

Redefining Educational Authority and Learning in the Age of Generative AI: A Constructivist Grounded Theory of Teacher–Student Relationship Reconfiguration in Health Professions Education

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Abstract

Background: The emergence of generative AI (e.g., ChatGPT) is reshaping higher education, particularly in health professions, by altering how knowledge is created, accessed, and validated. This challenges traditional educational authority and the teacher-student relationship, shifting it from a teacher-centered model to a more distributed ecosystem. However, there is a lack of empirical research exploring the *process* of this transformation in the specific context of health professions education.

Methods: Using a Constructivist Grounded Theory approach, this qualitative study explored the reconfiguration of educational authority in AI-integrated health professions education. We conducted semi-structured interviews with 17 faculty members and students who had used generative AI tools (e.g., ChatGPT) in their teaching or learning for at least six months. Sampling began purposively and evolved into theoretical sampling as analysis progressed. Data were analyzed through iterative coding (initial, focused, and theoretical), constant comparative analysis, and memo-writing. Trustworthiness was established following Lincoln and Guba's criteria, including prolonged engagement, member checking, reflexive journaling, and an audit trail.

Results: The analysis identified "Educational Authority Negotiation" as the core category explaining the reconfiguration of the teacher-student relationship. The resulting paradigmatic model illustrates this process through five dynamic sub-processes: democratization of access to knowledge, challenging traditional authority, redefinition of roles, redistribution of legitimacy, and trust tensions. The process is influenced by causal conditions (e.g., technological advancements), intervening conditions (e.g., individual digital literacy, institutional policies), and leads to consequences at learning (e.g., critical thinking), relational (e.g., dynamic trust), professional (e.g., decision-making readiness), and systemic levels (e.g., curriculum revision).

Conclusion: Generative AI is not merely diminishing teacher authority but is driving a dynamic, relational, and context-dependent negotiation of authority. This shift requires a move from a model of knowledge transmission to one of collaborative knowledge construction, where educators become facilitators and students become critical evaluators. Successful integration necessitates faculty development, curriculum redesign, and institutional policies that balance technological innovation with human values like clinical judgment and empathy. The study provides a context-sensitive framework for understanding this ongoing transformation.

Introduction

Higher education, particularly health professions education, has always adapted to technological change. However, the emergence of Generative Artificial Intelligence (Generative AI) and Large Language Models (LLMs) such as ChatGPT, Claude, Gemini, Copilot, and Pi marks a more fundamental shift. Rather than simply introducing new educational tools, these technologies are reshaping how knowledge is created, accessed, and evaluated, while redefining the roles of learners and educators[1, 2, 3]. By generating contextually relevant content, synthesizing information, and providing personalized feedback,

generative AI increasingly functions as a cognitive partner that supports learning, problem-solving, and knowledge construction[4, 5]. Consequently, the traditional boundaries between students, teachers, and knowledge sources are becoming less distinct [2, 6].

These changes are especially significant in health professions education, where learning has long relied on expert mentorship, clinical reasoning, and evidence-based practice. Generative AI is influencing this landscape in three major ways. First, it is transforming learning by enabling students to receive immediate support for clinical reasoning, patient-case simulation, and complex problem solving. In this sense, AI can function as a *More Knowledgeable Other* within Vygotsky's Zone of Proximal Development, promoting personalized and self-directed learning [2, 7, 8, 9]. Nevertheless, researchers caution that excessive reliance on AI may undermine critical thinking, creativity, and independent clinical judgment if it replaces rather than supports human learning [10, 11, 12].

Second, generative AI is redefining educational authority. As students gain direct access to sophisticated knowledge tools, instructors are no longer the sole gatekeepers of information. Their role is gradually shifting from transmitting knowledge toward designing learning experiences, facilitating reflection, and fostering critical engagement with AI-generated content [6, 13, 14]. At the same time, concerns about accuracy, academic integrity, authorship, and privacy continue to shape faculty perceptions of AI integration [15].

Finally, AI is challenging conventional approaches to assessment and curriculum design. Since AI can contribute to both learning processes and academic outputs, assessment is increasingly expected to emphasize reasoning, transparency, and authentic performance rather than final products alone [16, 17, 18]. Accordingly, scholars argue that health professions curricula should incorporate AI literacy while strengthening uniquely human competencies such as ethical decision-making, empathy, communication, critical thinking, and context-sensitive clinical judgment [18, 19, 20].

The emergence of generative AI has fundamentally reshaped the teacher–student relationship by redistributing educational authority. Rather than simply supporting learning, AI increasingly influences how knowledge is produced, accessed, and validated. Some scholars describe AI as an *Algorithmic Gatekeeper*, arguing that control over knowledge is gradually shifting from educational institutions to proprietary AI systems, raising concerns about academic independence and epistemological diversity [21]. Others characterize this shift as an *Epistemic Crisis*, where AI-generated responses may be accepted as authoritative without sufficient critical evaluation [6]. Traditionally, educational authority depended on instructor expertise, peer-reviewed knowledge, and assessment as mechanisms for validating learning [6]. Today, however, students can obtain immediate, personalized answers directly from AI, reducing reliance on instructors and increasing the risk of *Epistemic Surrogacy*, automation bias, hallucinations, algorithmic bias, and weakened critical thinking[6, 12, 22, 23]. Consequently, educational authority is shifting across knowledge production, personalized learning, and institutional control over educational resources [21, 23].

Overall, these changes move education beyond the traditional teacher–student–content model toward a more distributed ecosystem in which AI acts as an influential participant in learning rather than merely a technological tool [6, 24, 25]. Two complementary theoretical perspectives help explain this transformation. Social Constructivism [7] raises questions about whether AI can function as a *More Knowledgeable Other* and how learning relationships evolve when an intelligent non-human agent becomes part of the educational process [2, 24]. Meanwhile, the Epistemic Authority and Gatekeeping framework explains how generative AI challenges the instructor's traditional role as *Epistemic Gatekeeper* by assuming some functions of knowledge production and distribution [6, 21]. Together, these frameworks enable analysis of educational change at individual, institutional, and societal levels.

Recent research reflects both rapid progress and important knowledge gaps. Studies consistently report that AI supports learning through personalized feedback, content generation, clinical simulations, and decision-making assistance, improving learning efficiency and clinical reasoning [8, 9, 26, 27]. At the same time, researchers warn that excessive dependence on AI may reduce critical thinking, creativity, and collaborative learning [12, 10, 11, 20].

Evidence also suggests that AI is transforming, rather than diminishing, teacher authority. Faculty members increasingly act as learning designers, ethical guides, mentors, and evaluators of AI-supported learning instead of serving primarily as information providers [15, 10, 20, 28]. Nevertheless, many educators report uncertainty about institutional policies, practical guidance, and ethical standards for AI integration, highlighting the need for faculty development and clearer governance [29, 30, 31].

Similarly, assessment and curriculum design are undergoing substantial revision. Scholars advocate replacing traditional product-focused assessment with authentic, process-oriented approaches while developing institutional policies that support responsible AI use [16, 29, 32]. They also emphasize integrating AI literacy into curricula alongside uniquely human competencies—including communication, empathy, ethical reasoning, clinical judgment, and critical thinking—to prepare future health professionals for AI-enabled practice [17, 18, 20, 33, 34]. Despite growing enthusiasm for AI, systematic reviews conclude that robust empirical evidence regarding its long-term educational impact remains limited, underscoring the need for further research [9, 12, 35].

Despite the growing body of research, several important gaps remain. First, most studies rely on quantitative methods or systematic reviews, providing limited insight into the lived experiences of educators and students. Second, existing qualitative research has focused mainly on teachers, paying far less attention to how teacher–student relationships are jointly reshaped in everyday educational practice. Third, although many studies acknowledge that AI is transforming educational authority, few explain how this transformation occurs or offer context-sensitive models describing its underlying processes and consequences for professional identity, epistemic agency, and learning experiences. Fourth, much of the literature is situated in general education, overlooking the distinctive features of health professions education, such as clinical learning, patient responsibility, uncertainty, empathy, and

professional ethics. Finally, there is still limited understanding of how educators and students adapt to AI in practice while balancing its opportunities with its potential risks.

Overall, the evidence suggests that generative AI is shifting educational authority from a teacher-centered model toward a more distributed and collaborative one, where instructors increasingly serve as facilitators, critical evaluators, and ethical guides rather than the sole source of knowledge[10, 11, 20]. Yet a central challenge remains: achieving an appropriate balance between technological innovation, academic integrity, scientific rigor, and the human values that define health professions education, including clinical judgment, empathy, ethical responsibility, and commitment to patient care[20, 11, 30, 36]. Addressing this challenge requires context-sensitive empirical research grounded in real educational settings.

In response to these gaps, this study employs Constructivist Grounded Theory, which emphasizes meaning-making through interaction, context, and social processes[37], to examine the following question: How is the teacher–student relationship and educational authority reconfigured in the era of generative AI within health professions education, through what mechanisms does this process occur, and what are its consequences for educators and students? Drawing on the lived experiences of faculty members and students across educational and clinical settings, the study aims to develop a context-sensitive model that explains changes in educational authority, professional roles, adaptation strategies, and their implications for learning, assessment, human interaction, and educational quality. The findings are expected to inform educational policy, curriculum design, and faculty development while contributing to responsible, ethical, and human-centered integration of generative AI in health professions education.

Methods

Research Design

The present study was designed using a qualitative approach grounded in Constructivist Grounded Theory [37]. The primary aim was to elucidate the process of redefining educational authority in the era of generative artificial intelligence and to explore how this phenomenon influences the reconfiguration of the instructor–student relationship within medical education. This framework, as developed by Charmaz, rests on the foundational assumption that social realities are constructed through interactions among individuals, and that the researcher is inherently part of the meaning-making process. This approach is particularly well-suited for investigating emerging, complex, and evolving phenomena for which no coherent theoretical framework yet exists [37]. Given that the use of generative AI in medical sciences is a relatively novel development, and its implications for pedagogical relationships, academic authority, and learning processes remain theoretically underexplored, Constructivist Grounded Theory was identified as the most appropriate methodology for generating theory grounded in empirical data.

Research Setting

The study was conducted in medical schools and higher education institutions in the field of medical sciences. The participant pool consisted of faculty members and students from various medical disciplines who had prior experience using generative AI tools—such as ChatGPT, Claude, Gemini, or similar platforms—in their educational activities.

Participants and Sampling Strategy

Sampling was carried out purposively, followed by theoretical sampling (Purposive and Theoretical Sampling). In the initial phase, participants were selected who had direct experience of educational interaction in environments influenced by generative AI. Following the initial interviews and the commencement of data analysis, theoretical sampling continued to develop, enrich, and refine the emerging categories [37]. The inclusion criteria were as follows: Being a faculty member or a student in medical sciences disciplines; Having experience using generative AI in educational processes over at least the past six months and Willingness to participate and share personal experiences.

The exclusion criteria consisted of: Withdrawal from the study at any stage and Incomplete interviews.

A total of 20 interviews were conducted; however, the final number of participants was determined based on theoretical saturation (17 participants). Theoretical saturation was achieved when new data no longer contributed to the development of the conceptual properties of the categories [38].

Data Collection

Data were collected through semi-structured, in-depth interviews. The interview guide was developed based on a review of the relevant literature, the research objectives, and ongoing data analysis, and was iteratively refined throughout the study. Sample opening questions included:

- "What has been your experience with using generative artificial intelligence in the teaching and learning process?"
- "In your view, how has the role of the instructor changed in AI-mediated learning environments?"
- "When the AI-generated response differs from the instructor's perspective, how do you decide about the credibility of the knowledge?"
- "What impact has the use of AI had on educational interactions between instructors and students?"

Interviews were conducted either face-to-face or online and were audio-recorded with participants' informed consent. Each interview lasted between 45 and 90 minutes. Field notes and analytical memos were recorded concurrently with data collection. The final English-language version of the interview guide is provided as Supplementary File 1.

Data Analysis

Data analysis was performed in accordance with the principles of Constructivist Grounded Theory and proceeded concurrently with data collection [37]. The analytical process comprised the following stages:

Initial Coding

At this stage, data were examined line-by-line, and initial codes were extracted. Efforts were made to keep the codes as close as possible to the language and experiences of the participants.

Focused Coding

In the second phase, the initial codes were reviewed for their explanatory power and frequency, and the more significant codes were selected to organize the extensive dataset.

Theoretical Coding

At this stage, the relationships among categories were identified, and the final theoretical framework took shape. Constant comparative analysis was employed throughout all phases of the research.

Memo Writing

Analytical memos, as a key component of Grounded Theory, were recorded throughout the study to document the development of concepts, categories, and the theoretical relationships among them.

Ensuring Rigor and Trustworthiness

To enhance the quality of the research, the criteria proposed by Lincoln and Guba—namely credibility, transferability, dependability, and confirmability—were applied [39].

Credibility

Prolonged engagement with the data; Theoretical sampling; Member checking and Continuous data comparison.

Transferability

Provision of rich, thick descriptions of the research context, participants, and the research process.

Dependability

Comprehensive documentation of all research stages and Maintenance of a detailed audit trail.

Confirmability

Recording of reflexive memos by the researcher and Review of the analytical process by peer researchers.

Reflexivity

Given that in Constructivist Grounded Theory the researcher is considered part of the meaning-making process, the researcher's assumptions, experiences, and interpretations were systematically documented throughout the study. This process contributed to reducing interpretive bias and enhancing the transparency of the analysis [37].

Results

The findings reported in this section emerge directly from the participants' narratives and the interpretive process undertaken throughout the study. The analytical journey, which involved moving iteratively between data collection and analysis, ultimately led to the identification of a core category and the development of a paradigmatic model that captures the dynamics of authority redefinition in AI-integrated medical education. To ensure transparency and rigor, Table 1 offers a detailed, exhaustive presentation of the three-level coding process—open, axial, and selective—fully specifying all elements of the paradigm model, namely causal conditions, contextual and intervening conditions, the central phenomenon, interactional strategies, and outcomes. In what follows, each component of the model is described in depth, supported by illustrative quotations from the participants, thereby grounding the theoretical claims in the empirical evidence.

Table 1
Summary of Open, Axial, and Selective Coding Process

Model Component	Open Codes with Illustrative Quotations	Axial Codes	Selective Code
Causal Conditions	Technological Advancements: • "24/7 up to date access to information" (P9). • "High speed responsiveness that accelerates learning" (P15). • "Conversational interaction like a virtual assistant" (P3). Emerging Educational Needs: • "Need for personalized learning based on the student's level" (P17). • "Expectation of immediate and accurate feedback" (P7). • "Lifelong learning in the fast paced world of medicine" (P15). Characteristics of Medical Education: • "Vast volume and complexity of medical knowledge" (P12). • "High level of responsibility in clinical decision making" (P5). • "Traditional teacher centered culture in the educational system" (P13). • "Ethical and professional commitments toward patients" (P11).	1. Technological Advancements 2. Emerging Educational Needs 3. The Specific Context of Medical Education	Educational Authority Negotiation
Intervening Conditions	Individual Characteristics: • "Varying levels of digital literacy among faculty and students" (P16).	1. Individual Characteristics of Actors 2. Institutional Structures and Policies	

Model Component	Open Codes with Illustrative Quotations	Axial Codes	Selective Code
	• "Open or closed attitudes toward technology" (P2). • "Prior experience with AI tools" (P7). • "Active versus passive learning styles" (P8). Institutional Factors: • "Ambiguous university policies regarding AI use" (P17). • "Traditional and inflexible curricula" (P13) • "Faculty empowerment programs" (P6). Educational Culture: • "Traditional valorization of the professor's authoritative role" (P16). • "Group's openness to innovation" (P14). • "Collaborative versus individualistic culture" (P17). • "Level of trust and transparency in relationships" (P1). Discipline Specific Nature: • "High risk level of decision making in emergency and ICU settings" (P5). • "Need for human clinical judgment" (P12). • "Complexity of clinical situations" (P9). Student Strategies: • "Purposeful searching and precise questioning" (P15). • "Self-regulated learning and personal scheduling"	3. Prevailing Educational Culture 4. Discipline-Specific Characteristics	

Model Component	Open Codes with Illustrative Quotations	Axial Codes	Selective Code
	(P2). • "Reflective learning and process re-examination" (P3). • "Critical evaluation of information sources" (P7). AI Interaction Strategies: • "Responsible and purposeful use" (P3). • "Fact-checking and validation of responses" (P11). • "Employing AI as an information source" (P4). • "Using AI as a cognitive partner" (P14) Institutional Strategies: • "Curriculum revision" (P16). • "Developing AI usage guidelines" (P13). • "Conducting empowerment courses" (P2). • "Continuous evaluation and monitoring" (P14).		
Core Process	Democratization of Knowledge: • "Direct and unmediated access to knowledge resources" (P15). • "Breaking of the professor's information monopoly" (P17). • "Increased student autonomy and independence in learning" (P4). • "Facilitating self-directed learning" (P2).	1. Democratization of Access to Knowledge 2. Disruption of Traditional Authority 3. Redefinition of Faculty and Student Roles 4. Redistribution of Legitimacy and Authority 5. Trust Tensions	

Model Component	Open Codes with Illustrative Quotations	Axial Codes	Selective Code
	Challenging Traditional Authority: • "Questioning the accuracy of the professor's responses" (P7). • "Comparing AI outputs with traditional sources" (P11). • "Requesting evidence and documentation from the professor" (P16). • "Reducing dependence on the professor's opinions alone" (P3). Redefinition of Roles: • "Professor as facilitator and guide" (P9) • "Professor as critic and evaluator" (P14) • "Student as owner of their learning" (P16). • "Student as critical evaluator" (P11) Redistribution of Authority: • "Evidence based and reasoning based authority" (P6). • "Collaborative and distributed authority" (P10). • "Dynamic and situation dependent legitimacy" (P2). • "Performance based trust" (P11). Trust Tensions: • "Concerns about AI errors in decision making" (P5). • "Fear of over reliance on AI" (P13).		

Model Component	Open Codes with Illustrative Quotations	Axial Codes	Selective Code
	• "Conflict between AI information and the professor's opinion" (P8). • "Preserving human judgment against machine outputs" (P1).		
Actions/Interactions (Strategies)	Faculty Strategies: • "Designing interactive learning environments" (P12). • "Teaching critical thinking and evidence evaluation" (P9). • "Modeling ethical AI use" (P13) • "Designing meaningful learning experiences" (P6). Student Strategies: • "Purposeful searching and precise questioning" (P15). • "Self-regulated learning and personal scheduling" (P7). • "Reflective learning and process re-examination" (P9). • "Critical evaluation of information sources" (P7). AI Interaction Strategies: • "Responsible and purposeful use" (P3) • "Fact-checking and validation of responses" (P11). • "Employing AI as an information source" (P4) • "Using AI as a cognitive partner" (P14). Institutional Strategies:	1. Faculty Interactive-Pedagogical Strategies 2. Student Cognitive-Metacognitive Strategies 3. Safe AI Interaction Strategies 4. Institutional Policy Strategies	

Model Component	Open Codes with Illustrative Quotations	Axial Codes	Selective Code
	• "Curriculum revision" (P3). • "Developing AI usage guidelines" (P13). • "Conducting empowerment courses" (P2). • "Continuous evaluation and monitoring" (P8).		
Consequences	Learning Outcomes: • "Deeper learning and understanding of conceptual relationships" (P8). • "Improved academic performance" (P15). • "Development of higher-order cognitive skills" (P16). • "Encouragement of lifelong learning" (P14) Relational Outcomes: • "Establishment of dynamic and mutual trust" (P1). • "Formation of new collaborative relationships" (P6). • "Increased meaningful communication" (P10). • "Reduction of the generational gap" (P9). Professional Outcomes: • "Preparation for entering work environments" (P15). • "Greater sense of responsibility" (P7). • "Development of independent professional identity" (P16). • "Improved clinical decision-making" (P11)	1. Cognitive-Educational Outcomes 2. Interactional-Relational Outcomes 3. Professional Development Outcomes 4. Transformative Systemic Outcomes	

Model Component	Open Codes with Illustrative Quotations	Axial Codes	Selective Code
	Systemic Outcomes: • "Continuous innovation in teaching methods" (P12). • "Enhancement of learning quality and safety" (P5). • "Transformation of the medical education system" (P10). • "Increased educational productivity and efficiency" (P11).		

Core Category and Paradigmatic Model

The core category identified in this study was "Educational Authority Negotiation," representing the central process governing all actions, interactions, and strategies of the actors. The extracted paradigmatic model demonstrates that causal conditions (technological advancements, emerging educational needs, and the specific context of medical education) provide the groundwork for this process; while intervening conditions (individual characteristics, institutional factors, educational culture, and discipline-specific nature) moderate its intensity and direction. The core process comprises five dynamic and intertwined sub-processes: democratization of access to knowledge, challenging traditional authority, redefinition of roles, redistribution of legitimacy, and trust tensions. Actors employ strategies at four levels—faculty, student, AI interaction, and institutional—to manage this process, ultimately leading to consequences at learning, relational, professional, and systemic levels, which in turn feed back into the intervening conditions.

Narrative Description of Components with Illustrative Quotations

a) Causal Conditions

Causal conditions encompass the formative contexts of the authority negotiation process, crystallized in three categories:

Technological Advancements: Easy accessibility, rapid responsiveness, and natural interaction were the most salient features. A faculty member noted: "Students now access with a phone what previously required weeks of study." (P9)

Emerging Educational Needs: Personalized learning and immediate feedback were dominant needs. A student stated: "Faculty lack time, but AI is always available and responds precisely to my level." (P15)

The Specific Context of Medical Education: Knowledge complexity, high responsibility, and traditional culture created a unique context. A department head remarked: *"In medicine, we deal with human lives and must choose between faculty opinion, evidence, and AI outputs."* (P16)

b) Intervening Conditions

These factors influence the intensity and direction of negotiation:

Individual Characteristics: The generational gap in digital literacy was key. A professor with 20 years of experience said: *"I wasn't raised with computers, but students grew up with smartphones and interact more easily with AI."* (P1)

Institutional Factors: The absence of clear policies posed a serious obstacle. A specialist noted: *"The university has yet to develop guidelines for AI use in assignments."* (P13)

Educational Culture: Openness to innovation facilitated the process. A professor stated: *"Our group has a culture of embracing new tools, which helped a smoother transition."* (P14)

Discipline-Specific Nature: In high-risk specialties, negotiation was approached more cautiously. An emergency specialist emphasized: *"In the ED, no one dares to rely solely on AI; human clinical judgment is the final decision-maker."* (P5)

c) Core Process: Educational Authority Negotiation

This process comprises five dynamic and intertwined sub-processes:

Democratization of Access to Knowledge: The traditional monopoly of faculty over knowledge has been disrupted. A professor noted: *"Previously, students had to come to me; now they search first, then ask for my opinion."* (P6)

Challenging Traditional Authority: Students compare responses and request justification. A professor stated: *"A student asked, 'ChatGPT gave a different answer, how do you make this diagnosis?' The era of 'my word is final' is over."* (P9)

Redefinition of Roles: The professor becomes a facilitator, and the student the owner of learning. A professor explained: *"My role is now teaching them how to evaluate information and use AI as an assistive tool."* (P12)

Redistribution of Authority: Authority is based on evidence and performance, not position. A professor remarked: *"Students respect a professor who can reason and offer superior analysis compared to AI."* (P2)

Trust Tensions: Alongside student autonomy, there are concerns about AI errors and over-reliance. A professor stated: *"My greatest fear is student laziness and unquestioning acceptance of AI outputs."* (P11)

d) Strategies

Actors employ multiple strategies to manage the process:

Faculty Strategies: Designing assignments that encourage comparison. A professor said: *"I design assignments requiring students to obtain answers from three sources and provide comparative analysis."* (P14)

Student Strategies: Critical evaluation and self-regulation. A student stated: *"I never accept AI responses unquestioningly; I think first, then check with textbooks."* (P3)

Institutional Strategies: Curriculum revision. A department head noted: *"We designed an elective 'AI Literacy' course for students and a mandatory workshop for faculty."* (P9)

e) Consequences

Consequences were observed at four levels:

Learning: Deepening conceptual understanding and critical thinking. A professor said: *"Students are no longer memorizers; they say, 'AI gave three options, but the second is more logical because...'"* (P16)

Relational: Dynamic trust and reduction of the generational gap. A student stated: *"Previously I was afraid to ask questions; now I discuss with my professor, and this relationship is much healthier."* (P8)

Professional: Readiness for intelligent systems. A professor noted: *"Students who work with AI have greater confidence in decision-making in the hospital."* (P11)

Systemic: Transformation of educational architecture. A department head remarked: *"This technology has pushed us toward problem-based and collaborative learning approaches."* (P14)

To further illuminate the systematic interconnections among the axial categories, a cross-category relationship matrix was developed. This matrix was constructed through an iterative process of theoretical coding and constant comparative analysis, wherein each axial category was systematically examined in relation to the five components of the paradigmatic model—namely, causal conditions, intervening conditions, the core process, strategies, and consequences. The matrix was subsequently reviewed and validated through member checking with a subset of participants to ensure the accuracy of the identified relationships. Table 2 presents this matrix, where (✓) denotes a direct relationship and (–) indicates no direct relationship between the respective categories. This matrix serves as a visual representation of the systemic and dynamic nature of the authority negotiation process, highlighting how different categories interact across the various dimensions of the model.

Table 2
Cross-Category Relationship Matrix

Axial Category	Relationship with Causal Conditions	Relationship with Intervening Conditions	Relationship with Core Process	Relationship with Strategies	Relationship with Consequences
Technological Advancements	–	✓	✓	✓	–
Emerging Educational Needs	–	✓	✓	✓	✓
Context of Medical Education	–	✓	✓	✓	✓
Individual Characteristics	✓	–	✓	✓	✓
Institutional Factors	✓	–	✓	✓	✓
Educational Culture	✓	–	✓	✓	✓
Discipline-Specific Nature	✓	–	✓	✓	✓
Democratization of Knowledge	✓	✓	–	✓	✓
Challenging Traditional Authority	✓	✓	–	✓	✓
Redefinition of Roles	✓	✓	–	✓	✓
Redistribution of Authority	✓	✓	–	✓	✓
Trust Tensions	✓	✓	–	✓	✓
Faculty Strategies	✓	✓	✓	–	✓
Student Strategies	✓	✓	✓	–	✓
AI Interaction Strategies	✓	✓	✓	–	✓
Institutional Strategies	✓	✓	✓	–	✓

The Paradigmatic Model of Educational Authority Negotiation

The paradigmatic model illustrated in Fig. 1 represents the culmination of the systematic coding and analytical process, offering a comprehensive visual framework for understanding how educational authority is redefined in the context of generative AI in medical education. At the heart of this model lies the core category of "Educational Authority Negotiation," which captures the dynamic, interactive, and context-dependent process through which instructors, students, and AI continuously negotiate knowledge resources, decision-making legitimacy, and their respective roles. The model is structured around five interconnected components: (1) causal conditions that create the impetus for negotiation; (2) intervening conditions that moderate the intensity and direction of the process; (3) the core process comprising five intertwined sub-processes; (4) strategies employed by actors at multiple levels to manage the negotiation; and (5) fourfold consequences that emerge from this process. Notably, the model incorporates feedback mechanisms, whereby consequences recursively influence intervening conditions, thereby sustaining and enriching the negotiation cycle. This dynamic, systemic representation not only explains the current state of authority relations but also maps the trajectory of transformation toward a more distributed, evidence-based, and collaborative educational system in the age of generative AI.

Discussion

This study examined how educational authority is being redefined and how teacher–student relationships are evolving in health professions education in the era of generative artificial intelligence. Using a Constructivist Grounded Theory approach, we developed a paradigmatic model that explains this transformation as an ongoing process of Educational Authority Negotiation, through which instructors, students, and AI continuously renegotiate access to knowledge, decision-making legitimacy, and educational roles. Rather than representing a simple shift from human expertise to technological assistance, the findings suggest that educational authority is becoming increasingly dynamic, relational, and context dependent. This process unfolds through interconnected changes in knowledge accessibility, role expectations, legitimacy, and trust, while being shaped by technological developments, institutional contexts, disciplinary characteristics, and individual differences.

These findings both confirm and extend the existing literature. Consistent with previous research[1, 2, 3], our findings indicate that generative AI represents a broader epistemological shift rather than merely another instructional technology. They also echo growing concerns regarding overreliance on AI, changing patterns of knowledge construction, and the need to preserve critical thinking in higher education[10, 11, 12]. Supporting the argument of Zhang et al[15], our findings offer a more nuanced perspective by revealing that teacher authority is not merely weakened or supplanted, but rather continuously reshaped through the dynamic interplay among teachers, students, and AI. In doing so, this study moves beyond descriptive accounts of AI adoption by offering a process-oriented explanation of

how educational authority is negotiated, redistributed, and sustained over time. The identification of trust tensions as a central component of this negotiation, together with the recursive feedback mechanisms embedded in the model, further expands current conceptualizations of authority in AI-supported education.

The study also contributes to theory and practice. From a theoretical perspective, it extends social constructivist perspectives by suggesting that generative AI can, under specific conditions, function as a *More Knowledgeable Other*, while simultaneously demonstrating that educational authority cannot be fully delegated to intelligent systems. Instead, authority emerges from interactions among multiple human and technological actors, refining existing understandings of epistemic authority and educational gatekeeping. Practically, the findings highlight that successful integration of AI into health professions education requires much more than technological adoption. Faculty development, curriculum redesign, authentic assessment, institutional governance, and the cultivation of students' critical evaluation and self-regulated learning skills are all essential for ensuring that AI enhances, rather than diminishes, educational quality.

Several limitations should be acknowledged. The findings were generated within the context of Iranian health professions education and were based on participants' lived experiences from selected medical disciplines. Future research should examine the transferability of the proposed model across different educational systems and cultural settings using longitudinal, comparative, and intervention-based designs. Including additional stakeholders, such as educational leaders, curriculum developers, and AI designers, may also provide a broader understanding of how educational authority continues to evolve.

Ultimately, this study suggests that the future of educational authority should not be understood as a contest between human educators and artificial intelligence. Instead, authority is increasingly shaped through continuous negotiation, shared expertise, and collaborative knowledge construction. The challenge for health professions education is therefore not whether AI should become part of teaching and learning, but how educational institutions can integrate it in ways that preserve professional judgment, strengthen human relationships, and promote meaningful learning. The grounded theory presented here offers a context-sensitive framework for understanding this transformation and provides a foundation for future empirical and theoretical work on educational authority in the age of generative AI.

Abbreviations

AI
Artificial Intelligence
LLMs
Large Language Models.

Declarations

Ethics approval and consent to participate

Ethics approval for this study was granted by the Ethics Committee of Lorestan University of Medical Sciences, Lorestan, Iran (Ethics Code: IR.LUMS.REC.1401.257). All participants provided informed consent to participate in the study.

Consent for publication

Not applicable.

Availability of data and materials

The qualitative data generated and analyzed during the current study are not publicly available because they contain sensitive participant information and may potentially compromise participant confidentiality. De-identified data may be made available from the corresponding author upon reasonable request, subject to appropriate consideration of participant confidentiality and ethical restrictions.

Competing Interests

The authors declare that they have no competing interests.

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Authors' contributions

FM: Conceptualization, supervision, methodology, interpretation of findings, and critical revision of the manuscript. MSB: Conceptualization, methodology, data collection, data analysis, and drafting of the manuscript. RPN: Data analysis, interpretation of findings, and critical revision of the manuscript. All authors read and approved the final manuscript.

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Figures

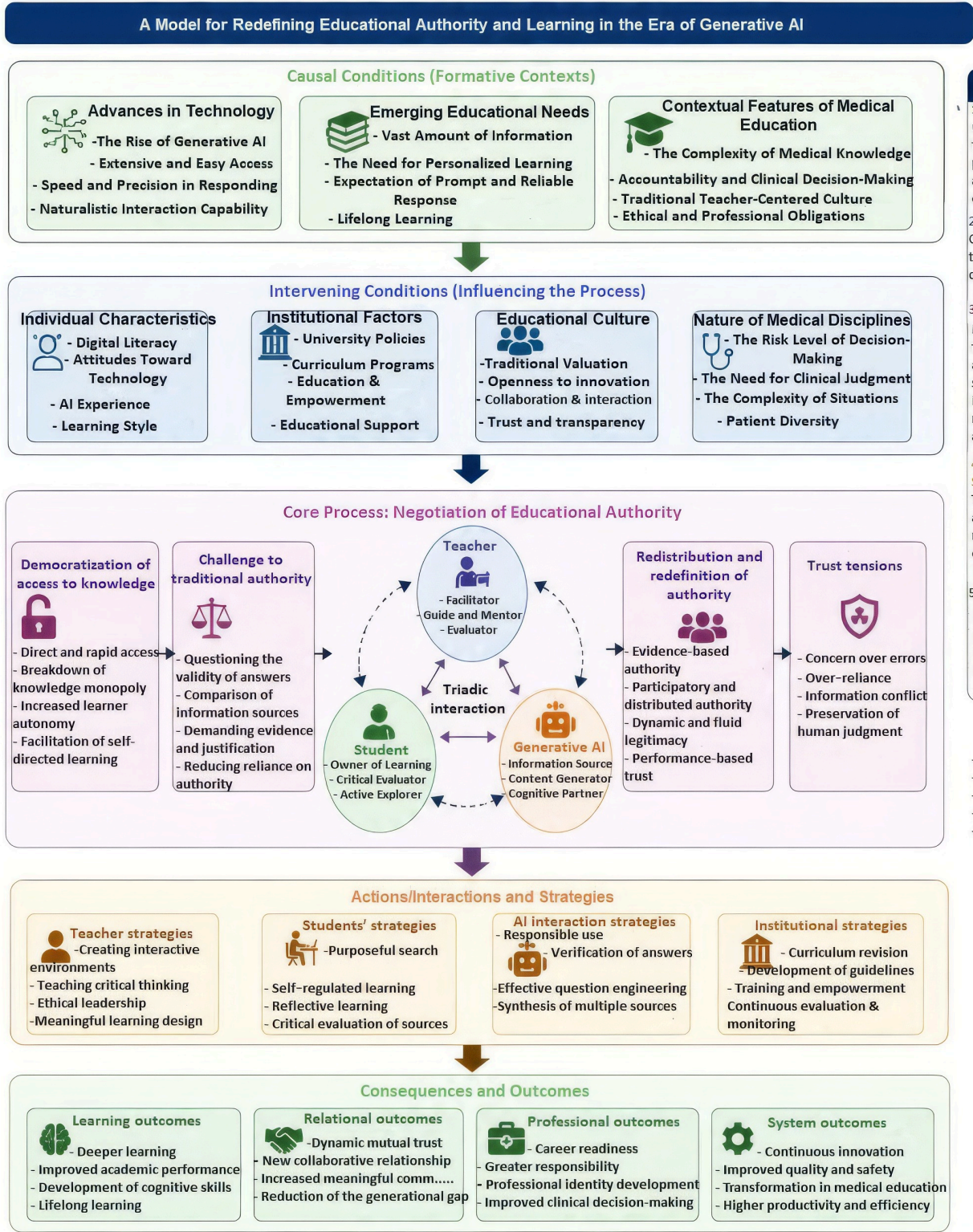


Figure 1

The Paradigmatic Model of Redefining Educational Authority and Reconfiguring the Teacher–Student Relationship in Generative AI-Enhanced Health Professions Education

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