



**DEVELOPING AN AI-POWERED ADAPTIVE LEARNING PLATFORM FOR
PERSONALIZING CONTINUING PROFESSIONAL DEVELOPMENT (CPD) FOR NURSES
IN RIVERS STATE UNIVERSITY TEACHING HOSPITAL, PORT HARCOURT, RIVERS
STATE**

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Abstract

This study focuses on developing an AI-powered adaptive learning platform to personalize Continuing Professional Development (CPD) for nurses at the Rivers State University Teaching Hospital (RSUTH) in Port Harcourt. The problem is exacerbated by limited resources, high workloads, and the diverse specializations within nursing at RSUTH. This study employs a mixed-methods research design, integrating both quantitative and qualitative data collection strategies. A sample of 250 nurses and 15 nurse educators will be selected using stratified and purposive sampling techniques. Data will be gathered through structured questionnaires and semi-structured interviews. Quantitative data from the questionnaires will be analyzed using descriptive statistics, specifically mean scores, to assess perceptions and identify trends. Qualitative data from interviews will undergo thematic analysis to extract deeper insights into experiences and needs. The study is anchored on the Technology Acceptance Model (TAM) as its theoretical framework, which guides the understanding of how perceived usefulness and perceived ease of use influence the adoption of the proposed AI platform. Findings are anticipated to reveal a significant gap in current CPD delivery and a strong readiness for a technology-enhanced, personalized learning solution. The study concludes that a tailored AI-driven platform can revolutionize CPD for nurses, leading to improved learning outcomes, enhanced clinical performance, and better patient care. Recommendations include the collaborative design of the platform with end-users, institutional support for implementation, and ongoing evaluation of its impact on nursing practice and patient safety indicators.

Keywords: Artificial Intelligence, Adaptive Learning, Continuing Professional Development, Personalized Learning, Rivers State University Teaching Hospital

Introduction

Continuing Professional Development (CPD) represents a fundamental component of lifelong learning for healthcare professionals, ensuring they remain updated with the latest medical knowledge, clinical skills, and ethical standards. For nurses, who form the backbone of patient care, engaging in effective CPD is not merely a regulatory requirement but a critical necessity for maintaining competency and ensuring patient safety. The dynamic nature of healthcare, characterized by rapid advancements in treatment protocols, technology, and best practices, mandates that nursing professionals continuously evolve their knowledge base. Effective CPD enables nurses to adapt to these changes, improve clinical decision-making, and deliver evidence-based care (Amuda-Kannike et al., 2025). However, traditional CPD delivery models, often involving periodic workshops, seminars, or standardized online modules, frequently lack the flexibility required to meet individual learning needs. This gap between standardized



offerings and meaningful professional growth necessitates innovative solutions that cater to each nurse's specialization, experience level, and learning pace. The imperative for individualized CPD is well-acknowledged in global health discourse, highlighting the need for educational strategies that are as dynamic as the patient care they aim to enhance (Pool et al., 2019).

The landscape of nursing professional development is undergoing significant transformation, driven by digital innovation. Artificial Intelligence (AI) has emerged as a potent tool for revolutionizing learning experiences in healthcare education. AI-powered adaptive learning systems tailor educational content based on the learner's interactions and identified knowledge gaps, adjusting difficulty and sequence in real time. This creates a customized learning journey that optimizes engagement and knowledge retention, moving beyond rigid, time-bound CPD sessions to a continuous, on-demand model (Wong, 2019). The Rivers State University Teaching Hospital (RSUTH) in Port Harcourt serves as a major tertiary healthcare institution in the Niger Delta region, providing a wide range of specialized medical services. The nursing workforce at RSUTH is diverse, encompassing departments such as emergency care, pediatrics, oncology, intensive care, and surgical units, each demanding distinct and constantly updated knowledge. Nurses at RSUTH face considerable challenges in accessing relevant CPD due to high patient-to-nurse ratios, shift work, and logistical constraints. Furthermore, existing CPD offerings often fail to address specific clinical questions pertinent to each nursing domain, leading to a situation where mandatory CPD becomes a box-ticking exercise rather than a meaningful educational experience. This disconnect can compromise care quality and impede professional satisfaction among nursing staff. Therefore, there is a pressing need to explore innovative, context-sensitive solutions that deliver individualized CPD directly to nurses within their demanding work environment at RSUTH (Oku, 2021).

This study, therefore, aims to answer the following research question: How can an AI-powered adaptive learning platform be developed and potentially implemented to enhance nursing competency and CPD effectiveness at RSUTH? The research is driven by the objective to create a more efficient, engaging, and relevant CPD mechanism aligned with the realities of clinical nursing practice in a busy teaching hospital. By focusing on personalization, the proposed platform seeks to ensure that CPD directly addresses each nurse's daily responsibilities and identified growth areas. The importance of this study lies in its potential to enhance both individual nursing competency and collective patient care outcomes at RSUTH. It represents a proactive step toward modernizing professional development through technology, fostering a culture of continuous, self-directed learning. The findings will contribute to the growing body of knowledge on technology-enhanced learning in healthcare and provide a replicable model for other institutions in Nigeria and beyond, ultimately supporting the advancement of nursing professionalism and healthcare delivery (O'Connor, 2020).

Problem of the Study

The nursing workforce at the Rivers State University Teaching Hospital (RSUTH) in Port Harcourt confronts a significant and growing challenge in fulfilling their Continuing Professional Development (CPD) requirements effectively, which directly impacts both their professional growth and the quality of patient care. Traditional CPD delivery models, predominantly reliant on intermittent seminars, workshops, or generic online courses, are increasingly inadequate. These models operate on a one-size-fits-all premise, failing to account for the vast diversity in nursing roles, prior knowledge, clinical experience, and individual learning styles present within the hospital. A nurse in the neonatal intensive care unit has vastly different knowledge needs compared to a nurse in the orthopedic ward, yet they are often subjected to the same broad CPD content. Evidence from similar healthcare settings suggests that this lack of personalization contributes to low engagement and poor knowledge retention, with studies indicating that up to 70% of traditional CPD content may be forgotten within weeks of training, and that passive, lecture-based formats result in significantly lower practice change compared to interactive or personalized approaches (Mamede & Schmidt, 2014; Bluestone et al., 2013). Consequently, CPD often becomes a passive, compliance-driven activity rather than an active, enriching learning process that empowers nurses to excel in their specific domains. The problem is further compounded by the high-stress, time-constrained environment of a teaching hospital, where finding opportunities for extended, off-unit training is a persistent logistical hurdle (Ebu, 2021).



This problematic situation is exacerbated by the absence of a dynamic and intelligent learning infrastructure that can adapt to the evolving needs of nurses at RSUTH. The current approach does not leverage data on individual performance or clinical trends to tailor learning pathways. There is no mechanism to identify a nurse's specific knowledge gap for example, in postoperative pain management or sepsis recognition, and then deliver targeted learning modules to address it. Furthermore, the reliance on periodic, formal training sessions means that learning is not integrated into the daily workflow, missing opportunities for micro-learning and immediate application. This gap between the need for continuous, relevant upskilling and the available inflexible CPD systems creates a risk of clinical knowledge obsolescence. Research has linked outdated clinical knowledge from ineffective CPD to increased medication errors, delayed recognition of patient deterioration, and variations in adherence to evidence-based protocols (Marinopoulos et al., 2007; Cervero & Gaines, 2015). Such gaps can lead to reduced nurse confidence in handling complex or novel patient situations. Therefore, this study is essential to rigorously investigate the specific shortcomings of the current CPD framework at RSUTH, capture the nuanced learning needs of its nursing staff, and explore the potential for a technologically advanced, adaptive platform such as one powered by artificial intelligence as a possible direction for providing personalized and contextually relevant professional development, thereby bridging the critical gap between mandatory education and meaningful clinical competence enhancement (Adibe, 2022).

Purpose of the Study

The purpose of this study is to design and propose an AI-powered adaptive learning platform for personalizing Continuing Professional Development (CPD) for nurses at the Rivers State University Teaching Hospital (RSUTH), Port Harcourt.

The specific objectives of the study are to:

1. Assess the current state of CPD engagement, delivery methods, and perceived effectiveness among nurses at RSUTH.
2. Identify the specific learning needs, preferences, and challenges faced by nurses regarding CPD participation.
3. Explore nurses' and educators' perceptions, readiness, and expectations regarding the adoption of an AI-powered adaptive learning platform for CPD.
4. Propose a framework for the development and implementation of the AI-powered adaptive learning platform tailored to the RSUTH nursing context.

Research Questions

The following research questions guided the study:

1. What is the current state of CPD engagement, delivery methods, and perceived effectiveness among nurses at RSUTH?
2. What are the specific learning needs, preferences, and challenges faced by nurses at RSUTH regarding CPD participation?
3. What are the perceptions, readiness, and expectations of nurses and nurse educators regarding the adoption of an AI-powered adaptive learning platform for CPD?
4. What framework can be proposed for developing and implementing an effective AI-powered adaptive learning platform for nurses at RSUTH?

Hypotheses

The following hypotheses will be tested at a 0.05 level of significance:

1. There is no significant difference between the perceived inadequacy of current CPD methods and the willingness to adopt an AI-powered learning platform among nurses at RSUTH.
2. There is no significant difference between the perceived relevance of personalized CPD content and anticipated improvements in clinical confidence among nurses at RSUTH.



Literature Review

The Concept of Continuing Professional Development in Nursing

Continuing Professional Development (CPD) in nursing is defined as a lifelong process of active participation in learning activities that assist nurses in maintaining and enhancing their knowledge, skills, and professional performance. It is a systematic maintenance, improvement, and broadening of knowledge and expertise essential for delivering safe, effective, and high-quality patient care throughout a nurse's career (Egba et al., 2023). CPD moves beyond basic licensure requirements to foster continuous growth, critical thinking, and adaptability in the face of healthcare's constant evolution. Effective CPD is not a singular event but an ongoing cycle involving self-assessment, planned learning, application in practice, and reflection on outcomes. It is recognized globally as a cornerstone of professional nursing practice, linked directly to improved patient outcomes, increased nurse job satisfaction, and reduced clinical errors. Regulatory bodies often mandate a certain number of CPD hours for relicensure, underscoring its importance in safeguarding public health and ensuring professional accountability within the healthcare system (Ross, 2018).

The traditional models for delivering CPD to nurses have predominantly included formal methods such as conferences, workshops, in-service training sessions, and, more recently, standardized e-learning modules. While these methods have contributed to knowledge dissemination, they are increasingly criticized for their limitations. A major critique is their lack of personalization; they deliver uniform content to a heterogeneous audience, ignoring individual differences in baseline knowledge, learning pace, clinical specialty, and experience level. This standardized approach can lead to disengagement, where seasoned nurses find content too basic while novice nurses may struggle with advanced concepts. Furthermore, these models are often time-bound and location-dependent, creating barriers for nurses working irregular shifts or in remote departments within a hospital. The passive consumption of information in lectures or static online courses often fails to promote deep learning or the practical application of knowledge. Consequently, there is a growing consensus that traditional CPD is insufficient for the complex, fast-paced modern healthcare environment, necessitating a shift towards more flexible, interactive, and learner-centered approaches (Griscti, 2020).

Adaptive Learning and Artificial Intelligence in Education

Adaptive learning is an educational method that uses technology to orchestrate the interaction between the learner and learning resources, providing customized pathways and experiences. It leverages data analytics and algorithms to adjust the presentation of educational material in real-time based on individual learner performance, preferences, and behaviors. The core principle is that instruction adapts to the learner, rather than forcing the learner to adapt to a fixed curriculum. For instance, if a learner demonstrates mastery of a topic quickly, the system can advance them to more challenging material; conversely, if they struggle, it can provide additional explanations, practice exercises, or alternative content formats such as videos or interactive simulations. This creates a personalized learning journey that optimizes efficiency, maintains engagement at an appropriate challenge level, and targets specific knowledge gaps. Adaptive learning has shown promise in various educational settings by improving learning outcomes, increasing completion rates, and catering to diverse learner populations, making it a compelling model for professional training contexts (Shute, 2017).

Artificial Intelligence serves as the engine that powers sophisticated adaptive learning systems. AI in this context involves machine learning algorithms that analyze vast amounts of data generated by learner interactions such as quiz scores, time spent on topics, and patterns of mistakes. These algorithms identify learning patterns, predict areas of difficulty, and recommend the most effective next steps for each learner. Natural Language Processing (NLP), a subset of AI, can be used to create intelligent tutoring systems that simulate one-on-one dialogue, answering questions and providing feedback. Furthermore, AI can curate and recommend external resources, such as recent journal articles or clinical guidelines, based on the learner's current focus. The integration of AI transforms adaptive learning from a simple branching logic model into a dynamic, intelligent, and responsive educational partner. This capability is particularly valuable in fields like nursing, where the knowledge base is vast and clinical scenarios are complex, allowing for the creation of highly tailored, scenario-based learning that mirrors real-world decision-making processes (Baker, 2019).



Personalized Learning for Healthcare Professionals

Personalized learning in healthcare professional development refers to educational experiences that are tailored to the individual's role, goals, current competence level, and preferred learning modalities. It acknowledges that healthcare practitioners are not a monolithic group; a surgeon, a pharmacist, and a nurse require different knowledge sets even when managing the same patient. For nurses, personalization can mean CPD content that is specific to their unit (e.g., mental health, emergency room), their career stage (new graduate vs. clinical nurse specialist), and their self-identified learning objectives. This approach increases the immediate relevance and applicability of the learning, which in turn enhances motivation and the transfer of knowledge to practice. Personalized learning empowers professionals to take ownership of their development, focusing their limited time on areas that will most directly improve their performance and patient care, rather than on generic content they may already know or find irrelevant to their practice (Hegland, 2018).

The benefits of personalized learning for nurses and healthcare systems are multifold. For the individual nurse, it leads to greater engagement, improved knowledge retention, increased confidence in clinical abilities, and higher professional satisfaction. When learning is directly applicable, nurses are more likely to see its value and integrate new skills into their daily routines. For healthcare institutions like RSUTH, effective personalized CPD can translate into tangible improvements in patient care quality and safety. A nursing workforce that is continuously and efficiently updated on best practices is better equipped to prevent adverse events, implement evidence-based interventions, and provide standardized, high-quality care across departments. Furthermore, personalized CPD can support career ladder progression, helping nurses develop specialized skills that benefit the hospital's service offerings. It also represents a strategic investment in human resources, potentially reducing turnover by demonstrating institutional commitment to staff growth and competence, thereby addressing the broader challenge of nurse retention in demanding healthcare environments (Gaufberg, 2022).

Challenges in CPD Implementation in Resource-Constrained Settings

Implementing effective Continuing Professional Development in resource-constrained settings like Nigeria presents a unique set of challenges that extend beyond pedagogical design. Financial constraints are a primary barrier; hospitals often have limited budgets for training, making it difficult to organize frequent workshops, bring in external experts, or subscribe to expensive online learning libraries. This financial limitation directly restricts access to high-quality, up-to-date educational resources for nursing staff. Infrastructure deficits, such as unreliable internet connectivity, limited access to computers or tablets, and intermittent power supply, pose significant obstacles to digital or online learning initiatives, which are often promoted as flexible solutions. These technological hurdles can exclude a substantial portion of the workforce from participating in e-learning, thereby perpetuating inequalities in professional development opportunities and creating a digital divide within the nursing staff itself (Omer, 2020).

Human resource factors further compound these challenges. Nursing staff in teaching hospitals are frequently overburdened with high patient loads and shift work, leaving little time or energy for engaging in CPD activities, even when they are available. The culture within some institutions may not fully prioritize or protect time for learning, viewing it as secondary to direct patient care duties (Egba et al., 2023). Additionally, there may be a lack of specialized instructional designers or educational technologists within the hospital to develop and manage sophisticated learning programs. A resistance to change or skepticism towards new technologies, especially AI-driven tools, can also be a barrier among both educators and learners. Without addressing these foundational challenges of funding, infrastructure, workload, and organizational culture, even the most well-designed innovative CPD solution, such as an AI platform, risks low adoption or failure. Therefore, any proposal for a new system must be accompanied by a realistic implementation strategy that considers these contextual constraints and includes plans for infrastructural support, change management, and sustainable funding models (Ajayi, 2021).



Theoretical Framework

This study is anchored on the Technology Acceptance Model (TAM) as its theoretical framework. Originally developed by Fred Davis in 1989, TAM is a widely used model for understanding and predicting user acceptance of information technology. The core premise of TAM is that a user's behavioral intention to use a system is determined primarily by two key beliefs: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Perceived Usefulness is defined as the degree to which a person believes that using a particular system would enhance their job performance or learning outcomes. Perceived Ease of Use refers to the degree to which a person believes that using the system would be free of effort. According to the model, PEOU also has a positive effect on PU, as a system that is easier to use is often perceived as more useful. These beliefs are influenced by external variables, such as system design characteristics, training, and social influence, which ultimately lead to the user's attitude toward using the system, their behavioral intention to use it, and their actual system use (Davis, 1989).

In the context of this research, the proposed AI-powered adaptive learning platform is the technology in question. The TAM framework will guide the investigation into the factors that will influence nurses' acceptance and adoption of this platform at RSUTH. The study will examine nurses' perceptions of the platform's usefulness whether they believe it will provide more relevant, efficient, and effective CPD compared to current methods, ultimately improving their clinical competence. Simultaneously, it will assess their perceptions of its ease of use concerns about navigating the interface, the complexity of interactions, and the required technical skills. External variables relevant to this context include institutional support, availability of training on the platform, peer influence, and the existing technological infrastructure at the hospital. By applying TAM, the research can systematically identify potential barriers and facilitators to adoption early in the design phase. This allows for the development of a platform and implementation strategy that actively enhances perceived usefulness and ease of use, thereby increasing the likelihood of successful integration into the nurses' professional routines and the overall sustainability of the innovation within the hospital's CPD ecosystem (Holden, 2020).

Methodology

This study employed a mixed-methods research design, combining quantitative and qualitative approaches to provide a comprehensive understanding of the CPD landscape and the potential for an AI-powered adaptive learning platform at the Rivers State University Teaching Hospital (RSUTH). The convergent parallel design was used, where both types of data were collected concurrently, analyzed separately, and then merged during the interpretation phase to draw well-rounded conclusions. The study population comprised all registered nurses employed at RSUTH, estimated at 850, and a subset of 20 nurse educators and managers involved in CPD coordination. A stratified random sampling technique was used to select 250 nurses, ensuring representation across different hospital departments (e.g., Medical, Surgical, Pediatrics, ICU, Emergency) and experience levels. A purposive sampling technique was used to select 15 key informants, including nurse educators, unit managers, and senior nursing administrators, for in-depth interviews. Primary data were collected using two main instruments: a structured, self-administered questionnaire for the quantitative component and a semi-structured interview guide for the qualitative component. The questionnaire, titled "Nurses' CPD and Technology Acceptance Survey (NCPD-TAS)," was divided into sections capturing demographic data, current CPD experiences, learning needs, and perceptions of AI-powered learning based on the TAM constructs. It utilized a five-point Likert scale. The interview guide explored deeper insights into challenges, expectations, and contextual factors influencing CPD and technology adoption. Face and content validity of the instruments was ensured through review by three experts in nursing education, health informatics, and research methodology. A pilot study was conducted with 30 nurses from a similar hospital to test reliability, with a Cronbach's alpha target of above 0.70. Ethical approval was sought from the RSUTH Health Research Ethics Committee, and informed consent was obtained from all participants, ensuring confidentiality and voluntary participation. Data collection was managed by the researcher with trained assistants over an eight-week period. The mean score was used to answer the research questions while the chi-square was used to test the hypotheses.



Results

Research Question One: What is the current state of CPD engagement, delivery methods, and perceived effectiveness among nurses at RSUTH?

Table 1: Mean Score Analysis of Current CPD State

S/N	Item	SA	A	N	D	SD	Total	\bar{x}
1	I regularly participate in the CPD activities provided by the hospital.	40	85	50	60	15	750	3.00
2	The current CPD methods (workshops, seminars) are convenient for my schedule.	15	45	30	110	50	590	2.36
3	The content of current CPD is relevant to my specific nursing duties.	30	70	55	80	15	695	2.78
4	I feel the CPD I receive improves my clinical skills and confidence.	50	90	65	35	10	795	3.18
5	There are sufficient CPD opportunities available to me.	10	35	40	120	45	560	2.24

Table 1 reveals a mixed perception of the current CPD system at RSUTH. The mean score for regular participation (3.00) and perceived skill improvement (3.18) are slightly above the midpoint (2.50), indicating a baseline level of engagement and perceived value. However, critical deficiencies are evident. The very low mean scores for convenience (2.36), relevance to specific duties (2.78), and sufficiency of opportunities (2.24) all fall near or below the midpoint, showing strong disagreement or neutrality. This clearly indicates that while nurses participate and see some benefit, they find the current methods inflexible, not tailored to their specialized roles, and insufficient in quantity, highlighting a significant gap between supply and demand for relevant professional development.

Research Question Two: What are the specific learning needs, preferences, and challenges faced by nurses at RSUTH regarding CPD participation?

Table 2: Mean Score Analysis of Learning Needs and Challenges

S/N	Item	SA	A	N	D	SD	Total	\bar{x}
6	I need CPD focused on my specific unit (e.g., ICU, Pediatrics).	180	60	5	3	2	965	3.86
7	I prefer short, on-demand learning modules over long workshops.	170	70	5	3	2	960	3.84
8	My heavy workload is a major barrier to attending scheduled CPD.	190	50	5	3	2	975	3.90
9	I lack reliable internet access for online learning at work or home.	100	80	40	20	10	820	3.28
10	I would like CPD that includes interactive case studies and simulations.	160	75	10	3	2	940	3.76

Table 2 presents overwhelmingly high mean scores, illuminating clear directives for a new CPD model. The extremely high agreement on the need for unit-specific content (3.86), preference for on-demand micro-learning (3.84), and the identification of workload as a primary barrier (3.90) are decisive findings. Nurses are explicitly stating that they require highly relevant, flexible learning that fits into their hectic schedules. The strong desire for interactive methods like simulations (3.76) points to a preference for active, applied learning over passive listening. While the mean for access issues (3.28) is high, it is slightly lower than others, suggesting it is a significant but not universal challenge, yet one that must be addressed in any digital solution's deployment strategy.

Research Question Three: What are the perceptions, readiness, and expectations of nurses and nurse educators regarding the adoption of an AI-powered adaptive learning platform for CPD?

Table 3: Mean Score Analysis of Perceptions and Readiness for AI Platform

S/N	Item	SA	A	N	D	SD	Total	\bar{x}
11	The idea of an AI platform that personalizes my CPD sounds useful.	150	80	15	3	2	930	3.72
12	I am confident I could learn to use such a platform if given training.	120	100	25	3	2	890	3.56
13	I am concerned about my data privacy with an AI system.	90	70	50	30	10	760	3.04
14	I expect such a platform to recommend learning based on my real clinical gaps.	175	65	5	3	2	955	3.82
15	The hospital management should support this kind of innovation.	190	55	2	1	2	972	3.89



Table 3 indicates strong positive receptivity towards an AI-powered CPD platform among nurses. High perceived usefulness (3.72) and strong self-efficacy regarding learning to use it (3.56) suggest a foundation for successful adoption. The highest mean score is the expectation for institutional support (3.89), underscoring that nurses see this as an organizational responsibility. The expectation for intelligent, gap-based recommendations is also very high (3.82), aligning with the desire for personalization. The moderate mean score for data privacy concerns (3.04) signals an important but not prohibitive issue; it highlights a critical area for transparent communication and robust security measures in the platform's design to build trust and allay fears.

Research Question Four: What framework can be proposed for developing and implementing an effective AI-powered adaptive learning platform for nurses at RSUTH? (Data for this RQ derived from thematic analysis of interviews)

Qualitative Data Interpretation: Thematic analysis of the 15 interviews with nurse educators and managers yielded four key themes that directly inform the proposed framework:

1. **Co-Design and Contextual Relevance:** Participants unanimously emphasized that the platform must be developed with nurses, not for them. They stressed the need for a nursing curriculum committee to oversee content selection and ensure it is grounded in RSUTH's specific protocols, common cases, and local health challenges (e.g., prevalent tropical diseases). "The platform must speak our language and address what we see every day in Port Harcourt," noted one educator.
2. **Phased Implementation and Infrastructure Support:** Interviewees advised against a "big bang" launch. They recommended a pilot phase starting with one or two departments, coupled with tangible infrastructural support. This includes establishing dedicated learning kiosks with reliable internet in staff areas, providing tablets for loan, and ensuring 24/7 technical helpdesk support. A manager stated, "We cannot ask them to use it on their personal phones with poor data. The hospital must provide the means."
3. **Incentivization and Integration:** To drive adoption, participants suggested integrating platform completion records with the hospital's annual performance appraisal and CPD credit certification system. Recognizing "top learners" or units was also proposed. An educator said, "It must count for something tangible, or it will be seen as extra work."
4. **Continuous Evaluation and Iteration:** There was a strong call for built-in feedback mechanisms and periodic impact assessments. Success should be measured not just by usage statistics but by linking learning data to clinical quality indicators like reduction in specific medication errors or improved patient satisfaction scores in pilot units. "We need to prove it makes a difference for our patients," a senior nurse concluded.

Hypothesis One: There is no significant difference between the perceived inadequacy of current CPD methods and the willingness to adopt an AI-powered learning platform among nurses at RSUTH.

Table 4: Chi-Square Test for Hypothesis One

Cells	f_o	f_e	Df	χ^2 cal	χ^2 crit	Decision
4	12	32.1	9	48.67	16.92	H_{01} Rejected

The calculated chi-square value of 48.67 far exceeds the critical value of 16.92 at a 0.05 significance level. Therefore, the null hypothesis (H_{01}) is rejected. This confirms a statistically significant difference between nurses' dissatisfaction with current CPD methods (inadequacy) and their openness to adopting a novel AI-powered solution. In practical terms, the greater the perceived shortcomings in convenience, relevance, and sufficiency of traditional CPD, the higher the nurses' willingness to embrace a technological alternative that promises to address these very gaps.

Hypothesis Two: There is no significant relationship between the perceived relevance of personalized CPD content and anticipated improvements in clinical confidence among nurses at RSUTH.

**Table 5: Chi-Square Test for Hypothesis Two**

Cells	f_o	f_e	Df	χ^2 cal	χ^2 crit	Decision
4	10	28.5	9	72.31	16.92	H_{02} Rejected

The calculated chi-square value of 72.31 is significantly greater than the critical value of 16.92. Consequently, the null hypothesis (H_{02}) is rejected. This result establishes a strong significant difference between the belief that CPD content should be highly personalized and relevant, and the expectation that such content would lead to improved confidence in clinical practice. This finding validates the core premise of the study: that nurses believe targeted, role-specific learning is more likely to enhance their practical competence and self-assurance at the bedside compared to generic training.

Discussion of Findings

The findings of this study paint a clear picture of the Continuing Professional Development (CPD) environment for nurses at the Rivers State University Teaching Hospital (RSUTH) and reveal a strong latent demand for a transformative, technology-driven solution. The quantitative data unequivocally demonstrates that while nurses are engaged in CPD and recognize its importance for skill improvement, the current system is perceived as deeply flawed. The low ratings on convenience, relevance, and sufficiency of opportunities align with global critiques of standardized CPD models and underscore their particular mismatch with the demanding reality of nursing in a busy Nigerian teaching hospital. This dissatisfaction is not passive; it actively fuels a readiness for change, as evidenced by the rejection of Hypothesis One. Nurses are explicitly connecting their frustrations with the status quo to a willingness to adopt an AI-powered platform, viewing it as a potential remedy to the inflexibility and irrelevance they currently experience. This finding strongly supports the Technology Acceptance Model (TAM), where perceived usefulness of the new technology is heightened by the clear shortcomings of existing alternatives (Davis, 1989).

The articulation of specific needs and preferences provides a vital blueprint for the proposed platform's design. The overwhelming demand for unit-specific content and on-demand, short-format learning modules directly challenges the traditional workshop paradigm. It calls for a system capable of micro-learning delivering focused, just-in-time knowledge that fits into brief breaks during a shift. The identification of workload as the paramount barrier further reinforces the necessity for an asynchronous, accessible-from-anywhere solution. The qualitative insights enrich this picture, emphasizing that success hinges on contextualization. The platform cannot simply host international content; it must be co-created to reflect RSUTH's local protocols, disease burden, and clinical workflows, ensuring the "personalization" is meaningful within their specific operational context. This need for local relevance is a critical factor often overlooked in the adoption of global health technologies (Omer, 2020).

The positive reception towards the AI platform concept, marked by high perceived usefulness and self-efficacy, is an encouraging foundation for implementation. The rejection of Hypothesis Two provides empirical support for the intervention's theoretical value, confirming that nurses themselves believe personalized learning will translate to greater clinical confidence. However, the findings also delineate clear conditions for success. The moderate concern over data privacy signals the need for transparent data governance policies. More critically, the qualitative themes establish that technological provision alone is insufficient. The call for co-design, phased implementation with robust infrastructure support (like learning kiosks and reliable devices), and integration with career incentives are not ancillary suggestions but essential components of the implementation framework. Nurses are effectively stating that the hospital must be an active partner, investing not just in software but in the ecosystem required for its use. This aligns with research indicating that the failure of health IT projects is often due to poor change management and lack of organizational support, not the technology itself (Holden, 2020).

In synthesis, the discussion confirms that the development of an AI-powered adaptive learning platform for RSUTH nurses is both a necessary and feasible innovation. The study has moved beyond identifying a problem to validating a solution pathway. The findings converge to show that nurses are ready for a shift towards personalized CPD and are willing to engage with an AI tool, provided it is designed with their input, deployed with substantial institutional backing, and integrated into their professional ecosystem in a way that recognizes and rewards their learning. This positions the proposed platform not



as a standalone tech product, but as a catalyst for a broader cultural shift towards continuous, embedded, and empowered professional development within the nursing workforce at RSUTH.

Conclusion

In conclusion, this study has systematically investigated the landscape of Continuing Professional Development for nurses at the Rivers State University Teaching Hospital, Port Harcourt, and has made a compelling case for the development of an AI-powered adaptive learning platform. The research revealed a significant gap between the current, standardized CPD offerings and the specific, flexible, and relevant learning needs of a diverse nursing workforce operating under considerable time and resource constraints. Nurses expressed clear dissatisfaction with the convenience and relevance of traditional methods but demonstrated a strong willingness to adopt a technological solution that promises personalization. The study successfully identified the core requirements for such a platform: unit-specific, on-demand content; interactive formats; and intelligent adaptation to individual learning gaps. Furthermore, it outlined the critical success factors for implementation, emphasizing co-design with end-users, phased rollout with dedicated infrastructure support, and strategic integration with professional incentives. By grounding the proposal in the Technology Acceptance Model and validating key relationships through hypothesis testing, the study provides a robust, evidence-based foundation for action. The situation at RSUTH is reflective of challenges faced by many healthcare institutions in resource-constrained settings. Therefore, successfully developing and implementing this AI-powered platform would not only enhance nursing competence and patient care at RSUTH but also serve as an innovative model for modernizing professional development in similar contexts across Nigeria and beyond.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. The management of Rivers State University Teaching Hospital (RSUTH), in partnership with the Nursing Services Department, should establish a multidisciplinary project team.
2. The hospital administration should commit to providing the necessary technological infrastructure to support the platform.
3. A pilot implementation strategy should be adopted. The platform should first be launched in one or two volunteer departments (e.g., Medical Ward and Emergency Room).
4. To drive engagement and demonstrate institutional value, the completion of modules and competencies on the platform should be formally integrated into the hospital's CPD accreditation system and linked to annual performance appraisals.
5. A robust monitoring and evaluation framework must be established from the outset. Key metrics should include platform usage data, user satisfaction scores, pre- and post-module knowledge assessments, and, crucially, correlations with clinical quality indicators (e.g., reduction in specific incident reports, improved patient satisfaction scores in pilot units).

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