



From AI Literacy to Leadership: Milestones for Faculty Development in Health Professions Education

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Abstract

Artificial intelligence (AI) is transforming health professions education (HPE), yet structured guidance for HPE faculty development remains limited. We propose a milestone-based approach for integrating AI competencies into faculty development. This approach builds on the UNESCO framework for general educators and the IACAI AI integration recommendations for medical education. We used the ACGME Milestones format to define five progressive levels, from basic AI literacy to global leadership, across six competency domains. The goal is to support faculty development in effectively evaluating and teaching with AI while also addressing ethical concerns and impacts on educator and learner well-being.

Keywords Artificial intelligence · Health professions education · Faculty development · Competency framework · Milestones · AI literacy

Background

Artificial intelligence (AI) is rapidly transforming health professions education (HPE), including teaching, learning, assessment, curriculum design (CD), program evaluation, and research. While AI offers opportunities to enhance HPE, it also introduces risks, such as ethical concerns and the possibility that overreliance on AI will compromise learning [1, 2]. Despite growing adoption, health professions educators have lacked a structured framework to guide their AI competency development and faculty development (FD) planning.

To address this gap, we developed the AI Competency Milestones Framework for HPE educators, modeled on the familiar ACGME Clinician Educator Milestones [3]. Alongside aligning elements from UNESCO's AI Competency Framework for Teachers [4] (not HPE-specific) and the

International Advisory Committee on Artificial Intelligence (IACAI) recommendations [5], we integrated insights from our direct experience designing and delivering AI-enhanced HPE initiatives.

Activity

In this framework, AI refers to current computational systems that simulate human cognitive functions (e.g., machine learning, natural language processing, generative AI). We also intended for this framework to accommodate emerging AI capabilities, such as artificial general intelligence (AGI), because educators will need to continuously adapt to ensure responsible and effective AI use in HPE.

We used a structured, iterative, and AI-assisted process that included three phases. This AI-human collaboration aligns with co-intelligence models [5, 6] which balance AI efficiency with human expert oversight. Our human expert team has experience applying AI in faculty development for curriculum development and the Johns Hopkins Master of Education in the Health Professions (MEHP) degree program, both of which accommodate interprofessional learners. Across the three phases, we used ChatGPT4o, Claude 3.7 Sonnet, and Consensus AI. We report on our use of AI according to the FACETS framework proposed for AI innovations in medical education [1] (Fig. 1).

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FACETS Model¹ Application: AI-Human Collaboration in Developing the AI Competency Framework for Health Professions Educators

F - Form of AI
Natural Language Processing & Machine Learning (via GenAI tools)

A - AI Use Case
Developing an AI Competency Milestones Framework for HPE faculty
AI used to enhance speed and integration of expertise across multiple domains: health professions education, Faculty development, & AI.

C – Context
Faculty development for all stages of HPE
Support self-directed growth & institutional faculty development planning around AI competency.

E - Education Focus
Faculty development, AI competency-based education
AI-supported milestone structuring, ensuring logical competency progression & introducing a standalone Transparency in AI Use Reporting domain.

T - Technology
ChatGPT 4.0, Claude 3.7 Sonnet & Consensus AI
Iterative queries followed by expert review and critique for literature synthesis, milestone refinement, and cross-domain alignment

S - SAMR (Substitution, Augmentation, Modification, Redefinition) Model of Integration
Augmentation & Modification
GenAI facilitated literature search over multiple domains and synthesis of human expert feedback over multiple iterations.

Adapted from Fig. 4 In: ¹Gordon, M., Daniel, M., Ajiboye, et al. (2024). A scoping review of artificial intelligence in medical education: BEME Guide No. 84. *Medical Teacher*, 46(4), 446–470. <https://doi.org/10.1080/0142159X.2024.2314198>

Fig. 1 Application of the FACETS framework to report AI-human collaboration in developing the AI Competency Milestones Framework for Health Professions Educators

Phase I: Review and Mapping of Existing Frameworks

Starting in January 2025, we used iterative, chain-of-thought prompting with Chat GPT4o, Claude 3.7 Sonnet, and Consensus AI to review the publicly available peer-reviewed literature and other online sources as well as the UNESCO [4], IACAI [5], and ACGME [3] documents. AI identified a variety of competency domains, which our human team members then separately critiqued, focusing on evidence and expertise of what would be most useful to guide HPE FD. After a series of prompted AI revisions, the human experts then agreed upon the following six domains for our framework:

1. **AI Fundamentals & Data Literacy**—covers foundational AI concepts, data literacy, and existing integration of AI tools in HPE.
2. **Ethical AI Use**—encompasses bias mitigation, privacy, security, and human oversight, ensuring responsible AI integration through legal and ethical governance.
3. **AI-Assisted Educational Activities**—focuses on AI integration in teaching, learning, CD, research, and assessment while enhancing human judgment and critical thinking.
4. **AI for Well-being & Burnout Prevention**—explores AI applications to enhance educator and learner well-being, mitigate burnout, and improve workflow efficiency with ethical safeguards.
5. **Evaluation & Appraisal of AI Platforms and Outputs**—establishes systematic methods for evaluating AI tools based on reliability, accuracy, ethical considerations, and pedagogical soundness.
6. **Transparency in AI Use Reporting**—emphasizes structured documentation, accountability, and compliance to ensure AI-generated content is traceable, reproducible, and ethically sound.

While Transparency in AI Use Reporting is often embedded within ethics, we felt it important to emphasize structured documentation, traceability, and compliance because AI tools evolve so rapidly and more detailed disclosure

Table 1 AI Competency Framework for Health Professions Educators

Domain	Level 1 – Novice	Level 2 – Advanced Beginner	Level 3 – Competent	Level 4 – Proficient	Level 5 – Expert
I. AI Fundamentals & Data Literacy	Describes foundational AI concepts, including capabilities, limitations, and role of AI in HPE with a basic understanding of data literacy and AI model training	Introduces learners to foundational AI concepts and supports experimentation with institutionally approved AI tools, emphasizing their applications and limitations in HPE	Explains key considerations for responsible AI integration into HPE while ensuring alignment with institutional and regulatory guidelines	Leads institutional AI literacy initiatives, collaborating with IT staff and leaders to develop AI literacy resources (e.g., case studies, articles, demo videos), and guidance for HPE faculty and learners	Contributes to national/global AI competency frameworks and policies, navigating complex AI integration challenges across diverse educational settings, ensuring ethical, evidence-based, and equitable AI literacy
II. Ethical AI Use	Recognizes ethical considerations for AI in HPE, including bias, privacy, security, and equitable access to AI resources	Adheres to institutional policies and applies ethical AI frameworks ensuring safe, responsible AI interactions in HPE and maintaining data privacy and security with appropriate human oversight	Guides learners and junior faculty in responsible AI adoption in HPE, addressing ethical AI concerns including bias mitigation and equitable access	Co-develops institutional AI governance policies to ensure compliance with legal, cybersecurity, and ethical standards in HPE, while navigating complex ethical dilemmas and evolving regulatory landscapes	Leads global initiatives to develop ethical AI governance frameworks and consensus statements adapting to emerging risks such as misinformation, deep fakes, and AI-driven decision biases across diverse contexts
III. AI-Assistance in Educational Activities	Identifies examples of AI applications in HPE, such as adaptive learning platforms, AI-powered instructional design tools, simulation training, AI-assisted CD, and AI-driven assessment technologies	Applies AI tools for enhancing teaching, learning, assessment, and CD while guiding learners in responsible AI experimentation, recognizing risks of cognitive overreliance	Integrates AI into teaching, learning, assessment, and CD, ensuring ethical use and alignment with evidence-based HPE theories, best practices, and competency frameworks (e.g., AAMC, ACGME, CanMEDS)	Leads institutional adoption and FD on AI use in HPE, effectively managing evolving AI applications to enhance critical thinking, decision-making, and problem-solving while preserving human judgment and aligning with institutional priorities	Leads global initiatives on AI-enhanced HPE, shaping policies that prioritize human reasoning, interprofessional collaboration, and ethical AI implementation, while developing international best practices for AI-assisted teaching, learning, assessment, and CD
IV. AI for Well-being & Burnout Prevention	Recognizes AI applications for monitoring and supporting educator/learner well-being, promoting work-life balance, and combating burnout (e.g., AI-powered workload optimization, stress tracking, burnout prevention tools)	Identifies opportunities to integrate AI tools for learner and faculty well-being while maintaining ethical safeguards to prevent over-surveillance and data misuse	Implements AI-driven strategies to mitigate burnout drivers in workplace and clinical settings, including reducing administrative burden, enhancing workflow efficiency, and supporting mental health resilience among faculty and trainees	Develops institutional AI-driven initiatives to improve well-being, resilience, and professional fulfillment, while managing evolving AI applications to optimize workload efficiency, reduce burnout, and support mental health, while ensuring ethical safeguards and institutional alignment	Leads global initiatives on AI-driven well-being strategies, shaping ethical frameworks and policies that mitigate burnout, promote sustainable AI-driven well-being interventions, and address complex challenges in faculty and learner mental health across diverse educational settings

Table 1 (continued)

Domain	Level 1 – Novice	Level 2 – Advanced Beginner	Level 3 – Competent	Level 4 – Proficient	Level 5 – Expert
V. Evaluation & Appraisal of AI Platforms and Outputs	Understands the importance of verifying AI outputs and platforms in HPE	Recognizes potential biases and limitations in AI tools and outputs, emphasizing the need for critical appraisal of reliability, accuracy, and alignment with HPE theory and best practices	Critically appraises AI platforms (e.g., chatbots, course builders) and outputs for use in HPE, ensuring alignment with institutional policies, systematic HPE approaches, and pedagogical rigor	Develops and implements institutional protocols for the systematic evaluation of AI tools and outputs, managing complex validation processes to ensure reliability, validity, and alignment with sound HPE principles	Leads global research on appraising AI outputs and platforms, advancing frameworks that enhance evidence-based decision-making, preserve cognitive skills, ensure equity, and support responsible AI integration across diverse HPE environments
VI. Transparency in AI Use Reporting	Recognizes the importance of transparency when AI applications are used in HPE	Begins to apply structured reporting practices for AI accountability in HPE, with emerging awareness of traceability and ethical implications	Regularly reports AI use, ensuring transparent and accessible documentation of AI-related decisions, including sources of AI-generated content and validation processes	Leads institutional initiatives on AI transparency and accountability in HPE, ensuring systematic documentation, validation processes, and compliance with institutional policies and ethical standards	Promotes and advances global frameworks for standardized AI reporting (e.g., FACETS ¹), ensuring accountability, continuous improvement, and institutional compliance with ethical and regulatory standards in AI-enhanced HPE and healthcare

AI, artificial intelligence; HPE, health professions education; CD, curriculum design; FD, faculty development; AAMC, Association of American Medical Colleges; ACGME, Accreditation Council for Graduate Medical Education; CanMEDS, Canadian Medical Education Directives for Specialists; IT, information technology; FACETS, Framework for the Transparent Reporting of AI Use in Education and Scholarship

allows for greater external accountability, particularly when there is a lack of consensus on AI in HPE.

Phase II: Structuring of Milestones and Developmental Levels

Using the same process of iterative cognitive co-construction, our study team then defined five progressive levels adapted from the Dreyfus model [7] and ACGME Milestones [3]:

- **Novice (Level 1):** Understands foundational AI concepts but requires structured guidance.
- **Advanced Beginner (Level 2):** Begins applying AI tools in HPE with growing awareness of risks and benefits.
- **Competent (Level 3):** Independently integrates AI into teaching, assessment, and research, aligned with best practices.
- **Proficient (Level 4):** Leads institutional AI implementation, including FD and policy integration, while managing complex and evolving AI applications.
- **Expert (Level 5):** Shapes global AI frameworks and policies, leading ethical and responsible AI use in HPE, while distinguishing subtle variations in AI adoption across different educational settings.

Phase III: Drafting, Refinement, and Expert Review

Finally, we sought to concisely describe each competency domain at each development level to support self-directed growth and institutional FD planning. Once again, we used AI for initial drafting and alignment of these descriptions, followed by human expert review and refinement cycles until our author team achieved consensus. The full framework is presented in Table 1.

Results and Discussion

We aligned global recommendations for AI in teaching and medical education with ACGME Clinician Educator Milestones. This alignment produced a practical and flexible framework that supports AI competency development and supports teaching, assessment, research, and leadership roles in HPE. Importantly, this milestone-based framework may support emerging efforts to develop

entrustment models for AI in HPE, which emphasize the need for clearly defined criteria to determine readiness for independent AI use [8].

We share our framework to catalyze further discussion among others in the HPE community who are considering FD needs and appropriate competency levels for faculty in HPE. We also share how we used specific AI tools in a co-intelligence approach to model transparency in HPE scholarly endeavors. For readers seeking greater detail on how the framework is being applied in course design, we include a sample lesson plan from one of our FD courses, mapped to the relevant competency domain and milestone level, as a supplement.

Although the milestones are structured in five levels, FD is not expected to follow a linear path; educators may enter at different levels. For most, Level 3 (Competent)—independent, responsible AI integration—will meet educational needs, while Levels 4 and 5 support leadership roles.

Next steps include review and validation by broader groups of stakeholders, pilot testing, iterative refinement, and development of implementation guides to support broader adoption in HPE.

Future research can build on the IACAI framework for integrating AI into undergraduate and graduate medical education [5], the UNESCO AI Competency Framework for Students [9], and our methodology to develop similar milestone-based frameworks for medical students and trainees. This would support the alignment of responsible and ethical AI use across the educational continuum.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s40670-025-02438-0>.

Declarations

Conflict of Interest The authors declare no competing interests.

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