

# A Proof of Concept AI Chatbot System for Structured Nursing Preceptorship Feedback

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**Abstract**—We present a proof of concept for an AI-powered chatbot that supports nursing preceptorship feedback. We reviewed existing systems in healthcare education and found that while they offer automation, most do not align with professional nursing standards, lack structured competency tracking, and provide limited contextual feedback. To address these gaps, we designed the Clinical Feedback Helper, a conversational platform built on ChatGPT, which guides preceptors in producing structured feedback mapped to the BCCNM Standards of Practice. Our framework transforms short observations into detailed assessments, reduces workload, and preserves human oversight. We outline the system design, demonstrate its functionality, and propose next steps involving pilot testing, progress tracking, and broader adoption in nursing education.

**Index Terms**—LLM, nursing, education, preceptorship, feedback collection

## I. INTRODUCTION

Preceptorship is an integral part in nursing education as students in their final semester prepare to enter the workforce. Preceptors play a crucial role in students' professional development by guiding them through complex clinical situations and offering constructive feedback. This process fosters reflective practice, bridges the theory-practice gap, and advances students' clinical judgment, critical thinking, and clinical reasoning skills [1]. Traditional evaluation methods rely on midterm and final assessments, with sporadic feedback scattered across various channels such as written forms, emails, texts, or phone calls, making it challenging for clinical instructors to retrieve and synthesize this information for evaluation [1], [2]. Moreover, inconsistencies in feedback delivery arise as preceptors manage heavy workloads and operate under time constraints while units face staffing shortages. The situation is further complicated when students rotate among multiple preceptors throughout their clinical placements, creating additional inconsistencies in the quality of feedback [3], [4]. The emergence of artificial intelligence (AI) chatbots presents a potential solution to these communication and feedback gaps, offering automated, standardized, and timely assessment capabilities.

Recent advances in computational approaches to nursing challenges, including federated learning frameworks for reducing nurse fatigue [5] and optimization algorithms for nurse scheduling [6], demonstrate the growing potential of AI in addressing systemic healthcare workforce issues. The rapid adoption of AI in education, such as AI-based learning apps,

virtual patients, and chatbots like ChatGPT, necessitates a systematic analysis of large language model (LLM) applications in nursing preceptorship [7]. Chatbots are AI systems that utilize natural language processing to conduct conversations in a manner that mimics human interaction. In nursing education, AI applications currently range from basic question-and-answer tools that provide quick access to information to more advanced platforms designed to assess student competencies [8]. However, there is still limited evidence evaluating the effectiveness of these tools in supporting learning outcomes, feedback processes, and the development of professional practice.

Our analysis indicates that although chatbot integration in nursing education demonstrates considerable potential, substantial challenges persist in ensuring alignment with professional standards and preserving the human elements vital to clinical teaching. Additional concerns with generative and assistive AI include subscription costs, the risk of overreliance, information overload, limited accuracy, vague or incorrect responses, and privacy issues [9]. This paper proposes a proof of concept, based on ChatGPT, designed to deliver feedback and strategy recommendations for stakeholders in nursing education. We begin by conducting a systematic review of existing solutions to identify the research gap, followed by the design of the architecture and a demonstration of the tool.

## II. LITERATURE REVIEW

### A. Methodology and Scope

Our systematic review encompassed articles from 2020-2025 focusing on chatbot applications in healthcare education, with emphasis on nursing preceptorship and feedback systems. We searched major databases including PubMed, IEEE Xplore, Nursing & Allied Health, ACM Digital Library, and CINAHL using keywords such as "AI chatbots nursing education," "automated feedback clinical training," "nursing preceptorship feedback," and "preceptorship technology integration."

We reviewed a total of 50 articles, with 9 meeting full inclusion criteria. The included systems comprised 7 production-ready solutions and 2 academic research implementations. We sorted them into three main areas. The first area was technology, which included what AI methods were used, the system's architecture, and its integration with other tools. The second area explored pedagogical practices, examining competency-based approaches, frameworks, and feedback integration. The

third area was practical use, which looked at how the system was used and what subscription or training policies applied.

TABLE I  
TECHNOLOGY ARCHITECTURE CLASSIFICATION

System	Architecture	Intelligence	Integration
Jane AI [10]	Cloud-hosted	Generative AI	API
AWS Chatbot [11]	Cloud-hosted	Rule-based	Native AWS
Shadow Health [12]	Cloud-hosted	Hybrid	Limited
Health tasks [13]	Cloud-hosted	Generative AI	API
Nursify AI [14]	Cloud-hosted	Unknown	None
NurseMagic [15]	Cloud-hosted	Machine Learning	None
Elsevier (Scopus) AI [16]	Cloud-hosted	Generative AI	Limited
Adaptive-VP [17]	Research prototype	Generative AI	None
BMC Journal [18]	Research prototype	Generative AI	None

### B. Technology Architecture Patterns

The reviewed systems demonstrate varied technological approaches to automated feedback delivery. Our analysis in Table I reveals two primary architectural patterns: cloud-hosted platforms and research prototypes. Systems also vary in their integration capabilities with existing Learning Management Systems (LMS).

HealthStream’s Jane AI utilizes advanced machine scoring algorithms for competency assessment, as detailed in the “Unlocking the Potential of Machine Scoring” study [20]. When evaluated against trained clinical experts, the AI system demonstrated comparable scoring accuracy, indicating technological maturity and reliability for accurate assessment. In contrast, AWS Chatbot Feedback [11] provides infrastructure for feedback collection and analytics but requires substantial customization for nursing-specific applications.

The academic implementations, including Adaptive-VP [17] and the BMC Medical Education chatbot study [18], utilize LLMs but lack the necessary cloud infrastructure for production deployment. These systems typically process a few concurrent users, whereas commercial platforms, such as Shadow Health, support many simultaneous sessions.

### C. Pedagogical Approaches

We reviewed the pedagogical approaches integrated within the 9 different systems (Table II), with a focus on competency-based learning features, educational frameworks, feedback delivery mechanisms and privacy protection protocols.

Competency-based assessment models show promise, but lack standardization. Jane AI [10] maps feedback to specific competency domains, allowing tracking of student progress. Shadow Health uses competency-based educational tools with a focus on clinical judgment [12]. However, these competencies align primarily with US-based standards (NCLEX-RN, QSEN) rather than Canadian requirements specific to British Columbia, such as the British Columbia College of Nurses and Midwives (BCCNM) Standards of Practice. BCCNM establishes four core Professional Standards for registered nurses: Professional Responsibility and Accountability, Knowledge-Based Practice,

Client-Focused Provision of Service, and Ethical Practice. Students are evaluated according to these four professional standards and their associated clinical practice indicators. Throughout their clinical education, students receive both formative and summative feedback. Formative assessment is feedback provided on an ongoing basis to support student growth by guiding their learning. In contrast, summative assessment is delivered at the end of their practice experience to assess whether students have successfully met course outcomes and competencies [19]. Preceptors and clinical instructors are responsible for providing feedback throughout the student’s clinical experience.

A gap in the pedagogical foundation of AI educational systems emerged, with most lacking evidence-based educational frameworks to guide their design and implementation. Among the exceptions, Jane AI utilized the Performance-Based Development System (PBDS), which evaluates a nurse’s ability to think critically in clinical situations, such as critical thinking, interpersonal relationships and technical skills [21], while Shadow Health primarily focused on the Jeffries Simulation Framework to guide simulation development [22]. The chatbot evaluated in the BMC Journal emphasizes the autonomy of the learner and self-regulation in the educational process [18].

Feedback type and delivery varied in each of the systems, with some being unknown or partial. Systems with established educational frameworks (Jane AI’s PBDS, Shadow Health’s Jeffries Framework, BMC’s self-directed learning) provided feedback mechanisms, while those without pedagogical foundations offered limited or non-educational feedback. However, none replicate the contextual feedback preceptors provide during clinical practice [2].

Privacy protections varied significantly across AI educational systems, with research-based and healthcare-specific platforms demonstrating stronger safeguards than general-purpose tools. Jane AI, BMC Chatbot, and Adaptive VP implemented comprehensive privacy frameworks, including HIPAA compliance [10], IRB approval, data anonymization [18], and restricted access protocols, while Nursify AI provided enterprise-grade encryption and FERPA compliance. In contrast, NurseMagic acknowledged limitations in electronic data security and third-party integration risks, and several systems lacked adequate privacy documentation. This variation is significant because AI collects sensitive and personal data, making privacy essential for user trust.

### D. Systems Deployment

Our analysis revealed significant differences in both the cost of these systems and their pricing structures: enterprise solutions like Jane AI withheld pricing information entirely. At the same time, per-student models ranged from Shadow Health’s \$100-150 per term to Health tasks’ substantially higher \$250 per term. Subscription-based options showed the widest variation, from Nursify AI’s freemium model starting at \$0 to NurseMagic’s \$34.99 monthly fee. Training requirements

TABLE II  
PEDAGOGICAL FEATURES AND NURSING EDUCATION ALIGNMENT

System	Competency-Based	Model/Framework	Feedback	Privacy
Jane AI	Yes	Dr. Dorothy del Bueno's Performance-Based Development System (PBDS)	Yes	Unclear
AWS Chatbot	No	No	Partial	Yes
Shadow Health	Yes	Jeffries Simulation Framework	Yes	Yes
Health tasks	Unknown	Unknown	Unknown	Unknown
Nursify AI	No	Unknown	Yes	Yes
NurseMagic	No	No	No	Partial
Elsevier (Scopus) AI	No	Evidence Based Approach	Yes	Yes
Adaptive-VP	Partial	Experiential Learning Framework	Partial	Yes
BMC Journal	Yes	Self-directed learning framework (SDL)	Yes	Yes

presented an additional hidden cost, with Jane AI demanding dedicated training compared to the minimal requirements for subscription services. AWS Chatbot's usage-based model, which requires high technical training, presents a significant barrier for institutions lacking dedicated IT support. The inconsistent costs and training requirements create budget challenges for nursing programs trying to select these technologies.

Some challenges extend far beyond financial considerations. User acceptance studies from the BMC Medical Education chatbot study [18] demonstrate the need to clearly communicate AI's supportive rather than replacement role to achieve successful adoption, particularly addressing preceptor concerns that Kauth and Reed [3] identified. The ongoing challenges of maintaining quality feedback during staffing shortages [4] make automated support systems increasingly necessary for sustainable nursing education.

TABLE III  
COST AND ACCESSIBILITY ANALYSIS

System	Pricing Model	Student Cost	Training
<i>Commercial Solutions Only</i>			
Jane AI	Enterprise	Not disclosed	20+ hours
Shadow Health	Per student	\$100–150	4–6 hours
Health tasks	Subscription	\$250	Minimal
Nursify AI	Freemium	\$0–29/mo	Minimal
NurseMagic	Subscription	\$34.99/mo	Minimal
AWS Chatbot	Usage-based	Variable	High Technical

### III. CRITICAL GAPS IN CURRENT SOLUTIONS

Through our analysis, we identified gaps that limit current systems' effectiveness in nursing preceptorship. Despite Ma et al.'s [7] thorough review of AI's role in nursing education, we found that no existing system addresses the needs of preceptorship.

We observed that current solutions fail to address the BCCNM's Standards of Practice. The concerns that Han et al. [9] raised regarding generative AI in nursing education—including accuracy, privacy, and overreliance—remain largely unaddressed in current implementations.

Additionally, existing systems lack comprehensive student progress tracking across multiple clinical rotations. There is no mechanism to identify learning patterns, track competency

development over time, or provide data-driven insights for curriculum improvement. This limitation prevents educators from understanding how individual students progress through different clinical environments and makes it impossible to identify systemic issues in education delivery.

Our analysis reveals that existing systems lack the feedback mechanisms necessary to replicate the guidance that preceptors provide. We aim to address these gaps by developing an AI-powered chatbot that combines intelligent feedback with competency-based assessment frameworks, specifically designed to incorporate BCCNM's four Standards of Practice.

This approach will provide personalized feedback that adapts to individual student needs while maintaining alignment with professional standards and supporting preceptor workload management during preceptorship.

### IV. PROOF OF CONCEPT FRAMEWORK ARCHITECTURE

#### A. System Design Overview

We developed the Clinical Feedback Helper to address identified gaps in existing systems by leveraging ChatGPT's language understanding capabilities while maintaining essential human oversight in nursing education. As shown in Figure 1, the platform features a simple, accessible interface that guides preceptors through structured feedback collection aligned with BCCNM Professional Standards.



Fig. 1. Clinical Feedback Helper Interface showing BCCNM Standards Integration. The interface displays reference cards for all four BCCNM Professional Standards, ensuring preceptors maintain awareness of evaluation criteria while providing feedback. The system guides users through structured assessment across competency domains.

Hello! Thank you for providing weekly feedback on your nursing student's clinical performance. Your input helps us greatly in supporting student learning. Please keep your feedback anonymous—avoid including any identifiable information.

Before we begin, here's a reminder of the BCCNM Professional Standards for Registered Nurses and Nurse Practitioners that guide evaluation:

1. **Professional Responsibility and Accountability** – Nurses maintain standards of practice and professional conduct determined by regulatory bodies and accept responsibility for their actions and decisions.
2. **Knowledge-Based Practice** – Nurses use evidence-informed knowledge from nursing science and other disciplines to provide safe, competent, and ethical care.
3. **Client-Focused Provision of Service** – Nurses provide care that is centered on the needs and well-being of clients, respecting their diversity, preferences, and autonomy.
4. **Ethical Practice** – Nurses understand, uphold, and promote the ethical standards of the profession, ensuring that their practice is consistent with ethical principles and values.

To get started:

👉 Is this feedback submission Weekly, Midterm, or Final?

Fig. 2. Initial Interface for Guided Feedback Collection. The welcome screen introduces preceptors to the four BCCNM competency domains and prompts them to begin with informal observations. The system emphasizes anonymity and natural language input, lowering barriers to feedback provision while maintaining professional standards alignment.

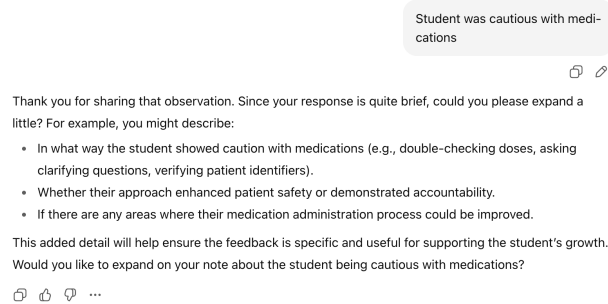


Fig. 3. Conversational Interface for Guided Feedback Collection. The system demonstrates intelligent follow-up questioning, transforming the preceptor's brief observation ("Student was very cautious with medications") into detailed, contextual feedback through targeted prompts that elicit specific behavioral examples and clinical significance.

The tool operates through a conversational interface that collects feedback across four BCCNM competency domains: Professional Responsibility and Accountability, Knowledge-Based Practice, Client-Focused Provision of Service, and Ethical Practice. This structured approach ensures a thorough assessment. Reference cards display these standards, maintaining preceptor awareness of evaluation criteria throughout the feedback process. The system currently operates as a guided documentation tool where preceptors manually map observations to BCCNM standards through conversational prompts, with automated tracking features planned for future development.

### B. Intelligent Feedback Elicitation

Figure 2 and 3 demonstrate the conversational interface, where preceptors provide informal notes and observations. At the same time, AI facilitates the development of professionally structured feedback through targeted follow-up questions.

When preceptors offer brief or vague observations (as shown in Figure 3), targeted follow-up questions elicit specific behavioral examples, contextual details, and clinical significance. The AI then transforms raw clinical observations into sound

feedback statements connecting specific behaviors to learning outcomes and professional development goals (as shown in Table IV). We developed this conversational approach to address a critical challenge in clinical education: the gap between what preceptors observe and what they can communicate in written feedback. This approach enhances feedback quality from busy preceptors and improves communication across the preceptor-student-instructor triangle.

### C. Quality Assurance and Processing Capabilities

We embedded quality assurance mechanisms that maintain professional standards while streamlining the feedback process. As shown in Table IV, we programmed the system to process input, acknowledging receipt while filtering non-relevant content immediately. The parenthetical note in the conversation demonstrates our transparent communication about content filtering, where we omit environmental details unrelated to clinical performance while preserving clinically relevant observations.

We designed the system to maintain a professional, supportive tone while identifying both strengths and areas for improvement in student performance. The conversational design allows preceptors to request additional support at any point in the process, making the feedback development collaborative rather than prescriptive. This user-centred design enhances rather than complicates the feedback process, making quality assessment accessible to all preceptors regardless of their comfort with technology or formal evaluation procedures.

## V. SYSTEM ACCESS AND AVAILABILITY

We have deployed our Clinical Feedback Helper as a custom GPT application on ChatGPT's platform, currently available for demonstration and initial testing at: <https://tinyurl.com/BCITnurseAI>. The platform functions as a specialized conversational interface that leverages ChatGPT's language capabilities while implementing our custom prompts and workflow design for collecting nursing preceptorship feedback. This web-based approach requires only a ChatGPT account for access, enabling us to leverage existing infrastructure and concentrate our development on specialized conversation flows and integration with BCCNM standards.

## VI. CONCLUSION AND FUTURE WORK

We developed and presented an AI-powered chatbot system specifically designed to address critical gaps in nursing preceptorship feedback collection. Our Clinical Feedback Helper integrates BCCNM Professional Standards with conversational AI techniques to transform brief preceptor observations into comprehensive, structured feedback.

Our immediate next steps involve conducting structured pilot testing with nursing preceptors ( $n = 15 - 20$ ) across multiple clinical settings. We will evaluate: (1) usability through System Usability Scale (SUS) scores and task completion rates; (2) feedback quality via blind assessment by clinical instructors

TABLE IV  
CONVERSATIONAL FEEDBACK ENHANCEMENT PROCESS

Preceptor Input	AI Follow-up	Generated Feedback
“Student was cautious with medications”	“Can you describe specific safety behaviors you observed?”	“Demonstrated medication safety by double-checking dosages and verifying patient identity—excellent adherence to safe practice protocols.”
“Communication needs work”	“What specific communication challenges did you notice? With patients or staff?”	“Focus area: Therapeutic communication. Practice active listening techniques and patient-centered dialogue to build rapport.”
“Good clinical reasoning”	“What situation showed their reasoning? How did they approach the problem?”	“Strong analytical skills demonstrated when prioritizing interventions for multiple patient needs. Continue developing systematic assessment approaches.”
“Struggled with documentation”	“Which documentation areas? What support might help?”	“Improvement needed: Documentation timeliness and completeness. Recommend structured practice with charting templates and peer review.”

using rubrics; (3) time efficiency by comparing documentation time against traditional methods. This mixed-methods evaluation will provide quantitative performance metrics and qualitative insights into system effectiveness, addressing the empirical validation gap identified in this proof of concept.

This work presents a proof of concept demonstration without empirical validation. We have not yet conducted quantitative usability testing, measured feedback quality improvements, or assessed system effectiveness through controlled studies. The competency tracking mechanism remains manual rather than fully automated. Privacy protections require formal verification of FERPA and HIPAA compliance before deployment in clinical settings. These limitations reflect the early-stage nature of this design research and inform our pilot study evaluation.

Future development priorities include implementing student progress tracking capabilities to address the critical gap we identified in existing systems. We also plan to extend our framework to support additional nursing education standards beyond BCCNM, enabling broader adoption across Canadian nursing programs. Long-term research goals include investigating the system’s impact on student clinical outcomes and preceptor satisfaction. Through continued development and rigorous evaluation, we aim to establish evidence-based AI support systems that enhance rather than replace the essential human elements of clinical nursing education.

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