

Exploring Student Perspectives on E-Learning in Nursing Education

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E-learning has rapidly gained prominence in nursing education, offering flexible alternatives to traditional learning. This study aimed to explore nursing students' experiences with e-learning, focusing on perceived benefits, challenges, and its impact on skill acquisition. Using a qualitative design, data were collected from four face-to-face focus groups comprising 20 nursing students. Thematic analysis was employed to examine the data, yielding six key themes: Flexibility and accessibility benefits, Impact on student engagement and interaction, Technological and infrastructure challenges, Effect on practical skills and learning outcomes, Diverse preferences in learning approaches, and Self-management and motivation in e-learning. The findings indicate that, while e-learning provides accessibility and flexibility, it poses challenges in practical skill development and engagement. This study emphasises the need for adaptive e-learning models to meet diverse learning requirements effectively.

Keywords: online learning, blended learning, thematic analysis, skill development, student engagement

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Introduction

E-learning, defined as the use of digital technologies to facilitate education, has rapidly evolved into a core instructional medium, particularly in higher education. The Organisation for Economic Co-operation and Development (OECD) defines e-learning as a system that is interactive, adaptive, self-determined, and decentralised, overcoming temporal and spatial limitations of conventional learning settings (Prosen et al., 2022). E-learning's flexibility and adaptability make it a compelling alternative to traditional face-to-face teaching, allowing students greater control over the pace and location of learning (Miličević et al., 2021). This shift has not only democratized access to education by breaking down geographical barriers but has also introduced new pedagogical challenges. These, among other things, include maintain-

ing engagement and ensuring the quality of interaction in a virtual learning environment (Sayaf, 2023).

In addition to providing a flexible approach to learning, e-learning fosters a learner-centred environment where students control the pace and direction of their study, making it particularly beneficial in diverse fields such as healthcare, where students can often customise their learning path to match their specific needs and competencies (Ličen et al., 2022, 2023). Recent studies indicate that students' engagement and academic performance improve through personalized adaptive learning approaches (du Plooy et al., 2024). These systems adapt content to meet individual learners' needs, using indicators such as pre-knowledge assessments and confidence levels to tailor learning experiences. Adaptive platforms, like Moodle for example, play a significant role in enabling these personalized pathways, which have shown promise in increasing both engagement and academic success (du Plooy et al., 2024; Ullah et al., 2023).

Moreover, the COVID-19 pandemic¹ initiated the adoption of e-learning globally, creating an urgency for educational institutions to adapt. In response, higher education institutions have moved from cautious integration of e-learning to a more widespread adoption, which has, in turn, highlighted the need for a robust, supportive infrastructure to ensure smooth delivery and engagement (Chow & Croxton, 2017). This systemic change has led to increased interest in sustainable e-learning models that are resilient to future disruptions (Mashroofa et al., 2023).

However, the expansion of e-learning is not without socio-cultural challenges, especially in culturally diverse regions like Africa (Njenga, 2018), where local culture and technological readiness play crucial roles in technology acceptance. In some settings, deeply-rooted traditions and values can sometimes conflict with the rapid advancement of digital learning, creating resistance among certain student populations (Luppicini & Walabe, 2021). For instance, high-power distance cultures² may favour more instructor-led, structured learning, which can sometimes clash with the autonomous nature of e-learning, requiring careful integration of cultural sensitivity into instructional design. These barriers underline the need for contextually adaptive solutions that consider the socio-cultural contexts of the user population

¹ Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus (World Health Organization, 2024).

² Power distance refers to the degree to which people in a society accept inequities in power distribution. In high power distance cultures, individuals often show respect for authority, which may affect their decision-making (Hofstede, 2011).

(Njenga, 2018) as well as the needs of a multi-generational, diverse student body, each with distinct learning styles and preferences (Eshun Yawson & Amofa Yamoah, 2021).

The aim of this chapter is to explore the varied experiences of nursing students with e-learning, examining their perceptions, challenges, and insights as they adapt to a digital learning environment. Through a qualitative study, data collected from focus groups were analysed thematically to gain insight into the perspectives of nursing students, revealing both the benefits and limitations of e-learning in their educational journeys. In this study, we aimed to answer two key research questions: What are the experiences and challenges nursing students face with e-learning in health science education? and How do nursing students perceive the impact of e-learning on their engagement, skill acquisition, and overall educational experience?

Student-Centred E-Learning and Constructivist Theories

Student-centred e-learning approaches have gained significant attraction in educational pedagogy, focusing on fostering active participation, critical thinking, and collaborative problem-solving among students. Constructivist learning theory, which underpins many student-centred e-learning models, promotes knowledge construction through interactive, learner-led experiences rather than passive reception of information (Wu et al., 2023). In this model, students actively engage with materials, instructors, and peers, thereby building their understanding through real-world context and social interaction (Tsai et al., 2023).

Constructivism, as detailed in the works of Vygotsky and Piaget, posits that learning occurs most effectively when students are provided with opportunities to explore, inquire, and relate knowledge to prior experiences (Tsai et al., 2023; Tsai, 2008). This approach is particularly relevant in online settings, where digital tools facilitate learner-content, learner-instructor, and peer interactions. For instance, interactive platforms and multimedia resources allow students to construct knowledge dynamically, fostering a deeper engagement with content and a stronger sense of ownership over their learning journey (O'Connor et al., 2022).

In healthcare education, constructivist theories help address complex, real-world challenges by simulating clinical environments through e-learning. For example, problem-based learning (PBL),³ a constructivist approach

³ Problem-Based Learning (PBL) is a student-centred educational approach designed to

commonly used in medical training, enhances learners' critical thinking and prepares them for professional scenarios. PBL encourages students to work through real-case scenarios, thus aligning theoretical knowledge with practical application (Wu et al., 2022; Wu et al., 2023). Studies have shown that e-learning platforms using constructivist models improve students' confidence and readiness to face clinical realities (Wu et al., 2023).

Incorporating peer assessment into student-centred e-learning, as guided by constructivist principles, has also been shown to promote critical thinking and self-efficacy. This approach according to Wang et al. (2024) enables students to engage in reflective learning, where they analyse their own and others' work, fostering a deeper understanding and continuous improvement. For example, the 'Understanding-Evaluation-Backward Evaluation-Reflection Peer Assessment – UEER-PA⁴ approach', which includes stages of understanding, evaluation, and reflection, has been demonstrated to enhance students' critical thinking, self-assessment skills, and learning performance in e-learning environments (Wang et al., 2024).

Another valuable application of constructivist principles in e-learning is design thinking, which supports complex problem-solving and fosters innovation (Stefan, 2017). This approach highlights the constructivist emphasis on (e-)learning through experience and iterative processes. By embedding design thinking in e-learning, students are encouraged to approach problems creatively, test solutions iteratively, and learn from experimentation. Research suggests that such methods increase students' motivation and problem-solving abilities, making them better equipped to tackle real-world challenges (Tsai et al., 2023; Wang et al., 2024).

Constructivist learning, therefore, not only enhances academic performance but also prepares students for lifelong learning. By promoting a sense of au-

engage students in active learning by working through complex, real-world problems. This method places students in collaborative groups, where they analyse a given problem, identify knowledge gaps, and develop self-directed learning strategies to find solutions. The underlying philosophy of PBL is constructivist, encouraging students to build their understanding through exploration, discussion, and reflection, aligning new information with prior knowledge (Yew & Goh, 2016).

⁴ This constructivist-based peer assessment method is designed to improve the quality and depth of peer evaluations in educational settings by guiding students through four structured phases: (1) Understanding – Students start by thoroughly understanding their peers' work, often using tools like mind mapping to visualise and analyse projects; (2) Evaluation – They then perform a detailed evaluation of their peers' work, using an online forum or similar platforms to provide structured feedback; (3) Backward Evaluation – Students reflect on the feedback they've received, either agreeing with or constructively responding to evaluations made by others; (4) Reflection – Finally, they summarise the entire feedback process, incorporating insights to enhance their own projects (Wang et al., 2024).

tonomy and critical engagement with content, constructivist student-centred e-learning contributes to developing professionals who are adaptive, reflective, and resilient – qualities essential for success in healthcare and other fields that demand continuous learning and adaptation (Berestova et al., 2022).

Challenges of E-Learning in Health Science Education

E-learning has increasingly become a core component in health science education, offering a flexible and accessible means of learning that addresses geographical and temporal barriers. However, this shift brings several significant challenges. One primary challenge in health science education, where hands-on training is crucial, is the lack of practical skill acquisition. Clinical skills traditionally rely on face-to-face training, and many students report that digital learning environments lack the interactive, hands-on elements essential for mastering clinical competence and patient communication. This gap is particularly prominent in areas like nursing, where practical application and direct feedback are integral to student confidence and competence (Mojarad et al., 2023; Ongor & Uslusoy, 2023).

A notable issue within e-learning is the reliance on digital literacy and self-regulation, both of which can be challenging for students unaccustomed to managing their own schedules and learning without in-person guidance. This aspect has been shown to impact motivation and focus, with students finding it difficult to maintain attention during long, screen-based sessions (Choi & Kim, 2024). Moreover, this challenge is exacerbated by limited interaction with instructors and peers, leading to a sense of isolation. In particular, synchronous e-learning settings, which aim to mimic in-person interactions, often fall short of replicating the community and immediacy of face-to-face learning, resulting in diminished engagement (Jin & Kim, 2024).

The technological infrastructure required for effective e-learning also poses challenges. In regions with limited digital resources, students often encounter connectivity issues and lack access to necessary equipment, creating disparities in educational quality and learning experiences (Shahmoradi et al., 2018). Even in well-equipped areas, technical difficulties can disrupt learning flow, and students and instructors alike may lack training on digital platforms, impeding smooth course delivery (Abuzaid et al., 2024).

Academic integrity is another area of concern within e-learning. The digital format, with less direct supervision, can lead to increased opportunities for academic misconduct, raising concerns about the validity and reliability of assessments, particularly in fields that require rigorous competency verification, such as healthcare (Ličen et al., 2023).

Finally, cultural and generational differences in health science classrooms can create additional barriers to e-learning adoption and engagement. Students from high power distance cultures may favour structured, instructor-led learning over the autonomous nature of e-learning, and generational differences in digital familiarity can create further discrepancies in engagement and learning outcomes. These cultural dimensions necessitate tailored, context-sensitive approaches to e-learning design, ensuring that the diverse needs of a multi-generational student body are met (Ličen et al., 2022, 2023; Njenga, 2018; Prosen et al., 2022).

Methods

This study employed a qualitative research design, specifically using thematic analysis to explore the perceptions and experiences of nursing students in relation to e-learning. Thematic analysis, as outlined by Braun and Clarke (2006), provides a flexible yet systematic approach to analysing qualitative data, allowing researchers to identify, organise, and report on patterns or themes within a data set (Kiger & Varpio, 2020). The approach is particularly suited for exploring participant experiences across complex topics, as it provides both a structured and adaptable framework for examining diverse viewpoints (Nowell et al., 2017).

The study sample consisted of 20 nursing students. All students had prior experience with e-learning. This purposeful sampling approach allowed for a range of perspectives, capturing insights from students at different stages and modalities within nursing education.

Data were collected through four face-to-face focus group discussions, each lasting approximately one hour. Focus groups were chosen for their ability to foster interaction and discussion, thus generating a rich exchange of experiences and insights. The decision to conduct four focus groups was guided by research suggesting that data saturation in focus group studies often occurs within three to six groups, particularly when the participant pool is relatively homogenous and the topic complexity moderate (Guest et al., 2016). Each session was audio-recorded and later transcribed verbatim to ensure the accuracy of data for analysis. The use of a semi-structured topic guide allowed for consistency across groups while providing flexibility to pursue emerging topics relevant to participants' experiences (Schweitzer et al., 2024). Some examples of interview questions include: What are your expectations of e-learning? How did you experience e-learning during the COVID-19 pandemic? What infrastructure did you have at home to support your participation in e-learning? How do you see the role

of the teacher in e-learning? and What forms of e-learning do you prefer: active participation, a mix of active and passive participation, or more passive forms?

The text analysis was conducted using the software program NVivo, version 1.7.2 (QSR International, Australia). The data were analysed using the six-step process for thematic analysis as outlined by Braun and Clarke (2006) and adapted by Kiger and Varpio (2020). The steps included:

- *Familiarisation with the data*: The researchers reviewed each transcript multiple times to gain a thorough understanding of the content.
- *Generating initial codes*: Key segments of the transcripts were coded based on patterns observed in the data, using both inductive and deductive approaches.
- *Searching for themes*: Codes were then grouped to identify broader themes that represented underlying patterns in the data.
- *Reviewing themes*: Themes were refined and reorganised to ensure coherence and alignment with the research objectives.
- *Defining and naming themes*: Each theme was defined to capture the essence of the grouped codes and was given a descriptive label.
- *Producing the report*: A narrative was developed to present the themes, supported by direct quotes from participants to illustrate key points. The transcripts were originally in Slovenian, and the thematic analysis was conducted in Slovenian to ensure authenticity and accuracy in capturing participants' perspectives. The final results were then translated into English by the authors, who are fluent in both languages, to facilitate reporting and ensure clarity for an international audience.

To ensure the trustworthiness of the findings, the study adhered to criteria including credibility, dependability, confirmability, and transferability as defined by Lincoln and Guba (1985). Credibility was enhanced through member checking, where summaries of findings were shared with participants to validate interpretations. Ten participants confirmed the final conceptualisation of findings. Dependability was supported by maintaining a detailed audit trail documenting each step of data collection and analysis, enabling replication of the methodology (Elo et al., 2014). Confirmability was achieved by maintaining reflexive journals throughout the study, reducing researcher bias, while transferability was considered by providing detailed descriptions of the sample and setting to allow others to assess the applicability of findings to similar contexts (Manojlović et al., 2023).

Ethical approval was obtained from the Commission of the University of Primorska for Ethics in Human Subjects Research (Approval No: 4264-16-3/2022), ensuring compliance with ethical standards in qualitative research. Participants provided informed consent, were assured of their right to withdraw at any point, and were guaranteed anonymity in any publications resulting from the study. The study was co-funded by the ARIS – Slovenian Research and Innovation Agency (Development of a digital education standard in higher education for ensuring equity and accessibility in digital education, J5-4572).

Findings

Sample Strength, Vocabulary Structure and Key Themes:

An Initial Analysis

The sample including 15 students enrolled in the Bachelor of Nursing programme and 5 in the Master's of Nursing programme at the University of Primorska, Faculty of Health Sciences, during the academic year 2022/23. Of the Bachelor's group, 6 participants were part-time students. The sample was composed of 13 female and 7 male participants, with an average age of 27.6 years.

The review and analysis of the interview sample indicated a high level of reliability and homogeneity, as confirmed by Pearson's correlation coefficient, which measures word similarity among sources ($r=0.859$). In this context, the Pearson coefficient suggests a strong correlation, meaning that the vocabulary across different transcripts is highly similar, which reinforces the consistency of responses within the focus groups. This high level of similarity allows for robust analysis as it indicates that the transcripts can be grouped together effectively, highlighting patterns and themes common to the participant group.

As part of the preliminary analysis of transcript characteristics, our initial goal was to identify vocabulary features from a structural perspective. In the early steps, we analysed the most frequently used words across all transcripts (minimum length of 7 letters) and presented this visually through a word cloud (Figure 1) and cluster analysis (Figure 2).

The word cloud in Figure 1 is providing a visual representation of key terms that emerged during the focus group discussions. The words 'education', 'students', 'learning', 'lectures', and 'professors' appear prominently, indicating that these concepts were central to the participants' experiences and discussions. This prominence reflects the primary themes around educational practices, student engagement, and the role of educators in the e-learning context. Smaller but notable words, such as 'support', 'technology', and 'interaction' may suggest additional areas of concern or interest.



Figure 1 Word Cloud of the Most Frequently Used Words

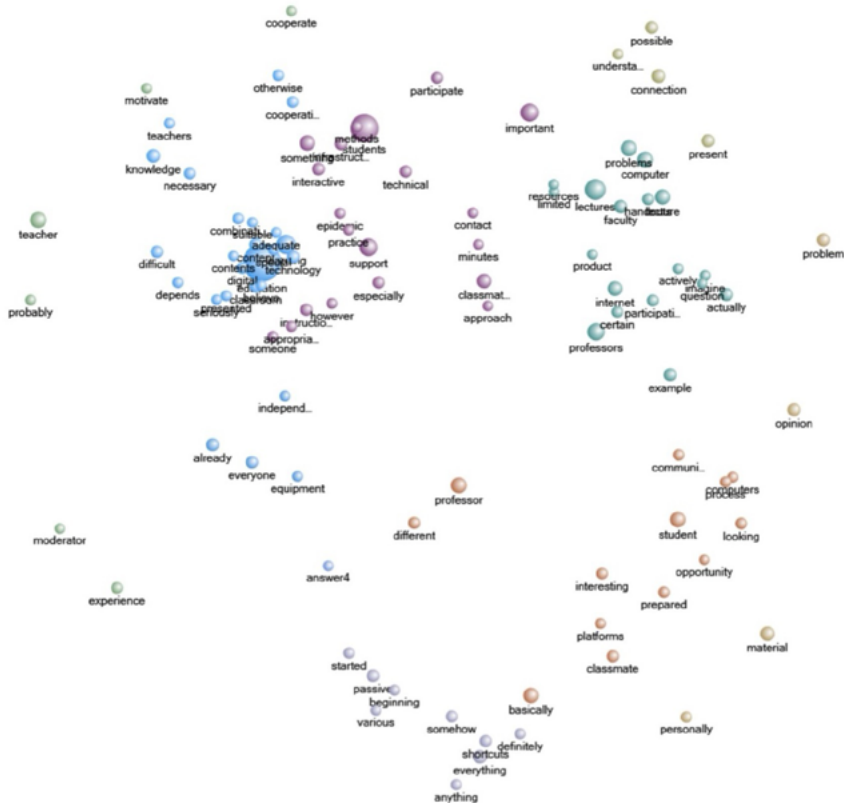


Figure 2 Cluster Analysis

Figure 2 shows the cluster analysis, illustrating how frequently used words are grouped based on their co-occurrence within the transcripts. This clustering provides insight into the relationships between terms, showing which words tend to appear together and may thus represent connected ideas or themes. For instance, clusters around words like 'education', 'students', and 'support' may suggest a thematic focus on the importance of supportive educational structures. Another cluster linking 'internet', 'computer', and 'resources' highlights discussions related to the technological aspects of e-learning, such as the availability of reliable internet and appropriate hardware, which are essential for effective digital learning experiences.

The clustering also reveals smaller, context-specific groups. For example, terms such as 'participate', 'interaction', and 'classroom' may indicate themes around student engagement and the effectiveness of interaction within virtual classrooms. This clustering analysis adds depth to the word cloud by perhaps revealing underlying patterns of association, offering a more nuanced view of the thematic structure within the discussions. These visualisations collectively demonstrated, at least at this stage, that while fundamental elements of education and student support were recurring topics, practical issues related to technology and engagement emerged as significant challenges in the e-learning experiences of nursing students.

Thematic Analysis

The analysis of nursing students' experiences with e-learning revealed six main themes: (1) Flexibility and accessibility benefits; (2) Impact on student engagement and interaction, (3) Technological and infrastructure challenges; (4) Effect on practical skills and learning outcomes; (5) Diverse preferences in learning approaches, and (6) Self-management and motivation in e-learning (Table 1). Each theme presents distinct aspects of the e-learning experience, from the practical benefits of flexible access to the challenges faced in maintaining engagement, overcoming technical obstacles, and adapting learning approaches.

Flexibility and Accessibility Benefits

The theme 'Flexibility and accessibility benefits' emerged strongly across all focus group discussions, highlighting the significant advantages e-learning offered nursing students. This theme illustrates how students appreciated the adaptability of e-learning, which allowed them to balance academic and personal responsibilities more effectively.

Table 1 Identified Themes and Sub-themes

Themes	Sub-themes	Codes
Flexibility and accessibility benefits	Time and cost savings	Saved commuting time; Reduced travel and accommodation costs; Financial accessibility; Flexibility to manage work and studies simultaneously
	Flexible learning environment	Ability to work from home; Coordination with work and study; Balancing personal commitments; Increased comfort from studying in home settings
Impact on student engagement and interaction	Reduced peer and instructor interaction	Lack of in-person socialising; Reduced class discussions; Limited opportunities for peer collaboration
	Distractions and reduced focus	Distractions at home (e.g., family obligations); Challenges with focus in a non-classroom setting; Interruptions from multitasking during lectures; Lowered attention span over extended online sessions
Technological and infrastructure challenges	Passive participation	Reduced motivation to actively engage; Absence of immediate feedback; Tendency toward passive learning
	Connectivity issues	Unreliable internet; System crashes; Inconsistent signal quality
	Equipment limitations	Outdated computers or devices; Lack of access to cameras; Insufficient funds for new equipment
	Software and platform issues	Difficulties with Zoom or Teams; Lack of familiarity with e-learning tools; System outages and crashes; Trouble accessing learning materials
	Limited practical skill development	Reduced hands-on practice; Challenges in clinical skill acquisition; Lack of real-world application; Difficulty applying theoretical knowledge in practice
Effect on practical skills and learning outcomes	Reduced confidence and preparedness	Feeling underprepared for meeting professional standards; Decreased confidence in clinical settings
	Adaptation to digital tools	Navigating new learning platforms; Adapting to online assessments; Learning through digital simulations; Increased familiarity with technology as a learning tool
Diverse preferences in learning approaches	Learning format preferences	Preference for active learning; Hybrid or mixed learning preferences; Interest in synchronous vs. asynchronous learning
	Tool and content preferences	Favouring videos and visual aids; Preference for interactive content; Interest in quizzes and hands-on activities; Preference for materials that allow self-paced learning
Self-management and motivation in e-learning	Self-discipline and time management	Time management difficulties; Procrastination tendencies; Challenges with self-regulation; Struggles with prioritising study tasks over personal activities
	Motivation and engagement barriers	Struggling to maintain motivation; Reduced engagement over time; Loss of interest in online learning; Increased reliance on external reminders or deadlines
	Use of shortcuts in e-learning	Seeking shortcuts during lectures; Multitasking while attending online classes; Engaging in passive learning methods

A key benefit identified by the students was the considerable time and financial savings that e-learning facilitated. By eliminating the need for commuting, students were able to save time, which they could reallocate to other activities, such as work or family obligations. As one participant noted:

The best thing was that the drive to lectures or to the college was somehow saved. It was physically less tiring, given that we were in our own rooms. [F3]

Similarly, another student shared:

Yes, maybe this economy of time, so that we also arranged certain things more easily. You could also arrange something during the lectures, because you were on ZOOM and could use the computer for something else at the same time. [F2]

The financial aspect was also highlighted, with one student saying:

Good things: when the lectures ended, I could immediately focus on work and the things that were waiting for me at home, it was also better because of the logistics – less worries about transportation to the university. [F1]

These savings were especially beneficial to part-time students, who could juggle their studies with employment more conveniently. In addition, the flexible nature of e-learning was also highly valued, as it allowed students to adapt their study schedules to fit around other responsibilities. This flexibility enabled students to balance both work and study commitments more seamlessly. One participant highlighted this benefit by stating:

I think it was basically great, and because of the job itself, it was easier for me to follow the lectures, because I took advantage of this so that I could actually listen to some lectures from work, which I otherwise wouldn't have been able to. [F4]

Another student reflected on the convenience of e-learning by sharing:

Among the good sides, I count the fact that you are more flexible, that you can monitor your education retrospectively. [FG2]

Furthermore, some students appreciated the comfort and independence that learning from home afforded, as one participant mentioned:

The positive sides of e-education were that we were spared the drive, the time that I could schedule my work during the day parallel to the lectures, and I could sleep longer. [FG3]

Impact on Student Engagement and Interaction

This theme highlights the ways in which e-learning affected students' ability to engage actively with both their peers and instructors, reflecting the social and cognitive challenges of e-learning. While the virtual environment offered convenience, it also introduced barriers to effective communication, focus, and active participation.

One of the prominent issues identified by students was the decrease in face-to-face interaction, which impacted their ability to engage fully with both their peers and instructors. This lack of in-person socialisation was highlighted as a significant drawback, as students missed the opportunity to engage in discussions and collaborative activities. One student expressed this sentiment, stating:

The negative aspect for me was mainly the lack of communication, which led to a weaker relationship with other students. We hardly knew each other by the end of the term. [FG3]

Another student elaborated on the difficulty in connecting with instructors, saying that:

It was harder to get feedback and clarification immediately. You had to email or wait for a response, unlike in class where you could just ask. [FG2]

This limitation in spontaneous interaction added to a sense of isolation and diminished the collaborative learning experience. Students also faced numerous distractions in the home environment, which hindered their ability to concentrate fully on their studies. The absence of a formal classroom setting, combined with household obligations, often made it challenging for students to remain focused. One student commented:

It was hard to concentrate at home. There were always family members around, and it's easy to get distracted with other things like cooking or even using the phone during lectures. [FG4]

Another student shared similar concerns, saying:

I found it hard to keep my attention on the lecture for long periods, especially when it was all on a screen. [FG1]

This lack of focus not only affected their learning experience but also led to gaps in knowledge retention. Furthermore, the structure of e-learning, as experienced by these nursing students, often led to a tendency toward passive participation, where students engaged less actively compared to in-person

classes. This shift towards passivity was largely attributed to the absence of immediate feedback and a structured learning environment that encourages active engagement. One student noted:

When you're just sitting in front of a screen, it's easier to switch off. There's no pressure to participate actively, so it's more passive learning. [FG3]

Another student remarked on the limited motivation to engage actively in online settings, which highlighted a gap in maintaining the same level of engagement and accountability that students were accustomed to in traditional classrooms:

Sometimes you're just listening, but not really involved. Without the professor physically there, it's easy to zone out. [FG2]

Technological and Infrastructure Challenges

The theme 'Technological and Infrastructure Challenges' highlights the critical role that technology plays in shaping the e-learning experience, especially when students face issues with access, quality, and reliability.

A significant challenge emphasised by many students, especially those living in rural areas, is unreliable internet connectivity, which frequently interrupted their learning process. Many students shared that weak signals and system crashes often led to disruptions during lectures and exams, impacting their ability to focus and retain information. For instance, one participant mentioned:

The biggest weaknesses were technical problems with the Internet connection. After a whole week of watching the screen, these would be the biggest weaknesses, and maybe there weren't really enough short breaks. [FG3]

Another student expressed frustration over inconsistent signal quality, saying 'I was afraid when it would cut the connection, especially during exams.' (FG4). In addition to connectivity, equipment issues emerged as a significant barrier. Students reported having outdated computers and insufficient funds to upgrade or purchase necessary devices. The lack of cameras, microphones, and other essential equipment hindered active participation in e-learning sessions. As one participant noted, 'I had a bad computer, which also shut down and failed several times during the exam.' (FG3). Another student shared that for some, it was a 'financial challenge' to acquire new equipment, especially during the pandemic.

Students also addressed the difficulties they encountered with the communication/e-learning platforms, such as Zoom and Microsoft Teams. Some students faced frequent system crashes and were sometimes unfamiliar with the platforms, which led to additional stress and time lost during lectures. One participant shared:

The system went down a lot. We had times when the wrong links were given, and we'd be waiting with no idea what happened [FG2]

Others expressed frustration with the lack of training provided for using these platforms, which often complicated their learning experience.

Effect on Practical Skills and Learning Outcomes

The theme illustrates both the limitations and adjustments that nursing students experience with e-learning in terms of skill development and learning outcomes. While digital platforms offer certain advantages, the lack of hands-on practice remains a significant barrier to students feeling fully prepared for clinical roles.

Many students expressed frustration with the lack of real-world application in the online setting, as practical nursing skills are best learned through in-person experiences. For instance, one participant shared:

It's hard to apply theoretical knowledge when you don't get the chance to practice it in a real environment. [FG2]

E-learning often left students feeling under-confident in their skills, which in some cases points to the gap between theoretical knowledge and practical competence, exacerbated by the online format. One student noted:

I don't feel ready to meet the professional standards required in clinical settings. I feel like I'm missing critical hands-on experiences. [FG1]

Many students appreciated learning through online assessments and digital simulations, which helped them become more proficient in navigating new learning technologies. Some also adapted very quickly. One student mentioned:

While I miss in-person training, I've become more comfortable with digital tools that I know will be part of my career. [FG3]

This adaptation reflects a form of resilience and a willingness to engage with digital learning tools despite the challenges.

Diverse Preferences in Learning Approaches

This theme captures the various learning preferences nursing students exhibited in an e-learning environment, reflecting the need for educational flexibility to accommodate diverse student needs.

Students expressed varied preferences for different learning formats, with some showing a strong inclination toward active learning environments, while others preferred hybrid or mixed approaches that combined synchronous and asynchronous sessions. For instance, one participant noted:

Active participation helps me stay engaged, but I find that a mix of both live and recorded sessions works best, allowing flexibility around my schedule. [FG2]

Another participant highlighted their interest in synchronous learning to maintain a structured routine, stating:

Synchronous sessions keep me on track, whereas asynchronous ones sometimes make it easy to procrastinate. [FG3]

Students showed preferences for specific types of educational tools and content, such as videos, visual aids, quizzes, and interactive activities, which support different learning styles and help maintain engagement. Two participants said:

I learn best with interactive content, especially quizzes and hands-on activities that make the material more engaging. [FG4]

Videos are incredibly helpful for visualising concepts, and I appreciate self-paced materials that let me take my time. [FG3]

Self-Management and Motivation in E-Learning

In the context of e-learning, nursing students highlighted challenges related to self-management and sustaining motivation. This theme demonstrates the personal discipline required to balance study with other responsibilities and maintain engagement without the structure of in-person learning.

Students frequently mentioned difficulties with time management and procrastination in e-learning, pointing to the need for greater self-regulation to stay on track with assignments and study routines. As one participant described:

It's easy to fall behind because you're not physically in class. Without someone reminding you, managing time becomes a personal struggle. [FG2]

Another student added:

I sometimes found myself prioritising personal tasks over studying, thinking I could catch up later, but it often didn't work out. [FG3]

Many students experienced reduced motivation over extended periods of online learning. The lack of face-to-face interaction seemed to diminish their enthusiasm and engagement, making it harder to stay committed. As some explained:

At first, I was motivated, but over time, I found it difficult to remain engaged. There was no one to push me, and it felt isolating. [FG4]

The novelty wore off quickly, and I started losing interest because there was no immediate feedback or real human connection. [FG1]

Some students admitted to taking shortcuts during online classes, a tendency linked to the flexibility of the format. For instance, participants noted using their phones or multitasking during lectures, which detracted from the depth of learning.

Sometimes, I just logged in and then went back to doing other things at home. It was tempting to do so, especially when you had other responsibilities. [FG3]

I would occasionally just tune in for attendance, not paying full attention to the lecture. [FG4]

Discussion and Conclusion

This study highlights the nursing students' experiences with e-learning, revealing both the benefits and challenges inherent to digital learning environments in health sciences. Consistent with findings by Mashroofa et al. (2023), e-learning's flexibility emerged as a significant advantage, particularly for students balancing academic, work, and personal commitments. However, as highlighted in similar studies (Ličen et al., 2022; Mojarad et al., 2023), these benefits are often tempered by unique challenges, especially in disciplines like nursing that depend on hands-on skill development.

Flexibility associated with e-learning was widely valued by students, aligning with global findings on the advantages of asynchronous learning in

enabling self-paced study (Sareen & Mandal, 2024). While this adaptability supports accessibility, it also emphasises the need for robust technological infrastructure. Sayaf (2023) and Mojarad et al. (2023) further noted that flexible learning alone does not ensure quality engagement, with infrastructural inconsistencies often amplifying accessibility issues.

Our study also identified challenges in maintaining engagement, consistent with research by Njenga (2018) and Wu et al. (2022), who found that while e-learning supports knowledge dissemination, it often lacks the interpersonal dynamics necessary for effective learning (Luppiciini & Walabe, 2021). The absence of direct interaction can undermine collaborative learning and skill-building, particularly in fields like nursing, where peer and instructor interactions are integral to professional development (Eshun Yawson & Amofa Yamoah, 2021).

Technological challenges, such as unreliable internet and insufficient equipment, were also highlighted. These limitations align with findings from Wu et al. (2022), which suggest that technology infrastructure is often a barrier to e-learning success, particularly in low-resource settings where students face inequitable access to essential tools (Luppiciini & Walabe, 2021). Ensuring access to reliable technology and internet resources still remains a critical component in supporting effective digital education.

A core concern for nursing students was the difficulty in acquiring practical skills through e-learning alone. The importance of hands-on experience is well-documented in constructivist learning theory, which emphasises experiential and applied learning as essential for knowledge retention (O'Connor et al., 2022). Research indicates that while e-learning can support theoretical knowledge acquisition, practical competencies require blended learning approaches that incorporate real-world application (Ličen et al., 2023). Thus, hybrid models that integrate digital learning with in-person practical sessions may offer a more comprehensive learning experience in health sciences.

Our study's findings on varied student preferences for learning styles indicate a need for more personalised pathways in e-learning. Research by Tsai et al. (2023) supports this, showing that constructivist approaches that accommodate individual preferences enhance both engagement and academic outcomes. Adaptive platforms that allow students to interact with content in diverse ways could be instrumental in meeting these varied needs effectively.

Many students highlighted self-management and motivation as ongoing challenges in e-learning. While e-learning enables self-directed learning, it also demands high levels of intrinsic motivation, as found in other studies examining the motivational aspects of digital education (Ličen et al., 2022).

Self-regulation tools, such as mentoring programs and digital progress-tracking, may offer valuable support in this regard.

While this study provides valuable insights, there are limitations to consider. First, the generalizability of these findings is inherently limited due to the single-institution sample size. Qualitative research, by design, does not aim for statistical generalisability, yet transferability is possible through rich, descriptive analysis (Polit & Beck, 2017). Future studies should include participants from various institutions and cultural backgrounds, allowing for greater transferability and broader applicability. Moreover, sample diversity within this study focused solely on nursing students, potentially limiting applicability across other healthcare disciplines. Future research should consider expanding to include multiple healthcare fields, which could reveal discipline-specific differences in e-learning engagement. Methodologically, future studies could employ mixed methods to provide a comprehensive view of e-learning's impacts, blending quantitative and qualitative data for richer insights (Flick, 2018). A longitudinal design could further explore how students' e-learning experiences and engagement evolve over time, providing a dynamic understanding of adaptation to digital platforms.

In conclusion, while e-learning provides flexible, accessible opportunities for nursing students, challenges in engagement, infrastructure, and skill development highlight areas for improvement. Adaptive, blended models with robust support structures will be essential to ensure e-learning can fully support the development of competent healthcare professionals.

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Raziskovanje študentskih perspektiv o e-učenju v izobraževanju zdravstvenih delavcev

E-izobraževanje je hitro postalo pomemben pristop v izobraževanju za zdravstveno nego, saj ponuja prilagodljive alternative tradicionalnemu učenju. Namen pričujoče raziskave je bil preučiti izkušnje študentov zdravstvene nege z e-izobraževanjem, s poudarkom na zaznanih prednostih, izzivih in vplivu na pridobivanje veščin. S kvalitativnim pristopom so bili podatki zbrani s štirimi fokusnimi skupinami, v katerih je sodelovalo 20 študentov zdravstvene nege. Za analizo podatkov je bila uporabljena tematska analiza, ki je izpostavila šest ključnih tem: prednosti prilagodljivosti in dostopnosti, vpliv na vključenost in interakcijo študentov, tehnološki in infrastrukturni izzivi, vpliv na praktične veščine in učne izide, različne preference v učnih pristopih ter samoregulacija in motivacija pri e-izobraževanju. Ugotovitve kažejo, da e-izobraževanje ponuja dostopnost in prilagodljivost, vendar predstavlja izziv pri razvoju praktičnih veščin in vključenosti. Raziskava poudarja potrebo po prilagodljivih modelih e-izobraževanja za učinkovito zadovoljevanje raznolikih učnih potreb.

Ključne besede: spletno učenje, kombinirano učenje, tematska analiza, razvoj veščin, vključenost študentov