

Digital Technologies Used in Nursing Education: A Systematic Review of Literature on Educators' Perspectives

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Abstract

Introduction: The integration of digital technologies into nursing and midwifery education has the potential to enhance learning experiences but also presents various challenges. A review of the perspectives of nurse educators on the use of digital tools in nursing and midwifery education was necessary.

Methods: This systematic review of recent studies was conducted guided by a PiCo-based statement of inquiry and search strategy. The review adhered to the PRISMA guidelines. The PubMed and ScienceDirect databases were searched alongside manual hand search. Four eligible studies were included in the review. The studies were selected based on their relevance to digital technologies in nursing education, with a focus on educator perspectives and reported challenges.

Results: The review identified several key digital tools used in nursing education, including course management systems and video conferencing platforms. Educators reported technical, educational, and emotional challenges in delivering educational services using digital technologies. These challenges impacted the effectiveness of teaching and the overall educational experience.

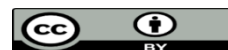
Conclusion: While digital technologies offer significant benefits for nursing and midwifery education, overcoming the identified challenges is essential for enhancing teaching effectiveness and student engagement. Future research should focus on developing solutions to these challenges and refining digital integration strategies in educational settings.

How to Cite this Article

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1. Introduction

The role of digital technologies in education has increased post-COVID pandemic (Zancajo *et al.*, 2022). Nursing and midwifery education is not left out of this growing trend where they are applied to enhance accessibility to resources and knowledge retention among students. Digital technologies such as portable devices, simulation kits, and virtual realities offer student nurses the opportunity for enhanced audio-visual interactive learning experience (Ricci *et al.*, 2022). The need to grow personalized learning has motivated nursing colleges worldwide to begin integrating digital technologies into nursing and midwifery education (O'Connor *et al.*, 2023).

The integration of digital technologies comes with benefits and challenges. Regarding benefits, digital technologies can streamline the educational process (Alenezi *et al.*, 2023). It could make educational tasks more efficient and facilitate engaging and interactive learning experiences (Tuma, 2021). For example, digital tools can overcome great distances and offer real-time feedback, simulate clinical scenarios, and provide access vital resources. Nonetheless, the successful adoption of the digital technologies requires nurse educators to be trained in its use (Nes *et al.*, 2021). Educators must possess technical skills to operate and apply them effectively in their teaching practice. There may as well be varying levels of comfort with technology among the educators which can limit the success of digital technology integration (Amhag *et al.*, 2019).

Digital technologies have the potential to improve nursing and midwifery education quality. However, understanding nurse educators' perspectives concerning its integration into nursing education is essential (Salminen *et al.*, 2021). It will provide insights into educators' attitudes towards digital technological tools in teaching. It will also highlight potential areas for improvement (Amhag *et al.*, 2019). A review of existing evidence will extend the understanding of this rapidly evolving phenomenon across different nursing and midwifery educational settings (Hernon *et al.*, 2023). The statement of inquiry was articulated in line with the Population, phenomenon of Interest, and Context (PiCo) format as thus: Among nurse and midwifery educators, what are their perspectives concerning digital technologies integration in nursing and midwifery education.

2. Methods

This systematic review of literature adhered to the guidelines recommended by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA). PubMed and ScienceDirect (Scopus) databases were searched for literature published between 2014 and 2024. Additionally, articles in the reference list of eligible studies were hand searched using descendant and ancestral approaches. The search strategy used search terms that applied limiters in line with set inclusion and exclusion criteria. Digital technology, use,

learning, teaching, educat*, nurs*, midwi* and students were the keywords. Keywords with a similar spelling of the root word were grouped together using truncations (*). Brackets and Boolean operators (AND, OR, NOT) were employed in sewing together these keywords to form a search string for the database search: (digital technology) AND (use) AND (learning OR teaching OR educat*) AND (nurs* OR midwi*) AND (students). English language articles and published within 2014-2024 were applied as limiters to refine the specificity of the search. Inclusion criteria involved articles relating to nursing or midwifery educators with full text availability. The exclusion criteria were umbrella meta-analyses, systematic reviews, and articles involving only students as respondents.

The titles, abstracts and full-texts of the articles found during the initial research were independently screened by two members of the research team. Articles that met selection criteria and were included for evidence synthesis. Disparities in opinion between the two authors were resolved by discourse with other members of the research team. Two members of the research team independently extracted data and consulted with the other members where discrepancies arose.

Quality assessment of the included articles was done using Pluye *et al.*'s (2011) Mixed Methods Appraisal Tool (MMAT). It is a 19-item tool designed for the appraisal of qualitative, quantitative as well as mixed method articles. Each MMAT item had three possible responses: Yes (score of 1), No (score of 0), and Can't tell (score of 0). The authors transformed the MMAT quality scores to percentage and articles with a score of 50% and above were included in the review as advocated (Alshammari & Fayez-Alanazi, 2023). The two members of the research team appraised the articles and discussed discrepancies with the others to reach a consensus.

Relevant data extracted from the included studies were author, year of publication, country, design, sample, sampling technique, and study findings. The extracted data were summarized using the narrative approach. Where necessary, tables were used to present the findings of this review.

3. Results

The study selection process is illustrated using the PRISMA flow diagram in Figure 1. The literature search identified 375 articles from PubMed (n = 195), ScienceDirect (n = 167) databases and hand search (n = 13) protocols. During the screening process, one duplicate article, 362 non-related titles, and eight studies focusing solely on nursing students' perspectives were removed. Four full-text articles were checked for eligibility and all four articles were found eligible and were included in the review.

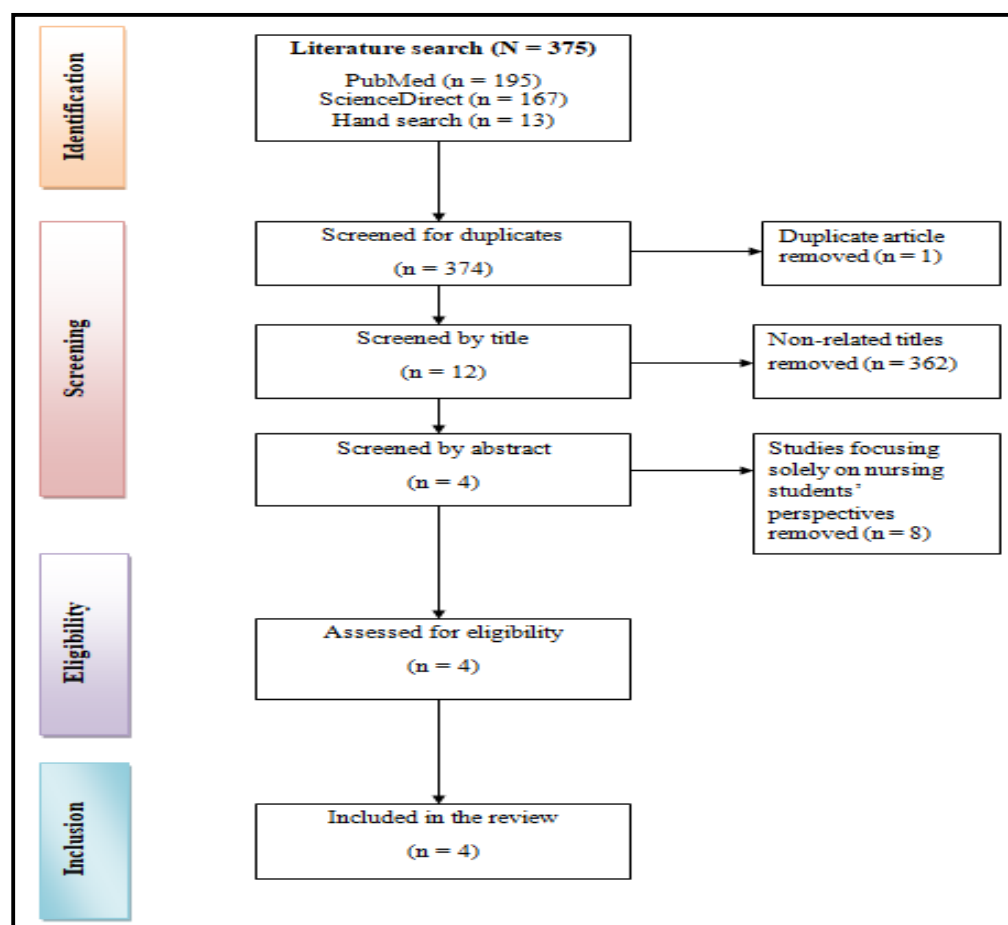


Figure 1: PRISMA flow diagram

An overview of the selected studies is presented in Table 1. The four studies were conducted between 2022 and 2024 in Saudi Arabia (n = 3) and Pakistan (n = 1). Two of the studies were qualitative while the other two utilized cross-sectional designs. In all the studies

involved 244 nurse educators (24 engaged in qualitative interviews while 220 filled out questionnaires). The 24 respondents who engaged in qualitative interviews were purposively selected, 120 who filled questionnaires were selected by convenience, and 100 others that filled out questionnaires were randomly selected.

Table 1: Overview of selected studies (n = 4)

Author	Year	Country	Design	Sample	Sampling technique
Albloushi et al.	2024	Saudi Arabia	Qualitative	12 nurse educators	Purposive sampling
Cassum et al.	2024	Pakistan	Qualitative	12 nurse educators (8 faculty and 4 curriculum developers)	Purposive sampling
Abdalla	2023	Saudi Arabia	Cross-sectional	100 nurse educators	Random sampling
Castro et al.	2022	Saudi Arabia	Cross-sectional	120 nurse educators	Convenience sampling

The Quality appraisal of the included studies based on the MMAT criteria is presented in Table 2. All four studies scored above 50% on methodological quality. One study (quantitative) scored 100%, two qualitative studies scored 75%, and the remaining quantitative study scored 50%.

Table 2: Quality appraisal of the included studies based on the MMAT criteria

Study	Albloushi et al. (2024)	Cassum et al. (2024)	Abdalla (2023)	Castro et al. (2022)
Study type	Qualitative	Qualitative	Quantitative	Quantitative
Qualitative 1.1	Yes	Yes		
Qualitative 1.2	Yes	Yes		
Qualitative 1.3	Yes	Yes		
Qualitative 1.4	Can't tell	Can't tell		
Descriptive 4.1			Yes	Can't tell
Descriptive 4.2			Yes	Can't tell
Descriptive 4.3			Yes	Yes
Descriptive 4.4			Yes	Yes
MMAT score %	75	75	100	50

MMAT score ≥ 50% is acceptable

Table 3 presents the findings from the included studies. The studies revealed that nurse educators employed course management systems, video conferencing tools, interactive software, and instant messaging applications. The course management systems applied were Blackboard, Google classroom, Web CT, and Moodle. The video conferencing tools used were Zoom, Skype, and Adobe Connect. The interactive software employed were Kahoot, Mentimeter, and Padlet. The instant messaging applications utilized were WhatsApp, Yahoo Chat, AOL Chat, and Facebook Chat. The studies identified technical, educational, and emotional challenges nurse educators faced while employing the mentioned digital technologies. Under technical challenges were issues such as difficulties in using online platforms, poor broadband internet accessibility, internet service interruptions, and learning to use the digital technologies by trial and error. Related to the educational challenges were poor assessment of student understanding, problems with proving student cheating in online quizzes, difficulties in delivering clinical skills courses, inability to observe students' body language, lack of direct contact between educators and students, inadequate faculty member's training in information technology use. The emotional challenges were emotional engagement of students during online lectures, questioning whether instructors can capture and maintain students' attention effectively.

Table 3: Findings from the included studies

Author	Study findings
Albloushi et al. (2024)	<p>Digital technologies:</p> <ul style="list-style-type: none"> (1) Course management system (Blackboard and Google classroom) (2) Video conferencing tool (Zoom). <p>Challenges:</p> <p>Technical challenges</p> <ul style="list-style-type: none"> (1) Difficulties with using the online platforms (2) Poor broadband internet accessibility. <p>Educational challenges</p> <ul style="list-style-type: none"> (1) Student cheating in online quizzes (2) Difficulties in executing clinical skills courses. <p>Emotional challenges</p> <ul style="list-style-type: none"> (1) Not being sure that instructors have the full attention of the students during online lectures

Table 3 (Cont'd)	
Cassum et al. (2024)	<p>Digital technologies:</p> <ol style="list-style-type: none"> (1) Virtual Learning Environment (Blackboard) (2) Video-conferencing software (MS Teams and Zoom) (3) Interactive software (Kahoot, Mentimeter, and Padlet) (4) Instant messaging application (WhatsApp) <p>Challenges:</p> <p>Technical challenges</p> <ol style="list-style-type: none"> (1) learning to use digital technologies by experimentation, and (2) Interruptions in internet service. <p>Educational challenges</p> <ol style="list-style-type: none"> (1) Faculty not educationally prepared with typing and information technology skills to enhance use of digital technologies (2) Cannot capture students' body language which is important in face-to-face teaching. <p>Emotional challenges</p> <ol style="list-style-type: none"> (1) Students' emotional disconnection during online classes
Abdalla (2023)	<p>Digital technologies:</p> <ol style="list-style-type: none"> (1) Course management systems (Web CT, Moodle), (2) Video conferencing tools (Skype, Adobe Connect) (3) Online instant messaging applications (Yahoo chat, AOL Chat, Facebook Chat)
Castro et al. (2022)	<p>Challenges:</p> <p>Educational challenges</p> <ol style="list-style-type: none"> (1) Poor assessment of students understanding of topics (2) Faculty members not adequately trained to use digital technologies (3) Lack of direct educator student contact

4. Discussion

This review highlights that nurse educators have begun integrating digital tools such as course management systems, video conferencing platforms, and interactive software. A possible reason for the integration of the digital tools by nurse educators is the need to enhance the flexibility and accessibility of education. Digital tools such as course management systems, video conferencing platforms, and interactive software enable educators to deliver content and interact with students remotely thus overcoming geographical and time constraints. This flexibility supports diverse learning needs and ensures that education can continue effectively. This finding corroborates the Vandenberg and Magnuson's (2021) finding that digital technologies like video conferencing in nursing education in Canada. It is however surprising that the nurse educators did not mention simulation kits and virtual reality. This could mean that simulation kits are relatively new in nursing and faculty members lack the required training on how to use them.

This review identified challenges that impact the effectiveness of the digital technologies. Technical issues, such as difficulties with online platforms and unreliable internet connectivity were recurrent themes among the nurse educators. Technical problems can lead to interruptions in lectures, difficulties in accessing resources, and delays in communication can disrupt the learning process and hinder the overall educational experience. Such technical issues reflect underlying problems with infrastructure and support systems. Institutions may lack the necessary technical support or resources to ensure smooth operation of digital tools especially in developing countries. Additionally, inadequate training of nurse educators on troubleshooting technical problems can worsen such situations. This finding aligned with Albloushi *et al.* (2024) who found that nurse educators reported that digital platforms freeze a lot and wastes time and made some of them prefer face-to-face teaching and learning.

This review found that nurse educators faced challenges like inability to detect student cheating in quizzes, difficulties in properly evaluating students understanding of topics of interest, inability to read the students body language, and difficulties in delivering clinical skills remotely. Digital platforms often lack effective mechanisms to monitor and prevent dishonest behaviours during online assessments. This makes it difficult for educators to ensure academic integrity and accurately evaluate students' understanding of relevant ideas. Educators are ideally expected to assess cognitive, psychomotor and affective aspects of learning but remote learning platforms often do not capture non-verbal cues. This makes it difficult for educators to address such non-verbal cues in real time. Still on the psychomotor aspect of learning, educators understand that touch and experience of depth is important for skill development. That experience of touch and depth is challenging to replicate on digital tools leading to difficulties in transfer of essential clinical competencies. This finding supports the views expressed in Castaño *et al.* (2021) that cheating in online examinations is a major challenge that nurse educators have to devise ways of dealing with.

This review found that nurse educators experienced a recurrent emotional challenge with digital tools relating to the fear of students emotionally disconnecting from online lectures sessions. Emotional distance can affect the effectiveness of teaching and reduce the overall impact of the educational experience. When students feel emotionally disconnected, they may be less likely to participate actively in discussions, ask questions, or engage with course materials. It can also lead to decreased motivation and interest in the subject matter. Additionally, it can make it challenging for educators to establish trust and rapport with students, which is essential for effective teaching and learning. This finding aligns with Naylor and Nyanjom (2021) who noted that educator's have emotional responses to online teaching that can disrupt the learning process.

This review is limited by the heterogeneity of study designs and sampling methods used across the included studies. Variations in research methodologies and sample sizes may affect the generalizability of the findings. Furthermore, the review primarily includes studies from Saudi Arabia and Pakistan, which limits the generalizability of the results to other contexts.

Implications for Practice

To address the identified challenges, institutions should invest in robust technical support and ensure reliable internet access for both educators and students. Additionally, targeted training programs should be developed to equip faculty with the necessary skills to effectively use digital technologies for example proctor use.

There are very few related published studies on this subject matter. Future research should explore longitudinal studies to assess the long-term impact of digital technologies on educational outcomes. Investigating the effectiveness of different digital tools in various educational settings and understanding the specific needs and preferences of nursing educators across different regions could provide valuable insights. Additionally, examining strategies to overcome technical and emotional challenges in more depth could help refine best practices for integrating digital technologies into nursing and midwifery education.

5. Conclusion

Digital technologies such as course management systems, video conferencing tools, and instant messaging platforms are employed in nursing and midwifery education. Technical, educational, and emotional challenges were among the recurring challenges experienced by the nurse educators while employing the digital technologies. Addressing these challenges through improved infrastructure, educator training, and supportive tools is essential for maximizing the benefits of digital technologies. Future research should focus on developing strategies to overcome the barriers.

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Ethical Approval: Ethical approval was waived by the University of Port Harcourt institutional review board (IRB) as it involves secondary data.

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