locate accurate information efficiently, while those with limited skills may experience difficulties in finding relevant academic materials for their studies (Tang & Tseng, 2013).

Information evaluation and critical thinking skills are important aspects of academic information use behaviour. With the vast amount of information available online, students must be able to assess the credibility, reliability, relevance, and authenticity of information sources before using them in academic work (Head & Eisenberg, 2010). Critical thinking skills enable students to analyze information carefully, compare different sources, identify misinformation, and make informed academic judgments. Effective evaluation of information helps students avoid unreliable and non-scholarly materials, thereby improving the quality of academic assignments and research outcomes (Ruhl, 2016).

Ethical use of information is another key component of academic information use behaviour. Students are expected to follow academic integrity principles by acknowledging the sources of information used in their work through proper referencing and citation practices (Jones, 2011). Ethical information use involves avoiding plagiarism, respecting intellectual property rights, and accurately citing authors and scholarly materials. However, some students struggle with referencing techniques and citation styles due to inadequate information literacy training (Malanga 2017). Poor understanding of ethical information practices may lead to academic misconduct, plagiarism, and weak academic writing.

The increasing digitization of higher education has also influenced students' use of digital academic resources such as electronic journals, online databases, institutional repositories, and digital libraries (Rajkumar & Sitwala, 2025). These resources provide students with access to current and peer-reviewed scholarly information necessary for academic success and research development. Students who are familiar with the use of digital academic resources are more likely to conduct effective research and produce quality academic work (Apuke & Iyendo, 2018). Nevertheless, challenges such as limited digital literacy skills, poor internet connectivity, and low awareness of available academic databases may affect students' ability to fully utilize these digital resources effectively

#### **2.4 Relationship between digital literacy and academic information use**

Digital literacy competence plays a significant role in shaping students' academic information use behaviour in higher education (Quraishi et al., 2024). Students with strong digital literacy skills are generally able to access, retrieve, and manage academic information from various digital sources. These skills enable students to effectively use search engines, online databases, digital libraries, and academic platforms to locate relevant and credible scholarly materials (López-Fitzsimmons & Nagra, 2019). In contrast, students with limited digital competence may experience challenges in navigating online resources, identifying reliable information, and efficiently retrieving academic content needed for learning and research activities.

Digital literacy also has a direct impact on the quality of academic work and research output among university students (Ukwoma et al., 2016). Students who possess adequate digital skills are more capable of evaluating information critically, synthesizing evidence from multiple sources, and using appropriate digital tools for academic writing and research. Such students are more likely to produce well-researched assignments, projects, and scholarly work supported by credible

references and accurate citations (Evenstein Sigalov et al., 2025). On the other hand, poor digital literacy may contribute to weak research practices, dependence on unreliable online sources, plagiarism, and low-quality academic writing.

In addition, digital literacy competence supports independent learning among university students. The increasing use of e-learning platforms, online courses, and digital educational resources requires students to learn independently using digital technologies (Anthonysamy et al., 2020). Students with strong digital skills can effectively engage in self-directed learning, participate in virtual discussions, access instructional materials online, and manage their academic activities efficiently. Digital literacy therefore, promotes critical thinking, problem-solving, creativity, and lifelong learning, which are essential skills in modern education and professional environments (Martínez-Bravo et al., 2022).

Several studies have also established a positive relationship between digital literacy competence and academic performance (Ardhiani et al., 2023). Digitally literate students tend to demonstrate better academic outcomes because they can access quality information, utilize academic technologies effectively, and complete academic tasks more efficiently. Digital competence enhances students' ability to conduct research, communicate academically, and adapt to technology-driven learning environments (Otto et al., 2024). However, inadequate digital literacy skills may limit students' academic participation and negatively affect their overall academic achievement. As a result, higher education institutions are increasingly encouraged to strengthen digital literacy training and provide adequate technological support for students.

## 2.5 Challenges affecting digital literacy and information use

Despite the growing importance of digital literacy in higher education, several challenges continue to affect students' ability to effectively use digital technologies and academic information resources (Kayyali, 2024). One major challenge is the limited access to ICT resources and reliable internet connectivity. Many students, particularly those from economically disadvantaged and rural backgrounds, experience difficulties in accessing computers, smartphones, stable internet services, and other digital learning facilities (Lembani et al., 2020). Inadequate ICT infrastructure and the high cost of internet data also limit students' ability to participate fully in online learning and access scholarly materials needed for academic activities (Al-Ansi et al., 2021).

Another significant challenge is the lack of adequate training in information literacy and digital skills (Jeffrey et al., 2011). Some students enter university with limited knowledge of how to search for academic information, use electronic databases, evaluate online sources, and apply referencing techniques correctly. In many institutions, insufficient integration of digital literacy and information literacy training into academic curricula contributes to students' weak digital competence (Ndibalema, 2025). As a result, students may struggle to effectively use digital academic resources, conduct research, and apply ethical information practices in their academic work.

Information overload and the widespread availability of misinformation on the internet also pose serious challenges to students' academic information use behaviour (Alheneidi, 2019). The large volume of online content available through websites, blogs, and social media platforms often makes it difficult for students to identify relevant and credible information (Metzger & Flanagin, 2008). Many students encounter challenges in distinguishing scholarly sources from unreliable or misleading information. The spread of misinformation and non-peer-reviewed materials may

negatively influence students' learning, research quality, and academic decision-making processes (Akeriwe et al., 2023).

Poor evaluation and filtering of online information further affect students' effective use of academic resources (Zlatkin-Troitschanskaia et al., 2021). Some students lack the critical thinking and analytical skills required to assess the credibility, accuracy, relevance, and authenticity of information sources. Consequently, they may rely on unreliable websites, outdated materials, or non-academic sources in completing assignments and research projects (Mammadova, 2020). Weak evaluation skills may also contribute to plagiarism, poor academic writing, and low-quality research outcomes. Addressing these challenges requires improved ICT infrastructure, digital literacy training, information literacy programs, and institutional support aimed at enhancing students' critical evaluation and responsible use of digital information resources (Chen & Zainudin, 2024).

## **2.6 Digital tools and platforms in academic information use**

Digital tools and platforms have become essential components of academic information use in higher education. Universities increasingly rely on digital technologies to support teaching, learning, communication, and research activities (Alenezi, 2023). Students are expected to use various digital platforms to access course materials, submit assignments, participate in discussions, and retrieve academic information. The effective use of these tools enhances learning experiences, improves access to scholarly resources, and promotes independent and collaborative learning among students.

Learning Management Systems (LMS) play a significant role in supporting academic activities in universities (Veluvali & Suriseti, 2022). Platforms such as Moodle, Canvas, Blackboard, and

Google Classroom enable students to access lecture notes, assignments, quizzes, announcements, and recorded lectures conveniently. LMS platforms also facilitate communication between students and lecturers through discussion forums, messaging systems, and virtual classrooms (Zahra et al., 2024). The use of LMS improves flexibility in learning and allows students to engage with academic content beyond the traditional classroom environment. However, students with limited digital literacy skills may experience challenges in effectively navigating and utilizing these platforms.

Academic databases such as Google Scholar and JSTOR are also important tools for academic information use (Rafi et al., 2019). These databases provide students with access to peer-reviewed journals, research articles, conference papers, books, and other scholarly materials necessary for academic work and research. The ability to search and retrieve information from academic databases helps students improve the quality of assignments, projects, and research outputs (López-Fitzsimmons & Nagra, 2019). Effective use of these databases requires information searching skills, critical evaluation abilities, and familiarity with academic search techniques.

Social media platforms and mobile technologies have further transformed academic information use among university students. Platforms such as WhatsApp, YouTube, and Facebook are increasingly used for academic discussions, sharing educational resources, and collaborative learning (Patmanthara et al., 2019). Mobile devices such as smartphones and tablets also provide students with flexible access to digital learning tools, e-books, educational applications, and online courses anytime and anywhere. Although these technologies support learning convenience and accessibility, excessive dependence on social media may expose students to misinformation and non-academic distractions, highlighting the need for responsible and critical use of digital platforms in academic environments.

## 2.7 Institutional support and intervention

Institutional support plays an important role in enhancing digital literacy competence and academic information use among university students (Islamia & Arif, 2024). Higher education institutions are increasingly implementing strategies and support systems to help students develop the digital and information skills required for academic success. Universities provide access to digital learning platforms, academic databases, internet services, and ICT facilities to support students in teaching, learning, and research activities. Effective institutional interventions help students adapt to technology-driven academic environments and improve their ability to access and use academic information resources efficiently (Sinaga, 2025).

University libraries are among the key institutions promoting digital literacy and academic information use (Bozkurt, 2025). Modern academic libraries no longer focus only on printed materials but also provide access to electronic journals, online databases, institutional repositories, and digital reference services. Libraries support students by offering training on information searching, database navigation, referencing techniques, and evaluation of information sources. Through these services, university libraries help students develop the skills needed to locate, evaluate, and ethically use scholarly information for academic work and research purposes (Ince, Hoadley, & Kirschner, 2019).

Information literacy training programs for first-year students have also become important interventions in many universities. These programs are designed to equip students with essential skills in digital information searching, academic database use, citation practices, plagiarism avoidance, and critical evaluation of online information (Phippen, Bond, & Buck, 2021). First-year students often face challenges in adjusting to digitally intensive learning environments, making such training programs necessary for improving their academic information use behaviour.

Information literacy workshops, seminars, and practical ICT sessions help students build confidence in using digital tools and academic resources effectively.

The integration of digital skills into university curricula and the provision of orientation and academic support services at University of Energy and Natural Resources also contribute significantly to students' digital competence. Embedding digital literacy components into academic courses ensures that students continuously develop relevant technological and information management skills throughout their studies. Additionally, orientation programs, ICT support units, academic counseling services, and student training workshops at UENR help students become familiar with available digital learning platforms and academic resources. These institutional support systems enhance students' ability to engage effectively with digital technologies and improve their overall academic performance.

## **2.8 Global and local perspective of digital literacy and information use behavior**

Empirical studies conducted in developed countries have shown that digital literacy competence significantly influences students' academic information use behaviour and academic performance (Salimi et al., 2025). Research in countries such as the United States, United Kingdom, and Canada indicates that university students with strong digital literacy skills are better able to access online academic resources, evaluate information critically, and participate effectively in digital learning environments (Pérez-Escoda & Rodríguez-Conde, 2015). These studies also highlight the increasing role of digital technologies in supporting independent learning, research productivity, and collaborative academic activities. In many developed countries, universities have invested heavily in ICT infrastructure, digital libraries, and information literacy programs, contributing to higher levels of digital competence among students.

Studies conducted in developing countries, particularly in Ghana and other African countries, reveal both progress and persistent challenges regarding digital literacy competence and academic information use (Dzidzornu & Xu, 2025). While many students demonstrate basic digital skills, limitations such as poor internet connectivity, inadequate ICT infrastructure, limited access to digital devices, and insufficient information literacy training continue to affect effective academic information use (Siddiquah & Salim, 2017). Research within the Ghanaian higher education context suggests that many university students rely heavily on general internet search engines and social media for academic information due to low awareness and limited use of scholarly databases and institutional repositories (Marsh, 2015). These challenges often affect the quality of academic research and students' ability to critically evaluate online information sources.

Comparative studies across institutions have also shown variations in students' digital literacy competence and academic information use behaviour (Georgopoulou et al., 2025). Differences are often influenced by institutional resources, availability of ICT facilities, quality of internet services, and the extent to which digital literacy is integrated into academic curricula. Universities with strong technological support systems, active library services, and structured digital literacy programs tend to produce students with higher levels of digital competence and more effective academic information practices. Comparative research further indicates that students in urban-based institutions generally demonstrate better access to digital resources than those in less technologically equipped institutions (Nkomo, 2000).

Despite the growing body of literature on digital literacy and academic information use, several gaps still exist. Many studies focus broadly on university students without giving adequate attention to first-year students who often face greater challenges in adapting to digital academic environments. In the Ghanaian context, limited research has specifically examined the relationship

between digital literacy competence and academic information use behaviour among first-year students in universities such as University of Energy and Natural Resources. Furthermore, some existing studies emphasize technical digital skills while paying less attention to critical evaluation skills, ethical information use, and the influence of socio-economic and environmental factors. These gaps highlight the need for further research to provide a deeper understanding of digital literacy competence and academic information use behaviour among university students.

## **2.9 Cognitive and psychological aspects of information use**

Cognitive and psychological factors play a significant role in shaping students' academic information use behaviour in digital learning environments (Hannafin et al., 2003). In higher education, students are expected to think critically, analyze information carefully, and make informed academic decisions when using digital resources. Critical thinking and analytical skills help students evaluate the credibility, relevance, and accuracy of online information before applying it in academic work (Lucaser & Acedera, 2025). These skills are particularly important in digital environments where large volumes of information are readily available. Students with strong critical thinking abilities are better able to distinguish credible scholarly materials from misinformation, biased content, and unreliable online sources (Phippen et al., 2021).

Cognitive load and information processing also influence students' ability to effectively use academic information (Kalyuga, 2011). The rapid growth of digital information and online learning platforms often exposes students to excessive amounts of content, which may overwhelm their cognitive capacity. When students encounter too much information at once, they may experience difficulties in concentrating, understanding, organizing, and retaining relevant academic materials (Lujan & DiCarlo, 2006). Effective information processing therefore requires the ability to filter unnecessary information, synthesize ideas from multiple sources, and manage

digital content efficiently. Students with limited digital literacy skills may struggle more with information overload and complex digital learning environments.

Motivation and self-efficacy are additional psychological factors that affect digital learning and academic information use (Abdolrezapour et al., 2023). Self-efficacy refers to students' confidence in their ability to successfully use digital technologies and academic resources. Students with high levels of motivation and digital self-efficacy are more likely to actively engage with online learning platforms, academic databases, and digital research tools (Saleh & AlAli, 2022). They also tend to demonstrate greater persistence in solving technological challenges and completing academic tasks independently. Conversely, students with low confidence in their digital abilities may avoid using digital academic resources, thereby limiting their learning opportunities and academic performance.

Digital anxiety and technophobia are common challenges among some first-year university students, particularly those with limited prior exposure to technology (Gabriel et al., 2012). Digital anxiety refers to feelings of fear, stress, or discomfort associated with the use of digital technologies, while technophobia involves a broader fear or resistance toward technology use (Kim et al., 2023). These psychological barriers may negatively affect students' willingness and ability to participate in online learning, use academic databases, and engage with digital educational tools. First-year students transitioning into digitally intensive academic environments may experience difficulties adapting to unfamiliar technologies, especially when institutional support and training are inadequate (Gabriel et al., 2012). Addressing these challenges requires supportive learning environments, digital literacy training, and continuous academic and psychological support to improve students' confidence and engagement with digital learning systems.

## 2.10 Role of libraries in digital literacy development

Academic libraries play a vital role in promoting digital literacy competence among university students (Martzoukou, 2021). In modern higher education, libraries have evolved from traditional centers for printed materials into digital knowledge hubs that support teaching, learning, and research activities (Meesad & Mingkhwan, 2024). Libraries provide students with access to electronic journals, academic databases, institutional repositories, digital catalogs, and other online scholarly resources. Through these services, academic libraries help students develop essential digital skills such as information searching, evaluation of online sources, database navigation, and ethical use of academic information (Raju, 2014). As a result, libraries serve as important institutions for strengthening students' digital competence and academic information use behaviour.

Library orientation programs are also important interventions designed to introduce students, particularly first-year students, to available academic information resources and digital services. These orientation sessions often focus on the use of library databases, online catalogs, referencing tools, plagiarism awareness, and information searching techniques (Childress, 2011). Studies have shown that effective library orientation programs improve students' confidence in accessing and utilizing digital academic resources for assignments and research activities (Donaldson, 2000). However, the effectiveness of such programs largely depends on the availability of trained personnel, practical learning opportunities, and continuous user support throughout students' academic journeys.

Digital reference services and user support systems further contribute to the development of digital literacy among university students (Nelson et al., 2011). Many academic libraries now provide

virtual reference services through email, chat platforms, online consultations, and social media channels to assist students in locating and using scholarly information. Librarians also offer guidance on citation practices, database searching, academic writing, and evaluation of information sources (Nel, 2020). These digital support services enhance students' ability to independently access reliable academic information and effectively navigate digital learning environments. Continuous support from librarians therefore plays a significant role in improving students' academic research skills and responsible information use practices.

The integration of library services with e-learning systems has further strengthened the role of libraries in digital education. Academic libraries increasingly collaborate with universities to embed library resources and support services into Learning Management Systems (LMS) and other online learning platforms (Shaw & De Sarkar, 2021). This integration allows students to conveniently access scholarly materials, digital reading lists, research guides, and library support directly through virtual learning environments. By aligning library services with e-learning systems, universities improve accessibility to academic resources and promote independent learning among students (Nfila, 2010). Such integration also enhances students' engagement with digital technologies and contributes to the development of effective digital literacy and academic information use skills.

## **2.11 Digital literacy and research skills development**

Digital literacy competence plays a crucial role in the development of academic research skills among university students. In modern higher education, research activities increasingly depend on the effective use of digital technologies for accessing, managing, analyzing, and presenting information (Alenezi et al., 2023). Students with strong digital competence are better able to search

for scholarly materials, evaluate academic sources, organize information, and utilize digital research tools effectively. Digital literacy therefore supports critical thinking, independent learning, and evidence-based research practices, which are essential for academic success and knowledge creation (Kumar & Prajapati, 2025).

The use of reference management tools has become an important aspect of digital research competence. Applications such as Zotero and Mendeley help students organize scholarly materials, store references, generate citations, and manage bibliographies efficiently (Sarkar, 2025). These tools simplify academic writing by supporting different citation styles and reducing errors in referencing. Students who are familiar with reference management software are more likely to demonstrate proper citation practices and avoid plagiarism in academic work. However, effective use of these tools requires adequate digital literacy training and continuous practice (Nawaz & Kundi, 2010).

Digital tools are also widely used in data collection and analysis for academic research. Students and researchers increasingly utilize online surveys, spreadsheets, statistical software, and digital data analysis platforms to gather, organize, and interpret research data (Hai-Jew, 2019). Digital technologies improve the speed, accuracy, and efficiency of research processes by enabling easier data management and analysis. Students with adequate digital skills are therefore better positioned to conduct quality research and interpret findings effectively (Pagani, Argentin, Gui, & Stanca, 2016). Nevertheless, limited digital competence may hinder students' ability to use research software and digital analytical tools efficiently.

Academic writing in digital environments has further transformed students' research experiences (McKenna, 2015). Word processing applications, collaborative online platforms, plagiarism detection software, and cloud-based storage systems now support the preparation, editing, and

sharing of academic work (Al-Samarraie & Saeed, 2018). Digital writing environments encourage collaboration, easier document management, and access to online academic resources during the writing process (Strobl et al., 2019). However, students must possess strong digital literacy skills to effectively navigate these technologies and apply ethical academic writing practices. Consequently, universities are increasingly encouraged to provide digital literacy and research training programs that enhance students' competence in digital research and academic writing.

## **2.12 Technology adopting and usage patterns**

The adoption and use of digital technologies among university students have increased significantly with the growing integration of ICT into higher education. Students now rely on various digital tools and platforms for academic learning, communication, research, and personal development. The adoption of digital tools among students is influenced by several factors, including accessibility, ease of use, perceived usefulness, availability of internet services, and institutional support (Linus et al., 2025). Students are more likely to adopt technologies that improve academic performance, facilitate communication, and provide convenient access to learning resources (Mayisela, 2013). Personal interest, prior exposure to technology, and peer influence also contribute to students' willingness to use digital tools in academic environments.

The frequency and purpose of ICT usage among students vary depending on academic needs and individual preferences (Dube, 2017). Many students use digital technologies daily for activities such as accessing online lectures, conducting research, communicating with lecturers and peers, submitting assignments, and participating in virtual learning platforms. Smartphones, laptops, tablets, and internet-based applications have become essential tools for academic and social activities. In addition to academic purposes, students also use ICT for entertainment, social

networking, and information sharing through social media platforms (Eid & Al-Jabri, 2016). Frequent engagement with digital technologies has therefore become an important aspect of students' educational experiences and daily lives.

Despite the increasing use of technology in higher education, several barriers continue to affect effective technology utilization among students (Klein et al., 2019). Common challenges include inadequate access to digital devices, poor internet connectivity, high cost of data, limited ICT infrastructure, and insufficient digital literacy skills. Some students may also experience difficulties in adapting to new technologies due to limited training, lack of technical support, or low confidence in using digital tools (Rahiem, 2020). These barriers may reduce students' ability to fully benefit from online learning systems and digital academic resources, thereby affecting their academic participation and performance.

Recent trends in student technology use indicate a growing dependence on mobile technologies, cloud-based applications, e-learning systems, and social media platforms for academic activities (Matthew et al., 2021). Universities increasingly integrate virtual classrooms, online collaboration tools, digital libraries, and educational applications into teaching and learning processes. Students are also becoming more engaged in self-directed learning through online courses, video tutorials, and open educational resources (Zainuddin, 2019). The continuous advancement of technology is therefore transforming how students access information, communicate, and participate in academic activities. However, the rapid evolution of digital technologies also requires continuous development of students' digital literacy skills to ensure effective and responsible technology use in higher education.

## CHAPTER THREE: METHEDODOLOGY

### 3.1 RESEARCH DESIGN

The research employed quantitative research design which adopts cross-sectional survey design. Quantitative research approach is efficient as it promotes the measurement of the objective and statistical analysis of variables. This enables the researcher in the examination of relationship and predictive influence between the variables thus digital literacy competence and academic information use among the study population.

Cross-sectional survey facilitates data collection among respondents at a single point in time allowing the suitability of assessing existing patterns, relationships and variations without manipulating the variables. This design is relevant for studies that aims to establish an association and make predictions based on the observed data from the survey.

Also, quantitative research design supports the testing of hypotheses statistically, it also employs Pearson correlation and linear regression techniques to assess the strength, direction and the predictive power of the relationship between the dependent and independent variables thus digital competence and academic information use behavior respectively. This design also helps to generalize the findings of the wider population.

### 3.2 Study Area

The study will be conducted among first year students at the University of Energy and Natural Resources-Dormaa Ahenkro campus in the Bono Region of Ghana. UENR is a public university that was establish to provide quality higher education and research in areas such as energy, natural resources and allied disciplines.

The university currently comprises of two campuses the Sunyani campus and the Dormaa campus. The Dormaa campus comprise of two schools including the School of Agricultural and Technology and the School of Geosciences with various departments. The campus admits students from diverse academic background and geographical locations across the country and other countries.

The campus provides diverse teaching and learning atmosphere that is characterized by increasing integration of digital technologies in teaching, learning and research. This makes it more appropriate environment to assess the differences in digital literacy competence and academic information use behavior particularly within first year undergraduate students who are now adapting to the changes in academic demands and digital information systems.

### **3.3 Population**

The study will target the sampled first year undergraduate student at the campus across the two schools from various academic programs. This sampled population is considered appropriate because first year students are considered as transitional group adapting to the academic and digital demands of the university education.

Students at this level increasingly need to engage with the digital information systems, including online academic databases, institutional repositories and scholarly search engines. At that level students digital literacy competence and patterns of academic information use behavior are still developing, which makes the very suitable for the examination of the relationship and predictive influence between these constructs the population will consist of first year students who are available during the data collection phase.

### **3.4.0 Sample size and Sampling technique**

#### **3.4.1 Sample size**

Yamane's (1967) formula will be used to determine the sample size for the study population. This formula is more suitable for finite populations

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = required sample size

N = total population size

e = level of precision

This equation is suitable to ensure the selected sample adequately represents the population while it maintains a manageable population. A precision level of 5% (0.5) was used. Which is mostly accepted in social science studies.

### **3.4.2 Sampling technique**

This study will employ a multistage sampling technique to ensure adequate representation of first-year undergraduate students across the various schools at UENR.

In the first stage, stratified sampling will be used to divide the population into homogeneous groups based on their respective schools or faculties (e.g., School of Sciences, School of Engineering, School of Natural Resources, and School of Agriculture and Technology). This approach ensures that all relevant subgroups within the population are proportionately represented in the sample.

In the second stage, simple random sampling will be applied within each stratum to select individual respondents. This will be done using random selection methods such as random number generation or ballot selection, giving each student an equal chance of being included in the study.

The use of this multistage sampling approach enhances the representativeness of the sample, improves the accuracy of the findings, and minimizes sampling bias, thereby increasing the reliability and generalizability of the study results.

### **3.5.0 Variables and Measurement**

This study involves two main variables, thus digital literacy competence as the independent variable and academic information use behaviour as the dependent variable. These variables will be operationalized into measurable components and assessed using structured questionnaire items measured on a Likert scale.

#### **3.5.1 Independent Variable: Digital Literacy Competence**

Digital literacy competence refers to the ability of students to effectively use digital tools and technologies to locate, evaluate, create, and ethically utilize information. In this study, digital literacy competence will be measured using five key dimensions: information searching skills, critical evaluation, digital content creation, data literacy, and ethical use of information.

Information searching skills will assess students' ability to locate relevant academic information using search engines and online databases. Critical evaluation will examine students' ability to determine the credibility, relevance, and reliability of information sources. Digital content creation will focus on students' ability to create, organize, and present academic content using digital tools and technologies. Data literacy will assess the ability of students to interpret, analyze, and manage data presented in various formats, while ethical use of information will evaluate students' awareness and application of ethical practices such as proper citation, referencing, and avoidance of plagiarism.

Each of these dimensions will be measured using multiple questionnaire items adapted from validated instruments in previous studies. Responses will be rated on a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. A composite score for digital literacy competence will be computed by calculating the mean of all related items, with higher scores indicating higher levels of digital literacy competence.

### **3.5.2 Dependent Variable: Academic Information Use Behaviour**

Academic information use behaviour refers to the manner in which students' access, evaluate, and utilize academic information for learning and research purposes. In this study, it will be measured using indicators such as use of library databases, use of Google Scholar, citation management practices, quality of sources used, avoidance of predatory sources, and responsible referencing.

The use of library databases will assess the frequency and effectiveness with which students utilize institutional databases and electronic library resources. The use of Google Scholar will evaluate students' ability to search for and retrieve scholarly information online. Citation management practices will examine students' ability to use appropriate referencing styles and citation tools. Quality of sources used will assess students' preference for credible, scholarly, and peer-reviewed sources. Avoidance of predatory sources will measure students' ability to identify and avoid unreliable or non-scholarly sources, while responsible referencing will examine consistency and accuracy in acknowledging information sources.

These indicators will also be measured using Likert-scale items ranging from 1 to 5. A composite score will be generated by calculating the mean of all items, where higher scores indicate better academic information use behaviour.

### **3.5.3 Measurement Scale**

All variables in this study will be measured using a five-point Likert scale structured as follows:

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = Neutral
- 4 = Agree
- 5 = Strongly Agree

The Likert scale is appropriate for capturing respondents' perceptions, attitudes, and self-reported behaviours in a standardized and quantifiable manner, thereby facilitating statistical analysis.

### 3.5.4 Categorization of Variables for Hypothesis Testing

For the purpose of hypothesis testing, particularly in comparing groups, the composite scores for digital literacy competence will be categorized into high and low levels using either a mean split or quartile distribution. This categorization will facilitate the application of inferential statistical techniques such as the independent samples t-test or one-way analysis of variance (ANOVA).

### 3.6 Data Collection

A structured questionnaire will be used as the main instrument for data collection in this study. The questionnaire will be designed to obtain quantitative data relevant to the study objectives and hypotheses. It will be adapted from validated instruments used in previous studies on digital literacy and academic information use behaviour and modified to suit the context of first-year undergraduate students at the University of Energy and Natural Resources (UENR).

The questionnaire will be divided into three sections. Section A will capture respondents' demographic information such as gender, age, programme of study, and prior digital experience. Section B will assess students' digital literacy competence, including information searching skills, critical evaluation, digital content creation, data literacy, and ethical use of information. Section C will examine academic information use behaviour, including the use of library databases, Google Scholar, citation management practices, quality of sources used, avoidance of predatory sources, and responsible referencing.

To ensure proper data collection procedures, ethical approval will be obtained from the appropriate university authorities before the commencement of the study. Permission will also be sought from relevant academic and administrative authorities within the university. The questionnaires were administered electronically using kobo collect, depending on the convenience and accessibility of respondents. Prior to participation, respondents will be informed about the purpose of the study and assured of confidentiality, anonymity, and the voluntary nature of their participation. Data collected will be used strictly for academic purposes

### **3.7 Data Analysis**

Data collected from the respondents will be coded, entered, cleaned, and analyzed using the Statistical Package for Social Sciences (SPSS). Both descriptive and inferential statistical techniques will be employed to analyze the data in line with the study objectives and hypotheses.

Descriptive statistics such as frequencies, percentages, means, and standard deviations will be used to summarize and describe the demographic characteristics of respondents as well as the major study variables. Specifically, descriptive statistics will be used to determine the level of digital literacy competence among first-year undergraduate students at UENR and to assess the nature

and patterns of academic information use behaviour among the students. The results will be presented using tables and charts where appropriate.

To examine the relationship between digital literacy competence and academic information use behaviour, Pearson Product-Moment Correlation Analysis will be employed. This analysis will help determine the strength and direction of the relationship between the independent and dependent variables and will be used to address Objective 3 and test Hypothesis H01.

Furthermore, Simple Linear Regression Analysis will be conducted to determine whether digital literacy competence significantly predicts academic information use behaviour among first-year students. The regression analysis will establish the predictive influence of digital literacy competence on academic information use behaviour and will address Objective 4 and test Hypothesis H02.

In addition, an Independent Samples t-test or One-Way Analysis of Variance (ANOVA) will be used to compare differences in academic information use behaviour between students with high and low levels of digital literacy competence. Respondents will be categorized into high and low digital literacy groups using a mean split or quartile distribution. This analysis will be used to test Hypothesis H03.

All statistical analyses will be conducted at a 0.05 level of significance.

### **3.8 Presentation of results**

The results of the data analysis will be presented using tables and appropriate statistical summaries to facilitate easy interpretation and discussion of findings. Descriptive statistics such as frequencies, percentages, means, and standard deviations will be presented in tables to summarize

respondents' demographic characteristics, levels of digital literacy competence, and patterns of academic information use behaviour.

In addition, the findings from the inferential statistical analyses will be presented using correlation matrices, regression output tables, and t-test or ANOVA result tables. The correlation matrix will show the strength and direction of the relationship between digital literacy competence and academic information use behaviour. Regression output tables will present the predictive influence of digital literacy competence on academic information use behaviour, including regression coefficients, R-square values, and significance levels. Furthermore, t-test or ANOVA tables will be used to present differences in academic information use behaviour between students with high and low levels of digital literacy competence.

The presentation of results will be aligned with the study objectives and hypotheses to ensure clarity and coherence in the interpretation of findings.

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