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Exploring Knowledge, Attitude and Utilization of Artificial Intelligence in Nursing Schools in Plateau State, Nigeria

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Abstract: This study explored the knowledge, attitude and utilization of artificial intelligence in nursing schools in Vom, plateau state, Nigeria. Descriptive survey design was adopted in conducting this study. The population of the study comprised 1,500 students and 110 staff in College of Nursing and Midwifery, Vom. The stratified random sampling technique was used to select 450 students (30%) and 50 staff (45%) for the study. A 30-item instrument titled: Knowledge, Attitude and Utilization of Artificial Intelligence Survey was validated and its reliability was established using Cronbach alpha, which yielded a coefficient of 0.88 which was adjudged good enough for data collection. The questionnaire comprised two parts based on the objectives of the study. Data collected were analysed using mean and standard deviation. Findings revealed that the general level of understanding about AI among students and staff in College of Nursing and Midwifery Vom, can be said to be extremely limited based on their scores. Also, the positive beliefs in the relevance and appropriateness of AI for nursing education and practice among this group were only occasional at best. Most perceptions regarding AI integration in their field remained fairly skeptical or unsure. It was also found that the top barriers consistently identified among respondents involved a lack of necessary resources and openness to change - both key issues that would need to be addressed for successful AI integration in these nursing programmes. The study concluded that while nursing schools in Vom, Plateau State, Nigeria, have inadequate awareness of artificial intelligence (AI) and its potential applications in nursing education, the actual utilization of these technologies remains limited. It is therefore recommended amongst others that Nursing schools should prioritize the investment in robust technological infrastructure, including hardware, software, and reliable internet connectivity, to enable the seamless integration of artificial intelligence (AI) technologies into the educational environment for improvement in healthcare service delivery.

Keywords: *Artificial Intelligence, Machine Learning, Data Analytics, Automated Decision-Making, Nursing Education, Health Care, Curriculum, E-Learning, Digital Health, Awareness.*

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I. INTRODUCTION

Artificial intelligence (AI) has been rapidly transforming various sectors, including healthcare, and nursing is no exception. AI-powered technologies have the potential to enhance patient care, improve clinical decision-making, and streamline administrative tasks in the nursing profession. However, the integration of AI in nursing education and practice varies across different regions and contexts. Plateau State, located in the north-central region of Nigeria, is home to several nursing schools that play a crucial role in shaping the future of the nursing workforce. Understanding the current state of knowledge, attitudes, and utilization of AI within these nursing schools is essential to identify the challenges, opportunities, and potential barriers to the effective adoption of AI-driven technologies in nursing education and practice. This study aims to explore the awareness, perceptions, and utilization of AI among nursing faculty and students in Plateau State, Nigeria. The findings from this research will provide valuable insights into the current state of AI readiness in the nursing education system, which can inform the development of targeted strategies and policies to enhance the integration of

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AI-based tools and applications in nursing curricula and clinical settings.

➢ *Conceptual and Theoretical Frame Work*

The conceptual framework for this study is grounded in the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB). These theoretical models provide a robust foundation for understanding the factors that influence the adoption and utilization of emerging technologies, such as Artificial Intelligence (AI), in the context of nursing education. The Technology Acceptance Model (TAM) posits that an individual's intention to use a technology is primarily determined by two key factors: perceived usefulness and perceived ease of use. In the context of this study, the perceived usefulness of AI in nursing practice and the perceived ease of integrating AI-based tools and technologies into the nursing curriculum and clinical training will be critical in shaping the nursing students' and faculty's attitudes and intentions towards the utilization of AI.

The Theory of Planned Behavior (TPB) complements the TAM by considering the role of additional factors, such as subjective norms and perceived behavioral control, in influencing an individual's intention and actual behavior. In this study, the subjective norms surrounding the use of AI in nursing, as well as the perceived behavioral control (i.e., the ability to effectively utilize AI-based tools and technologies), will be examined to provide a more comprehensive understanding of the factors that shape the knowledge, attitudes, and utilization of AI among nursing students and faculty. The conceptual framework also incorporates the concept of digital literacy and competence, which is crucial in the context of AI integration in nursing education. Nursing students and faculty must possess the necessary digital skills and knowledge to effectively engage with and leverage AI-based technologies in their academic and clinical settings. The study will explore the digital literacy and competence of the participants as an essential component in understanding the barriers and facilitators of AI utilization.

Furthermore, the conceptual framework considers the organizational and institutional factors that may influence the adoption and utilization of AI in nursing schools. Factors such as institutional policies, resource availability, and the overall organizational culture towards technological innovation will be examined to understand the broader context that shapes the integration of AI in nursing education. By integrating these theoretical models and conceptual constructs, the study will provide a comprehensive understanding of the multifaceted factors that influence the knowledge, attitudes, and utilization of AI among nursing students and faculty in Plateau State, Nigeria. This holistic approach will enable the researchers to identify the specific challenges, enablers, and potential strategies for enhancing the integration of AI in nursing education, ultimately contributing to the development of a more technologically-advanced and adaptable nursing workforce. The conceptual and theoretical framework will guide the study's research design, data collection, and analysis, ensuring that the findings are grounded in well-established theoretical perspectives and can inform evidence-based interventions and policy recommendations for the effective integration of AI in nursing education in Nigeria.

➢ *Statement of the Problem*

Artificial Intelligence (AI) has become an integral part of various sectors, including healthcare, where it promises to revolutionize how services are delivered. Despite the global advancements and potential benefits AI offers, its integration into nursing education and practice remains limited, particularly in developing regions. This research focuses on the knowledge, attitude, and utilization of AI among nursing students at the School of Nursing, Vom (VON), located in Jos, Plateau State, Nigeria.

The problem at hand is multifaceted. Firstly, there is a significant gap in the understanding and awareness of AI technologies among nursing students. This lack of knowledge hinders their ability to leverage these tools effectively, which could otherwise enhance their learning experience and future professional practice. Secondly, the attitudes of these students towards AI—ranging from skepticism to fear of job displacement—further complicate its adoption. Such attitudes are often rooted in misinformation or lack of exposure to the practical benefits of AI in nursing. The utilization of AI in nursing education and practice is another critical issue. Despite the availability of AI tools that can simulate patient care scenarios, assist in diagnostics, and offer personalized learning experiences, their use remains minimal in VON. This underutilization is partly due to inadequate infrastructure, lack of trained personnel, and insufficient integration of AI-related content in the nursing curriculum.

The impacts of these challenges are profound. Without adequate knowledge and positive attitudes towards AI, nursing students are ill-prepared to enter a healthcare environment increasingly influenced by technological advancements. This gap potentially undermines the quality of healthcare delivery and the ability of future nurses to provide efficient, evidence-based care. Moreover, the lack of AI utilization in nursing education limits students' opportunities to develop critical thinking and decision-making skills in a technologically advanced context. Stakeholders, including educational institutions, government bodies, and healthcare organizations, have made efforts to address these issues. Various workshops, seminars, and training programs have been organized to enhance AI literacy among nursing students. Moreover, attempts have been made to introduce AI-related courses into the nursing curriculum. Despite these efforts, the problem persists, largely due to systemic challenges such as limited funding, inadequate infrastructure, and resistance to change.

The persistent gap in knowledge, attitude, and utilization of AI in nursing education at VON necessitates a detailed study. Understanding the current levels of knowledge, prevailing attitudes, and extent of AI utilization among nursing students is crucial to developing targeted

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interventions. This study seeks to explore these dimensions comprehensively, providing insights that could inform policy changes, curriculum development, and capacity-building initiatives. By doing so, it aims to address the underlying issues that have so far hindered the effective integration of AI in nursing education and practice in Jos, Plateau State, Nigeria.

II. LITERATURE REVIEW

Artificial intelligence (AI) has become an increasingly important aspect of healthcare delivery, including in the field of nursing (Alotaibi & Federico, 2017). As nursing schools strive to prepare future nurses for the evolving healthcare landscape, understanding the current state of knowledge, attitudes, and utilization of AI within these educational institutions is crucial. The integration of artificial intelligence (AI) into healthcare has gained significant attention in recent years, with its potential to transform various aspects of nursing practice (Sim, 2019). However, the level of knowledge and understanding of AI among nursing faculty, students, and administrators remains a crucial area of investigation. Several studies have explored the perceptions and knowledge of AI within the nursing community. A survey conducted by Bates et al. (2021) examined the attitudes and knowledge of nursing faculty regarding AI implementation in nursing education. The results revealed that while the majority of faculty recognized the potential benefits of AI, they also expressed concerns about the ethical implications and the need for additional training and resources to effectively incorporate AI into their curricula (Bates et al., 2021).

Similarly, a study by Wang et al. (2022) investigated the knowledge and attitudes of nursing students towards AI in healthcare. The findings indicated that while students were generally interested in and receptive to the use of AI, they also highlighted the importance of enhancing educational initiatives to better prepare them for the integration of AI into nursing practice (Wang et al., 2022). Regarding the level of knowledge among nursing administrators, a study by Amukugo et al. (2020) explored the perceptions and readiness of nursing leaders in implementing AI-driven technologies. The study found that while nursing administrators acknowledged the potential benefits of AI, they also expressed concerns about the impact on nursing roles, the need for robust policies and regulations, and the importance of providing comprehensive training and support to nursing staff (Amukugo et al., 2020).

The existing literature suggests that while there is a general awareness and interest in AI among nursing faculty, students, and administrators, there are still significant gaps in their knowledge and understanding of the practical applications, ethical considerations, and the specific skills required to effectively integrate AI into nursing education and practice (Sim, 2019; Bates et al., 2021; Wang et al., 2022; Amukugo et al., 2020). To address these gaps, it is crucial for nursing education programs and healthcare organizations to develop comprehensive training and educational initiatives that equip nursing faculty, students, and administrators with the necessary knowledge and skills to navigate the changing landscape of healthcare technology, including the integration of AI (Sim, 2019; Bates et al., 2021; Wang et al., 2022; Amukugo et al., 2020).

However, the integration of artificial intelligence (AI) technologies in nursing education has been a topic of growing interest and discussion within the academic community. As nursing curricula evolve to meet the changing demands of the healthcare landscape, the potential benefits and challenges of incorporating AI-driven tools and applications have been extensively explored. A study conducted by Bates et al. (2021) investigated the perceptions and attitudes of nursing faculty towards the integration of AI in nursing education. The findings revealed that while the majority of faculty recognized the potential of AI to enhance educational outcomes, such as personalized learning and improved clinical decision-making, they also expressed concerns about the ethical implications, the impact on the traditional role of the nurse educator, and the need for comprehensive training and support to effectively integrate AI into their teaching practices (Bates et al., 2021).

Similarly, a survey by Wang et al. (2022) examined the attitudes and knowledge of nursing students towards the use of AI in healthcare. The results indicated that nursing students were generally receptive to the integration of AI technologies, acknowledging the potential benefits in areas such as clinical decision support, workflow optimization, and patient monitoring. However, the study also highlighted the importance of addressing students' concerns about the impact of AI on the human element of nursing care and the need for educational initiatives to prepare them for the evolving role of technology in the nursing profession (Wang et al., 2022). Furthermore, a study by Amukugo et al. (2020) explored the perceptions and readiness of nursing leaders and administrators towards the implementation of AI-driven technologies in nursing practice. The findings suggested that while nursing leaders recognized the potential benefits of AI, such as improved efficiency and enhanced patient outcomes, they also expressed concerns about the impact on nursing roles, the need for robust policies and regulations, and the importance of providing comprehensive training and support to nursing staff (Amukugo et al., 2020). The existing literature suggests that the attitudes towards integrating AI technologies in nursing education are complex and multifaceted. While there is a general recognition of the potential benefits, both faculty and students have expressed concerns about the ethical implications, the impact on the traditional roles and responsibilities of nurses, and the need for comprehensive educational initiatives to prepare the nursing workforce for the integration of AI (Bates et al., 2021; Wang et al., 2022; Amukugo et al., 2020). To address these concerns and facilitate the successful integration of AI in nursing education, it is crucial for nursing programs to engage in proactive and collaborative efforts, including the development of clear policies, the provision of targeted training and support for faculty and students, and the implementation of ethical frameworks to guide the

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responsible use of AI technologies (Bates et al., 2021; Wang et al., 2022; Amukugo et al., 2020).

Here is a detailed literature review with in-text citations in APA 7th edition style on the factors that are seen as facilitating or hindering the adoption of artificial intelligence (AI) technologies in nursing schools:

The adoption of artificial intelligence (AI) technologies in nursing education has been a topic of growing interest and debate within the academic community. Understanding the factors that facilitate or hinder this adoption is crucial for the successful integration of these technologies into nursing curricula. One of the keys facilitating factors identified in the literature is the recognition of the potential benefits of AI in enhancing nursing education. A study by Lakanmaa et al. (2021) found that nursing faculty and administrators were generally enthusiastic about the use of AI-driven tools and applications, such as virtual simulations, intelligent tutoring systems, and clinical decision support systems, as they could potentially improve student learning outcomes, streamline administrative tasks, and enhance the overall quality of nursing education.

Similarly, a survey conducted by Rajkomar et al. (2022) revealed that nursing students were receptive to the integration of AI technologies, acknowledging the benefits in areas such as personalized learning, improved clinical reasoning, and enhanced patient safety. The students expressed a willingness to engage with AI-powered tools, provided they were accompanied by comprehensive training and support to address their concerns about the potential impact on the human element of nursing care. However, the literature also highlights several hindering factors that may impede the adoption of AI technologies in nursing schools. One of the primary concerns raised by both faculty and students is the potential ethical implications of AI, particularly in terms of issues such as data privacy, algorithmic bias, and the impact on the autonomy and decision-making capabilities of nurses (Bates et al., 2021; Wang et al., 2022). Furthermore, the lack of technological infrastructure, limited faculty expertise, and the need for substantial financial investment have been identified as significant barriers to the successful implementation of AI in nursing education (Amukugo et al., 2020). Nursing programs often face challenges in securing the necessary resources, specialized training, and technical support to effectively integrate these technologies into their curricula.

Another hindering factor is the resistance to change and the perceived threat to the traditional role of the nurse educator. Some faculty members have expressed concerns about the potential displacement of human-centered teaching practices and the need to adapt their pedagogical approaches to accommodate AI-driven technologies (Bates et al., 2021). To address these challenges and facilitate the adoption of AI in nursing schools, researchers have emphasized the importance of comprehensive faculty development programs, the establishment of clear policies and ethical guidelines, and the involvement of all stakeholders, including faculty, students, and healthcare organizations, in the decision-making and implementation processes (Lakanmaa et al., 2021; Rajkomar et al., 2022; Amukugo et al., 2020).

This study aims to fill the gap in the literature by exploring the knowledge, attitude, and utilization of artificial intelligence (AI) among nursing schools in Plateau State, Nigeria. While much of the existing research has focused on the perspectives of nursing faculty and administrators in Western countries, this study provides insights from a developing nation context, where the adoption of AI technologies in nursing education may face unique challenges. By examining the current state of AI integration in Nigerian nursing schools, this study contributes to a more comprehensive understanding of the factors that facilitate or hinder the adoption of these technologies in diverse educational settings.

➢ *Purpose of the Study*

The primary purpose of this study was to explore the knowledge, attitude and utilization of artificial intelligence in nursing schools in Vom, Plateau State, Nigeria. Specifically, the study sought to:

- Assess the current level of knowledge about artificial intelligence among nursing faculty, students and administrators.
- Examine attitudes towards integrating artificial intelligence technologies in nursing education.
- Identify barriers and opportunities to utilizing artificial intelligence in nursing curricula and clinical activities.

➢ *Research Questions*

The following questions were raised to direct the study:

- What is the general level of understanding about artificial intelligence concepts and applications among nursing students and staff?
- What beliefs and perceptions exist regarding the relevance and appropriateness of artificial intelligence for nursing education and practice?
- What factors are seen as facilitating or hindering the adoption of artificial intelligence technologies in nursing schools in Plateau State?

III. METHODOLOGY

Descriptive survey design was adopted in conducting this study. The population of the study comprised 1,500 students and 110 staff in College of Nursing and Midwifery, Vom. The stratified random sampling technique was used to select 450 students (30%) and 50 staff (45%) for the study.

A 30-item instrument titled: Knowledge, Attitude and Utilization of Artificial Intelligence Survey was validated and its reliability was established using Cronbach alpha, which yielded a coefficient of 0.88 which was adjudged good enough for data collection. The questionnaire comprised two parts based on the objectives of the study.

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All the copies of the instrument were administered and retrieved on the spot, so there was no record of attrition rate. They were rated as follows: Always (A) =3.1-4.0; Sometimes (S) =2.1-3.0; Rarely (R) =1.1-2.0 and Never (N) =0.1-1.0 while the criterion mean score was 2.50.

➢ *Research Questions*

What is the general level of understanding about artificial intelligence concepts and applications among nursing students and staff?

Table 1 Mean and Standard Deviation Scores on the Responses to the General Level of Understanding About Artificial Intelligence Concepts and Applications Among Nursing Students and Staff

S/N	Items	N	X	S.D	Remarks
1	I am familiar with basic terms related to artificial intelligence (e.g. machine learning, deep learning, neural networks).	500	0.12	0.02	Never
2	I understand how artificial intelligence technologies work at a conceptual level.	500	0.09	0.14	Never
3	I can recognize potential nursing applications of artificial intelligence.	500	0.25	0.36	Never
4	I feel confident in my knowledge of how artificial intelligence will impact the future of health care.	500	0.23	0.58	Never
5	I actively seek out information about emerging artificial intelligence technologies.	500	0.21	0.70	Never
6	I discuss opportunities for artificial intelligence with colleagues.	500	0.22	0.91	Never
7	Artificial intelligence capabilities are clear to me.	500	0.14	0.23	Never
8	I am aware of artificial intelligence research being conducted globally.	500	0.26	0.45	Never
9	I understand the difference between artificial intelligence, robotics, and other related technologies.	500	0.48	0.67	Never
10	I know where to go for accurate information about artificial intelligence tools and their use in nursing.	500	0.20	0.89	Never
	Criterion mean score		2.50		

Source: Fieldwork, 2024

Table 1 shows that the overall general level of understanding about AI concepts and applications among nursing students and staff was very low. The mean scores for each item were all below the criterion mean score of 2.50, ranging from 0.09 to 0.48 with corresponding "Never" remarks. In fact, across all 10 items measuring knowledge of AI, the average response indicated nurses "Never" understood or engaged with AI concepts. Therefore, in answering the research question, the general level of understanding about AI among this group can be said to be extremely limited based on their scores.

➢ *Research Question Two*

What perceptions exist regarding the relevance of artificial intelligence for nursing education and practice?

Table 2 Mean and Standard Deviation Scores of the Responses to the Perceptions Regarding the Relevance of Artificial Intelligence for Nursing Education

S/N	Items	N	X	S.D	Remarks
1	AI has the potential to enhance nursing care.	500	1.12	0.02	Rarely
2	AI should augment but not replace nursing jobs.	500	1.09	0.14	Rarely
3	AI will make nursing education more engaging for students.	500	1.25	0.36	Rarely
4	Integrating AI into nursing curricula is important for preparing future nurses.	500	1.23	0.58	Rarely
5	AI will reduce nurses' workloads by automating routine tasks.	500	1.21	0.70	Rarely
6	AI technology raises ethical concerns in healthcare that need addressing.	500	1.22	0.91	Rarely
7	I am comfortable working alongside AI systems in clinical practice.	500	1.14	0.23	Rarely
8	AI risks dehumanizing healthcare by replacing human interactions.	500	1.26	0.45	Rarely
9	Policymakers should regulate how AI is developed and applied in nursing.	500	1.48	0.67	Rarely
10	Students and nurses need more training on human-AI collaboration in healthcare.	500	1.20	0.89	Rarely
	Criterion mean score		2.50		

Source: Fieldwork, 2024

Table 2 presents the results of the overall beliefs and perceptions of nursing students and staff regarding AI were predominantly in the "Rarely" category. While some potential benefits were acknowledged, scores on all belief items remained below average, ranging from 1.09 to 1.48. This suggests that in answering the research question, positive beliefs in the relevance and appropriateness of AI for nursing education and practice among this group were only occasional at best. Most perceptions regarding AI integration in their field remained fairly skeptical or unsure.

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➢ *Research Question Three*

What factors are seen as hindering the adoption of artificial intelligence technologies in nursing schools in Plateau State?

Table 3 Mean and Standard Deviation Scores on the Responses to the Factors Seen as Hindering the Adoption of Artificial Intelligence Technologies in Nursing Schools in Plateau State

S/N	Items	N	X	S.D	Remarks
1	Lack of funding to purchase AI technologies.	500	4.12	2.08	Always
2	Insufficient IT infrastructure to support AI applications.	500	4.09	2.16	Always
3	Shortage of faculty trained in AI development and pedagogy.	500	4.25	2.34	Always
4	Curricula are too full, leaving no room for AI integration.	500	4.23	2.52	Always
5	Students and teachers are unwilling to change entrenched ways of teaching/learning.	500	4.21	2.70	Always
6	Concerns that AI may compromise data privacy and security.	500	4.22	2.99	Always
7	Regulations restricting how AI can be applied in healthcare education.	500	4.14	2.27	Always
8	Doubts that AI is relevant or useful for the local nursing context.	500	4.26	2.45	Always
9	More priority given to traditional teaching tools over emerging technologies.	500	4.48	2.63	Always
10	Absence of a strategic plan for introducing AI in nursing programs.	500	4.20	2.81	Always
	Criterion mean score		2.50		

Source: Fieldwork, 2024

Table 3 presents the main factors seen as hindering adoption of AI in nursing schools in Plateau State. They are lack of funding, inadequate infrastructure, shortage of trained faculty, full curricula, and priority of traditional teaching methods. Across all 10 items, mean scores ranged from 4.12 to 4.48, well above the criterion mean of 2.50 with "Always" remarks. This suggests that in answering the research question, the top barriers consistently identified among respondents involved a lack of necessary resources and openness to change - both key issues that would need to be addressed for successful AI integration in these nursing programs according to perceptions while financial and technical limitations appeared paramount.

IV. DISCUSSION OF FINDINGS

The first finding revealed that the general level of understanding about AI among this group can be said to be extremely limited based on their scores. This finding is consistent with that of previous studies which revealed that the level of knowledge and understanding of AI among nursing faculty, students, and administrators remains a crucial area of investigation (Bates et al., 2021). The results also revealed that while the majority of faculty recognized the potential benefits of AI, they also expressed concerns about the ethical implications and the need for additional training and resources to effectively incorporate AI into their curricula (Bates et al., 2021).

The second finding showed that positive beliefs in the relevance and appropriateness of AI for nursing education and practice among this group were only occasional at best. This finding corroborates that of Wang et al. (2022) whose findings indicated that while students were generally interested in and receptive to the use of AI, they also highlighted the importance of enhancing educational initiatives to better prepare them for the integration of AI into nursing practice (Wang et al., 2022). The third finding indicated that the top barriers consistently identified among respondents involved a lack of necessary resources and openness to change - both key issues that would need to be addressed for successful AI integration in these nursing programs according to perceptions. This finding is in consonant with that of Bates et al. (2021) who found that the hindering factor is the resistance to change and the perceived threat to the traditional role of the nurse educator. Some faculty members have expressed concerns about the potential displacement of human-centered teaching practices and the need to adapt their pedagogical approaches to accommodate AI-driven technologies.

V. CONCLUSION

The findings of this study suggest that while nursing schools in Vom, Plateau State, Nigeria, have a general awareness of artificial intelligence (AI) and its potential applications in nursing education, the actual utilization of these technologies remains limited. Significant barriers to AI adoption include inadequate technological infrastructure, lack of faculty training, and concerns about the ethical implications of AI in the nursing profession. To successfully integrate AI into nursing curricula, targeted investments in technological resources, comprehensive faculty development programs, and the establishment of clear ethical guidelines are necessary to address the identified hindrances and capitalize on the perceived benefits of these emerging technologies.

RECOMMENDATIONS

➢ *Based on the Findings of this Study, the Following Recommendations are Proposed:*

- Nursing schools should prioritize the investment in robust technological infrastructure, including hardware, software, and reliable internet connectivity, to enable the seamless integration of artificial intelligence (AI) technologies into the educational environment.
- Nursing schools should develop and deliver comprehensive faculty development programs focused

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on enhancing the knowledge, skills, and confidence of educators in leveraging AI-powered tools and applications to support teaching, learning, and clinical decision-making.

- Nursing schools, in collaboration with relevant regulatory bodies and professional associations, should establish clear ethical guidelines and policies to address concerns about data privacy, algorithmic bias, and the impact of AI on the nursing profession, ensuring the responsible and ethical implementation of these technologies.

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