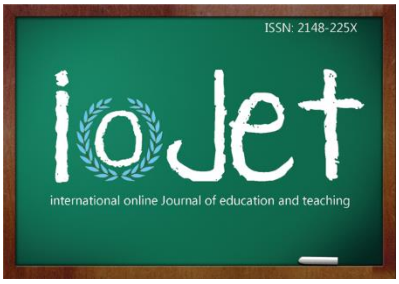

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A QUALITATIVE STUDY ON INFORMATION AND DIGITAL TECHNOLOGY SKILLS DEVELOPMENT FOR EVIDENCE-BASED PRACTICE APPLICATION IN REPRODUCTIVE AND GYNECOLOGICAL NURSING CARE AMONG NURSING STUDENTS

(Research article)

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Abstract

This qualitative study explored the experiences of nursing students developing information and digital technology skills for evidence-based practice application in reproductive and gynecological nursing care. The data were collected through in-depth interviews, reflective journals, and focus group discussions with 15 second-year nursing students who were selected using purposive sampling method at Boromarajonani College of Nursing, Uttaradit, Thailand. Thematic analysis revealed five major themes: transforming perceptions of evidence-based practice, navigating the digital information landscape, bridging theory and practice through evidence application, encountering and overcoming barriers, and developing professional identity and confidence. Participants experienced a shift from viewing evidence-based practice as an academic exercise to recognizing it as an essential clinical tool, while developing sophisticated strategies to overcome language barriers and resource limitations. The integration of evidence into clinical learning involved complex cognitive work in contextualizing research for individual patients and Thai healthcare settings. Cultural considerations emerged as foundational elements shaping how evidence was conceptualized and applied, with participants actively navigating tensions between evidence and traditional practices. These findings suggest that effective evidence-based practice education must address not only technical skills but also cultural dimensions and professional identity formation, with implications for developing culturally responsive approaches to nursing education in increasingly digital healthcare environments.

Keywords: Digital technology, evidence-based nursing, information literacy, nursing education, reproductive health

1. Introduction

In the digital era characterized by rapid health information transformation, the nursing profession faces significant challenges in integrating information technology and evidence-based practice (EBP) to enhance patient care quality (Risling, 2021). Evidence-based nursing has become a recognized standard in nursing practice, enabling nurses to make clinical decisions based on current scientific evidence, ultimately leading to improved patient outcomes (Melnyk et al., 2022). Information and Communication Technology (ICT) skills serve as essential tools for efficiently accessing and applying evidence-based practice. The World Health Organization has identified digital competency as a key capability for healthcare personnel in the 21st century (World Health Organization, 2021), while the International Council of Nurses emphasizes that proficiency in information technology utilization and evidence-based practice implementation are core competencies for professional nurses (International Council of Nurses, 2023).

Despite this recognized importance, studies indicate that nursing students still experience limitations in developing these skills, particularly in searching, evaluating, and applying evidence-based practice in nursing care (Downer & Slade, 2020). These limitations may stem from multiple factors, including curricula that do not systematically emphasize digital skill development, limited access to academic databases, or lack of confidence in using technology and evaluating research (Wilson et al., 2023). Reproductive and gynecological nursing represents a specialty where knowledge and practice guidelines continuously evolve due to advances in medical technology and changing social factors affecting women's health (Thompson et al., 2023). Additionally, care for these patients involves cultural and ethical sensitivities, making clinical decision-making dependent on both reliable evidence and consideration of patient-specific contexts (Tsai et al., 2024). Therefore, developing skills in using information technology and digital resources to search and apply evidence-based practice in reproductive and gynecological nursing care holds particular significance.

The integration of ICT skills into nursing education enhances learning effectiveness and prepares students for professional practice in the digital age (Rouleau et al., 2020). Educational technologies such as blended learning, online learning platforms, and clinical simulations help develop critical thinking and clinical decision-making skills in students (Smith et al., 2024), which form the foundation for effective EBP application. In Thailand specifically, Srisawang et al. (2023) found that Thai nursing students demonstrate positive attitudes toward using technology in learning and practice but lack advanced technological skills for searching and applying evidence-based practice. Furthermore, Konrad et al. (2023) highlighted limitations in Thai nursing curriculum regarding systematic development of digital skills and EBP utilization. While Thai nursing institutions typically include evidence-based practice concepts in their curricula and are equipped with basic computer laboratories, the systematic integration of advanced digital skills for EBP application remains inconsistent and lacks structured approaches to address language barriers, limited access to international databases, and cultural adaptation of evidence. This creates a gap between theoretical knowledge and practical application of digital EBP skills in clinical settings.

However, there remains a research gap concerning appropriate models for developing digital skills and EBP utilization in the specific context of reproductive and gynecological nursing for Thai nursing students, who face different cultural backgrounds and resource constraints compared to developed countries (Rajkovic et al., 2023). Therefore, the research questions of the study are formulated as in the following:

1. How do nursing students experience and interpret their participation in an information and digital technology skills development program for evidence-based practice in reproductive and gynecological nursing care?
2. What transformations occur in nursing students' attitudes, competencies, and professional identity through this learning process?
3. What contextual factors influence nursing students' development of digital EBP skills in the Thai educational and cultural context?

2. Method

2.1. Research Design

This study employed a descriptive qualitative research approach situated within a constructivist paradigm. This paradigm acknowledges that meaning is constructed through individual experiences and social interactions, making it particularly suitable for exploring

how nursing students develop and interpret their experiences with digital technology and evidence-based practice (Creswell & Poth, 2018). The descriptive qualitative design allowed for a comprehensive examination of participants' experiences, perceptions, and the meanings they attributed to the skills development program without imposing predetermined theoretical frameworks (Sandelowski, 2010). This approach was selected because it facilitates an in-depth understanding of participants' perspectives in their natural educational setting while acknowledging the contextual factors unique to nursing education in Thailand.

2.2. Research Setting

The research was conducted at Boromarajonani College of Nursing, Uttaradit, Faculty of Nursing, Praboromarajchanok Institute, Thailand, during September 2024 to April 2025. This institution offers a four-year Bachelor of Nursing Science program that follows the Thailand Qualifications Framework for Higher Education. The nursing curriculum includes evidence-based practice concepts throughout the program, with formal instruction beginning in the second year. The reproductive and gynecological nursing course is taught in the second year and comprises both theoretical knowledge and clinical practice components. The college is equipped with computer laboratories and digital resource centers, though access to international nursing databases is limited to the campus network. This setting was chosen because it represents a typical nursing education institution in Thailand, providing an authentic context for examining the integration of digital technology in nursing education.

2.3. Participants

Participants were selected through purposive sampling to ensure information-rich cases that could provide detailed insights into the phenomenon under study (Patton, 2015). The selection criteria included: (1) second-year nursing students enrolled in the reproductive and gynecological nursing course; (2) aged 18 years or older; (3) willing to participate in the skills development program and subsequent in-depth interviews; and (4) able to articulate their experiences clearly. Students who had participated in formal evidence-based practice training within the past six months were excluded to avoid potential influence from prior specialized training. Initially, 15 participants were recruited, which is considered adequate for reaching data saturation in qualitative research exploring a specific phenomenon (Hennink et al., 2017). During the research process, data collection continued until data saturation was achieved at 15 participants, with no new themes or patterns emerging from additional interviews. The final sample consisted of 13 female and 2 male nursing students with ages ranging from 19 to 21 years.

2.4. The Skills Development Program

The information and digital technology skills development program was specifically designed as an enhancement to the existing curriculum to address identified gaps in systematic digital EBP skills development. The program was developed based on Melnyk and Fineout-Overholt's (2018) EBP competency framework and the Information Literacy Competency Standards for Nursing (AACN, 2021). The 8-week program differed from the standard curriculum by providing structured, progressive skill-building activities with intensive hands-on practice and personalized feedback. The program consisted of four integrated components: 1. Face-to-face workshops (16 hours total): Four 4-hour sessions covering EBP principles, database searching strategies, critical appraisal methods, and cultural adaptation of evidence 2. Online learning modules (12 hours): Self-paced modules through the college's learning management system covering advanced search techniques, statistical interpretation, and evidence synthesis 3. Simulation-based practice (8 hours): Two simulation sessions using reproductive and gynecological nursing case scenarios where

students applied EBP processes in realistic clinical situations 4. Group projects (20 hours): Collaborative development of evidence-based nursing care guidelines for specific reproductive health topics relevant to Thai healthcare settings. The program was delivered over 8 weeks with weekly 2-hour sessions, allowing time for practice and reflection between sessions. Unlike the standard curriculum which introduces EBP concepts theoretically, this program emphasized practical application, peer collaboration, and cultural contextualization of evidence. The program provided benefits including access to premium database training, bilingual support materials, and mentorship from experienced clinical nurses specializing in reproductive health.

2.5. Data Collection

Data collection occurred from January to April 2025 following the implementation of the information and digital technology skills development program. The timeline for data collection was as follows: Week 1-2 (January): Pre-program interviews and baseline reflective journal entries; Week 3-10 (February-March): Program implementation with ongoing reflective journaling (participants submitted weekly journal entries, totaling 120 journal entries across all participants); Week 11-12 (April): Post-program interviews and focus group discussions.

Multiple data collection methods were employed to enhance the richness and trustworthiness of the findings. Primary data came from semi-structured in-depth interviews conducted individually with each participant. The interview guide contained open-ended questions exploring participants' experiences, perceptions, challenges, and growth throughout the program. Sample questions included: "Could you describe your experience learning to search for evidence-based information for reproductive nursing care?"; "How has your understanding of applying evidence-based practice changed through this program?"; and "What aspects of the program were most meaningful to you?" Interviews lasted 45-60 minutes, were audio-recorded with permission, and conducted in a private room at the college to ensure confidentiality.

Supplementary data were collected through: (1) Reflective journals: 120 weekly journal entries kept by participants throughout the 8-week program, with specific prompts related to learning experiences, challenges, and insights; (2) Observation notes: Field notes from 32 program sessions documenting participant interactions, engagement patterns, and learning behaviors; (3) Focus group discussions: Two focus groups of 7-8 participants each, conducted at the program's conclusion, lasting 90 minutes each and focusing on collective reflections and peer learning experiences. These additional data sources allowed for triangulation and provided a more comprehensive understanding of participants' experiences (Carter et al., 2014).

2.6. Data Analysis

Data analysis followed Braun and Clarke's (2006) thematic analysis approach, consisting of six phases: familiarization with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. All interviews were transcribed verbatim in Thai and checked for accuracy against the original recordings. The research team immersed themselves in the data by repeatedly reading the transcripts to gain a holistic understanding.

Table 1 presents the coding framework and thematic structure that emerged from the analysis.

Table 1: Coding Framework and Thematic Structure

Major Theme	Subthemes	Key Codes	Description
Theme 1: Transforming Perceptions of Evidence-Based Practice	• From Academic Exercise to Practical Tool • Recognizing Relevance to Reproductive Nursing • Reconciling Evidence with Cultural Context	• Academic vs. practical value • Clinical relevance • Cultural integration • Traditional practice evaluation	Shift from viewing EBP as theoretical concept to practical clinical tool, with specific recognition of its importance in reproductive health and integration with cultural practices
Theme 2: Navigating the Digital Information Landscape	• Developing Strategic Search Competencies • Critical Appraisal of Digital Information • Overcoming Language and Access Barriers	• Database navigation skills • PICO formulation • Boolean operators • Quality evaluation criteria • Translation strategies • Resource adaptation	Development of sophisticated information literacy skills including technical search abilities, critical evaluation methods, and creative strategies for overcoming resource limitations
Theme 3: Bridging Theory and Practice Through Evidence Application	• Contextualizing Evidence for Individual Patient Care • Integrating Evidence into Clinical Decision-Making • Creating Evidence-Based Educational Materials	• Patient-centered adaptation • Clinical integration • Care planning • Patient education • Knowledge translation	Complex cognitive work involved in adapting research findings to individual patients and Thai healthcare contexts
Theme 4: Encountering and Overcoming Barriers	• Technical and Resource Limitations • Language and Comprehension Challenges • Balancing Traditional Knowledge and Evidence	• Infrastructure constraints • Access limitations • English proficiency • Statistical literacy • Cultural tension resolution	Various obstacles faced during learning process and innovative strategies developed to overcome them
Theme 5: Developing Professional Identity and Confidence	• Growing Professional Confidence • Envisioning Future Practice • Becoming Knowledge Mediators	• Professional self-efficacy • Career aspirations • Advocacy skills • Knowledge brokering • Lifelong learning	Transformation in professional identity and increased confidence in evidence-based practice capabilities

Initial coding was performed manually by two researchers independently, using both inductive and deductive approaches. The researchers then met to compare and discuss their coding until consensus was reached. Similar codes were clustered to develop potential themes, which were then reviewed against the original data to ensure they accurately represented participants' voices. Thematic maps were created to visualize relationships between themes and subthemes. Final themes were clearly defined, named, and illustrated with representative quotes from participants.

The analysis was conducted primarily in Thai to preserve linguistic nuances, with the final themes and illustrative quotes translated into English by a bilingual researcher and verified by a professional translator to ensure conceptual equivalence (van Nes et al., 2010).

2.7. Ethical Considerations

This study received ethical approval from the Uttaradit Provincial Public Health Office Ethics Committee (COA No.060/2567 UPHO REC No.060/2567, approved on August 26, 2024). Participants were fully informed about the study's purpose, procedures, potential benefits and risks, confidentiality measures, and their right to withdraw at any time without consequences. Written informed consent was obtained from all participants before data collection commenced. Confidentiality was maintained by assigning code numbers to participants and removing identifying information from all data. Interview recordings and transcripts were stored on password-protected devices accessible only to the research team. Participants were also offered the opportunity to review their interview transcripts for accuracy and clarification, enhancing the credibility of the findings.

2.8. Trustworthiness

Several strategies were employed to ensure the trustworthiness of this qualitative study, following Lincoln and Guba's (1985) criteria. Credibility was enhanced through prolonged engagement with participants throughout the program, methodological triangulation using multiple data sources, and member checking where participants verified the accuracy of their interview transcripts and preliminary themes. Transferability was addressed by providing detailed descriptions of the research context, participant characteristics, and the skills development program to allow readers to assess the applicability of findings to other settings. Dependability was strengthened through an audit trail documenting all research decisions and procedures, while confirmability was supported by researcher reflexivity and peer debriefing sessions. Additionally, the involvement of multiple researchers in data analysis provided investigator triangulation, further enhancing the rigor of the findings.

3. Findings

Analysis of the interview data, supplemented by reflective journals and focus group discussions, revealed five major themes: (1) Transforming perceptions of evidence-based practice; (2) Navigating the digital information landscape; (3) Bridging theory and practice through evidence application; (4) Encountering and overcoming barriers; and (5) Developing professional identity and confidence. Each theme comprised several subthemes that captured the nuanced experiences of participants throughout the program.

3.1. Theme 1: Transforming Perceptions of Evidence-Based Practice

This theme encapsulated the significant shift in participants' understanding and attitudes toward evidence-based practice from the beginning to the end of the program. Initially, many participants viewed evidence-based practice as an abstract academic concept

with limited practical relevance. Through their engagement with the program, this perception evolved toward seeing EBP as an essential component of quality nursing care.

3.1.1. From Academic Exercise to Practical Tool

Participants described how their perception of evidence-based practice transformed from viewing it as merely an academic requirement to recognizing it as a valuable clinical tool. This perceptual shift was evident in statements such as:

"At first, I thought EBP was just something we need to study for exams. I never really connected it to actual patient care. Now I see it's a tool that helps me make better decisions for my patients. It's like having a guide when you're uncertain about what care approach is best." (Participant 3)

Another participant noted:

"Before this program, whenever I heard 'evidence-based practice,' I imagined complex research papers that are difficult to understand. Now I realize it's really about providing care based on the best available knowledge rather than just tradition or what we've always done." (Participant 10)

3.1.2. Recognizing the Relevance to Reproductive and Gynecological Nursing

Participants specifically highlighted how they came to appreciate the significance of evidence-based practice in reproductive and gynecological nursing, a field they recognized as rapidly evolving:

"Women's health care changes so quickly. What we learned about breast cancer screening last year might not be the current recommendation this year. I now understand why we need to constantly update our knowledge with new evidence." (Participant 7)

"I was surprised to discover how many different approaches exist for managing postpartum hemorrhage or preeclampsia. Evidence helps us choose the most effective approach rather than just following what our seniors have always done." (Participant 12)

3.1.3. Reconciling Evidence with Cultural Context

A distinctive subtheme emerged around participants' efforts to balance evidence-based practice with cultural considerations common in Thai reproductive health care:

"In our culture, there are many traditional practices related to pregnancy and childbirth. I used to think we had to choose between evidence and tradition, but now I understand we can evaluate traditional practices using evidence while still respecting cultural beliefs." (Participant 5)

"When I searched for evidence about postpartum care, I found studies supporting some traditional Thai practices like yuu fai [traditional postpartum care involving heat]. This helped me see that evidence can sometimes validate cultural practices, not just contradict them." (Participant 8)

3.2. Theme 2: Navigating the Digital Information Landscape

This theme captured participants' experiences developing the digital skills necessary to effectively search, evaluate, and manage health information. Participants described a journey from feeling overwhelmed by the volume and complexity of digital information to developing systematic strategies for information seeking and appraisal.

3.2.1. Developing Strategic Search Competencies

Participants described acquiring specific technical and cognitive skills that transformed their approach to information searching. The identified skills included: PICO

question formulation, Boolean search operators, database-specific search strategies, MeSH term utilization, and systematic search documentation methods.

"Before, I just used Google and took whatever came up first. Now I understand how to use PICO to form my question, select appropriate databases like CINAHL or ThaiJO, and use Boolean operators to refine my search. It's like learning a new language, but once you understand it, searching becomes much more efficient." (Participant 1)

"I learned that each database has its own features. For example, PubMed has MeSH terms that make searching more precise. When looking for information about endometriosis pain management, using MeSH terms helped me find relevant articles quickly instead of wading through hundreds of irrelevant results." (Participant 4)

3.2.2. Critical Appraisal of Digital Information

Participants emphasized the development of critical thinking skills for evaluating the quality and relevance of digital information:

"Now I don't just accept information because it's published. I examine the methodology, sample size, and when the study was conducted. For instance, when researching cervical cancer screening guidelines, I found contradictory information until I realized some sources were outdated. The newer studies reflected changes in recommendations based on HPV testing technology." (Participant 9)

"The program taught me to look at levels of evidence. I now understand why systematic reviews and meta-analyses provide stronger evidence than single studies or expert opinions. This was particularly helpful when researching interventions for gestational diabetes." (Participant 15)

3.2.3. Overcoming Language and Access Barriers

A significant subtheme involved participants' strategies for overcoming barriers related to English-language materials and limited database access:

"Most high-quality research is in English, which was challenging for me. I developed a system of first using Thai-language resources to understand the basic concepts, then using translation tools and medical dictionaries to help me understand English articles." (Participant 6)

"We don't have access to all databases off-campus. I learned to download important articles while on campus and organize them in folders by topic. I also discovered open-access resources like the WHO Reproductive Health Library that don't require institutional access." (Participant 14)

3.3. Theme 3: Bridging Theory and Practice Through Evidence Application

This theme reflected participants' experiences applying evidence-based knowledge to reproductive and gynecological nursing scenarios. Participants described a developmental process of learning to translate research findings into practical nursing interventions.

3.3.1. Contextualizing Evidence for Individual Patient Care

Participants emphasized the importance of adapting evidence to individual patient circumstances:

"Through the case scenarios, I learned that applying evidence isn't just following a protocol. When we worked on the case of a teenage mother with postpartum depression, I had to consider not only the evidence for treatment options but also her age, family support, and cultural background." (Participant 2)

"Evidence gives you a foundation, but you still need to adapt it to each patient. In our group project on supporting women with high-risk pregnancies, we found evidence for various interventions, but then had to consider which would be feasible in rural Thai healthcare settings with limited resources." (Participant 11)

3.3.2. Integrating Evidence into Clinical Decision-Making

Participants described their growing ability to incorporate evidence into the nursing process:

"The simulation sessions helped me see how evidence fits into each step of the nursing process. When assessing a patient with polycystic ovary syndrome, knowing the latest diagnostic criteria from research helped me collect the right information. Then, evidence guided my care planning for lifestyle modifications and medication management." (Participant 13)

"During our clinical practice, I used evidence to explain to a patient why we now recommend immediate skin-to-skin contact after cesarean delivery. Being able to say 'research shows this improves breastfeeding success and bonding' gave me confidence in advocating for this practice." (Participant 3)

3.3.3. Creating Evidence-Based Educational Materials

Several participants highlighted the value of developing evidence-based patient education materials:

"For our group project, we created educational materials about cervical cancer prevention based on current evidence. We had to translate complex research into simple Thai language that patients with different education levels could understand. This made me realize that part of using evidence is communicating it effectively to patients." (Participant 8)

"I developed a teaching plan about contraceptive options based on WHO guidelines and recent research. The evidence helped me provide accurate information about effectiveness rates and side effects, which I realized is crucial for women to make informed decisions about their reproductive health." (Participant 5)

3.4. Theme 4: Encountering and Overcoming Barriers

This theme encompassed the challenges participants faced during their learning journey and the strategies they developed to overcome these obstacles.

3.4.1. Technical and Resource Limitations

Participants identified various technical and resource constraints that impeded their learning:

"Internet connection in our dormitory is unreliable, which made accessing online modules difficult sometimes. I started downloading materials when I had good connection so I could study offline later." (Participant 2)

"Our college has limited access to international nursing databases. I learned to use what we have efficiently and also found alternative resources like Google Scholar and free PubMed Central articles." (Participant 9)

3.4.2. Language and Comprehension Challenges

Language barriers emerged as a significant challenge, particularly when engaging with English-language research:

"Reading research articles in English was my biggest challenge. Medical terminology was especially difficult. I started building my own glossary of reproductive health terms in English and Thai, which gradually made reading easier." (Participant 6)

"Understanding statistical analysis in research papers was challenging. Our group formed a study circle where those stronger in statistics helped explain concepts to others. We also used online tutorials to improve our understanding." (Participant 1)

3.4.3. Balancing Traditional Knowledge and Evidence

Participants described tensions between traditional practices and evidence-based approaches:

"During clinical placement, I observed practices that contradicted what evidence suggests is best. For example, some senior nurses still restrict fluid intake during labor despite evidence showing it's unnecessary. Finding tactful ways to discuss this was challenging." (Participant 7)

"My family has strong beliefs about postpartum practices like avoiding certain foods or bathing. When I found evidence that contradicted these beliefs, I had to carefully consider how to discuss this with my family without dismissing their cultural knowledge." (Participant 12)

3.5. Theme 5: Developing Professional Identity and Confidence

The final theme captured the impact of the program on participants' emerging professional identity and self-confidence as evidence-informed practitioners.

3.5.1. Growing Professional Confidence

Participants expressed increased confidence in their abilities as future nurses:

"Before this program, I would hesitate to speak up if I saw something that didn't seem right. Now that I know how to find and evaluate evidence, I feel more confident in respectfully questioning practices that aren't evidence-based." (Participant 4)

"During our presentations, faculty asked challenging questions about our evidence-based recommendations. Being able to defend our choices with research evidence made me feel like a real professional, not just a student." (Participant 15)

3.5.2. Envisioning Future Practice

Participants described how the program influenced their vision of their future nursing practice:

"I now see myself as someone who will continue learning throughout my career. Evidence changes, so being a good nurse means continuously updating my knowledge. I plan to join professional organizations that provide access to current research." (Participant 10)

"This experience has made me interested in becoming a clinical nurse specialist in women's health someday. I want to help implement evidence-based protocols in maternity units and mentor other nurses in using research." (Participant 13)

3.5.3. Becoming Knowledge Mediators

Several participants highlighted their emerging role as mediators of knowledge between research, practice, and patients:

"I realized we have an important role in bridging research and practice. We can help translate complex research findings into practical nursing care that makes sense in our context." (Participant 11)

"My family and friends already come to me with health questions. Now I can provide them with information based on evidence rather than just repeating what I've heard. I feel a responsibility to share accurate information, especially about sensitive topics like contraception or sexually transmitted infections." (Participant 14)

In summary, these findings reveal the complex, multifaceted nature of nursing students' experiences as they develop digital technology skills for evidence-based practice in reproductive and gynecological nursing. The themes illustrate both the challenges faced and the transformative learning that occurred through engagement with the program. Participants' narratives highlight not only the acquisition of technical skills but also the deeper cognitive, attitudinal, and professional identity changes that accompanied their learning journey.

4. Discussion

4.1. Transformation of Attitudes and Confidence

A significant finding of this study was the transformation in nursing students' perceptions of evidence-based practice from an abstract academic concept to a practical clinical tool. This shift aligns with Melnyk and Fineout-Overholt's (2018) observation that effective EBP education must bridge the gap between theoretical knowledge and practical application. However, our findings extend beyond previous research by highlighting the specific contextual factors that influence this transformation in Thai nursing students. The initial perception of EBP as primarily an academic exercise rather than a clinical tool mirrors finding from international studies (Fiset et al., 2017; Ryan, 2016), suggesting this may be a universal challenge in nursing education. However, the path to transformation appears to be culturally mediated. For Thai nursing students, the recognition of EBP's relevance seemed particularly pronounced when they discovered evidence that validated certain traditional practices in reproductive health care. This finding resonates with Songwathana's (2020) observation that integrating cultural wisdom with scientific evidence creates more meaningful learning experiences for nursing students in Southeast Asian contexts. The development of confidence in EBP application represents a form of professional self-efficacy, which Bandura (2001) identified as crucial for sustained behavior change. Our findings suggest that confidence develops not simply from knowledge acquisition but through opportunities to apply EBP in authentic learning situations. This supports Jackson's (2019) argument that simulation and case-based learning are particularly effective for developing EBP competencies. However, our study uniquely demonstrates that for Thai nursing students, confidence was also bolstered by successfully navigating cultural tensions between evidence and traditional practices, a dimension not prominently featured in Western research on EBP education.

4.2. Digital Skills Development Process

The participants' journey in developing digital information literacy reveals a more complex progression than typically described in the literature. While previous studies often focus on technical skill acquisition (Lavin et al., 2015; Mills et al., 2014), our findings suggest that for these nursing students, the development of digital skills involved three interconnected dimensions: technical competency, critical thinking, and adaptive problem-solving. Technical competency development followed a trajectory similar to that described in Olson's (2020) study of nursing informatics education, progressing from basic database navigation to sophisticated search strategies. However, our findings highlight how language barriers significantly impact this progression for non-English speaking students. The creative strategies developed by participants—such as using Thai-language resources as conceptual scaffolding before engaging with English literature—exemplify the metacognitive aspects of information literacy described by Lloyd (2017) but rarely acknowledged in EBP education models. The critical appraisal skills developed by participants extended beyond methodological assessment to include contextual evaluation—considering not only a study's quality but its applicability to Thai healthcare settings. This reflects what Kitson et al. (2018) describe as "contextual intelligence" in evidence implementation. Our findings suggest that

this contextual intelligence develops earlier in the EBP learning process than previously recognized, emerging concurrently with technical skills rather than sequentially.

4.3. Integration of Evidence-Based Practice in Clinical Learning

The process by which participants integrated evidence into clinical scenarios reveals important insights about the cognitive work involved in applying research to practice. Participants described moving beyond algorithmic application of evidence to a more nuanced process of contextualizing research findings for individual patients. This aligns with Tanner's (2006) clinical judgment model, which emphasizes the integration of multiple knowledge sources, including research evidence, patient preferences, and contextual factors. Our findings extend Tanner's model by illustrating how cultural considerations specifically influence this integration process. Participants' narratives about adapting evidence-based interventions for rural Thai healthcare settings or reconciling evidence with family beliefs about postpartum practices demonstrate what Leininger (2002) termed "culturally congruent care." The ability to provide such care requires not only evidence knowledge but cultural competence—a dimension that deserves greater emphasis in EBP education frameworks. The creation of evidence-based educational materials represents a particularly meaningful avenue for EBP integration. By translating complex research into accessible patient education, participants engaged in what Nutbeam (2008) describes as "knowledge translation"—a critical yet often overlooked component of evidence-based practice. This finding suggests that patient education activities may serve as effective pedagogical tools for developing EBP competencies while simultaneously addressing health literacy needs in clinical populations.

4.4. Cultural and Contextual Considerations

This study provides valuable insights into the culturally specific dimensions of EBP education in Thailand. The tension between evidence and traditional knowledge emerged as a central challenge for participants. This finding echoes Songwathana and Promkuntong's (2018) research on integrating local healing wisdom into nursing education but further illuminates the specific cognitive and emotional work involved in reconciling potentially conflicting knowledge systems. The observed strategies for navigating this tension—such as evaluating traditional practices through an evidence lens while maintaining cultural respect—represent a form of "cognitive integration" not fully captured in Western EBP models. While models like the JBI Model of Evidence-Based Healthcare (Jordan et al., 2019) acknowledge cultural considerations, they typically position culture as contextual rather than foundational. Our findings suggest that in the Thai context, cultural considerations are not merely contextual factors but fundamental elements that shape how evidence is conceptualized, evaluated, and applied. Resource limitations in Thai nursing education institutions emerged as significant contextual factors influencing EBP learning. Limited access to international databases, language barriers, and technical infrastructure challenges required adaptive strategies from participants. These findings align with Veeramah's (2016) observation that resource inequities significantly impact EBP implementation globally but extend beyond this by documenting the creative adaptations developed by nursing students to overcome these limitations. Such adaptations represent important contextual knowledge that could inform more globally equitable approaches to EBP education.

4.5. Theoretical and Practical Implications

The findings of this study contribute to theoretical understanding of how nursing students develop evidence-based practice competencies in culturally specific contexts. The experiences described by participants suggest that EBP development is not a linear process of

knowledge acquisition but a transformative learning experience that reshapes professional identity. This aligns with Mezirow's (2000) transformative learning theory, which emphasizes how learners revise their meaning perspectives through critical reflection on assumptions. Our findings extend transformative learning theory by illustrating how digital technology functions as both a tool for and a context of transformation. Participants' development of digital information literacy did not merely facilitate EBP learning but fundamentally altered how they conceived of their professional responsibilities and capabilities. This suggests that in contemporary nursing education, digital literacy and professional identity development are inextricably linked processes—a theoretical insight not fully articulated in current nursing education literature. From a practical perspective, this study offers several implications for nursing education. First, it highlights the importance of creating learning experiences that explicitly address the cultural dimensions of evidence application. Faculty should acknowledge potential tensions between evidence and traditional practices and facilitate reflective discussions about reconciling different knowledge systems. Second, the findings suggest that EBP education should incorporate adaptive strategies for overcoming resource limitations, particularly for institutions in middle-income countries. Finally, the study demonstrates the value of creating opportunities for students to communicate evidence to diverse audiences, as this appears to strengthen both EBP competencies and professional identity. These findings also have implications for international nursing knowledge exchange. While global standards for evidence-based practice are valuable, our study suggests that the processes by which nurses develop EBP competencies are culturally mediated. Educational approaches developed in Western contexts may require significant adaptation to be effective in settings with different cultural traditions, resource availability, and language contexts. This calls for more culturally responsive approaches to global nursing education that acknowledge diverse pathways to evidence-based practice.

5. Conclusion and Recommendations

This qualitative study provides valuable insights into the experiences of Thai nursing students as they develop skills in using information and digital technology for evidence-based practice in reproductive and gynecological nursing care. The findings reveal a complex, transformative learning journey characterized by shifting perceptions, developing competencies, and emerging professional identities. The study demonstrates that nursing students' relationship with evidence-based practice evolves from viewing it as an abstract academic concept to recognizing it as an essential clinical tool. This transformation is facilitated by meaningful engagement with digital technology and authentic learning experiences but is distinctly shaped by cultural context. For Thai nursing students, reconciling evidence with traditional practices represents a significant aspect of their learning journey—one that requires not only technical skills but cultural sensitivity and critical thinking.

The development of digital information literacy emerges as a multidimensional process involving technical competency, critical appraisal skills, and adaptive problem-solving strategies. Participants demonstrated remarkable creativity in overcoming resource limitations and language barriers, developing approaches that could inform EBP education in similar contexts globally. Their experiences highlight how digital skills development and professional identity formation are interconnected processes, with growing technological competence contributing to increased professional confidence. The integration of evidence into clinical learning represents perhaps the most meaningful dimension of participants' experiences. Their narratives reveal sophisticated cognitive work in contextualizing evidence for individual patients and Thai healthcare settings. The creation of evidence-based patient education materials provided a particularly effective vehicle for developing both EBP

competencies and professional communication skills. These findings suggest that EBP education should extend beyond searching and appraising evidence to emphasize contextual application and knowledge translation. Cultural considerations emerge as foundational rather than peripheral elements of EBP development in this context. The tension between evidence and traditional knowledge requires careful navigation, with participants developing strategies to evaluate traditional practices while maintaining cultural respect. This finding challenges Western EBP models that may position culture primarily as a contextual factor rather than a fundamental element shaping how evidence is conceptualized and applied.

6. Limitations

Several limitations should be acknowledged when considering these findings. First, the study was conducted at a single nursing college in Thailand, potentially limiting transferability to other educational contexts. Second, the research focused specifically on reproductive and gynecological nursing, and different patterns might emerge in other nursing specialties. Third, as a qualitative study, it captures the depth of participants' experiences but cannot quantify the prevalence of particular phenomena or measure changes in specific competencies. Finally, the researchers' positions as nursing educators, despite reflexive practices, may have influenced participants' willingness to express certain perspectives.

7. Implications for Nursing Education

The findings of this study have several important implications for nursing education as given below:

7.1. Culturally responsive EBP education Nursing curricula should explicitly address the cultural dimensions of evidence application, acknowledging potential tensions between evidence and traditional practices and facilitating reflective discussions about reconciling different knowledge systems.

7.2. Resource-sensitive approaches EBP education should incorporate adaptive strategies for overcoming resource limitations, particularly for institutions in middle-income countries with limited access to international databases and English-language materials.

7.3. Authentic learning experiences Educational approaches should include opportunities for students to apply evidence in realistic clinical scenarios and communicate evidence-based information to diverse audiences, as these experiences appear crucial for developing both EBP competencies and professional identity.

7.4. Integration of digital and EBP competencies Nursing education should recognize the interconnected nature of digital literacy and evidence-based practice, developing integrated approaches that simultaneously address both competency areas.

7.5. Knowledge translation focus EBP education should emphasize the skills needed to translate complex research into accessible information for patients and colleagues, recognizing this as a core nursing responsibility in contemporary healthcare.

7.6. Blended learning approaches The positive response to blended learning methods suggests that combining face-to-face instruction, online learning, simulation, and group projects provides effective scaffolding for developing complex competencies in digital information literacy and evidence-based practice.

8. Recommendations for Future Research

Based on the findings and limitations of this study, several directions for future research are recommended:

8.1. Longitudinal studies Future research should examine how nursing students' EBP competencies and digital skills evolve over time, following them from education into clinical practice to understand how these skills are maintained and applied in workplace settings.

8.2. Cultural comparative research Cross-cultural comparative studies could illuminate how nursing students in different cultural contexts develop EBP competencies, potentially identifying both universal and culturally specific aspects of this learning process.

8.3. Educational intervention studies Building on the insights from this qualitative exploration, future research could evaluate specific educational interventions designed to address the challenges identified, particularly approaches for integrating cultural considerations into EBP education.

8.4. Technology access research More focused investigation of how resource limitations and technology access disparities impact EBP education globally would contribute valuable knowledge for developing more equitable educational approaches.

8.5. Interdisciplinary perspectives Future studies should explore how nursing students develop collaborative EBP competencies with students from other healthcare disciplines, as interprofessional collaboration is increasingly essential in evidence implementation.

8.6. Patient outcome research Ultimately, research should examine how nursing students' development of digital EBP competencies translates into clinical practice and impacts patient outcomes in reproductive and gynecological healthcare.

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