

## การศึกษานำร่องแพทยบทบาทเพื่อส่งเสริมความรู้การซักประวัติผู้ป่วย ในนักศึกษาพยาบาล

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### บทคัดย่อ

การซักประวัติผู้ป่วยเป็นทักษะพื้นฐานที่สำคัญของนักศึกษาพยาบาล โดยเฉพาะในช่วงปีแรกของการเรียน อย่างไรก็ตาม โอกาสในการฝึกปฏิบัติจริงมักมีจำกัด ด้วยข้อจำกัดด้านเวลา แหล่งเรียนรู้ และความปลอดภัยของผู้ป่วย แม้ว่าการใช้แพทยบทบาทที่ขับเคลื่อนด้วยปัญญาประดิษฐ์จะได้รับความสนใจในแวดวงการศึกษาทางการแพทย์ ทั่วโลก แต่การประยุกต์ใช้อย่างเป็นระบบเพื่อพัฒนาทักษะการซักประวัติ ในบริบทของนักศึกษาพยาบาลไทย ยังมีอยู่อย่างจำกัด การวิจัยนี้ประเมินความเป็นไปได้ของแพทยบทบาทที่พัฒนาด้วยแพลตฟอร์ม ChatGPT เพื่อเสริมสร้างความรู้การซักประวัติในนักศึกษาพยาบาลชั้นปีที่ 1 วิทยาลัยพยาบาลแห่งหนึ่งในกรุงเทพมหานคร ประเทศไทย นักศึกษาอาสาสมัคร 30 คน ฝึกต่อตอบกับแพทยบทบาทใน 3 สถานการณ์ทางคลินิก ได้แก่ ได้สั่งอักเสบ โรคติดเชื้อรัง และกล้ามเนื้อหัวใจตายเฉียบพลันชนิด ST ไม่ยกตัว (STEMI) อย่างน้อย 1 ครั้งต่อสถานการณ์ ภายในระยะเวลา 1 สัปดาห์ การวิจัยใช้รูปแบบก่อน-หลังการทดลอง โดยวัดการเปลี่ยนแปลง ความรู้ด้วยแบบทดสอบก่อนและหลังการใช้แพทยบทบาท พร้อมแบบสำรวจความพึงพอใจหลังการทดลอง ผลการวิจัยพบว่า คะแนนความรู้หลังการทดลอง (mean = 9.37, SD = 1.25) สูงกว่าคะแนนก่อนการทดลอง (mean = 8.47, SD = 1.31) อย่างมีนัยสำคัญทางสถิติ ( $p=0.005$ ) โดยมีผลต่างของค่าเฉลี่ยเท่ากับ 0.90 (ความเชื่อมั่นร้อยละ 95 = 0.31-1.49) นักศึกษารายงานการยอมรับในระดับสูงทุกมิติของโมเดลการยอมรับเทคโนโลยี ได้แก่ การรับรู้ประโยชน์ การรับรู้ความง่ายในการใช้ ทัศนคติต่อการใช้งาน ความตั้งใจใช้ และปัจจัยสนับสนุน โดยมีค่าเฉลี่ยอยู่ในช่วง 4.35-4.58 จากคะแนนเต็ม 5 คะแนน แสดงให้เห็นว่าแพทยบทบาทได้รับการยอมรับในฐานะเครื่องมือเสริม การเรียนรู้ที่มีศักยภาพ อย่างไรก็ตาม การศึกษานี้มีข้อจำกัดหลายประการ ได้แก่ กลุ่มตัวอย่างจำกัดเล็ก ระยะเวลาการทดลองที่สั้น และการดำเนินการในสถานบันการศึกษาเพียงแห่งเดียว แม้จะมีข้อจำกัดเหล่านี้ ผลการศึกษา ก็ได้ให้หลักฐานเบื้องต้นถึงความเป็นไปได้ และศักยภาพของการใช้แพทยบทบาท ChatGPT เพื่อพัฒนาความรู้ การซักประวัติผู้ป่วยในนักศึกษาพยาบาลไทย งานวิจัยในอนาคตควรขยายการศึกษาในหลายสถานบัน ระยะเวลา ที่นานขึ้น และประเมินผลในระยะยาว เพื่อยืนยันผลลัพธ์และประสิทธิผลของการใช้เทคโนโลยีในบริบทการเรียน การสอนทางการพยาบาลอย่างยั่งยืน

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# A pilot study on a role-play chatbot for enhancing patient history-taking knowledge in nursing students

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## Abstract

Taking patients' history is a fundamental skill for nursing students, yet opportunities for hands-on practice are often limited, particularly in the early years of training. While AI-powered chatbots have gained attention in healthcare education globally, their specific application in systematic history-taking training for Thai first-year nursing students remains underexplored. This study evaluates the feasibility of a role-play chatbot developed using the ChatGPT platform to enhance history-taking knowledge among first-year nursing students at a nursing college in Bangkok, Thailand. Thirty volunteer students interacted with three clinical scenarios: appendicitis, chronic kidney disease, and non-ST elevation myocardial infarction (NSTEMI), completing at least one session per scenario over a one-week period. A pre-post design was employed to measure knowledge changes, with tests administered before and after the intervention, along with a post-intervention satisfaction survey. The results showed that the post-test knowledge scores (mean = 9.37, SD = 1.25) were significantly higher than the pre-test scores (mean = 8.47, SD = 1.31),  $p=0.005$ , with a mean difference of 0.90 (95% CI = 0.31-1.49). Students reported high levels of acceptance across all technology acceptance model dimensions, including perceived usefulness, perceived ease of use, attitude toward using, behavioral intention, and facilitating conditions, with mean scores ranging from 4.35 to 4.58 on a 5-point Likert scale. This indicates that the chatbot was well-accepted as a potential supplementary learning tool. However, this study has several limitations, including a small sample size, a short experimental duration, and its conduction at a single institution. Despite these limitations, the findings provide preliminary evidence of the feasibility and potential of using the ChatGPT chatbot to enhance patient history-taking knowledge among Thai nursing students. Future research should expand to multiple institutions, employ a longer duration, and include long-term evaluation to confirm these findings and establish the sustainable effectiveness of this technology in nursing education.

**Keywords:** chatbot; nursing education; history-taking knowledge; artificial intelligence; technology acceptance

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## Introduction

History-taking is an essential early learning outcome in undergraduate nursing curricula because it provides the conceptual foundation for collecting patient information, identifying relevant problems, and organizing subsequent clinical reasoning. However, for first-year nursing students, it is often challenging to develop, as they must simultaneously acquire core terminology, basic biomedical concepts, and professional communication norms. At the start of training, students acquire these, yet they typically have limited opportunities for repeated, low-stakes practice<sup>1</sup>. To support students more effectively, we need teaching tools that respond to each student in real time, offering guidance, feedback, and the opportunity to try again<sup>2</sup>. In short, classroom strategies in the digital era should blend technology with deliberate practice so learners can connect concepts to bedside decisions with greater confidence<sup>3</sup>.

As conversational artificial intelligence has matured, chatbots have become practical training partners: they converse, probe, and mirror the small twists of real clinical interviews<sup>4</sup>. Effective execution demands clinical expertise and proper inquiry techniques, along with strong communication skills, sound clinical judgment, and the ability to establish a supportive relationship with patients. Yet many students struggle to gain fluency. Common barriers include limited access to real patients, compressed clinical rotations, patient-safety constraints, and uneven learning opportunities across settings<sup>5</sup>. In this context,

chatbot-supported role-play may offer a structured mechanism for students to rehearse the knowledge and conceptual understanding underlying interview content and organization, with opportunities for repetition that do not require faculty presence at each attempt<sup>6</sup>. Importantly, the present study does not evaluate performance-based interviewing competence or clinical communication proficiency because no objective performance assessment (e.g., OSCE ratings or observational checklists) was implemented. Instead, the focus is on preliminary evidence regarding changes in history-taking knowledge and conceptual understanding following structured practice.

Although interest in AI-driven chatbots for education has surged, evidence remains limited, particularly for first-year cohorts. Prior work has established the technical feasibility and content accuracy of GPT-based history-taking tools, and several reviews have discussed AI chatbots in nursing education more broadly<sup>7-9</sup>. However, Thai programs are underrepresented despite distinctive constraints: high student-to-instructor ratios<sup>10,11</sup>, limited placements in specialty areas, and geographic barriers that complicate consistent access to learning resources<sup>12</sup>. These conditions make locally grounded evidence especially important.

Accordingly, this study was conducted a pilot evaluation of an AI-powered role-play chatbot incorporating three clinical scenarios: Appendicitis, Chronic kidney disease (CKD), and Non-ST-elevation myocardial infarction

(NSTEMI), as structured practice materials for first-year Thai nursing students. The study examined feasibility within a course context, students' acceptance and learning experience, and preliminary changes in history-taking knowledge following structured practice. The findings provide context-specific preliminary evidence to inform whether AI-based role-play chatbots warrant further investigation using more rigorous performance-based assessment approaches in Thai nursing education.

## Materials and Methods

### 1. Research design

This study was conducted a single-group pretest–posttest pilot study to estimate the educational impact of a chatbot-based role-play without a control group. The intervention comprised structured interactions with a chatbot simulating three clinical scenarios (appendicitis, CKD, and NSTEMI). These scenarios were purposively selected to represent common clinical conditions with varying levels of acuity and system involvement, appropriate for first-year nursing students. Knowledge of history-taking was measured before and after the intervention. A post-intervention satisfaction questionnaire was administered to evaluate the learning experience and platform usability.

The study received approval from the Institutional Review Board of Saint Louis College (Protocol No. E. 011/2568). All participants provided written informed consent and were informed of their right to withdraw at any time without penalty. Data

were anonymized, and no real Protected Health Information (PHI) was used during the simulation practice.

### 2. Participants and recruitment

This study was recruited 30 first-year nursing students using convenience sampling, and baseline academic characteristics (e.g., prior knowledge or grade point average) were not collected. Participation was voluntary, and students were free to withdraw at any time without penalty. To ensure equity, students who did not participate were given access to the chatbot training after the study. Before enrollment, all students received written information regarding the study's purpose, procedures, potential risks and benefits, and participant rights, and provided written informed consent.

### 3. Instruments

#### 3.1 Role-Play Chatbot scenarios

This study was developed three interactive scenarios (Appendicitis, CKD, NSTEMI) on the ChatGPT platform. Platform selection followed a comparative review of Microsoft Copilot Studio and Google Gemini by a focus group of nurse educators, who rated reliability, clinical accuracy, prompt-design usability, and natural-language fluency. ChatGPT was selected for educational purposes and dialogue realism.

Protocol: Students used the same scenario set. Each scenario employed structured prompts to guide questioning and stimulate clinical reasoning. Students were

required to complete all three scenarios within one week, engaging with each scenario at least once. No formal time limit was imposed, and the duration of engagement with each scenario was not systematically recorded.

### 3.2 Knowledge assessment

This study was administered a 10-item multiple-choice test (four options/item) pre- and post-intervention to assess history-taking knowledge (symptom identification, appropriate questioning, reasoning). The conducted item analysis, including difficulty (P) and discrimination (D) for all items. Most items met targets ( $P = 0.30-0.80$ ,  $D > 0.30$ ). Item 1 (too easy) and Item 8 (too complicated) were flagged for revision in future iterations. Internal consistency, as measured by KR-21, was 0.74, indicating acceptable reliability for formative use. Due to the exploratory nature of this pilot study, parallel forms of the test were not developed.

### 3.3 Satisfaction questionnaire

After the intervention, students completed a 15-item questionnaire (5-point Likert scale). Items were adapted from TAM and UTAUT core constructs<sup>7</sup> and were mapped to the following dimensions: perceived usefulness, perceived ease of use, attitude toward using, behavioral intention to reuse, and facilitating conditions (including technical support). The questionnaire demonstrated excellent internal consistency (Cronbach's  $\alpha = 0.96$ ).

## 4. Procedure and data collection

Data collection was executed in three phases:

4.1 Pretest: Students completed the knowledge test to establish a baseline.

4.2 Intervention (1 week): We distributed chatbot links via Google classroom. Students completed three role-play scenarios ( $\geq 1$  interaction/scenario). After each interaction, students submitted the session link as evidence of participation.

4.3 Posttest and survey: Students completed the same knowledge test and then the satisfaction questionnaire.

## 5. Statistical analysis

Descriptive statistics (means and standard deviations) were used to summarize test scores and satisfaction ratings. Pre- and post-training scores were compared using a paired-samples t-test in SPSS version 26.0, after verifying normality assumptions. Statistical significance was determined at  $\alpha = 0.05$  (two-tailed). Cohen's d method was used to estimate the effect size of the improvement.

## Results

The results of this study are presented in two main sections: 1) the learning outcomes of the chatbot-based training and 2) students' satisfaction with the chatbot-based learning experience. Quantitative data were analyzed using descriptive statistics and a paired-samples t-test to compare pre- and post-intervention knowledge scores. The analysis also included mean and standard deviation scores for each item in the satisfaction questionnaire.

1. Learning outcomes of the chatbot-based training

As shown in Table 1, the pre-test and post-test results demonstrated a statistically significant improvement in students' knowledge following the chatbot-based training. The pre-test mean was 8.47 (SD = 1.31), while the post-test mean increased to 9.37 (SD = 1.25), yielding a mean gain of 0.9 points. A paired-samples t-test showed that this improvement was statistically significant, ( $p=0.005$ ), with a

95% confidence interval for the mean difference of 0.31-1.49. The effect size, measured by Cohen's  $d = 0.55$ , indicated a moderate educational effect. These findings suggest that the role-playing chatbot effectively enhanced students' understanding of history-taking concepts and improved their ability to apply clinical reasoning during simulated interviews.

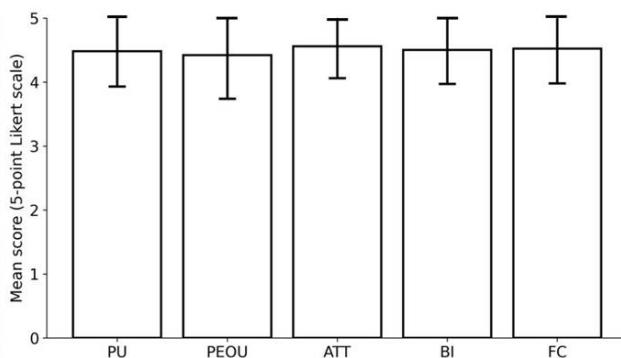
**Table 1** Paired t-test results comparing pre- and post-test history-taking knowledge scores (mean $\pm$ SD), including effect size (Cohen's  $d$ )

Measure	Pre-test	Post-test	Mean difference	t	p-value	Cohen's d
Test score	8.47 $\pm$ 1.31	9.37 $\pm$ 1.25	0.90	3.031	0.005	0.55

## 2. Satisfaction with the chatbot-based learning experience

The satisfaction questionnaire, grounded in the Technology Acceptance Model (TAM) and UTAUT frameworks, demonstrated excellent internal consistency (Cronbach's alpha = 0.96). As shown in Figure 1, students reported high satisfaction across all TAM dimensions, with aggregated mean scores exceeding 4.35 on a 5-point Likert scale. Perceived usefulness (PU) and attitude toward using (ATT) yielded the highest ratings, indicating that students viewed

the chatbot as a valuable and appropriate learning support tool. Perceived ease of use (PEOU), facilitating conditions (FC), and behavioral intention (BI) also showed consistently high scores, reflecting positive usability perceptions and strong acceptance. The relatively low standard deviations across dimensions suggest a high degree of consistency in students' responses, supporting overall acceptance of the chatbot-based learning approach.



**Figure 1** Mean scores with standard deviations across Technology Acceptance Model (TAM) dimensions

Bars represent aggregated mean scores, and error bars indicate standard deviations for perceived usefulness (PU), perceived ease of use (PEOU), attitude toward using (ATT), behavioral intention (BI), and facilitating conditions (FC), measured using a 5-point Likert scale.

## Discussion

The integration of a role-play chatbot into nursing education showed statistically significant improvements in students' clinical interviewing knowledge. Post-test scores (mean = 9.37, SD = 1.25) were notably higher than pre-test scores (mean = 8.47, SD = 1.31), with a moderate effect size (Cohen's  $d = 0.55$ ), suggesting a meaningful improvement in knowledge test performance that may be associated with structured chatbot-supported practice<sup>13</sup>. This enhancement is plausibly linked to the chatbot's structured interactivity, which appears to have facilitated rehearsal and contextualization. Such iterative rehearsal and refinement of question selection and sequencing, which is consistent with mechanisms described in active learning and situated cognition<sup>6</sup>.

Interpreted cautiously, the observed gains may also align with cognitive learning progression as described in Bloom's taxonomy, in that students may have moved beyond

recalling and understanding symptoms and disease presentations toward applying and organizing information in response to simulated patient cues<sup>9</sup>. It is conceivable that the chatbot's simulated scenarios, particularly those involving complex conditions such as CKD or NSTEMI, functioned as cognitive scaffolds that helped learners structure and prioritize history-taking content<sup>6</sup>. Additionally, the structured chatbot's design aligns with principles of adult learning theory, particularly Knowles' emphasis on autonomy, relevance, and problem-centeredness<sup>14</sup>. The observed learning improvements may reflect the chatbot's capacity to support self-directed inquiry and experiential engagement, both of which are critical motivators for adult learners<sup>15</sup>. However, it remains possible that individual differences in digital literacy or prior exposure to clinical content may have influenced outcomes, warranting further exploration<sup>16</sup>.

Beyond knowledge-related outcomes, students reported high satisfaction with the chatbot-based learning experience, as reflected in consistently high mean scores across all Technology Acceptance Model (TAM) dimensions, with aggregated ratings exceeding 4.35. In particular, high scores in perceived usefulness (PU) and attitude toward using (ATT) suggest that students viewed the chatbot as a valuable and appropriate learning support tool and responded positively to its integration into the nursing education context<sup>13</sup>. From a constructivist perspective, this favorable affective response may be attributable to the chatbot's simulated dialogic format, which likely supported active engagement with contextually meaningful clinical scenarios and encouraged reflection on one's own questioning approach<sup>17</sup>. At the same time, comparatively lower (though still favorable) scores in perceived ease of use (PEOU) and facilitating conditions (FC) indicate that some learners experienced barriers related to confidence in use, interface usability, or the availability of technical and instructional support. These findings suggest that, while the chatbot was generally well accepted, full engagement may have been moderated by practical implementation factors<sup>18</sup>. Consistent with instructional design principles, such variability underscores the importance of implementation supports, including brief onboarding tutorials, explicit usage guidance, and responsive technical assistance, to enhance learner autonomy and reduce extraneous cognitive load<sup>19</sup>.

Notably, high scores on behavioral intention (BI), including intentions to continue using the chatbot and to recommend it to peers, indicate strong acceptance of the chatbot as a learning support tool. However, these findings should be interpreted as indicators of perceived value rather than evidence of improved clinical performance. Although the dialogic format allowed students to engage in simulated nurse–patient interactions within a psychologically safe environment that supported reflection, the absence of performance-based assessments precludes conclusions regarding interviewing competence or clinical communication proficiency<sup>20</sup>.

Taken together, the findings provide preliminary, context-specific evidence that chatbot-mediated learning environments are feasible and well accepted across key TAM dimensions in nursing education. Nevertheless, given the exploratory nature of the study, caution is warranted in interpreting the results. Future research should consider longitudinal and mixed methods designs to clarify the mechanisms underlying acceptance and engagement, examine moderating factors such as digital literacy and instructional support, and evaluate whether positive perceptions translate into measurable performance outcomes across diverse educational contexts.

### Limitations

However, several limitations should be acknowledged. First, the duration of engagement with each chatbot scenario was not controlled or systematically recorded, and

students were not restricted from consulting external learning resources during the intervention. Second, participants were recruited using convenience sampling, and baseline academic characteristics, such as prior knowledge or grade point average, were not collected, limiting the ability to account for individual differences. Third, potentially relevant background variables, including previous experience with AI tools, actual usage time, and concurrent learning activities during the study period, were not assessed and may have acted as unmeasured confounders. These limitations reflect the exploratory nature of this pilot study and should be addressed in future research employing more rigorous control and measurement strategies.

## Conclusions

This pilot study provides preliminary evidence that a ChatGPT-powered role-play chatbot may support nursing students' knowledge and conceptual understanding of history-taking, with high levels of learner acceptance and satisfaction. Within the Thai nursing education context, the findings suggest that chatbot-supported role-play is a feasible and well-accepted instructional approach for early-stage learners, particularly where opportunities for repeated, low-stakes practice are limited. Future research is warranted to examine whether observed gains in knowledge and acceptance translate into measurable clinical performance outcomes. Overall, AI-supported role-play chatbots may serve as a complementary learning resource when thoughtfully integrated within a comprehensive nursing curriculum.

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