

Original Article

Exploring the role of ChatGPT-generated personalized feedback to enhance learning in Certificate in Health Professions Education: A Qualitative analysis

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Abstract

Objective: To explore Certificate in Health Professions Education (CHPE) course participants' perceptions of ChatGPT-generated formative feedback and its potential to enhance learning within the Certificate in Health Professions Education (CHPE) program.

Methodology: A descriptive qualitative study was conducted with 25 participants enrolled in the CHPE program at the Bahria University College of Medicine in Islamabad. A structured activity, based on the Computer-Supported Collaborative Learning (CSCL) framework, integrated ChatGPT (GPT-4) as a feedback tool during a week of face-to-face instruction. Participants used standardized prompts to generate individualized feedback on assessment design tasks. Data were collected through post-activity surveys and open-ended questions and then manually analyzed to generate themes.

Results: Participants described ChatGPT feedback as clear, specific, and action-oriented. The prominent themes included clarity, purpose, actionable guidance, and relevance. While most respondents valued immediate and structured Artificial intelligence feedback, some noted limited contextual depth and human empathy. A hybrid model combining AI and human facilitation is preferred to ensure efficiency and contextual relevance.

Conclusion: ChatGPT-based feedback enhanced learners' reflection and understanding of improvement goals while saving facilitator time. However, its contextual and emotional limitations necessitate complementary human supervision. A blended human-AI approach may optimize formative feedback processes in health professions education.

Keywords: Artificial intelligence, ChatGPT, Formative feedback, Medical education, Self-directed learning.

Introduction

Formative feedback plays a crucial role in adult education, specifically in faculty development programs.¹ Key components are identified in the medical literature, which defines high-quality feedback, including task-specific guidance and learner reflection.² Blended learning environments, such as computer-supported collaborative learning (CSCL), are commonly utilized to help students apply the knowledge gained through self-directed learning modules.³ Ideally, each class is supported by a facilitator who offers formative feedback, identifies misconceptions, and stimulates meaningful discussions. However, analyzing these microecological interactions poses resource limitations for humans.⁴

A global shift is occurring towards utilizing artificial intelligence (AI) and chatbots to scale personalized learning in higher education.⁵ Multiple frameworks advocate for the targeted application of AI within healthcare systems to ensure better patient outcomes and clinical workflows.⁶ Numerous studies have revealed that AI-augmented curriculum development is the need of the hour to meet the demands of the current healthcare system. This shift has mandated that healthcare professionals are technologically competent while addressing the lack of AI integration into institutional policies.⁷

Large Language Models (LLMs), such as ChatGPT, have shown expertise in reasoning in high stakes i.e., the United States Medical Licensing Examination (USMLE), thus

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showing strong theoretical capabilities to handle complex clinical data successfully. This has led to an emphasis on the importance of artificial intelligence in medical research and training.⁸

To add to the empirical data of ChatGPT's successful handling of data, we integrated a collaborative workshop using ChatGPT to deliver personalized formative feedback to each participant.

Methodology

A Qualitative study was conducted with 25 participants enrolled in the six-month Certificate in Health Professions Education (CHPE) program at Bahria University College of Medicine, Islamabad. Purposive sampling was used to enroll the participants in the AI-Driven CHPE program. The participants were healthcare professionals across diverse disciplines, including basic sciences, clinical sciences, and allied health sciences.

This study was conducted in accordance with ethical standards and principles. Ethics Committee approval was obtained before the commencement of the research (Reference number: BUCM/ERC/2515). Informed consent was obtained from all participants involved in the study.

Before the in-person session, the participants completed a three-week self-directed distance learning phase. This included an introductory module on AI tools in education to build foundational knowledge and reduce the technical barriers. The computer-supported collaborative learning (CSCL) framework proposed by Borge and Mercier,⁹ was used to structure an activity integrating ChatGPT (Version GPT -4) as a tool for delivering formative feedback. Standardized, structured prompts were developed to optimize the consistency and relevance of ChatGPT's responses.¹⁰ The prompts were pre-tested to minimize variability in the output.¹¹ A link to the full GPT 4 conversation, including the prompts and instructions, was shared for replication purposes. Potential technical disruptions were mitigated through on-site technical support.

During the face-to-face session, the ChatGPT activity was conducted as a 45-minute individual exercise for each student. This began with a 15-minute demonstration of ChatGPT featuring step-by-step instructions for effective interaction and prompt use. Participants then spent 20 minutes constructing a multiple-choice question using the Zuckermann Model of MCQ construction,¹² aligned with the week's topic, followed by 10 minutes reviewing and reflecting on personalized feedback generated by ChatGPT.

Participants were asked to complete an expert-validated end-of-activity response sheet for feedback quality of ChatGPT as a tool afterwards. The response sheet was adapted using Brookhart's guidelines,¹³ for feedback quality as shown in Table I. This assessed the clarity, specificity, and usefulness of ChatGPT's feedback.

Table 1: Open-ended qualitative questions.

1.	To what extent and why did the AI-generated feedback help establish a clear purpose or context for improvement?
2.	In what ways did the feedback address your specific learning needs or professional focus?
3.	How well did the AI feedback help you understand your current level of performance? Please elaborate?
4.	Were the performance gaps clearly identified and explained? Please provide examples if possible.
5.	Did the AI feedback suggest specific strategies for improvement? Were they realistic and applicable to your context?
6.	Did the feedback encourage you to reflect, self-assess, or ask questions? If so, how?
7.	How did the tone and wording of the AI-generated feedback affect your comfort or confidence in engaging with it?
8.	Did the feedback feel respectful and non-judgmental? Please describe any emotional reactions you experienced.
9.	What aspects of the AI-generated feedback did you find most and least helpful? Provide examples
10.	Would you trust AI-generated feedback for academic or clinical performance improvement in the future? Why or why not?
11.	Based on your experience, what are the strengths and limitations of each (ChatGPT vs. facilitator) in providing feedback?

The research team comprised health professions education experts who were involved in the delivery of the AI-Driven CHPE program. The researchers acknowledged that their roles could influence the data interpretation. Regular reflexive discussions were conducted throughout the analytical process to ensure that the themes remained grounded in the participants' accounts.

The SRQR guidelines were used for the qualitative analysis of the data. To enhance trustworthiness, open-ended responses were independently coded by two researchers (HK and ZN) using an open-coding approach. Any discrepancies were resolved through discussions. Key themes were identified, followed by a frequency analysis to quantify their prevalence and enrich the interpretation.

Results

The study included the CHPE enrolled participants (n=25) from multiple institutions across the twin cities. The participants comprised 16 (64%) females and 9 (36%) males. The academic designation, teaching experience, and AI tool use for educational purposes are given in Table 2.

Table 2: Demographics of the participants (n=25)

Participants Demographics		No of participants (%)
Academic Designation	Assistant Professor	10 (40%)
	Lecturer	15 (60%)
Teaching Experience (Years)	1-5	18 (72%)
	6-10	7 (28%)
AI Tools Use for Educational Purposes	Yes	20 (80%)
	No	5 (20%)

There were four emerging themes with 12 sub-themes. Table III illustrates the relative frequency of the major themes identified across participant responses. The most prominent patterns reflected participants' appreciation of ChatGPT's clarity and actionability, tempered by recognition of its contextual and emotional limitations.

Theme 1. Pedagogical Utility and Functional Scaffolding:

Three subthemes were identified under this theme: gap identification, strategy recommendations, and structural clarity.

Participant P13 stated, "It helped me to identify areas that need improvement", highlighting the gap identification, whereas participants P2 and P8 stated that ChatGPT recommended strategies such as "Refining the distractors: replace less plausible options". "ChatGPT Feedback on structural clarity was given as "aligning the question with Bloom's taxonomy" (P8, P25) and "the AI feedback on my MCQ helped identify areas of clarity and question design," as shared by participant P3.

Theme 2. Cognitive and Reflective Engagement:

Self-reflection, self-assessment, and critical inquiry were the subthemes identified under Theme 2.

Participant P16 shared that "The feedback encouraged me to reflect and be self-assured of my effort". P1 said, "The feedback encouraged reflection and self-assessment by pointing out areas of ambiguity and suggesting improvements". Similarly, P18 remarked, "It made me think about how my content is received by students and how I could explain things better". According to P19, ChatGPT "prompted me to review my lecture recordings and course evaluations". Thus, instilling critical thinking.

Theme 3. Emotional Impact and Psychological Safety:

The subthemes identified under this theme were a non-judgmental, professional, supportive, and encouraging tone of ChatGPT.

One of the participants (P12) remarked that it "gives precise, accurate info in a very short time, with no fear of being judged". Similarly, P24 added that "Instant feedback, non-judgmental tone" was provided by ChatGPT. P8 remarked that "The tone and wording were clear, supportive, and professional, which made me feel comfortable". Likewise, P2 wrote about "the thoughtful tone and professional wording of the AI feedback created a psychologically safe space for reflection and learning". P16 felt that "The tone and wording of the AI-generated feedback was friendly and encouraging".

Theme 4. Alignment Disconnect:

Contextual misinterpretation, lack of empathetic depth, and technical mistrust were the main subthemes under alignment disconnect.

P5 participant stated that "it can't understand the context and environment we are in". This was agreed by P14, who said that it "lacks contextual understanding". Participant P9 shared that "it lacks the warmth of a conversation with a real person". P9 talked about technical mistrust by writing, 'I will use it for laying down some basic research work. But I will build the actual construct on that foundation in my own way.' This was endorsed by P16, who stated, "I would proceed with caution, endorsing the potentially good while avoiding the obvious bad".

Table 3: Content Analysis of Open-ended questions

Words	Frequency (mentions)	Illustrative Interpretation
Clarity and Purpose	42	Define the objective and focus of improvement
Actionable / Specific Guidance	39	Concrete and implementable suggestions
Relevance / Context-Awareness	28	Feedback relevant but lacked local clinical context
Performance Diagnosis	25	Participants gauge their current performance level
Tone and Respect	23	Feedback was polite, neutral, and non-judgmental
Trust and Reliability	19	Trusted for academic purposes, less for clinical decisions
Human Empathy and Nuance	17	Lack of emotional depth compared to human facilitators
Encouraged Reflection	15	Prompted self-assessment and reflective thinking
Limitations / Inaccuracy	13	Occasional superficial or generic feedback
Speed and Availability	11	Rapid and accessible at all times

Overall, the participants described the ChatGPT-generated feedback as clear, structured, and valuable in identifying areas for improvement. Participants noted that the AI-augmented feedback helped articulate the purpose of revisions and provided specific, actionable suggestions for improvement. However, several respondents highlighted that while feedback was generally relevant, it sometimes lacked local or clinical contextualization, particularly in discipline-specific areas.

Discussion

Health Professions Education is undergoing a huge transformational shift towards the integration of Artificial Intelligence (AI) into its workflow systems and delivery. Similarly, formative feedback in developing MCQs plays a crucial role in ensuring the quality of education.¹³ Our study revealed that ChatGPT-generated feedback augments the phenomenon of feedback through rapid, timely, and accessible options compared to human facilitators. This aligns with the findings of Lulkahatai et al., where Large Language Models (LLMs) help in large dataset analysis and emphasize improved learning and quality of training for better patient outcomes.¹⁴

ChatGPT's responses to the MCQs gave the participants food for thought to critically analyze the evidence and rationale for each answer. This aligns with the technological role in identifying gaps and providing strategic recommendations for refined MCQs development.¹⁵ This often matches or exceeds human technical precision and consistency.¹⁶ Student engagement has tremendously increased with the use of AI chatbots, especially in low-stakes environments,¹⁷ like our CHPE course. This creates a psychologically safe space for learners to experiment with different types of prompts.¹⁸

While the benefits of artificial intelligence can't be undermined, at the same time, lack of human empathy and emotional touch remains a potential drawback.¹⁹ Studies show that AI can revolutionize pedagogical processes; however, its integration into curriculum and assessment should be done with caution.²⁰ Participants in our study also discussed the contextual gap in their understanding of ChatGPT. A cross-sectional study from Jordan documented that AI chatbots are readily available to students as self-study tools; however, the perceived reliability of these agents is still very low.²¹

One qualitative study from Pakistan stated that ChatGPT serves as a useful tool for a personalized, interactive, user-friendly experience. This can help generate customized, relevant learning outcomes.²² However, alignment conflict remains the main disadvantage of ChatGPT, as per one of the themes identified in our study. This alignment conflict was also reported by Turner L et al., who proposed a framework to bridge this misalignment. Human oversight is one of the recommended principles, thus ensuring that artificial intelligence agents can augment the learning experience for students and not replace the human facilitators.²³

Conclusions

AI-generated formative feedback from ChatGPT was perceived as clear, structured, and time-efficient, thus enhancing learners' understanding of personal goals and effective task-specific reflection. However, it lacks contextual understanding and the empathetic touch of human feedback. The findings advocate for a hybrid human–AI feedback model in which ChatGPT provides first-pass feedback that is later validated, contextualized, and enriched by human educators. Such synergy promises to enhance both the scalability and quality of formative feedback in health professions education.

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Contributions:

HAK AAQ SI - Conception, Design

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All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

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