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Investigating Digital Challenges In Nursing Education

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Abstract — This qualitative study investigates the digital challenges experienced by 4th-year Bachelor of Science in Nursing (BSN) students at Urdaneta City University. As these students approach professional practice, understanding their interactions with digital tools in education is vital. Using in-depth interviews and focus group discussions, the study reveals common difficulties and coping strategies related to digital technology use in their learning environment. Key findings highlight persistent issues such as unreliable internet connectivity, technical device and software problems, and limited digital literacy. Students often struggle with unstable internet, which hampers their participation in online learning. Device malfunctions, storage limitations, and compatibility issues further impact their academic performance. Many also face difficulties navigating digital platforms and tools due to insufficient training or experience. Additional barriers include physical discomfort from extended screen use and external distractions like advertisements. Despite these obstacles, students adopt coping mechanisms such as using multiple internet sources, relying on personal or family-owned devices, and seeking peer or instructor support to improve their digital skills. Financial constraints remain a critical concern, limiting access to suitable technology and contributing to digital inequity. The study recommends enhancing digital literacy education, improving access to reliable internet and affordable digital tools, and strengthening technical support systems. Emphasizing digital equity, it advocates for inclusive educational practices that address diverse student needs. These insights contribute to curriculum development and policy planning in nursing education, helping better prepare future nurses for the digital demands of modern healthcare.

Keywords — Digital Literacy, Nursing Education, Internet Connectivity, Student Challenges, Digital Equity

I. Introduction

The advent of digital technology has revolutionized various sectors, including education. In the field of nursing, digital technology has been integrated into the curriculum in various forms, such as online learning platforms, digital simulations, and electronic health records. This integration aims to equip future nurses with the necessary digital competencies to navigate the increasingly digital healthcare landscape. However, the integration of digital technology in nursing education is not without challenges. These challenges can range from technical issues, such as unreliable internet connections and lack of technical support, to pedagogical issues, such as the need for digital literacy skills and the shift from traditional face-to-face teaching methods to online learning. Previous studies have shown that these challenges can significantly impact the effectiveness of digital learning and student satisfaction (Smith et al., 2020; Johnson & Brown, 2019). The population of this study, 4th-year Bachelor of Science in Nursing students, are at a

critical juncture in their education. They are transitioning from being students to becoming professional nurses. As they prepare to enter the workforce, understanding their experiences with and perceptions of the digital challenges in their education becomes crucial. Digital literacy is not just an educational requirement but a professional necessity, influencing patient care, clinical decision-making, and overall healthcare outcomes. This study aims to investigate these digital challenges, providing a platform for these students' voices to be heard. By exploring their lived experiences, this research seeks to uncover specific issues related to internet connectivity, technical support, and digital literacy skills. The findings of this study could inform the development of strategies to address these challenges, enhancing the quality of nursing education and preparing future nurses for the digital age.

In addressing the digital challenges in nursing education is essential for creating an effective and equitable learning environment. This study contributes to the ongoing discourse on digital literacy in nursing, highlighting the need for improved technical support, reliable internet access, and comprehensive digital literacy education. By focusing on the unique needs of 4th-year BSN students at Urdaneta City University College of Nursing, this research aims to inform curriculum development, instructional design, and policymaking in nursing education, ultimately enhancing student learning outcomes and patient care.

The purpose of this qualitative study is to explore and understand the digital challenges faced by 4th year Bachelor of Science in Nursing students. By focusing on their experiences and perceptions, the study aims to uncover the specific difficulties these students encounter in the integration of digital technology into their learning process. The study also seeks to identify the strategies these students employ to navigate these challenges. The ultimate goal is to use these insights to inform the development of effective strategies and interventions that can enhance digital literacy instruction within the nursing curriculum, thereby improving the quality of nursing education and preparing future nurses for the digital aspects of modern healthcare practice.

II. Methodology

Research Design

A qualitative research design was chosen for this study as it allows for an in-depth exploration of the digital challenges faced by the 4th year Bachelor of Science in Nursing students of Urdaneta City University College of Nursing. This design is particularly suitable for this study as it aims to understand complex phenomena that cannot be easily quantified or measured.

Data Collection:

The primary methods of data collection in this study could include in-depth interviews and focus groups with the students. This method was chosen as they allow the students to express their experiences and perceptions in their own words, providing rich and detailed data.

Population and Sample:

A purposive sampling strategy was used to select participants who have rich experience with the phenomenon under study. In this case, 4th year Bachelor of Science in Nursing students who have extensively used digital tools in their learning process were selected and have declared having experienced digital challenges.

Data Collection Procedures

For this study investigating digital challenges in nursing education, the researcher meticulously selected nursing student participants with relevant experience. The interviews followed a semi-structured format, allowing for flexibility while ensuring coverage of pertinent topics. We posed open-ended questions to delve into e-learning challenges and facilitators. Prior to each interview, we obtained informed consent from participants, and all interactions were recorded for subsequent analysis. This approach enabled the researcher to gain valuable insights into the complexities of digital education within the nursing field.

Data Analysis Procedures:

The data collected would be analyzed using thematic analysis, a method that identifies, analyzes, and reports patterns (themes) within the data. This involves a process of coding the data, identifying potential themes, reviewing, and refining the themes, and finally defining and naming the themes.

III. Results and Discussion

RESULTS THEMATIC ANALYSIS EMERGING THEMES

I. What digital devices do you personally own for your academic use?

The analysis of responses highlights the predominance and diversity of digital devices owned for academic use, revealing a strong reliance on certain types of devices with variations in their combinations. Cellphones/Smartphones are ubiquitous, owned by every respondent, underscoring their role as essential tools for communication, quick research, and various academic apps.

TABLE 1
Device Ownership

GADGET	TOTAL OWNERSHIP	PERCENTAGE OF TOTAL OWNERSHIP (%)
Cellphone/Smartphone	61	100%
Personal Computer/Laptop	41	60.66%
Tablet	12	19.67%
Family Home Desktop Computer	2	3.28%

The data indicate that a majority (41 out of 64) of respondents own personal computers or laptops, which are essential for complex academic tasks such as writing research papers, conducting online research, and utilizing academic software. Smartphones are universally owned and used for basic academic functions like communication and quick information access. Tablets, although less common (owned by 14 respondents), are valued for their portability and are frequently used for reading digital textbooks and note-taking. Notably, 12 respondents possess all three devices, reflecting an intentional diversification of tools to meet diverse academic demands. A small number (2 respondents) rely on shared, family-owned computers, highlighting disparities in personal access to technology.

These findings support the growing body of research emphasizing the importance of digital infrastructure in higher education. According to Lall and Rees (2020), device accessibility directly influences students' capacity to participate in digital learning environments, especially amid the increased integration of e-learning since the COVID-19 pandemic. The prevalence of multiple device ownership suggests that students recognize the value of both functionality and mobility in navigating academic tasks—a trend corroborated by Aguilera-Hermida (2020), who emphasized that students' perceived usefulness of technology significantly predicts their engagement and academic success in online learning.

However, reliance on shared devices among a few respondents reveals underlying issues of digital inequality. As highlighted by Beaunoyer, Dupéré, and Guitton (2020), digital access inequity remains a persistent challenge, especially in low-resource communities where students may lack consistent access to personal, high-functioning devices. This disparity can limit students' participation, reduce learning efficiency, and affect overall academic performance.

This implies that there is a need for higher education institutions to prioritize equitable digital access. This can be addressed by expanding device lending programs, offering digital literacy workshops, and designing instructional materials compatible with a range of devices. Moreover, educational policies should aim to bridge digital gaps to ensure that all students—regardless of socioeconomic background—have the tools necessary for academic success in the digital era.

II. What type of internet connection access do you have access to?

Analysis of Internet Connectivity Access Among Respondents

The analysis of internet connectivity among student respondents reveals a diverse range of access options tailored to meet the demands of academic engagement. The most frequently cited internet source is Home Wi-Fi, reported by 41 out of 64 respondents. Its stability and bandwidth capacity make it ideal for synchronous learning activities, such as video conferencing, virtual simulations, and real-time collaboration (Lassoued et al., 2020). Mobile data follows as the next most common option, used by 20 respondents. It provides flexibility and mobility, enabling students to access learning platforms outside of home environments or in areas where fixed internet infrastructure may be lacking. Notably, 8 respondents report using both Home Wi-Fi and Mobile Data, suggesting a contingency approach to ensure consistent internet access. This redundancy is critical in minimizing disruptions in online learning, a factor emphasized in studies on digital resilience in higher education (Adedoyin & Soykan, 2020)

Furthermore, 8 respondents identified using fiber optic internet connections (e.g., PLDT FIBER, Converge), which are preferred for their high-speed performance, especially for data-heavy academic tasks like streaming lectures, accessing cloud-based resources, and downloading large files. A minority (2 respondents) rely on Ethernet LAN connections, recognized for their stability and low latency, essential in situations requiring uninterrupted, high-performance connectivity. Meanwhile, 4 respondents rely on prepaid internet services, which offer flexibility in data consumption and cost control—often necessary for students managing limited financial resources. This reliance underscores ongoing concerns about digital equity and affordability, especially in lower-income households (Beaunoyer et al., 2020).

Table 2. Internet Connectivity Types Used by Respondents (n=64)

Type of Internet Connection	No. of Respondents	Description/Use Case
Home Wi-Fi	41	Primary source; stable, suitable for all academic tasks
Mobile Data	20	Flexible, mobile use; often secondary or backup source
Home Wi-Fi + Mobile Data	8	Redundant setup to ensure uninterrupted connectivity
Fiber Optic (PLDT/Converge)	8	High-speed, supports bandwidth-intensive academic activities
Ethernet LAN	2	Stable, low-latency; ideal for uninterrupted learning
Prepaid Internet Services	4	Flexible, cost-controlled; reflects economic considerations

These findings emphasize the critical role of reliable home internet access in sustaining effective digital learning environments. While Home Wi-Fi dominates as the primary connectivity method, the adoption of complementary mobile data illustrates the need for adaptive strategies in maintaining learning continuity. The preference for fiber-optic internet demonstrates students' awareness of the performance demands of digital education. However, the reliance on prepaid and shared services points to ongoing socioeconomic disparities, underscoring the importance of institutional and governmental support in improving digital infrastructure and affordability for marginalized learners (UNESCO, 2021).

III. Challenges Encountered in the Use of Digital Devices and Software: A Thematic Analysis

The qualitative analysis of participant responses reveals a complex set of challenges associated with the use of digital devices and software. Through thematic coding, five major categories emerged: internet connectivity issues, technical difficulties, digital literacy limitations, physical discomfort, and external disruptions.

1. Internet Connectivity Issues

Connectivity-related problems were the most frequently reported barrier. Participants cited slow internet speed (11), poor internet connection (10), unstable connectivity (4), and weak signal strength (1) as recurring obstacles. These issues significantly disrupted synchronous learning activities, access to digital resources, and overall productivity. The inadequacy of reliable internet infrastructure was highlighted as a structural limitation affecting digital engagement.

2. Technical Difficulties

Several participants described technical problems with both hardware and software. These included device lag (4), compatibility issues (1), storage limitations (1), and hardware malfunctions (1). Additionally, difficulties with navigating new or complex user interfaces were common, particularly when using unfamiliar platforms or applications essential for academic work.

3. Digital Literacy Limitations

Lack of digital literacy emerged as a key theme. Respondents reported challenges such as insufficient knowledge or confidence in using devices (8), difficulty following digital instructions (2), and trouble adapting to new features (1). This highlights a critical gap in user readiness and emphasizes the need for capacity-building interventions in digital competence, particularly among learners transitioning into digitally mediated education.

4. Physical Discomfort and Health Concerns

Some participants noted physical discomfort associated with prolonged digital engagement, including eye strain (1) and challenges related to battery life limitations (1). These responses reflect the often-overlooked ergonomic and physiological impacts of extended screen time, especially in remote or blended learning setups.

5. External Disruptions

A minor yet relevant category of challenges involved external distractions such as commercial advertisements (2) and environmental factors influencing internet quality (1). These

factors, although not intrinsic to the technology itself, affect the overall user experience and can compound existing barriers.

Emergent Themes and Implications

The themes reflect a multi-dimensional digital experience shaped by infrastructure, user competence, and environmental factors. The prevalence of connectivity issues underscores the urgent need to improve digital infrastructure, especially in underserved areas. The technical challenges and low digital literacy suggest that institutions must invest in user-focused technical support and digital skills training (Bond et al., 2018; OECD, 2021).

Furthermore, the physical strain and external disruptions call for inclusive strategies that promote digital wellness and enhance user experience design. Embedding digital literacy modules into the nursing curriculum and conducting faculty-student tech orientations may foster more confident and effective use of digital platforms.

The analysis reveals that digital learning environments are not universally accessible or user-friendly for all students. Barriers such as unreliable internet, technical limitations, insufficient digital skills, physical discomfort, and external disruptions persistently hinder the full integration of digital tools in academic settings. A comprehensive response—grounded in infrastructure improvement, digital competence training, and wellness awareness—is essential to create an equitable and supportive digital learning ecosystem.

IV. Difficulties in Accessing Digital Devices: A Thematic Analysis

The thematic analysis of participant responses reveals several key barriers to accessing digital devices, particularly in the context of academic use. Five major themes emerged: affordability, availability, technical specifications, compatibility, and digital literacy gaps.

1. Affordability

The most frequently cited challenge is the high cost of acquiring digital devices such as laptops, smartphones, and tablets. Many respondents indicated that financial constraints inhibit their ability to purchase adequate technology for academic tasks. For students from low- to middle-income families, prioritizing basic needs often takes precedence over acquiring educational tools. This finding is consistent with recent studies highlighting how cost remains a persistent barrier to digital equity in education (UNESCO, 2023).

2. Availability

Availability challenges are particularly evident in rural and underserved communities, where respondents reported limited access to digital stores, supply shortages, and restricted options for purchasing or upgrading devices. These geographic and systemic limitations contribute to the

broader digital divide (ITU, 2021), limiting timely access to essential tools for academic engagement.

3. Technical Specifications

Some respondents emphasized the difficulty in acquiring devices with adequate processing power, memory, or storage necessary for modern academic software and learning platforms. Low-specification devices hinder productivity, limit multitasking capabilities, and contribute to student frustration.

4. Compatibility Issues

Another recurring theme is software and platform compatibility. Students often struggle to find devices that align with specific academic requirements, such as compatibility with licensed educational software or Learning Management Systems (LMS). These incompatibilities reduce the overall usability and efficiency of digital devices in academic contexts.

5. Digital Literacy

Though less frequently mentioned, limited digital literacy remains a critical underlying barrier. Some respondents acknowledged a lack of familiarity with technology, navigation challenges, or reduced confidence in selecting and utilizing devices effectively. This underscores the importance of capacity-building initiatives to help students maximize the utility of available technologies (OECD, 2021).

The findings suggest the need for a multi-pronged intervention strategy.

- Financial assistance programs or subsidies can help reduce affordability barriers, especially for students from socioeconomically disadvantaged backgrounds.
- Public-private partnerships can facilitate the availability of low-cost, high-quality devices in remote and underserved communities.
- Academic institutions should offer technical guidance to students when choosing devices to ensure compatibility with institutional systems.
- Lastly, integrating digital literacy training into higher education curricula can equip students with the necessary skills to use technology effectively and independently.

The study highlights affordability, availability, insufficient technical specifications, compatibility issues, and digital literacy as critical challenges in accessing digital devices for academic use. These interconnected barriers reveal the structural and skill-based inequalities that persist in digital access. Addressing these challenges requires institutional support, policy reforms, and inclusive technology programs aimed at enhancing equitable digital access in education.

Thematic Analysis: Challenges in Accessing and Using Digital Resources

This thematic analysis explores the challenges encountered by users in accessing digital devices, navigating online platforms, and understanding digital content. The data revealed five major themes: (1) Technical Barriers, (2) Digital Literacy Gaps, (3) Financial Constraints, (4) Connectivity Issues, and (5) Inclusivity and Accessibility Concerns.

1. **Technical Barriers:** Many respondents reported technical difficulties as a primary challenge in using digital tools. These included slow website loading times, frequent application crashes, compatibility issues, and poorly designed user interfaces—especially on mobile platforms. Users expressed frustration when navigating inconsistent or complex website layouts, which hindered their ability to complete tasks efficiently. These issues often led to delays, reduced productivity, and disengagement from online learning and services.

2. **Digital Literacy Gaps** : A significant number of users highlighted gaps in their digital literacy. Respondents struggled with evaluating the credibility of online content, identifying trustworthy sources, and navigating unfamiliar platforms or applications. Many also faced challenges in interpreting digital instructions or effectively using software tools for academic purposes. These literacy gaps often led to cognitive overload, confusion, and increased vulnerability to misinformation. Respondents emphasized the need for training to improve their digital competencies and confidence.

3. **Financial Constraints** : Affordability emerged as a central theme, particularly regarding access to digital devices and internet connectivity. Many respondents cited the high cost of laptops, smartphones, and tablets as a barrier to digital participation. Others mentioned the expense of internet subscriptions and educational software as limiting factors in accessing academic content. For some, financial constraints prevented them from engaging in online learning, accessing digital libraries, or participating in virtual academic communities. This theme underscores the socioeconomic digital divide.

4. **Connectivity Issues** : Intertwined with financial challenges, connectivity issues were widely reported. Respondents noted unstable or slow internet connections, especially in rural or underserved areas. These connectivity problems affected their ability to access digital tools and participate in real-time online activities. Even those with devices faced limitations due to unreliable internet, which interrupted tasks, hindered communication, and caused academic delays. This theme points to the urgent need for improved digital infrastructure.

5. Inclusivity and Accessibility Concerns: Lastly, respondents raised concerns related to inclusivity and accessibility. Users with disabilities mentioned difficulties using platforms that lacked screen reader compatibility or other assistive features. Others expressed challenges due to language barriers or cultural differences, particularly when digital content was not localized or was culturally biased. These issues limited equitable access and engagement, especially for non-native speakers and individuals from diverse backgrounds.

The thematic analysis reveals that users face interrelated challenges in digital access and use. Addressing these issues requires a comprehensive approach: improving digital literacy through targeted education, enhancing platform usability through user-centered and accessible design, providing financial support for devices and internet access, and expanding infrastructure in underserved areas. Promoting cultural and linguistic inclusivity is also vital for ensuring that digital environments are equitable and welcoming to all users.

Thematic Analysis: Digital Access Challenges and Their Impact on Education

This thematic analysis explores the multifaceted challenges individuals face in accessing digital resources and how these issues impact their academic engagement and performance. Four major themes emerged: Affordability and Financial Barriers, Technical and Connectivity Limitations, Educational Access and Participation, and Academic Performance and Digital Literacy.

Affordability and Financial Barriers were frequently cited. Respondents noted that high costs of internet subscriptions, digital devices, and premium educational platforms significantly limit their ability to participate in online learning. Paywalls, software fees, and subscription costs further exacerbate this inequality, deepening the digital divide among socioeconomically disadvantaged learners.

Technical and Connectivity Limitations also emerged as a key theme. Many individuals struggle with outdated devices, incompatible software, and unstable or slow internet, particularly in rural areas. These limitations hinder access to educational content, disrupt virtual classroom participation, and reduce engagement in online learning environments.

Under Educational Access and Participation, respondents described difficulties accessing learning materials, attending live classes, and conducting research. Barriers such as platform incompatibility, lack of technical support, and limited digital infrastructure prevent learners from fully engaging with digital education, leading to isolation and learning gaps.

Lastly, **Academic Performance and Digital Literacy** reflect the broader consequences of digital inequity. While some benefit from digital tools and self-directed learning, others face distractions, misinformation, and skill gaps that hinder their academic outcomes. Students emphasized the need for digital literacy training and support systems to improve focus, critical thinking, and effective resource use.

In conclusion, addressing digital access challenges requires comprehensive solutions: affordable internet, inclusive platform design, digital literacy programs, and equitable infrastructure. These strategies are essential to bridge the digital divide and ensure quality education for all learners in a digitally driven world.

Thematic Analysis: Digital Barriers and Academic Performance

Analyzing responses regarding digital barriers reveals several significant challenges that impact students' studies and academic performance. These challenges predominantly involve technological limitations, distractions, and reliance on unreliable resources.

Technological limitations emerged as a primary theme, with many respondents citing poor internet connections, slow devices, and unstable signals that hindered their ability to access online materials and engage in virtual classes. These issues disrupted learning, caused frustration, and delayed assignments, affecting overall academic performance. The need for improved technological infrastructure is evident to ensure uninterrupted access to digital resources.

Distractions, particularly from social media, online games, and other digital platforms, were also a common challenge. Respondents noted that these distractions led to procrastination, reduced focus, and inefficient study habits. As a result, students struggled to maintain attention during online classes, which negatively impacted their learning outcomes. Effective time management and strategies to manage digital distractions are essential for maintaining focus in digital learning environments.

Furthermore, **reliance on unreliable online resources** was highlighted as a major issue. Some students encountered misinformation or outdated content, which compromised the credibility of their work. This issue underscores the importance of promoting **digital literacy** and critical thinking skills to help students evaluate online sources effectively and ensure academic integrity.

In conclusion, addressing these barriers requires improvements in digital infrastructure, digital literacy education, and better time management strategies to support students in overcoming digital challenges and achieving academic success in online environments.

IV. Conclusion

In conclusion, investigating these areas will provide a deeper understanding of the challenges and opportunities within digital education. The insights gained will help stakeholders develop targeted solutions to improve academic performance, ensure equitable access to resources, and support the overall well-being of students in digital learning environments.

V. Recommendations

To enhance academic performance and ensure equitable access to resources in digital education, further research is essential in several key areas.

Firstly, investigating the impact of technological improvements, such as high-speed internet and device upgrades, is crucial. Understanding how these advancements influence student access to resources and learning outcomes will help identify the most critical technological factors that facilitate effective learning, guiding investments in infrastructure improvements.

Secondly, examining the effectiveness of digital literacy programs is vital. As digital literacy enables students to efficiently navigate online resources and critically evaluate information, research into existing programs can reveal best practices and areas for improvement. This will ensure that students are better equipped to handle digital content and avoid misinformation.

Additionally, researching strategies and tools to manage digital distractions is necessary. With the growing presence of social media and other online distractions, exploring effective methods to help students stay focused and improve time management can lead to the development of interventions that enhance productivity and academic performance.

The physical and mental health impacts of prolonged digital device use also warrant further study. Prolonged screen time and sedentary behavior are linked to significant health concerns. Research can help quantify these effects and inform the creation of healthier digital habits and practices to promote student well-being. Furthermore, exploring financial barriers and support mechanisms is essential for understanding how financial constraints affect digital access. Research in this area can evaluate the effectiveness of financial aid programs, scholarships, and subsidies in bridging the digital divide, ensuring equitable access for all students.

Research into equity and inclusion in digital education is also necessary to address disparities across socio-economic, geographic, and demographic groups. By identifying the root causes of these disparities, targeted interventions can be proposed to ensure all students benefit equally from digital learning opportunities.

Finally, evaluating the effectiveness of communication platforms and collaborative tools in digital learning environments is crucial. Research can assess how these tools impact student interaction, support, and teamwork, ultimately leading to improved academic experiences and outcomes.

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