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Development and Effectiveness of an AI Chatbot for Hospital Navigation

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----------***ABSTRACT***----------

Purpose

This study aimed to develop an AI chatbot for hospital navigation and examine the effects of education using the chatbot on nursing students' clinical practice engagement, clinical practice adaptation, and clinical practice satisfaction.

Methods

A nonequivalent control group pretest-posttest design was employed. Participants were 62 nursing students recruited from a university in G City, Korea, between March 5 and June 5, 2025. Clinical practice engagement, clinical practice adaptation, and clinical practice satisfaction were assessed using structured self-report questionnaires. Data were analyzed using IBM SPSS Statistics version 25.0.

Results

Statistically significant differences were observed between the experimental and control groups in clinical practice engagement (t=1.98, p=.038) and clinical practice adaptation (t=3.21, p=.015). However, no statistically significant difference was found in clinical practice satisfaction (t=0.26, p=.344).

Conclusion

Education incorporating a hospital navigation AI chatbot may be useful for enhancing nursing students' engagement in and adaptation to clinical practice. Further research is needed to develop more comprehensive AI chatbot-based educational interventions that address broader clinical learning needs and individualized learning strategies.

Keywords: *Hospital; Artificial Intelligence; Navigation; Chatbot; Nursing Students*

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I. Introduction

1. Background and Significance

Artificial intelligence (AI) refers to technology that enables computers to emulate human intellectual functions, including thinking, learning, understanding, and reasoning [1]. AI aims to reproduce or implement various human cognitive and reasoning capabilities [2]. In recent years, AI technologies have been rapidly adopted across a wide range of industries and have increasingly been applied in healthcare. For example, AI-based wearable devices can be worn on various parts of the body to continuously monitor and analyze physiological signals in real time [3,4]. Other applications include AI-enabled nursing robots designed to perform selected tasks traditionally carried out by nurses in hospital wards [5,6], companion robots that provide emotional and social support to individuals requiring ongoing interaction, such as older adults [7], and automated dispensing robots that can reduce nurses' workload during medication management [8]. These technologies are expected to contribute to changes in the roles of healthcare professionals, including nurses, and may ultimately contribute to a broader transformation of the healthcare paradigm.

AI has been continuously researched since the 1950s and has become increasingly integrated into everyday life with the emergence of the Fourth Industrial Revolution, facilitating more efficient task performance [9]. Its applications extend beyond healthcare—including clinical diagnosis, disease prediction, medical image interpretation, and physiological data analysis [10]—to diverse fields such as industry, finance, education, and entertainment [11]. This widespread adoption of AI is also expected to bring about a paradigm shift in nursing. In particular, the use of AI is increasing in both clinical nursing practice and nursing education [12]. Given the growing body of research examining the educational applications of AI across various educational settings [13,14], AI technologies are likely to be increasingly incorporated into nursing education.

Nursing is a practice-oriented discipline that requires the application of theoretical knowledge to real-world clinical settings. Clinical practice education is designed to help nursing students apply knowledge acquired through theoretical instruction, identify actual and potential health problems, and develop the critical-thinking and problem-solving skills required to address these problems [15]. As a core component of nursing education, clinical practice provides students with opportunities to experience diverse clinical situations and develop nursing skills in authentic healthcare environments, thereby preparing them to perform professional nursing duties after graduation [16]. However, difficulties in adapting to unfamiliar clinical environments, navigating complex hospital layouts, and managing time effectively may interfere with task performance and consequently hinder high-quality clinical practice experiences [17,18].

The application of generative AI to hospital navigation may enable nursing students to obtain route information more easily in complex hospital environments, thereby facilitating more efficient performance of nursing-related tasks during clinical practice. Personalized route guidance may also help students adapt more quickly to clinical settings and improve the efficiency of their learning [3]. In addition, navigation chatbots may help reduce the cognitive and decision-making burden associated with emergency situations, large and complex hospital environments, and congested routes during emergencies, disasters, or field-based situations. Although concerns have been raised that excessive reliance on generative AI may potentially interfere with the development of critical-thinking and creative abilities [4], positive educational outcomes may be achieved when

AI is implemented within educationally appropriate frameworks supported by clear standards and guidelines. Therefore, in response to rapidly advancing technologies, it is important to explore effective ways of incorporating AI chatbots into nursing education to support the development of clinical practice competencies required in complex nursing situations.

Various educational approaches have been explored in clinical practice education, including simulation-based practice education [19], team-building approaches to learning [20], peer feedback using video recordings [21], development of immersive VR-based content for insulin injection as a core nursing skill [22], and the application and evaluation of AI-based intravenous infusion VR simulation [23]. Nevertheless, studies examining AI-based clinical practice education specifically designed to enhance nursing students' clinical practice engagement and adaptation remain limited both in Korea and internationally. Thus, systematic research is needed to explore the educational potential of AI in clinical practice settings.

Accordingly, this study developed a hospital navigation AI chatbot and implemented education using the chatbot to explore its potential as an educational intervention for enhancing nursing students' clinical practice competencies. In addition, by examining the effectiveness of the hospital navigation AI chatbot, this study sought to provide a foundation for developing nursing education strategies that may contribute to enhanced student competencies and, ultimately, the provision of high-quality nursing care.

II. Purpose of the Study

This study aimed to develop a hospital navigation AI chatbot and examine the effects of education using the chatbot on nursing students' clinical practice engagement, clinical practice adaptation, and clinical practice satisfaction.

The specific objectives were as follows:

1. To compare clinical practice engagement between nursing students who used the hospital navigation AI chatbot and those who did not.
2. To compare clinical practice adaptation between nursing students who used the hospital navigation AI chatbot and those who did not.
3. To compare clinical practice satisfaction between nursing students who used the hospital navigation AI chatbot and those who did not.

III. Research Hypotheses

1. Nursing students who use the hospital navigation AI chatbot will have higher clinical practice engagement than those who do not use the chatbot.
2. Nursing students who use the hospital navigation AI chatbot will have higher clinical practice adaptation than those who do not use the chatbot.
3. Nursing students who use the hospital navigation AI chatbot will have higher clinical practice satisfaction than those who do not use the chatbot.

Methods

1. Study Design

This study employed a nonequivalent control group pretest-posttest design to develop a hospital navigation AI chatbot and examine the effects of education using the chatbot on nursing students' clinical practice engagement, clinical practice adaptation, and clinical practice satisfaction.

2. Participants

Participants were nursing students enrolled in the Department of Nursing at C University in G City, Korea. Participants were recruited using convenience sampling. Only students who fully understood the purpose of the study and voluntarily agreed to participate were included. The inclusion criteria were: (1) having previous clinical practice experience and (2) having no prior experience using a hospital navigation AI chatbot.

The required sample size was calculated using G*Power 3.1. Based on a previous study [24], an independent-samples t-test was selected with an effect size of 0.80, a significance level of .05, and a statistical power of .90 using a one-tailed test. The minimum required sample size was 28 participants per group. Considering potential attrition and incomplete responses, questionnaires were distributed to 31 participants in each group. All 62 participants completed the study.

3. Instruments

1) Clinical Practice Engagement

Clinical practice engagement was measured using an instrument originally developed by Engeser and Rheinberg and modified by Heo [25]. The instrument consists of 13 items. Items 1–10 are rated on a five-point Likert scale ranging from 5 ("strongly agree") to 1 ("strongly disagree"), whereas items 11–13 are assessed using a five-point semantic differential scale. Total scores range from 13 to 65, with higher scores indicating greater clinical practice engagement. In this study, the mean score across items was used for analysis. The Cronbach's α was .90 at the time of instrument development and .92 in the present study.

2) Clinical Practice Adaptation

Clinical practice adaptation was assessed using the instrument developed by Park [26]. The instrument consists of nine items, including five items assessing emotional responses to clinical practice and four items assessing understanding of the nursing major through clinical practice. Each item is rated on a five-point Likert scale ranging from 5 ("strongly agree") to 1 ("strongly disagree"). Total scores range from 9 to 45, with higher scores indicating greater clinical practice adaptation. The mean score across items was used for analysis. The Cronbach's α was .73 at the time of instrument development and .80 in the present study.

3) Clinical Practice Satisfaction

Clinical practice satisfaction was measured using an instrument originally developed by Lee [27] and subsequently modified and supplemented by Lee, Kim, and Kim [27]. The instrument consists of 31 items across six domains: clinical practice curriculum (3 items), clinical practice content (6 items), clinical practice guidance (9 items), clinical practice environment (7 items), clinical practice time (3 items), and clinical practice evaluation (3 items).

Each item is rated on a five-point Likert scale ranging from 5 ("strongly agree") to 1 ("strongly disagree"), with total scores ranging from 31 to 155. Higher scores indicate greater clinical practice satisfaction. The mean score across items was used for analysis. The Cronbach's α was .87 at the time of instrument development and .91 in the present study.

4. Data Collection and Ethical Considerations

Data were collected from March 5 to June 5, 2025, using self-report questionnaires. The questionnaire was administered through a URL created using Google Docs and distributed via KakaoTalk to nursing students in G City recruited through convenience sampling. Completion of the questionnaire required approximately 10–15 minutes.

To protect participants' rights and ensure ethical conduct, approval for data collection was obtained from the university before recruitment. Participants were informed of the purpose and procedures of the study, as well as measures taken to ensure confidentiality and anonymity. They were also informed that participation or nonparticipation would not affect their educational rights or academic grades. Participants were further informed that the collected data would be used once for statistical analysis and destroyed after completion of the study.

Students who voluntarily agreed to participate completed the online questionnaire through the provided URL. After the study was completed, participants in the control group were also provided with the same educational program on using the hospital navigation AI chatbot as that provided to the experimental group.

5. Clinical Practice Education Using the Hospital Navigation AI Chatbot

The hospital navigation AI chatbot was developed using machine-learning techniques to enable nursing students to easily identify routes within the hospital while performing various nursing tasks during clinical practice. The chatbot was designed to provide an optimized route within the complex hospital environment based on the user's starting point and destination.

To maximize accessibility and convenience, the chatbot was developed as a KakaoTalk-based application. Students could access the chatbot simply by adding the designated KakaoTalk channel. The AI chatbot was developed using the Kakao Channel Manager Center website, which could be accessed free of charge through a personal computer.

The AI chatbot based on the Kakao Channel Manager Center was implemented through a sequential algorithm consisting of five stages: "user input → intent analysis → scenario/AI branching → response generation →

transmission in Kakao format." The chatbot was designed to provide route guidance after the user entered both a starting point and a destination and requested route information.

The names of all departments in which the nursing students were undertaking clinical practice were incorporated into the AI chatbot system. For example, when a student practicing in Ward 53 needed to travel to the operating room, the student could enter "Ward 53" as the starting point and "Operating Room" as the destination. The chatbot would then provide the shortest route from Ward 53 to the operating room using a two-dimensional floor plan, with a link to the relevant map.

Before the education using the hospital navigation AI chatbot began, students in both the experimental and control groups completed self-report questionnaires assessing clinical practice engagement, clinical practice adaptation, and clinical practice satisfaction.

Participants in the experimental group received a preliminary orientation on how to use the chatbot and were instructed to use it whenever necessary during the clinical practice period. The orientation included instructions on accessing and using the chatbot before its implementation. A link to the chatbot was distributed through KakaoTalk, allowing participants to access it immediately after adding the channel.

The hospital navigation AI chatbot could be accessed using smartphones or tablets and could be used regardless of time or location. Participants were allowed to use the chatbot autonomously during each clinical practice session according to their needs. The researcher monitored whether participants used the chatbot and the frequency of use.

Participants in the control group were not provided with access to the hospital navigation AI chatbot and received routine clinical practice education. After completion of the study, the control group was provided with the same education on using the hospital navigation AI chatbot as the experimental group.

Following the implementation of the hospital navigation AI chatbot, both groups completed questionnaires assessing clinical practice engagement, clinical practice adaptation, and clinical practice satisfaction.

6. Data Analysis

Data were analyzed using IBM SPSS Statistics version 25.0. Statistical significance was set at .05, and one-tailed tests were used. The Shapiro–Wilk test was performed to assess the normality of the data, and all variables satisfied the assumption of normality. Differences between the experimental and control groups in pretest and posttest scores for clinical practice engagement, clinical practice adaptation, and clinical practice satisfaction were analyzed using independent-samples t-tests.

IV. Results

1. Test of Normality

The Shapiro–Wilk test was conducted to determine whether the scores for clinical practice engagement, clinical practice adaptation, and clinical practice satisfaction satisfied the assumption of normality. The results indicated that all p-values were greater than .05: clinical practice engagement (S-W = .145, p = .241), clinical practice

adaptation (S-W = .342, p = .432), and clinical practice satisfaction (S-W = .435, p = .228). Therefore, the assumption of normality was satisfied, and an independent-samples t-test, a parametric test, was used.

In addition, no statistically significant differences were found between the experimental and control groups in pretest scores for clinical practice engagement, clinical practice adaptation, or clinical practice satisfaction, indicating that the two groups were homogeneous at baseline (Table 1).

2. Hypothesis Testing

The differences in posttest scores between the experimental and control groups were analyzed to examine the effectiveness of the hospital navigation AI chatbot. The results are presented in Table 2.

A statistically significant difference was observed between the experimental and control groups in posttest clinical practice engagement scores (t=1.98, p=.038). Therefore, Hypothesis 1, which stated that "nursing students who use the hospital navigation AI chatbot will have higher clinical practice engagement than those who do not use the chatbot," was supported.

The results of the analysis of posttest clinical practice adaptation scores are presented in Table 3. A statistically significant difference was observed between the experimental and control groups (t=3.21, p=.015). Therefore, Hypothesis 2, which stated that "nursing students who use the hospital navigation AI chatbot will have higher clinical practice adaptation than those who do not use the chatbot," was supported.

The results of the analysis of posttest clinical practice satisfaction scores are presented in Table 4. No statistically significant difference was observed between the experimental and control groups (t=0.26, p=.344). Therefore, the results did not support a statistically significant effect of the intervention on clinical practice satisfaction.

V. Discussion

This study developed a hospital navigation AI chatbot and examined whether education using the chatbot was associated with changes in nursing students' clinical practice engagement, clinical practice adaptation, and clinical practice satisfaction.

Following the implementation of education using the hospital navigation AI chatbot, nursing students in the experimental group demonstrated increased clinical practice engagement. Because previous studies specifically examining nursing students were not identified, a previous study involving online learners was considered [28]. That study reported improved academic achievement, including knowledge, following AI-based education, which is consistent with the findings of the present study. These findings suggest that the use of a hospital navigation AI chatbot may facilitate students' engagement during clinical practice.

In the present study, the chatbot enabled nursing students to easily identify routes within the hospital while performing various nursing-related tasks during clinical practice. Easy access to route information may have reduced the burden associated with navigating a complex hospital environment and allowed students to devote greater attention to their clinical activities. Although students may initially have experienced some difficulty operating the technology, repeated use may have facilitated familiarity with the chatbot and enabled

them to navigate complex hospital routes more naturally. This increased familiarity may have reduced the burden associated with clinical tasks and contributed to greater engagement in clinical practice.

Clinical practice adaptation also increased following the implementation of education using the hospital navigation AI chatbot. A previous study involving elementary school students reported improved adaptation to school life following the application of an AI chatbot [29]. Another study involving middle school students reported increased confidence after participation in an AI convergence education program [30]. These findings are consistent with the present study in suggesting that AI-based educational interventions may support adaptation and confidence.

In the present study, nursing students were able to obtain information about hospital routes required for clinical practice through the AI chatbot. Repeated and proactive exposure to route information may have facilitated students' familiarity with the clinical environment and thereby supported their adaptation to clinical practice. This may be particularly relevant for students experiencing clinical practice for the first time, as the chatbot provided an accessible means of becoming familiar with complex hospital routes before or during actual movement within the hospital.

In contrast, clinical practice satisfaction did not show a statistically significant difference after the use of the hospital navigation AI chatbot. This finding differs from previous studies involving learners, which reported improvements in learning satisfaction following the application of AI tutors [31,32]. One possible explanation is that the hospital navigation AI chatbot was primarily designed to provide route information in response to users' questions. Although this function may have addressed an immediate practical need, the chatbot did not provide comprehensive support for the broader range of learning content required in clinical practice courses or individualized learning strategies. Because clinical practice satisfaction may be influenced by multiple aspects of the clinical learning environment—including curriculum, content, supervision, environment, time, and evaluation—the navigation function alone may have been insufficient to produce measurable changes in overall satisfaction.

Therefore, future AI chatbot-based interventions should consider expanding beyond navigation functions to include educational content related to clinical practice, individualized learning support, and other factors that may contribute to students' overall clinical practice experience.

This study has several limitations. First, the participants were recruited from a single university, which limits the generalizability of the findings. Future studies should include nursing students from multiple universities and regions and recruit more diverse populations. Second, convenience sampling was used, and therefore the possibility that extraneous variables were not fully controlled cannot be excluded.

Although the hospital navigation AI chatbot may provide practical educational benefits, several technological limitations remain. The current chatbot was not integrated into the physical clinical environment through extended reality (XR) technology, nor did it incorporate sensory modalities that could provide a more immersive experience. In addition, the chatbot required an internet connection to operate. Further

multidisciplinary efforts involving nursing, education, healthcare, and technology specialists will be needed to address these limitations and develop more sophisticated forms of AI-supported clinical practice education.

VI. Conclusion and Recommendations

This study was conducted to examine the effects of education using a hospital navigation AI chatbot on nursing students' clinical practice engagement, clinical practice adaptation, and clinical practice satisfaction.

The results demonstrated statistically significant differences in clinical practice engagement and clinical practice adaptation between the experimental and control groups following the intervention, whereas no statistically significant difference was observed in clinical practice satisfaction. These findings suggest that education using a hospital navigation AI chatbot may be a useful approach for supporting nursing students' engagement in and adaptation to clinical practice.

The significance of this study lies in its development and application of a hospital navigation AI chatbot for nursing students and its empirical examination of the educational effects of the intervention. The chatbot addressed a practical challenge faced by nursing students in complex hospital environments by providing accessible route information during clinical practice.

Further refinement and systematic expansion of the chatbot may increase its applicability beyond nursing students to other healthcare-related learners and professionals. In particular, integrating hospital navigation with clinical learning content and individualized educational support may provide a more comprehensive educational intervention.

To enhance the generalizability of the findings, future studies should recruit larger samples from multiple institutions and conduct repeated investigations. Longitudinal studies incorporating repeated measurements are also needed to examine whether the effects of hospital navigation AI chatbot education are sustained over time. Future research should also explore the integration of AI-based navigation with XR technologies and more comprehensive clinical practice education.

VII. Reference

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Table 1. Homogeneity Test of Dependent Variables

(N=62)

Variables	Exp. (n=31)	Cont. (n=31)	t	*p*
	M±SD	M±SD		
Clinical Practice Engagement	2.98±1.24	3.05±1.03	0.68	.450

Clinical Practice Adaptation	3.34±1.34	3.45±0.98	-1.06	.201
Clinical Practice Satisfaction	3.59±0.42	3.47±0.68	-1.13	.308

Exp.=experimental group; Cont.=control group

Table 2. Effects of clinical practice education using AI chatbot on clinical practice engagement among participants

Variable	Group	Post-test	Difference	t (p)
		Mean±SD	Mean±SD	
Clinical Practice Engagement	Exp.	4.36±0.24	1.54±1.02	1.98 (.038)
	Cont.	4.01±0.67	0.96±1.14	

Exp.=experimental group; Cont.=control group

Table 3. Effects of clinical practice education using AI chatbot on clinical practice adaptation among participants

Variable	Group	Post-test	Difference	t (p)
		Mean±SD	Mean±SD	
Clinical Practice Adaptation	Exp.	4.41±0.35	1.46±1.03	3.21 (.015)
	Cont.	3.97±0.61	0.31±1.10	

Exp.=experimental group; Cont.=control group

Table 4. Effects of clinical practice education using AI chatbot on clinical practice satisfaction among participants

Variable	Group	Post-test	Difference	t (p)
		Mean±SD	Mean±SD	
Clinical Practice Satisfaction	Exp.	3.72±0.12	0.13±1.11	0.26 (.344)
	Cont.	3.79±0.34	0.32±1.02	

Exp.=experimental group; Cont.=control group