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NURSING STUDENTS' EXPERIENCE USING ARTIFICIAL INTELLIGENCE IN NURSING CARE

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Abstract

The integration of Artificial Intelligence (AI) in nursing education presents both opportunities and challenges, particularly in aligning AI applications with national nursing standards. This study aimed to explore nursing students' experiences in using AI across the nursing care process, including assessment, diagnosis, intervention, rationale development, implementation, and evaluation, as well as their perceptions of AI's alignment with the nursing care standard books. A descriptive cross-sectional design was employed with a total of 186 nursing students recruited through purposive sampling. Data were collected using a structured questionnaire and analyzed using descriptive statistics. Findings revealed that students most frequently used AI during the assessment and diagnosis phases, while its application was limited in the implementation and evaluation stages. Furthermore, a majority perceived that AI recommendations were only partially aligned with the 3S books. These findings highlight the need for curriculum enhancement, including AI-specific training and the development of AI tools contextualized to local clinical guidelines. Clear policies, faculty readiness, and ethical considerations must be addressed to ensure safe and effective AI integration in nursing education. The study underscores the importance of institutional support in preparing nursing students to utilize AI responsibly and effectively within evidence-based and standardized frameworks.

Background

The development of digital technology, especially Artificial Intelligence (AI), has brought significant transformations in various fields, including nursing services and education (Salameh et al., 2025). AI has been used in various aspects of nursing practice such as clinical decision-making, patient monitoring, electronic documentation, and artificial intelligence-based simulation training (von Gerich et al., 2022). In the context of nursing education, AI has begun to be introduced as a tool to improve clinical competence, efficiency, and accuracy of nursing care (Lukkahatai & Han, 2024).

The use of technology in nursing education is becoming increasingly important in addressing the challenges and complexities of modern healthcare. The integration of technologies such as AI has revolutionized teaching methods, allowing nursing students to access flexible, interactive, and realistic learning. This technology not only enhances clinical skills through safe and risk-free simulations, but also expands access to education for students in remote areas or with time constraints. In addition, the use of mobile applications and digital platforms enables just-in-time learning, providing quick access to relevant clinical guidelines and training materials (Ronquillo et al., 2021). Thus, the use of technology in nursing education not only improves the quality of learning, but also prepares students to become adaptive and competent nurses in an ever-evolving healthcare environment.

Previous studies have focused more on the effectiveness of AI use in clinical practice by professional nurses or the development of AI systems in the health sector (Valencia-Contrera et al., 2024) (O'Connor et al., 2023). Meanwhile, studies on the subjective experiences of nursing students, especially in the use of AI for nursing care, are still very limited, especially in developing countries. In addition, most studies are still quantitative, even though a combination with a qualitative approach is important to deeply understand the perceptions, challenges and values formed from these experiences (Alenazi et al., 2025). Although the development of AI in nursing has been widely studied, especially in the professional practice of nurses, studies on nursing students' experiences in using AI during the educational process are still very limited. Students as prospective professional nurses have an important role in adopting this technology effectively early on during their education. This shows an urgent need to further examine how nursing students deal with the integration of AI in their educational process.

Nursing students as prospective professional nurses have an important role in adopting this technology ethically, critically, and adaptively. Their experiences in using AI in nursing care practice are crucial to understand, because these perceptions and experiences will influence their readiness to enter an increasingly digitalized world of work (Labrague et al., 2023). However, the use of AI in the context of nursing is not without challenges. Nursing students are faced with a dilemma between utilizing technology for efficiency and the demand to maintain the humanistic aspect in nursing services (Ahmed, 2024; Mohanasundari et al., 2023). Therefore, exploring nursing students' experiences in using AI provides in-depth insights for designing curricula and training that are in accordance with the needs and challenges of future nursing practice.

This study offers novelty in several aspects, namely focusing on the experiences of nursing students, not professional nurses, which have so far received less attention in the literature. Then the context of the direct use of AI in the nursing care process during clinical practice, not just as a learning medium or simulation. A descriptive approach that allows exploration of students' perceptions, meanings, and reflections on the role of AI in nursing practice, thus providing an empirical basis for the development of a nursing education curriculum that is adaptive to the development of AI technology. This study aims to descriptively analyze the experiences of nursing students in using AI to create nursing care reports.

Methods

This study employed a descriptive quantitative design using a survey approach to explore the experiences of nursing students in utilizing AI to support the development of nursing care plans. A total of 186 nursing students participated in the study, selected through convenience sampling. Data were collected through an online questionnaire distributed via Google Forms. The research was conducted at a private university in North Sulawesi, Indonesia. Institutional approval was obtained from the Faculty of Nursing (Approval No. 169.2/UK/FKEP/SPD/I/2025), and ethical approval from the Research Committee of the institution where the study was conducted (Number: 368/KP-FKEP.UNKLAB/PJP/I/2025).

The questionnaire consisted of three sections. The first section gathered demographic data, including age, gender, level of education, types of AI tools frequently used, and the purposes for which these AI tools were utilized. The second section comprised 14 closed-ended statements assessing the use of AI in various components of the nursing care process, including assessment, nursing diagnosis formulation, care planning, intervention selection, rationale development, implementation, and evaluation. Responses were measured on a 5-point ordinal

Likert scale: 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Always. The final section included two open-ended questions: the first asked respondents to share their opinions on whether the results generated through AI use aligned with the official guidelines outlined in the 3S books, Indonesian Nursing Diagnosis Standard (SDKI), Indonesian Nursing Outcome Standard (SLKI), and Indonesian Nursing Intervention Standard (SIKI); the second asked for suggestions or feedback related to the use of AI in nursing care planning.

A pilot study was conducted to evaluate the validity and reliability of a 14-item questionnaire designed to assess nursing students' experiences in utilizing artificial intelligence (AI) in nursing care. The pilot involved 40 nursing students as respondents. Item validity was assessed using Pearson product-moment correlation, examining the relationship between each item and the total score. The results demonstrated that all items had significance values (p-values) less than 0.05, indicating that each item was statistically significant and valid. Moreover, all correlation coefficients were marked with double asterisks (**), signifying strong and statistically significant correlations at the 0.01 level (two-tailed). The corrected item-total correlation values for all items exceeded the critical R-value of 0.312 (based on n = 40), further confirming that each item contributed meaningfully to the overall construct and possessed good internal consistency.

Reliability analysis was performed using Cronbach's Alpha, yielding a coefficient of 0.947. This value indicates excellent internal consistency reliability, well above the generally accepted threshold of 0.70 for social science instruments. The findings from the pilot study affirm that all 14 items in the questionnaire are both valid and highly reliable, making the instrument suitable for further use in exploring nursing students' experiences with AI applications in nursing care. Quantitative data were analyzed descriptively using frequency distributions, while qualitative responses from open-ended questions were analyzed narratively to identify recurring themes and insights expressed by participants.

Result and Discussion

The results of descriptive statistical analysis related to the characteristics of respondents and nursing students' experiences in using AI for nursing care are presented in tabular form. Numerical data is presented in the form of mean and standard deviation. Meanwhile, for categorical variables, a frequency distribution table is used to describe the proportion of respondents in each category. The results of the descriptive analysis are presented in detail in the following table.

Table 1 shows that 186 nursing students participated in the study, with a mean age of 22.11 years (SD = 1.69). The majority of respondents were female (80.6%), while only 19.4% were male. In terms of education level, the majority of students were enrolled in undergraduate (Bachelor) programs (88.2%), while 11.8% were students in professional nursing (Ners) programs. Regarding the type of Artificial Intelligence (AI) tool frequently used, the most frequently reported tool was ChatGPT, used by 66.1% of respondents. Other tools mentioned included Deep Seek (3.2%), Black Box AI (2.2%), Quillbot (2.2%), Meta AI via WhatsApp (2.2%), and Gemini AI (2.2%). Less frequently used tools included Perplexity (1.1%), Elicit (2.2%), DeepL (1.1%), Copilot (1.6%), and Narrow AI (1.1%).

Specifically, 15.1% of respondents reported using more than one type of AI tool. In terms of intended use, students indicated a variety of academic applications of AI tools. The most common purposes were to assist with all types of assignments (38.7%), followed by laboratory

practical assignments (33.3%), initial report assignments (19.4%), and nursing care reports for clinical practice in hospitals (8.6%). These findings illustrate the growing integration of AI tools among nursing students, particularly for academic-related tasks, with ChatGPT emerging as a dominant platform. However, the relatively limited use of AI in clinical documentation (e.g., nursing care reports) highlights potential areas for further exploration and integration in nursing education.

Table 1. Respondent Characteristics Overview

Aspects	**Mean ± Standard Deviation**	
Age (years)	22.11 ± 1.69	
	n	**Percent (%)**
Gender:		
Male	36	19.4
Female	150	80.6
Educational level:		
Bachelor	164	88.2
Ners Profession	22	11.8
Types of AI tools frequently used:		
Chat GPT	123	66.1
Deep Seek	6	3.2
Black Box AI	4	2.2
Perplexity	2	1.1
Elicit	4	2.2
Quillbot	4	2.2
Meta AI WhatsApp	4	2.2
DeepL	2	1.1
AI Gemini	4	2.2
Copilot	3	1.6
Narrow AI	2	1.1
Using more than one type of AI	28	15.1
Purposes for AI tools were utilized:		
Practical assignments in the laboratory	62	33.3
Preliminary Report Assignment	36	19.4
Nursing Care Report for clinical practice in Hospital	16	8.6
All Assignments	71	38.7

The findings of this study reveal important insights into how nursing students are engaging with AI tools in their academic and clinical learning processes. The predominance of female participants and undergraduate-level students aligns with the demographic trends commonly observed in nursing education globally (World Health Organization, 2020). The high adoption of ChatGPT (66.1%) as the most frequently used AI tool suggests that generative AI with natural language capabilities is particularly attractive and accessible for students in composing, summarizing, or interpreting nursing-related content. This is consistent with recent literature emphasizing the role of large language models in supporting nursing education and documentation (Chang et al., 2024; Topaz et al., 2023).

Interestingly, although a wide range of AI tools was reported, their utilization for clinical documentation tasks such as nursing care reports in hospital settings was relatively low (8.6%). This indicates that while students are increasingly familiar with AI for theoretical or academic purposes, there is still hesitation or limited integration of AI into more clinically oriented assignments. The concern may stem from uncertainties regarding the accuracy, standard compliance, or ethical implications of relying on AI-generated content for patient care planning (Ronquillo et al., 2022).

Furthermore, only 15.1% of students reported using more than one type of AI, suggesting that most students may lack exposure to or training in using diverse AI platforms beyond the mainstream tools. This limited scope of engagement underscores a potential gap in the digital literacy curricula within nursing education programs. It also points to the need for structured integration of AI literacy, aligned with national standards such as SDKI, SLKI, and SIKI, to ensure the safe and effective application of AI in nursing care processes.

The results also raise important questions about the readiness of nursing students to critically evaluate AI-generated content. As some students indicated using AI across all types of assignments (38.7%), it becomes essential to consider the implications of over-reliance on AI without proper guidance. Educational institutions may need to establish clear policies and pedagogical frameworks that incorporate AI use while fostering students' clinical judgment and adherence to professional standards.

Table 2. Overview of Nursing Students' Experience in Using AI in Developing Nursing Care in the Assessment Aspect

Indicators	Never		Rarely		Sometimes		Often		Always	
	n	%	n	%	n	%	n	%	n	%
Using AI to identify subjective and objective patient data in the assessment process.	48	25.8	48	25.8	46	24.7	26	14.0	18	9.7
Experience the ease of collecting patient data using AI during the assessment stage.	42	22.6	26	14.0	62	33.3	30	16.1	26	14.0

Table 2 presents the distribution of nursing students' experiences in using AI during the assessment phase of nursing care. When asked about using AI to identify subjective and objective patient data, 25.8% of respondents stated they had never done so, and another 25.8% reported rarely using AI for this purpose. Meanwhile, 24.7% indicated they sometimes used AI, 14.0% often used it, and only 9.7% reported always using AI in this context. This suggests that while AI tools are being explored for data identification in the assessment process, consistent integration into practice remains limited. Regarding the perceived ease of collecting patient data using AI during assessment, 33.3% of students reported sometimes experiencing ease, 16.1% often, and 14.0% always. However, 22.6% had never experienced such ease, and 14.0% reported rarely experiencing it. These findings imply that although a portion of students recognize AI as a helpful tool during assessment, a substantial number still lack either the experience or confidence to fully leverage these technologies during the data collection stage of nursing care.

The findings related to the assessment phase highlight a moderate but cautious engagement of nursing students with AI tools in collecting and identifying patient data. Despite the availability and increasing accessibility of AI-powered technologies, only a small proportion of respondents consistently used AI to identify subjective and objective patient data during assessments (9.7% always; 14.0% often). This indicates a tentative adoption of AI, potentially due to limited familiarity, lack of confidence in AI-generated data, or absence of formal integration within nursing curricula. Similar patterns were observed in previous studies, where students showed interest in AI but often hesitated to apply it in critical thinking or decision-making areas of clinical care (Pucchio et al., 2022).

Moreover, while 33.3% of respondents sometimes experienced the ease of using AI in data collection, only 14.0% reported always experiencing such benefits. This suggests that students may not fully perceive or realize the practical advantages of AI during the assessment stage. Factors such as insufficient digital literacy, lack of AI training, or misalignment between AI tool outputs and national nursing standards (SDKI, SLKI, SIKI) could contribute to this limited utility. These insights are consistent with Ronquillo et al. (2022), who emphasized that the integration of AI in nursing education requires more than just tool availability it demands structured instruction, critical appraisal skills, and alignment with ethical and professional standards (Smith et al., 2024).

The findings call for the development of targeted learning modules that demonstrate how AI can support structured patient assessment aligned with evidence-based guidelines. By incorporating AI literacy into core nursing education, students may be better equipped to discern appropriate contexts for AI use and maximize its benefits in clinical documentation and care planning.

Table 3. Overview of Nursing Students' Experience in Using AI in Developing Nursing Care in the Nursing Diagnosis Formulation Aspect

Indicators	Never		Rarely		Sometimes		Often		Always	
	n	%	n	%	n	%	n	%	n	%
Using AI to assist in determining nursing diagnoses based on patient data.	56	30.1	30	16.1	58	31.2	28	15.1	14	7.5
Using AI that provides appropriate nursing diagnosis recommendations.	44	23.7	20	10.8	70	37.6	38	20.4	14	7.5

Table 3 presents nursing students' experiences in utilizing AI for nursing diagnosis formulation. Approximately one-third of respondents (31.2%) reported sometimes using AI to assist in determining nursing diagnoses based on patient data, while 15.1% often and 7.5% always used AI for this purpose. However, 30.1% indicated they had never used AI in this context, and 16.1% reported rarely doing so. Similarly, when asked about using AI tools that provide nursing diagnosis recommendations, 37.6% reported sometimes using such tools, while 20.4% used them often, and 7.5% always. Notably, 23.7% of students never used AI tools to receive diagnostic suggestions, and 10.8% rarely did. These findings suggest moderate engagement with AI in the diagnostic phase, with a significant portion of students expressing limited or no experience in using such tools.

The results indicate that while AI holds potential for supporting nursing students in the diagnostic process, its actual use remains inconsistent and limited among a considerable proportion of learners. Despite technological advancements, 30.1% of students reported never using AI to formulate nursing diagnoses, and only 7.5% consistently used it. These findings are aligned with earlier observations by Chang et al. (2024), who emphasized that diagnostic reasoning in nursing is often perceived as a critical thinking skill best cultivated through human mentorship rather than automated tools.

The somewhat higher usage rate for AI-generated diagnostic recommendations (with 20.4% reporting frequent use) may suggest that students are more inclined to consult AI as a supplementary reference rather than as a primary decision-making tool. However, the relatively low "always" usage rate across both indicators suggests an underlying hesitation or lack of confidence in AI-generated diagnoses, possibly due to discrepancies between AI suggestions

and national standards such as SDKI (Standar Diagnosa Keperawatan Indonesia). These insights highlight the need for structured guidance on integrating AI into clinical reasoning education. Additionally, the gap between perceived AI capability and practical application highlights the necessity of integrating structured AI-supported diagnostic training into the nursing curriculum. Without appropriate instruction and critical thinking development, students may underutilize AI's potential in clinical reasoning and care planning. These observations align with recent studies emphasizing the importance of AI literacy in nursing education (Chang et al., 2024; Topaz et al., 2023). Moreover, while students appear open to AI use, their reliance on it is still heavily influenced by the clarity of AI output and perceived relevance to clinical judgment, echoing findings by Ronquillo et al. (2022) on AI trustworthiness and user competence in nursing contexts.

Table 4. Overview of Nursing Students' Experience in Using AI in Developing Nursing Care in the Care Planning Aspect

Indicators	Never		Rarely		Sometimes		Often		Always	
	n	%	n	%	n	%	n	%	n	%
Using AI to design specific, measurable nursing goals.	58	31.2	30	16.1	54	29.0	34	18.3	10	5.4
Using AI to determine realistic outcome criteria for patients.	72	38.7	38	20.4	44	23.7	22	11.8	10	5.4

Table 4 summarizes nursing students' experiences in using AI to support the care planning process. Regarding the use of AI to design specific and measurable nursing goals, 31.2% of students reported "never" using AI, while 29.0% used it "sometimes". Only 5.4% stated that they "always" utilized AI for this purpose. Similarly, the use of AI to determine realistic outcome criteria for patients was reported as "never" by 38.7% of students, and "sometimes" by 23.7%, with only 5.4% indicating "always" usage. These findings suggest that the majority of students use AI sporadically or not at all in formulating care plans.

The relatively low and infrequent use of AI tools in the planning phase of nursing care, as reported by students, points to several important considerations. Despite AI's potential to assist in designing measurable goals and outcome criteria that align with frameworks like the SLKI (Indonesia Nursing Outcome Standard), its practical application remains limited. The data reveal that nearly one-third of students do not utilize AI at all for goal-setting (31.2%) and an even higher proportion (38.7%) never use it to determine patient outcomes. This pattern may reflect several barriers. First, it suggests a gap in students' competencies or confidence when integrating AI recommendations into care planning, possibly due to a lack of formal training or limited integration of AI tools within clinical education environments. Secondly, students may perceive that AI tools are less reliable or too generic in providing tailored nursing goals and outcomes, which are often context-specific and require clinical reasoning rooted in human empathy and judgment (Schneidereith & Thibault, 2023).

Moreover, the planning phase demands the synthesis of assessment data and diagnostic reasoning into actionable and measurable plans. If AI tools are not explicitly designed or aligned with standardized nursing languages such as SLKI, students may find them incompatible with institutional or national standards, reducing their trust and use. These findings align with those of Zhang et al. (2023), who emphasized the importance of aligning AI decision-support systems with nursing taxonomies and student learning objectives. To improve the meaningful use of AI in nursing care planning, educators must provide students with practical experience and critical evaluation skills to assess the relevance and validity of AI-generated nursing goals and outcomes (Simms, 2024). Structured learning modules that

incorporate AI literacy, clinical simulation with AI-assisted care planning, and critical discussions on ethical use are essential to bridge this usage gap (Lane et al., 2024).

Table 5. Overview of Nursing Students' Experience in Using AI in Developing Nursing Care in the Intervention Selection Aspect

Indicators	Never		Rarely		Sometimes		Often		Always	
	n	%	n	%	n	%	n	%	n	%
Using AI to select nursing interventions appropriate to a patient's diagnosis.	62	33.3	44	23.7	54	29.0	16	8.6	10	5.4
Using AI to select evidence-based interventions.	50	26.9	38	20.4	54	29.0	30	16.1	14	7.5

Table 5 presents an overview of nursing students' experiences in using AI for selecting nursing interventions. A total of 33.3% of students reported "never" using AI to select nursing interventions appropriate to a patient's diagnosis, while 29.0% indicated using it "sometimes", and only 5.4% "always". Similarly, for the selection of evidence-based interventions, 26.9% of respondents reported "never", 29.0% "sometimes", and only 7.5% "always". These findings suggest a low to moderate level of experience among students in applying AI for intervention selection.

The findings from Table 5 highlight the underutilization of AI among nursing students in the domain of selecting appropriate and evidence-based nursing interventions. Although AI has the capacity to assist in aligning interventions with established taxonomies such as the Indonesian Nursing Intervention Standard (SIKI) or international guidelines, its adoption remains limited. One-third of the students reported never using AI for intervention mapping to diagnoses, and a quarter did not use AI to access evidence-based options. This limited engagement may be attributed to several contributing factors. First, there may be a lack of familiarity or training regarding AI-supported clinical decision-making tools that offer curated, evidence-based recommendations. Additionally, students may lack confidence in the relevance or accuracy of AI-generated interventions, particularly if these are perceived as generic or not adequately contextualized for patient-specific conditions (Naqvi et al., 2024).

These findings are consistent with research by Topaz et al. (2023), who noted that the integration of AI into nursing intervention planning is still at an early stage, especially in educational contexts. Without structured exposure to validated AI tools that are integrated into nursing education platforms or electronic health records (EHRs), students may default to manual decision-making methods and traditional references. To support the development of AI competency in clinical decision-making, nursing curricula should embed practical simulations using AI tools that provide real-time feedback and alignment with clinical reasoning standards. This approach may enhance students' readiness to utilize AI systems to support evidence-based practice, reduce cognitive burden, and optimize care outcomes.

Table 6. Overview of Nursing Students' Experience in Using AI in Developing Nursing Care in the Rationale Development Aspect

Indicators	Never		Rarely		Sometimes		Often		Always	
	n	%	n	%	n	%	n	%	n	%
Using AI to understand the scientific rationale behind selected nursing interventions.	32	17.2	20	10.8	54	29.0	42	22.6	38	20.4
Using AI to understand the	42	22.6	30	16.1	62	33.3	38	20.4	14	7.5

relationship between nursing diagnoses, interventions, and rationale.										

The results presented in Table 6 suggest that among the various stages of nursing care development, rationale formulation is the area where students engage more frequently with AI tools. A substantial proportion of students use AI at least occasionally to understand the scientific basis for nursing actions and to explore the logical connections among diagnoses, interventions, and rationales. This aligns with the critical thinking component of clinical reasoning that is emphasized in nursing education.

AI-driven platforms especially those integrated with evidence-based clinical knowledge bases can effectively support students in visualizing clinical pathways and understanding the rationale behind decision-making (Krive et al., 2023). The relatively high percentage of students who "often" or "always" use AI in this aspect may be due to the accessibility and intuitive presentation of information offered by AI interfaces, which often summarize complex clinical knowledge in understandable formats. This finding is supported by prior studies, such as by Bittner et al. (2022), which emphasized the role of AI in enhancing critical thinking by contextualizing nursing actions within biological, psychological, and social frameworks. Moreover, when AI is used to scaffold learning in this way, it not only supports knowledge retention but may also improve students' ability to explain and justify clinical decisions an essential skill in nursing practice. However, it is notable that a portion of students still "never" or "rarely" utilize AI for this purpose. This highlights a possible disparity in AI literacy or availability of appropriate tools, suggesting a need for faculty development and infrastructure investment to ensure equitable access and guidance.

Table 7. Overview of Nursing Students' Experience in Using AI in Developing Nursing Care in the Implementation Aspect

Indicators	Never		Rarely		Sometimes		Often		Always	
	n	%	n	%	n	%	n	%	n	%
Using AI to develop systematic nursing care implementation steps.	66	35.5	36	19.4	48	25.8	30	16.1	6	3.2
Using AI as a guide in implementing nursing actions practically.	58	31.2	38	20.4	54	29.0	30	16.1	6	3.2

Table 7 outlines the nursing students' experiences with AI utilization in the implementation phase of nursing care. For the indicator "Using AI to develop systematic nursing care implementation steps", 35.5% of students responded "never", followed by 19.4% "rarely", 25.8% "sometimes", 16.1% "often", and 3.2% "always". Regarding "Using AI as a guide in implementing nursing actions practically", 31.2% responded "never", 20.4% "rarely", 29.0% "sometimes", 16.1% "often", and 3.2% "always". These findings indicate relatively low utilization of AI tools in the implementation phase compared to other components of the nursing process.

The results in Table 7 reveal that the use of AI in the implementation phase of nursing care is still limited among students. A considerable proportion reported "never" or "rarely" using AI to develop systematic steps or as a practical guide during nursing interventions. This underutilization may be attributed to several factors, including the lack of direct integration of AI-based tools in clinical practice environments, limited training in AI-assisted procedural guidance, or concerns about the reliability of AI recommendations in hands-on situations. Despite the known potential of AI in standardizing and streamlining clinical procedures (Topaz

et al., 2023), nursing students appear more cautious in applying AI during the actual implementation of care. Unlike the planning or rationale development stages where AI provides cognitive support implementation demands real-time decision-making, manual skills, and human interaction, which may not yet be fully supported by current AI technologies in clinical education settings.

Furthermore, existing AI platforms may not offer user-friendly, context-specific procedural guides that align with students' clinical learning objectives or simulation-based practices (Kollerup et al., 2025). These limitations suggest a need to develop AI tools that are more interactive and compatible with nursing lab simulations or mobile bedside applications. Faculty guidance and organizational support are also essential to build student confidence in using AI beyond planning and reasoning toward actionable clinical execution. This underlines the importance of bridging the gap between technological potential and practical implementation by integrating AI literacy into clinical training modules.

Table 8. Overview of Nursing Students' Experience in Using AI in Developing Nursing Care in the Evaluation Aspect

Indicators	Never		Rarely		Sometimes		Often		Always	
	n	%	n	%	n	%	n	%	n	%
Using AI to assess the effectiveness of nursing care that I have provided.	56	30.1	42	22.6	52	28.0	26	14.0	10	5.4
Experienced that AI can provide recommendations for modification of nursing care if needed.	40	21.5	28	15.1	70	37.6	38	20.4	10	5.4

Table 8 presents nursing students' experiences in using AI during the evaluation phase of nursing care. When asked about "Using AI to assess the effectiveness of nursing care that I have provided", 30.1% responded "never", 22.6% "rarely", 28.0% "sometimes", 14.0% "often", and 5.4% "always". In the second indicator, "Experienced that AI can provide recommendations for modification of nursing care if needed", 21.5% reported "never", 15.1% "rarely", 37.6% "sometimes", 20.4% "often", and 5.4% "always". These results suggest a moderate level of engagement with AI in evaluating nursing interventions, with a tendency toward occasional usage.

Findings from Table 8 indicate that the utilization of AI in the evaluation stage of nursing care is emerging but not yet widespread. While a sizable proportion of students sometimes or often rely on AI to evaluate the effectiveness of their care or receive recommendations for adjustments, the percentages remain relatively modest in the "often" and "always" categories. The moderate frequency of AI use in this phase may reflect students' growing awareness of the potential of AI to support reflective practice and data-driven evaluation. AI tools have been increasingly recognized for their capability to synthesize clinical outcomes, flag inconsistencies, and suggest improvements based on real-time or cumulative data inputs (Chen et al., 2023). However, the fact that over half of the respondents still fall into the "never" or "rarely" categories for both indicators highlights existing barriers.

These barriers may include insufficient exposure to AI-supported evaluation platforms, lack of integration of these tools into nursing curricula or simulation labs, or a reliance on traditional evaluation methods such as manual chart audits or instructor feedback (Rajabi & Etminani, 2021). Additionally, students may feel uncertain about the credibility or clinical applicability of AI-generated evaluation insights, particularly if they are not validated by faculty or clinical preceptors. Given the importance of accurate and timely evaluation in ensuring quality patient

outcomes and continuous care improvement, there is a clear need to promote AI competency among nursing students. This includes structured training on how AI can support critical thinking in evaluation, exposure to platforms that offer outcome analysis, and faculty endorsement of AI-supported reflective practices.

Table 9. Overview of Nursing Students' Opinion about AI use aligned with the official guidelines outlined in the 3S books

Aspects	n	Percent (%)
Not in accordance with the 3S books.	45	24.2
Some are in accordance with the 3S books but some are not.	131	70.4
All are in accordance with the 3S books.	10	5.4
Total	186	100

Table 9 illustrates nursing students' opinions on whether AI use in nursing care aligns with the official guidelines outlined in the 3S books. The majority of students (70.4%) stated that some AI uses are in accordance with the 3S books but some are not. Meanwhile, 24.2% believed that AI use is not in accordance with the 3S books, and only 5.4% stated that all AI use is in accordance with the 3S guidelines. This indicates a general perception of partial alignment between AI applications and established nursing care standards.

The findings in Table 9 reveal a critical perspective among nursing students regarding the alignment of AI tools with standardized nursing guidelines, specifically the 3S books. While most students (70.4%) recognize that some aspects of AI align with the 3S framework, there is also a significant level of skepticism, with nearly a quarter of respondents (24.2%) perceiving a complete lack of alignment. This discrepancy suggests that while AI technologies offer promising support in nursing practice, there remains a gap in standardization and validation in accordance with national or institutional protocols. The 3S books, which typically encapsulate SDKI, SLKI, and SIKI, serve as core references for evidence-based practice in Indonesia. Therefore, tools or systems that are not aligned with these standards may be viewed as unreliable or inappropriate for direct clinical application.

The minimal proportion of students (5.4%) who believe that all AI use is aligned with the 3S guidelines could indicate either a lack of exposure to rigorously validated AI systems or insufficient education about how to assess the validity and standard compliance of AI tools. It also reflects a cautionary attitude, which is reasonable in the context of patient safety and clinical accountability. Educational institutions and developers of AI-based nursing tools need to collaborate in ensuring that these technologies are reviewed, endorsed, or adapted in accordance with national guidelines like the 3S. Incorporating these standards into AI models could significantly enhance student trust and encourage safer integration into practice (De Gagne, 2023).

In response to the open-ended question regarding suggestions for improving AI use in nursing care, the majority of participants recommended the development of an official digital or online version of the national nursing care standards, namely the “3S books”. Students expressed that when using AI tools particularly those available online, they often encountered discrepancies between AI-generated content and the standards taught in their nursing curriculum (Ejaz et al., 2022). They believed that integrating the 3S databases directly into AI platforms would improve consistency and accuracy in nursing care planning and enhance trust in AI-generated outputs.

The qualitative responses underscore a critical need for synergy between AI tools and nationally recognized nursing standards. Students' suggestion to create a digital or online version of the 3S books reflects their concern about inconsistencies between AI-generated nursing plans and standardized guidelines. This highlights an actionable gap: the absence of centralized, accessible digital clinical standards may limit the accuracy and applicability of AI in nursing education. Embedding verified 3S databases within AI platforms could bridge this gap, improve learning outcomes, and support safe, standardized nursing practice.

Conclusion

This study reveals that nursing students' experience in utilizing artificial intelligence (AI) to support nursing care development remains varied and relatively limited. In the rationale development domain, most students reported only occasional use of AI to understand the scientific basis of nursing interventions and their relationship to nursing diagnoses. Similarly, in the implementation domain, students frequently reported using AI sometimes to develop systematic care plans and as a guide in carrying out nursing actions. In the evaluation domain, AI was also occasionally used to assess the effectiveness of nursing care and to receive recommendations for modification. These findings indicate that while AI is being used to some extent, its integration into the nursing education and care process is not yet consistent or optimal.

Furthermore, students expressed concerns about the alignment of AI-generated recommendations with national nursing standards. A majority stated that AI use is partially aligned with the official "3S books", while nearly one-fourth perceived it as not aligned at all. This highlights a critical gap in the perceived reliability and contextual appropriateness of AI tools within the local clinical and educational setting.

The findings suggest that integrating AI into nursing education requires deliberate curricular reform, emphasizing both technical proficiency and alignment with national standards. Enhancing students' digital literacy and providing access to validated, context-relevant AI tools are essential steps toward meaningful adoption. The perceived misalignment between AI-generated recommendations and the 3S guidelines highlights the urgent need for the development of AI systems tailored to the local clinical context. Furthermore, ethical concerns and patient safety must be prioritized through education that fosters critical thinking and responsible AI use. Overall, this study underscores the importance of institutional readiness and policy support in preparing future nurses for a digitally enhanced healthcare environment.

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