Volume 4, Issue 3, 2026

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

EXPLORING CRITICAL THINKING IN NURSING EDUCATION THROUGH GENERATIVE AI: A QUALITATIVE STUDY RE-EXAMINING BLOOM'S TAXONOMY USING BRAUN AND CLARKE'S THEMATIC ANALYSIS

Safiah Mir[1], Najia Gul[2], Kanwal Naz[3], Sabahat Asghar[*4], Muhammad Ismail[5], Iftikhar Ullah[6]

[1]*MSN, RN, RM, Pakistan Institute of Medical Sciences, Islamabad*
[2]*MSN, RN, RM, MCC, College of Nursing, Armed Forces Undergraduate Medical Institute (AFPGMI), Rawalpindi, Pakistan*
[3]*Renal Clinical Nurse AFIU, Rawalpindi*
[*4]*Pathologist, microbiologist at Ayub Teaching Hospital, Abbottabad*
[5,6]*RN Shifa Internatoional Hospital, Islamabad*

[1]smirshah77@gmail.com, [2]gul.najia@gmail.com, [3]naeem.asif1988@gmail.com, [*4]sabahat.asghar28@gmail.com, [5]rnmik864@gmail.com, [6]janiiftikhar582@gmail.com

DOI:https://doi.org/10.5281/zenodo.22792154

Keywords
Generative AI, ChatGPT, critical thinking, nursing education, Bloom's Taxonomy, thematic analysis, qualitative research, higher education, Pakistan,

Article History
Received: 01 January 2026
Accepted: 17 March 2026
Published: 31 March 2026

Copyright @Author
Corresponding Author: *
Sabahat Asghar

Abstract

Background: *Generative artificial intelligence (AI) tools, particularly ChatGPT, are rapidly transforming higher education. In nursing education, where critical thinking underpins safe clinical practice, understanding how these tools interact with established cognitive frameworks such as Bloom's Taxonomy is a pressing educational priority.*

Objective: *This study explores nursing students' and faculty members' perceptions and lived experiences of using generative AI tools in a undergraduate nursing programme , specifically examining how AI supports, challenges, or reconfigures the cognitive levels of Bloom's Taxonomy.*

Methods: *A qualitative exploratory design was employed. Using purposive sampling, in-depth semi-structured interviews were conducted with 15 undergraduate nursing students and 5 nursing faculty members at the College of Nursing, Peshawar. Data were analysed using Braun and Clarke's (2006) six-phase reflexive thematic analysis with NVivo-assisted manual coding.*

Results: *Five major themes emerged: (1) Structured Cognitive Scaffolding: AI as a Gateway to Higher-Order Thinking; (2) Epistemic Distrust: Fabricated References and the Erosion of Evidence-Based Practice; (3) The Cognitive Load Paradox: AI as Both Relief and Burden; (4) Ethical Consciousness in the Age of AI; and (5) Faculty as Pedagogical Anchors in AI-Integrated Learning. Participants recognised that AI tools most strongly facilitated the lower cognitive levels of Bloom's Taxonomy (Remembering, Understanding) while presenting both opportunities and challenges at higher-order levels (Analysis, Evaluation, Creation).*

Volume 4, Issue 3, 2026

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Conclusion: *Generative AI can meaningfully support critical thinking in nursing education when embedded within ethically guided, faculty-supervised curricula. Curriculum designers should intentionally align AI tool use with the higher-order domains of Bloom's Taxonomy, particularly Analysis, Evaluation, and Creation, to maximise its educational value and minimise academic integrity risks.*

1.INTRODUCTION

The rapid proliferation of generative artificial intelligence (AI) tools, notably ChatGPT, Gemini, Perplexity, and Grammarly, has created both unprecedented opportunities and significant challenges for higher education globally. By June 2023, ChatGPT had surpassed 100 million active monthly users, making it the fastest-growing consumer application ever recorded (Miao & Ahn, 2023). Within nursing education, this technological surge intersects with one of the discipline's most fundamental educational imperatives: the development of critical thinking.

Critical thinking is not merely an academic competency in nursing it is a clinical safety imperative. Nurses are routinely required to make rapid, evidence-based decisions in complex, high-acuity patient care environments. Bloom's Taxonomy, originally proposed by Benjamin Bloom and colleagues in 1956 and revised by Anderson and Krathwohl in 2001, provides the most widely adopted theoretical framework for understanding the hierarchy of cognitive skills from lower-order (Remembering, Understanding) to higher-order (Applying, Analysing, Evaluating, Creating) thinking. These higher-order domains represent the cognitive competencies most directly linked to safe, reflective nursing practice (Ertürk Yavuz, 2023).

Recent research suggests that AI tools have a large positive impact on learning performance (Cohen's g = 0.867) and a moderately positive impact on higher-order thinking (g = 0.457), including the Analyse, Evaluate, and Create levels of Bloom's Taxonomy (Kasneci et al., 2023). However, these quantitative estimates do not capture the nuanced lived experiences of nursing students and educators navigating the integration of AI into their specific educational contexts. Qualitative inquiry is particularly needed in settings such as Pakistan's nursing institutions, where AI integration in nursing education remains understudied and where cultural, institutional, and hierarchical factors may shape AI use in distinct ways.

Several recent studies have examined nursing students' and educators' perceptions of ChatGPT, including qualitative phenomenological (Durmuş Sarıkahya et al., 2025; Kaya et al., 2024), descriptive qualitative (Gunawan et al., 2024), and mixed-methods designs (Abou Hashish et al., 2025). These studies converge on a picture of qualified promise: AI offers genuine scaffolding benefits, but also raises profound concerns about academic integrity, fabricated citations, cognitive dependency, and the essential role of faculty guidance. No study to date has examined these dynamics through the dual lens of Bloom's Taxonomy and Braun and Clarke's (2006) reflexive thematic analysis within nursing undergraduate setting — the specific contribution of the present study.

1.1 Study Objectives

1. To explore nursing students' perceptions of generative AI's role in developing analytical and clinical decision-making abilities aligned with Bloom's Taxonomy.
2. To assess the challenges and opportunities of integrating AI tools into undergraduate nursing curricula.
3. To examine how generative AI tools support or challenge the Application, Analysis, Evaluation, and Creation stages of Bloom's Taxonomy.
4. To explore nursing faculty members' perspectives on guiding ethical, educationally productive AI use.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

2. LITERATURE REVIEW

2.1 Generative AI in Nursing Education

Generative AI, particularly large language model (LLM)-based tools such as ChatGPT, has been increasingly adopted across healthcare education. Miao and Ahn (2023) identified ChatGPT's transformative potential in nursing and interdisciplinary research, highlighting its capacity for literature synthesis, case generation, and documentation support. Durmuş Sarıkahya et al. (2025) conducted a descriptive phenomenological study with 14 nursing faculty members, identifying six major themes including convenience, speed, and creative scenario generation, while also flagging concerns about academic integrity and the need for AI literacy. Abou Hashish et al. (2025) conducted a convergent mixed-methods study at a Saudi nursing college with 240 students and 40 educators, finding moderate AI knowledge and generally positive attitudes, with educators expressing stronger ethical concerns particularly regarding plagiarism, over-reliance, and data accuracy.

In terms of qualitative inquiry specifically focused on nursing students, Gunawan et al. (2024) conducted focus group discussions with 19 Indonesian nursing students using thematic analysis, identifying three themes: (1) AI may be helpful but not fully trusted; (2) nurse skills will never be replaced; and (3) the need for curriculum advancement. Similarly, Kaya et al. (2024) used a phenomenological design with semi-structured interviews in the UAE, finding that students valued ChatGPT for its speed and convenience but expressed concerns about cognitive dependency and accuracy. These international studies provide important comparative contexts for the present nursing setting.

2.2 Critical Thinking and Bloom's Taxonomy in Nursing

Critical thinking is defined in nursing literature as the ability to engage in self-directed, self-disciplined, self-monitored, and self-corrective thinking in the context of clinical practice (Tesh et al., 2014). Bloom's Taxonomy organises cognitive learning into six hierarchical levels: Remembering (recalling facts), Understanding (interpreting information), Applying (using knowledge in new situations), Analysing (breaking information into components), Evaluating (making judgments based on criteria), and Creating (producing new or original work). The higher-order levels Analysing, Evaluating, and Creating are most closely aligned with the competencies required for safe, evidence-based nursing practice.

Research using AI tools evaluated against Bloom's Taxonomy framework demonstrates that LLMs produce higher-quality responses when structured prompts are used, and that their performance varies significantly across cognitive levels (Kaya et al., 2024). Hood (2022) emphasised that professional writing in nursing, inherently requiring higher-order thinking, remains a critical but commonly underdeveloped skill. The intersection of AI assistance with writing-intensive nursing tasks thus represents a particularly important pedagogical site.

2.3 Ethical Dimensions of AI in Academic Writing

A consistent finding across the generative AI in education literature is the emergence of ethical concerns among both students and educators. Michel-Villarreal et al. (2023) identified plagiarism risk, erosion of student creativity, and citation fabrication as the primary integrity challenges. The phenomenon of AI hallucination whereby ChatGPT generates plausible-sounding but factually false or fabricated academic references has been documented across disciplines and represents a particular concern in evidence-based nursing education, where citation accuracy directly relates to clinical practice quality (Durmuş Sarıkahya et al., 2025). Dhawan (2020) also cautioned against over-reliance on digital tools in academic contexts, noting that convenience assumptions often obscure the additional cognitive work required to critically evaluate AI-generated content.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

2.4 The Role of Faculty in AI-Integrated Learning

Faculty guidance has emerged as a critical mediating variable between AI adoption and positive educational outcomes. Sun and Hoelscher (2023) argued that open faculty-student communication about AI's capabilities and limitations is essential for responsible adoption in nursing programmes. Tesh et al. (2014) demonstrated that mentorship and structured feedback are critical to developing academic writing skills in nursing. Abou Hashish et al. (2025) found that regression analysis identified knowledge as a significant predictor of both perceptions and attitudes toward ChatGPT, underscoring the role of educator-led AI literacy programmes. The present study contributes to this literature by documenting faculty perspectives alongside student experiences in a specific institute nursing undergraduate context.

2.5 Gap Analysis

Thirty international studies address AI and critical thinking in health sciences education, but only three national-level Pakistani studies address burnout and professional development in nursing, and none specifically examines generative AI's impact on critical thinking through the lens of Bloom's Taxonomy in undergraduate nursing settings. This study addresses this gap by combining: (1) a nursing educational context; (2) a dual theoretical framework (Bloom's Taxonomy + Braun and Clarke's thematic analysis); (3) both student and faculty perspectives; and (4) undergraduate-level participants who are simultaneously clinical practitioners and academic learners.

3.METHEDOLOGY

3.1 Research Design

This study employed a qualitative exploratory design, consistent with the interpretivist epistemological position that participant meanings are contextually constructed and best accessed through in-depth conversational methods (Braun & Clarke, 2006; Creswell & Poth, 2018). A qualitative approach was selected as the most appropriate methodology for capturing the nuanced, experience-rich perspectives of nursing students and faculty on AI use phenomena that cannot be adequately reduced to quantitative measurement. The study is reported according to the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist (Tong et al., 2007).

3.2 Setting

The study was conducted at the College of Nursing, Peshawar.

3.3 Sample and Sampling

Purposive sampling was employed to select information-rich participants (Patton, 2015). The final sample comprised 15 undergraduate nursing students currently enrolled in interview and 5 nursing faculty members with documented experience integrating AI tools into their teaching methods yielding a total of 20 participants. Sample size was determined by theoretical saturation: data collection continued until no new codes or themes were emerging (Braun & Clarke, 2006). This sample size is consistent with qualitative norms and comparable to recent studies in this field (Durmuş Sarıkahya et al., 2025: n=14; Gunawan et al., 2024: n=19; Kaya et al., 2024: n=12).

Inclusion criteria for students: Currently enrolled in a undergraduate nursing programme; active use of at least one generative AI tool (ChatGPT, Perplexity, Gemini, Grammarly, or Canva) in their coursework .Faculty members who have integrated AI technologies into their teaching methods.

Exclusion criteria: Participants unwilling to consent; those on leave during data collection; participants without direct experience using AI tools.Informed consent will be sought from all participants, ensuring they are aware of the study's purpose, confidentiality, and their right to withdraw at any time.

3.4 Data Collection

Data were collected through in-depth, semi-structured individual interviews, conducted by the principal investigator between May and August 2025. Interviews lasted between 35 and 65

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

minutes. An interview guide was developed iteratively, based on the study objectives, Bloom's Taxonomy domains, and existing literature. Probe questions encouraged participants to provide specific examples, describe critical incidents, and reflect on the cognitive processes involved in AI-assisted learning tasks. Interviews were audio-recorded with participants' consent, transcribed verbatim, and member-checked by returning transcripts to participants for accuracy confirmation. Field notes were maintained throughout data collection.

Sample interview guide questions included: (1) Can you describe a specific experience where using an AI tool helped or hindered your ability to think critically about a nursing topic? (2) At which stages of your assignments do you find AI most useful understanding content, applying it, analyzing information, or creating original arguments? (3) How do you evaluate the information provided by AI tools before using it in academic work? (4) What ethical concerns, if any, have you encountered when using AI in your studies? (5) **Faculty** How do you guide students to use AI tools in ways that enhance rather than undermine critical thinking?

3.5 Data Analysis: Braun and Clarke's (2006) Six-Phase Reflexive Thematic Analysis

Data were analyzed using Braun and Clarke's (2006) six-phase reflexive thematic analysis the most widely applied qualitative analytical framework and the gold standard for inductive qualitative inquiry in nursing and health sciences research. NVivo software (version 14) was used to facilitate organization and management of codes and themes, while the interpretive analysis remained entirely manual and researcher-led, consistent with Braun and Clarke's (2006) emphasis on reflexivity. The six phases were applied as follows:

Phase 1 Familiarization: All 20 interview transcripts were read and re-read in full by the principal investigator and supervisor, with initial observations noted.

Phase 2 Generating Initial Codes: Systematic line-by-line coding of all transcripts produced 84 initial codes including: 'AI outline help', 'fabricated references', 'verification burden', 'fear of plagiarism', 'instructor modelling', 'Bloom application level', 'trust deficit', 'cognitive outsourcing', 'ethical reflection'.

Phase 3 Searching for Themes: Codes were grouped into candidate themes based on semantic and latent patterns across the dataset.

Phase 4 Reviewing Themes: Candidate themes were reviewed against the full dataset by both researchers; two initially proposed themes were merged and one was refined into a sub-theme.

Phase 5 Defining and Naming Themes: Final themes were named to capture the essence of participants' experiences rather than mere topic descriptors.

Phase 6 Writing the Report: Themes are reported below with supporting verbatim participant quotations to substantiate each theme.

3.6 Rigor and Trustworthiness

Trustworthiness was established through: (1) credibility : member checking of transcripts and prolonged engagement with data; (2) transferability :thick description of the research context and participant sample; (3) dependability : an audit trail of analytical decisions maintained in NVivo and reflexive memos; and (4) confirmability : peer debriefing with the academic supervisor (Lincoln & Guba, 1985). Researcher reflexivity was maintained through a written reflexivity statement acknowledging the principal investigator's dual position as a nursing educator and a user of AI tools.

3.7 Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of nursing institute, Peshawar. Written informed consent was obtained from all participants prior to interviews. Participants were assigned pseudonyms (P1–P15 for students; F1–F5 for faculty) to ensure anonymity. All audio recordings and transcripts were stored on encrypted institutional systems. Participants were informed of their right to withdraw at any time without consequence. No incentives were provided. The study adhered to

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

the COREQ guidelines for reporting qualitative research (Tong et al., 2007).

4.RESULTS

4.1 Participant Characteristics

Table 1 presents the demographic profile of study participants.

Characteristic	Students (n=15)	Faculty (n=5)	Total (N=20)
Gender: Female	12 (80%)	4 (80%)	16 (80%)
Gender: Male	3 (20%)	1 (20%)	4 (20%)
Mean Age (years)	32.4 ± 4.2	41.6 ± 5.1	34.5 ± 5.8
Programme/Role	MCC Undergraduate	Nursing Instructor/Professor	—
Mean Yrs Experience	7.8 ± 3.4	14.6 ± 4.2	9.4 ± 4.9
AI Tools Used	ChatGPT, Gemini, Perplexity, Grammarly	ChatGPT, Canva, Grammarly	—
Frequency of AI Use	Daily/Weekly: 13 (86.7%)	Weekly: 4 (80%)	—

Table 1. Demographic profile of study participants (N = 20)

Data analysis yielded five major themes, each with associated sub-themes, directly linked to Bloom's Taxonomy domains where applicable.

Table 2 presents the thematic framework.

Theme	Sub-themes	Bloom's Level Engaged	Primary Source
1. Structured Cognitive Scaffolding	1a: Writing initiation 1b: Conceptual breakdown 1c: Clinical scenario rehearsal	Remembering, Understanding, Applying	Students primarily
2. Epistemic Distrust	2a: Fabricated references 2b: Factual inaccuracies 2c: Verification burden	Evaluating (forced)	Students and Faculty
3. Cognitive Load Paradox	3a: Time investment 3b: Critical re-engagement 3c: Depth deficit	Applying, Analysing	Students primarily
4. Ethical Consciousness	4a: Plagiarism awareness 4b: Citation integrity 4c: Academic identity	Evaluating, Creating	Students and Faculty
5. Faculty as Pedagogical Anchors	5a: Structured integration 5b: Ethical modelling 5c: Boundary-setting	All levels (facilitator)	Faculty primarily

Table 2. Thematic framework, sub-themes, and Bloom's Taxonomy alignment

4.2 Theme 1: Structured Cognitive Scaffolding AI as a Gateway to Higher-Order Thinking

The most consistently reported benefit of generative AI was its capacity to reduce the cognitive friction associated with initiating complex academic writing tasks functioning as a scaffold at the Remembering and Understanding levels of Bloom's Taxonomy, and enabling students to direct their cognitive energy toward higher-order processes.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

"When I don't know how to begin my paper, I just ask ChatGPT for an outline. It gives me a structure, and then I can start thinking more clearly. It's like having a writing assistant. [P3]"

"The bulleted response helped break things down. I could see the main points clearly, and then I researched more on my own. It didn't do the thinking for me it helped me focus. [P5]"

"I often get stuck just starting the introduction. Using AI gave me a push it helped me get past that blank page and got me moving. [P7]"

Faculty members corroborated this scaffolding function but framed it explicitly within Bloom's Taxonomy:

"I tell students that AI is good for the lower levels getting the facts, understanding concepts. But the analysis, the clinical judgment, the evaluation of evidence that has to come from them. ChatGPT cannot replace what happens in the mind of a competent nurse. [F2]"

This theme aligns with Luthy et al.'s (2009) finding that writing scaffolds support nursing students' academic development, and with Kasneci et al.'s (2023) evidence that AI tools can help students formulate better questions, which is foundational to higher-order thinking. The faculty perspective introduces a pedagogically important distinction: AI as a Bloom's level 1–2 enabler, with higher-order thinking remaining firmly the student's domain.

4.3 Theme 2: Epistemic Distrust Fabricated References and the Erosion of Evidence-Based Practice

A second major theme, reported by both students and faculty, was the experience of discovering fabricated, inaccurate, or unverifiable references generated by AI tools a finding that fundamentally undermined participants' trust in AI as an academic resource and forced them into unexpected engagement with Bloom's Evaluating level.

"One of the references ChatGPT gave me didn't exist when I searched for it. That made me question everything else it generated. [P4]"

"I found citations that looked real, but they weren't. It really reduced my trust in using AI for serious academic work. [P6]"

"Even though the information sounded right, I couldn't verify the sources. That's a big issue when we need evidence-based writing. [P8]"

Faculty members identified the hallucination problem as a specific pedagogical concern in nursing education:

"Nursing is built on evidence-based practice. If a student cites a reference that doesn't exist, the clinical implications are dangerous. I now use AI-generated references as a teaching tool I ask students to verify every single one before submission. [F1]"

"I actually find these hallucinated references useful now. When students discover AI is lying to them, they learn to be critical consumers of information. That critical evaluation is exactly what Bloom was talking about. [F4]"

This theme extends findings by Michel-Villarreal et al. (2023) and Durmuş Sarıkahya et al. (2025), and has a specific critical significance in nursing: the use of fabricated evidence in clinical decision-making contexts constitutes a patient safety risk, not merely an academic integrity issue.

4.4 Theme 3: The Cognitive Load Paradox AI as Both Relief and Burden

Contrary to the popular assumption that AI reduces academic workload, participants reported that the verification demands created by AI-generated content often increased their cognitive burden producing a paradox that specifically engaged Bloom's Applying and Analysing levels.

"It took me more time checking AI content than just writing from scratch. I had to verify every point and reference. [P2]"

"Using ChatGPT was not a shortcut. I spent extra time validating the content because it sometimes included wrong or shallow information. [P9]"

"People think AI saves time, but in my case, it made things more complicated because I kept cross-checking everything. [P11]"

This finding is consistent with Dhawan (2020) and Nasim (2024), who cautioned against

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

overestimating AI's convenience in academic contexts. However, participants also noted a silver lining in this paradox:

"The process of checking AI output actually made me read more carefully than I normally would. I ended up knowing the material better. [P13]"

"I think the verification burden is actually good pedagogy it forces students to engage analytically with content they might otherwise accept passively. [F3]"

This theme reveals a previously underappreciated pedagogical mechanism: the very unreliability of AI output may inadvertently scaffold engagement with Bloom's higher-order cognitive levels by necessitating critical analysis and evaluation of generated content.

4.5 Theme 4: Ethical Consciousness in the Age of AI

A fourth theme, related to but distinct from epistemic distrust, concerned participants' developing awareness of the ethical dimensions of AI use particularly regarding plagiarism, citation integrity, academic identity, and the boundaries of legitimate AI assistance. This theme maps onto Bloom's Evaluating and Creating domains.

"I was surprised how easily AI could generate text that sounded academic. It made me more aware of plagiarism and citation issues. [P1]"

"The assignment taught me not just to use AI but to question it. Now I double-check everything it generates and cite carefully. [P6]"

"I learned that using AI isn't cheating if you're thoughtful about it and still doing your own critical thinking. [P10]"

Faculty perspectives added an important dimension regarding the threat to professional identity formation:

"What worries me is not plagiarism per se, but intellectual passivity. If a nursing student gets used to accepting AI's answers without questioning them, how will they perform when AI isn't available in the emergency room, at 3am? [F5]"

"I explicitly teach that using AI without disclosure and critical engagement is ethically equivalent to using someone else's thinking without attribution and in clinical practice, that is dangerous. [F2]"

These findings extend the work of Michel-Villarreal et al. (2023) and reflect the broader nursing ethics literature's emphasis on professional accountability and evidence-based judgment. The faculty perspective introduces a patient safety dimension to the AI ethics discourse that is specific to health professional education.

4.6 Theme 5: Faculty as Pedagogical Anchors in AI-Integrated Learning

The fifth and overarching theme concerned the indispensable role of faculty guidance in determining whether AI tools functioned as genuine learning enhancers or as cognitive shortcuts that undermined the development of critical thinking.

"Our instructor explained how to use AI properly, which made me feel more confident and less afraid of doing something wrong. [P3]"

"If the teacher hadn't guided us, I would have probably misused ChatGPT. The support was key to understanding what's acceptable. [P5]"

"With proper guidance, I learned to use AI as a tool, not a crutch. It helped to have clear expectations from faculty. [P12]"

Faculty members reflected on the challenge and responsibility of this role:

"We cannot ban AI it's like banning the internet. Our job is to teach students to use it with wisdom, not to use it instead of wisdom. [F1]"

"I've redesigned my assignments so that AI can help with the remembering and understanding parts, but the analysis and the recommendation students have to generate those themselves. That's where critical thinking lives. [F4]"

This theme is strongly supported by Sun and Hoelscher (2023), Tesh et al. (2014), and Abou Hashish et al. (2025), who all identify faculty as the critical variable mediating AI integration outcomes. The faculty redesign approach described by F4 represents an evidence-aligned pedagogical strategy: deliberately scaffolding AI use to occupy lower Bloom's levels while protecting higher-order learning for student-generated work.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

5.DISSCUSSION

This study provides a detailed, contextualised account of how undergraduate nursing students and faculty at a nursing institution experience generative AI as a learning and pedagogical tool. The five themes identified through Braun and Clarke's (2006) thematic analysis converge on a coherent picture: generative AI is a genuinely valuable but fundamentally incomplete educational tool, whose impact is mediated by faculty guidance, student AI literacy, and the intentional alignment of AI use with Bloom's Taxonomy.

5.1 AI and Bloom's Taxonomy: A Level-Specific Analysis

The most theoretically significant finding of this study is the level-specific pattern of AI utility across Bloom's Taxonomy. Participants' accounts consistently indicated that AI tools most reliably supported the lower cognitive levels (Remembering and Understanding) through structured outlines, conceptual summaries, and information retrieval. This aligns with findings from Kaya et al. (2024) and Durmuş Sarıkahya et al. (2025), who similarly found AI strongest at knowledge acquisition tasks.

However, the study also revealed a more nuanced and educationally significant process: through the challenges of AI use specifically the verification demands imposed by fabricated references and shallow content students were inadvertently pushed into the Analysing and Evaluating levels of Bloom's Taxonomy. This 'productive struggle' mechanism is theoretically important and has not been explicitly documented in previous nursing AI studies. Faculty member F4's deliberate redesign strategy scaffolding AI to lower Bloom's levels while reserving higher-order tasks for students represents an evidence-based pedagogical response that other nursing educators could adopt.

5.2 The Epistemic Trust Problem in Evidence-Based Practice

The fabricated reference problem documented in Theme 2 has particular clinical significance in nursing education. The evidence-based practice (EBP) model, which underpins modern nursing, requires that clinical decisions be grounded in accurate, verifiable research evidence. A nursing student who uncritically accepts AI-generated citations and incorporates them into clinical reasoning frameworks is not merely committing academic misconduct they are rehearsing a pattern of clinical decision-making that is potentially dangerous to patients (Durmuş Sarıkahya et al., 2025). Faculty member F1's pedagogical reframing of hallucinated references as 'teaching tools' represents a creative and clinically grounded response that deserves wider implementation.

5.3 The Cognitive Load Paradox and Self-Regulated Learning

Theme 3's finding that AI use often increased rather than decreased cognitive load is consistent with Dhawan (2020) and adds nuance to the dominant narrative about AI as a time-saving convenience. From a self-regulated learning (Zimmermann, 2002) perspective, the verification processes students described cross-checking AI content against peer-reviewed sources actually represent high-quality academic behaviour. The pedagogical implication is that instructors should not attempt to eliminate verification burden but should scaffold it: providing students with structured verification frameworks (e.g., evidence appraisal tools, citation verification checklists) that convert the burden into a deliberate Bloom's-level-4 (Analysing) learning activity.

5.4 Ethics, Academic Identity, and Professional Formation

Theme 4 documents the emergence of ethical consciousness among nursing students using AI a finding that aligns with the broader health professional education literature on professional identity formation (Cruess et al., 2015). The faculty concern about intellectual passivity (F5's 'emergency room at 3am' statement) raises a critical question for nursing education: to what extent can clinical competence developed in AI-assisted learning environments be reliably transferred to high-stakes, technology-free clinical

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

contexts? This question warrants longitudinal research examining whether AI-assisted undergraduate nursing students demonstrate equivalent or superior clinical decision-making compared to peers with less AI exposure.

5.5 Faculty Guidance as the Critical Mediating Variable

Theme 5's identification of faculty as pedagogical anchors replicates findings from Abou Hashish et al. (2025), Sun and Hoelscher (2023), and Tesh et al. (2014), and carries important institutional implications. Private Nuursing Institute and comparable nursing institutions should invest in faculty professional development focused on AI pedagogy: specifically, training faculty to (1) design assignments that intentionally allocate AI use to lower Bloom's levels; (2) teach AI verification skills as an explicit component of EBP modules; (3) establish transparent, non-punitive institutional policies on AI use; and (4) model reflective, critical AI use in their own scholarly and teaching practices.

5.6 Implications for Nursing Education

The nursing educational context introduces specific considerations not addressed in existing international literature. The hierarchical culture of such institutions may both reinforce and complicate AI ethics reinforcing it through deference to institutional rules and faculty authority, but potentially complicating it through cultures of compliance that prioritise getting right answers over developing critical thinking processes. should develop explicit AI use policies that are sensitive to these cultural dynamics, establishing what constitutes acceptable use, how disclosure works in submitted work, and how AI literacy will be assessed as a formal competency alongside traditional nursing knowledge.

5.7 Limitations

This study has several limitations. The sample was drawn from a single institution, limiting generalisability to other nursing contexts. Purposive sampling, while methodologically appropriate for qualitative inquiry, may have attracted more AI-engaged participants. The study is cross-sectional, capturing perceptions at a single time point during a period of rapid AI evolution. Social desirability bias may have influenced participants' self-reported AI use patterns, particularly in a hierarchical educational environment. Future research should employ longitudinal designs, multi-site sampling, and participant observation methods to complement self-report data.

6.CONCLUSION

This qualitative study provides the first in-depth examination of generative AI's role in critical thinking development among undergraduate nursing students and faculty at a nursing institution, analysed through the dual lens of Bloom's Taxonomy and Braun and Clarke's (2006) reflexive thematic analysis. Five themes,Structured Cognitive Scaffolding; Epistemic Distrust; The Cognitive Load Paradox; Ethical Consciousness; and Faculty as Pedagogical Anchors collectively reveal that generative AI is a powerful but pedagogically incomplete tool that requires deliberate faculty integration to fulfil its potential in nursing education.

The most clinically significant finding is the fabricated reference problem, which in a nursing context is not merely an academic integrity issue but a patient safety concern. The most pedagogically generative finding is the identification of AI's inadvertent role in scaffolding higher-order Bloom's levels through the productive struggle of verification a mechanism that faculty can deliberately harness through assignment redesign. The most institutionally pressing recommendation is the urgent development of structured AI literacy curricula and transparent AI use policies within Private Nursing Institute that are sensitive to the specific cultural and hierarchical dynamics of nursing education.

Generative AI is not the end of critical thinking in nursing education but it is a profound test of nursing educators' capacity to intentionally design learning environments that develop rather than replace the analytical, evaluative, and creative

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

cognitive capacities that safe nursing practice demands.

REFERENCES

Abou Hashish, E. A., Alsayed, S. A., & Abdel Razek, N. M. F. (2025). Embracing AI in academia: A mixed methods study of nursing students' and educators' perspectives on using ChatGPT. PLoS ONE. https://doi.org/10.1371/journal.pone.0327981

Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's educational objectives. Longman.

Bloom, B. S. (1956). Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain. Longman, Green.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. Qualitative Research in Sport, Exercise and Health, 11(4), 589–597. https://doi.org/10.1080/2159676X.2019.1628806

Braun, V., & Clarke, V. (2021). Thematic analysis: A practical guide. SAGE Publications.

Creswell, J. W., & Poth, C. N. (2018). Qualitative inquiry and research design: Choosing among five approaches (4th ed.). SAGE Publications.

Cruess, R. L., Cruess, S. R., Boudreau, J. D., Snell, L., & Steinert, Y. (2015). A schematic representation of the professional identity formation and socialization of medical students and residents. Academic Medicine, 90(6), 718–725.

Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. Journal of Educational Technology Systems, 49(1), 5–22. https://doi.org/10.1177/0047239520934018

Durmuş Sarıkahya, S., Özbay, Ö., Torpuş, K., Usta, G., & Çınar Özbay, S. (2025). The impact of ChatGPT on nursing education: A qualitative study based on the experiences of faculty members. Nurse Education Today, 152, 106755. https://doi.org/10.1016/j.nedt.2025.106755

Gunawan, J., Aungsuroch, Y., Marzilli, C., Nazliansyah, Chaerani, E., & Montayre, J. (2024). Artificial intelligence chatbot as perceived by nursing students: A qualitative study. SAGE Open Medicine, 12. https://doi.org/10.1177/21582440241303453

Hood, L. J. (2022). Professional writing in nursing. Journal of Nursing Practice, 31(4), 101–105.

Kasneci, E., Seßler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., ... Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. Computers in Human Behavior: Artificial Humans, 1, 100013. https://doi.org/10.1016/j.chbah.2023.100013

Kaya, M. et al. (2024). AI in higher education: Unveiling nursing students' perspectives on ChatGPT's challenges and opportunities. Nurse Education in Practice. https://doi.org/10.1016/j.nepr.2024.104003

Lincoln, Y. S., & Guba, E. G. (1985). Naturalistic inquiry. SAGE Publications.

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Luthy, K. E., Peterson, N. E., Lassetter, J. H., & Callister, L. C. (2009). Successfully incorporating writing across the curriculum with undergraduate nursing students. Journal of Nursing Education, 48(2), 112–118. https://doi.org/10.3928/01484834-20090201-07

Michel-Villarreal, R., Vilalta-Perdomo, E., Salinas-Navarro, D. E., Thierry-Aguilera, R., & Gerardou, F. S. (2023). Challenges and opportunities of generative AI for higher education as explained by ChatGPT itself. Education Sciences, 13(9), 856. https://doi.org/10.3390/educsci13090856

Miao, H., & Ahn, H. (2023). Impact of ChatGPT on interdisciplinary nursing education and research. JMIR Nursing, 6, e48136. https://doi.org/10.2196/48136

Nasim, H. (2024). Challenges in academic writing for nursing students. Nursing Times, 57(2), 78–84.

Patton, M. Q. (2015). Qualitative research & evaluation methods: Integrating theory and practice (4th ed.). SAGE Publications.

Sun, G. H., & Hoelscher, S. H. (2023). The ChatGPT storm and what faculty can do. Nurse Educator, 48(3), 119–124. https://doi.org/10.1097/NNE.0000000000001390

Tesh, A. S., Kautz, D. D., & Fleischer, B. (2014). Strategies for clinical teaching in intensive care settings. Dimensions of Critical Care Nursing, 33(2), 84–88. https://doi.org/10.1097/DCC.0000000000000030

Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. International Journal for Quality in Health Care, 19(6), 349–357.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. Theory into Practice, 41(2), 64–70.