

Transforming Medical Communication Education: The Effectiveness of Generative AI Education Using ChatGPT

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Objectives: This study aims to explore the effectiveness of medical communication skills training through generative AI (Artificial Intelligence), such as ChatGPT. The primary objective is to analyze the impact of AI-based education on students' communication abilities and learning experiences, while also discussing the long-term potential of integrating AI into medical education. **Methods:** A communication education utilizing Generative AI was designed for 70 first-year medical students. The program employed a multifaceted approach, including virtual patient simulations, real-time feedback, and self-reflection. Post-training surveys were conducted to assess student satisfaction and learning outcomes. Both quantitative and qualitative data were analyzed to derive the results. **Results:** Students perceived AI-based training as having a positive impact on their communication skills. In particular, real-time feedback and the opportunity for repeated practice contributed to boosting students' confidence. The average satisfaction score exceeded 3.7, with students responding favorably to the interaction with AI, believing it would enhance their communication skills in real clinical settings. **Conclusions:** This study demonstrates the potential of generative AI as a valuable tool in medical education, contributing to the improvement of communication training quality. Future research should focus on expanding the scope of AI applications and analyzing the long-term effectiveness of such training programs across a wider range of clinical scenarios.

Key words: Generative AI, Medical communication, AI-based education, Medical education

INTRODUCTION

In medical education, communication is a core clinical skill that is essential for achieving successful outcomes in patient care, particularly during diagnostic and therapeutic processes [1,2]. Research has shown that a clinician's ability to listen to and empathize with a patient's emotions significantly impacts not only the patient's psychological and functional outcomes, but also their overall experience and satisfaction with the care they received [3]. However, communication skills do not necessarily improve over time without educational intervention, making it crucial to incorporate communication training for medical students [4,5].

There is a growing need to explore the potential applications of artificial intelligence (AI) in medical communication education [6]. AI is increasingly being recognized for its potential to significantly enhance students' learning experiences, particularly in developing core competencies such as communication [7]. AI-based educational tools have been shown to provide students with more effective learning opportunities, helping them develop appropriate communication skills even in complex clinical scenarios [8]. Recent studies on the integration of medical AI into education suggest that AI should be a central component of future medical curricula, moving beyond its role as a mere auxiliary tool [9].

Specifically, the use of AI in communication training is expected to

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strengthen the communication between healthcare providers and patients, foster trust, improve diagnostic accuracy, and enhance patient satisfaction [2]. Generative AI, such as ChatGPT, has been particularly highlighted for its potential to improve key soft skills, including communication and empathy [10].

Traditionally, communication training has been conducted through face-to-face role-play, interactive sessions, and lectures. However, these methods often have limitations in terms of time and resources, which restrict the availability of adequate practice opportunities for all students. In contrast, AI-based training systems provide opportunities for repeated simulated interactions with patients, thereby replicating real clinical scenarios. This ensures that students with weaker communication skills receive as much practice as they require. Recent advances in generative AI technologies such as ChatGPT offer innovative ways to simulate complex medical interactions, allowing students to refine their communication skills in a personalized and scalable manner [11].

Large language models (LLMs) such as ChatGPT are offering new paradigms for communication training in medical education. These technologies go beyond mere information dissemination and enable students to practice conversations with virtual patients across various clinical scenarios. Recent studies have reported that AI-based simulations have effectively helped students train for challenging patient interactions [12].

This study aims to design and implement a medical communication curriculum utilizing generative AI, specifically ChatGPT, to explore the effectiveness of such training in real-world classroom settings. Additionally, the study evaluates how generative AI-based communication training enhances students' learning experiences and skills, while examining the potential long-term implications of integrating generative AI into medical communication education.

METHODS

This study was approved by the Institutional Review Board (IRB No.: KIWIURB-ex20240715-001). This study aimed to integrate generative AI into communication skills training as part of a single university's medical humanities and social medicine curriculum. The primary objective was to enhance students' communication competencies through the application of AI, specifically focusing on generative models such as ChatGPT. Given the increasing emphasis on AI proficiency in medical education, particularly in areas such as "Understanding digital health and changes driven by AI", as outlined in recent guidelines on the competencies required by healthcare professionals, this initiative is timely and necessary [13]. The curriculum was designed to provide virtual interactions with patients, utilizing AI tools to simulate challenging patient encounters, such as patients who refuse treatment or exhibit difficult behaviors, thereby strengthening physician-patient communication skills.

Participants

The study involved 70 first-year medical students who had completed two years of pre-med education at a single university's medical school and participated in an intensive two-week training program. This training was part of a mandatory course on medical humanities and social medicine. To familiarize students with AI-based communication training, group activities were incorporated, followed by individual tasks in which students were required to engage in AI-driven communication exercises.

Curriculum design

The curriculum primarily focused on enhancing communication skills through virtual patient simulations powered by generative AI. Specifically, the course design followed these steps (Figure 1).

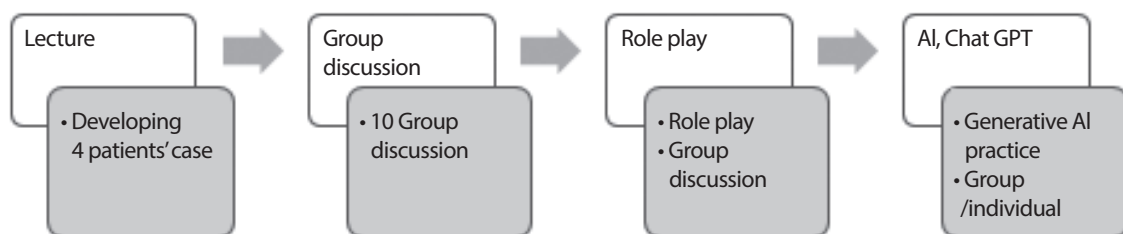


Figure 1. Process of communication training curriculum utilizing medical artificial intelligence (AI).

Group discussion, role play, and ChatGPT practice

The training utilized patient communication scenarios that students would find challenging. The scenarios were developed with the guidance of experts from the Department of Internal Medicine at a single university. These scenarios focused not on the inherent difficulty in conveying medical information, but on the challenges faced by physicians during the clinical process when interacting with difficult patients. The importance of training with difficult patient cases has been demonstrated in numerous studies, as it enhances physicians' ability to communicate effectively in complex and challenging situations. Interactions with difficult patients frequently occur in clinical practice, exposing healthcare providers to emotional, ethical, and legal challenges. In these complex scenarios, successful communication plays a critical role in improving patient satisfaction and clinical outcomes, making training with difficult patient cases essential [14]. Four specific cases were developed around this concept: Case 1: patients requesting non-medical treatment; Case 2: family members speaking disrespectfully; Case 3: family members threatening healthcare staff; and Case 4: patients refusing treatment and family members disagreeing with care.

Role play, group discussion, and self-reflection

Students engaged in extensive communication exercises to apply ChatGPT prompts effectively throughout this process. Once they received prior training to effectively navigate these situations, they familiarized themselves with various challenging patient communication scenarios and practiced using ChatGPT.

Generative AI communication practice

Group practice using ChatGPT was conducted based on the aforementioned patient cases. After interacting with the virtual patient, the students participated in small group discussions to share their experiences and provide peer feedback. These discussions played a crucial role in allowing the students to learn from each other's approaches and reflect on their communication strategies. Subsequently, students were assigned individual practice tasks as homework and submitted prompts that were included in their assignment evaluations.

Real-time feedback sessions

During their interactions with ChatGPT, students received real-time feedback. The AI provided immediate responses to student input, while

faculty members analyzed the challenges and successful strategies in conversations and provided tailored feedback. Interactive feedback sessions were conducted based on AI-assisted practice, which enabled the students to identify specific areas for improvement.

Evaluation of student satisfaction

Upon completion of the training program, a survey was conducted to assess student satisfaction. The survey utilized a 5-point Likert scale, with key questions addressing the following: • Was AI-based communication training useful? • Do you believe interacting with virtual patients will help in real clinical situations? • Was the feedback provided through interactions with AI beneficial? • How does the AI-based learning experience compare to traditional instructional methods? • Are you willing to utilize generative AI tools like ChatGPT more frequently in future communication training?

Data analysis method

The survey results were analyzed using descriptive statistical methods. Means and standard deviations (SD) were used to summarize student responses, and differences in satisfaction across items were analyzed. Open-ended questions regarding the strengths and challenges of the training were analyzed through content analysis, employing thematic analysis to identify key themes in student feedback.

RESULTS

In this study, the effectiveness of communication training utilizing generative AI such as ChatGPT was analyzed from multiple perspec-

Table 1. Results of the satisfaction survey on ChatGPT medical education (n=70)

| Survey content | Mean | SD |
|--|------|-------|
| 1. Prior to taking this course, I was aware that communication training could be conducted using artificial intelligence (AI). | 3.71 | 1.038 |
| 2. Utilizing artificial intelligence for communication training seems to be a useful. | 4.00 | 1.007 |
| 3. I believe that practicing communication training independently with the use of ChatGPT is beneficial. | 3.83 | 0.963 |
| 4. The educational content addressing the use of generative AI for communication training was informative. | 3.97 | 0.978 |
| 5. I am willing to utilize ChatGPT for communication practice in the future. | 3.73 | 1.048 |

SD, standard deviation.

tives. The results indicated that generative AI had a positive impact on students' learning experiences and communication skills, as presented in Table 1.

The analysis of the results from the open-ended survey questions regarding the advantages and challenges of utilizing ChatGPT in communication training yielded the following key findings, summarized as follows:

1. Ability to Train Independently: ChatGPT allows for simulated practice where it can take on the role of a patient, enabling convenient training without the constraints of time and location.

Example: "I can practice various scenarios independently."

Example: "Communication training can be easily conducted anytime and anywhere."

2. Efficient Information Processing and Diverse Patient Responses:

ChatGPT is highly efficient in inputting or processing repetitive and detailed information and allows for the setting of various patient personalities or responses, enabling experimentation with different situations.

Example: "It is very efficient in inputting or processing repetitive and detailed information."

Example: "I appreciate being able to observe diverse reactions by setting patient characteristics."

3. Quick Feedback Provision: ChatGPT provides large amounts of information rapidly and responds immediately to inquiries, enhancing learning efficiency.

Example: "I find it beneficial to receive quick responses to my questions."

Example: "The prompt replies are refreshing."

4. Emotional Support and Kindness: ChatGPT consistently responds in a polite and courteous manner, demonstrating calmness even in emotionally charged situations, which helps learners manage their emotional responses and effectively handle scenarios.

Example: "I really appreciated the thoughtful and courteous responses."

Example: "I learned to navigate situations smoothly by responding calmly and politely to emotional triggers."

5. Cost and Time Savings: Communication training can be conducted without a real partner, resulting in significant savings in both time and costs.

Example: "It saves time and money that would otherwise be spent finding a partner."

Example: "I am not constrained by time or location."

6. Professional Responses and Learning Support: ChatGPT possesses the necessary professional knowledge of a physician, enabling it to promptly address questions that arise during learning.

Example: "It provides not only textbook like answers but also unexpected insights that I hadn't considered."

The challenges faced by the students when using the ChatGPT can be summarized as follows:

1. Communication Challenges: There are instances where ChatGPT fails to accurately understand the user's intent or provides irrelevant responses. It may also produce answers that do not align with the established context or divert the conversation away from the main topic.

Example: "It is difficult to command it to function properly."

Example: "My intentions were not conveyed correctly, which posed a challenge."

2. Unrealistic and Limited Responses: While non-verbal communication is crucial in conversations with actual people, ChatGPT lacks this capability, leading to unrealistic interactions. In certain situations, the AI may fail to assume an appropriate role or fully embody the designated character.

Example: "Since it is not a real person, non-verbal communication is impossible, and I have to dictate the direction of responses, making effective communication difficult."

3. Consistency and Error Issues: ChatGPT may provide inconsistent responses or incorrect information even in the same situation, which can undermine its reliability. There are instances where the AI fails to operate as intended, even when the situation is repeated.

Example: "There are times when the responses or reactions are not consistent."

Example: "Sometimes it seems to provide incorrect information."

4. Decreased Immersion: ChatGPT cannot exhibit immersion or emotional responses as a patient, reducing the realism of the interaction. It struggles to perform the roles of aggressive or atypical patients, making it challenging to engage fully in the scenario.

Example: "It is more difficult than expected to get the AI to behave as I want."

Example: "There are times when I find myself playing both the patient and the physician. It struggles to assume the role of an aggressive patient."

5. Challenges in Learning and Scenario Setup: Significant time is required to teach ChatGPT specific situations or establish new scenarios, and if the setup is not accurate, smooth training becomes difficult.

Example: "Setting up the scenarios takes a considerable amount of time."

Example: "The most challenging part was ensuring that the AI accurately recognizes the user's intent."

DISCUSSION

This study analyzed the effects of medical communication education utilizing generative AI such as ChatGPT, and the results indicated a positive impact on various aspects. These findings highlight the significance and potential of AI in medical education.

The influence of AI on medical education is becoming increasingly important, contributing to the development of communication skills that students need in actual clinical situations. Masters [7] emphasized the potential of AI to enhance learning experiences in medical education [1,15], while Lorenzini et al. [8] discussed the critical role that AI can play in building trust in the physician-patient relationship [2]. The findings of this study support these discussions and suggest that students can develop better communication skills through AI-based training.

AI systems, such as ChatGPT, provide students with real-time feedback, offering immediate opportunities to improve their communication skills. Eysenbach [10] argued that AI-based feedback assists students to quickly achieve their learning objectives [16]. This study confirmed that

real-time feedback is highly effective in enhancing communication abilities, indicating its potential to contribute to improved educational quality.

Educational programs utilizing AI allowed students to experience various cases repeatedly, thus playing a crucial role in building their confidence and communication skills. Bowers et al. [11] noted that AI-based patient systems provide students with diverse interaction opportunities and enhance learning outcomes [4]. The present study's findings align with these Bowers et al. [11], confirming that the use of AI contributes to increased educational effectiveness.

Furthermore, this research demonstrated that ChatGPT can offer personalized learning experiences tailored to each student's level and needs, maximizing learning effectiveness. Lee et al. [13] argued that the capabilities of medical AI in medical education allow education to be customized for individual student needs [6]. The results of this study support this claim, indicating that AI-based education has the potential to provide more effective personalized learning.

Communication training using AI can also contribute to training for ethical situations and developing empathy skills. By providing students with opportunities to cultivate essential soft skills in complex healthcare interactions, this training aids in building trust between healthcare providers and patients. Eysenbach [10] emphasized that AI can simulate ethical dilemmas to assist students in making ethical judgments [9]. This study confirmed that interactions with AI positively influence students' experiences of ethical situations and their development of empathy skills.

However, this study had several limitations. Many participants found that ChatGPT's responses can be unrealistic, particularly in the aspect of non-verbal communication, which is crucial in actual healthcare interactions [17]. Nonetheless, if these limitations can be overcome, it is evident that this learning tool could serve as a valuable resource for enhancing communication skills. The results of this study suggest that AI can establish itself as an important tool in medical education, potentially contributing to improving the quality of medical communication training. According to the study by Lee [18], the integration of AI into medical education holds the potential to revolutionize the way students learn. Large language models such as ChatGPT can be utilized as virtual teaching assistants, offering detailed and relevant information to enhance the learning experience. However, ethical concerns and limitations must be carefully considered, underscoring the need for further research and evaluation. It is essential to assess the impact of such tools on education to ensure their appropriate and effective integration into medical curri-

cula [18].

Future research should expand the role of AI by developing educational programs that incorporate diverse clinical scenarios and complex communication situations, and analyze their long-term effects. Additionally, it is essential to investigate the specific learning outcomes that students achieve through their interactions with AI in greater depth.

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국문초록

의료 커뮤니케이션 교육의 전환: ChatGPT 활용 생성형 AI 교육의 효과

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목적: 본 연구는 ChatGPT와 같은 생성형 인공지능(AI)을 활용한 의사소통 교육이 의과대학 학생들에게 효과에 대해 알아보고자 한다. AI 기반 교육이 학생들의 의사소통 능력과 학습 경험에 미치는 영향을 분석하는 동시에 AI를 의학교육에 통합하는 장기적인 잠재적 가능성에 대해 고찰하고자 한다.

방법: 의과대학 1학년 학생 70명을 대상으로 생성형 AI를 활용한 의사소통 교육을 설계했다. 이 프로그램에는 가상 환자 시뮬레이션, 실시간 피드백, 자기 성찰 등 다각적인 접근 방식이 사용되었다. 교육 후 설문조사를 실시하여 학생들의 만족도와 학습 성과를 평가하였고, 정량적 데이터와 정성적 데이터를 모두 분석하여 결과를 도출하였다.

결과: 학생들은 AI 기반 교육이 자신의 의사소통 능력에 긍정적인 영향을 미친다고 인식했다. 특히 실시간 피드백과 반복 연습 기회가 학생들의 자신감을 높이는 데 기여한 것으로 나타났다. 평균 만족도는 3.7점을 넘었으며, 학생들은 AI와의 상호작용이 실제 임상 환경에서 의사소통 능력을 향상시킬 것을 인지하고 있으며 AI활용 교육에 긍정적인 반응을 보였다.

결론: 본 연구는 AI를 활용한 의료커뮤니케이션 교육이 의과대학 학생들의 의사소통 역량을 향상시킬 수 있는 도구로서 잠재적인 가능성을 확인하였다. 앞으로 생성형 AI에 적용할 수 있는 교수 가이드라인을 개발하여 생성형 AI의 적용 범위를 확대하고 생성형 AI를 활용한 의사소통 교육 프로그램의 장기적인 교육효과를 분석해 보아야 할 것이다.

주제어: 생성형 AI, 의료커뮤니케이션, AI 기반 교육, 의학교육