AI in Medical Education: Faculty as Learners and Educators

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Eric Weissman
Senior Director, Faculty and Academic Society Engagement
AAMC

Nathan Cross, MD, MS, CIIP, DABR
Associate Professor, Neuroradiology
Vice Chair of Informatics, Radiology
University of Washington

Diego Niño, MD, PhD
Associate Professor of Physiology
Department of Medical Education
University of Texas at Tyler School of Medicine

Akshay Sood, MD, MPH
Assistant Dean, Mentoring and Faculty Retention
Interim Director, Faculty Academic Affairs
University of New Mexico School of Medicine

Jinjie Zheng, PhD, MS, MA
Assistant Dean, Digital Technology
Morehouse School of Medicine
AI-integrated Faculty Affairs Offices for Future-Ready Medical Schools

Akshay Sood, MD, MPH
Interim Director, HSC Office of Faculty Academic Affairs
• None
Objectives

At the end of the session, the attendee will be able to discuss:

• Our approach to determining Large Language Model (LLM) priorities for our Faculty Affairs (FA) Offices
• Challenges encountered during this process
Approach

• EVP announcement to encourage use of AI at UNM Health & Health Sciences (HS)

• Faculty & staff at FA Offices at SOM & HS formed a committee
  • Reviewed the literature- not helpful
  • Spoke to FA Offices at sister institutions- not helpful
  • Met with AI and Data Science leaders at UNM H&HS- helpful
  • Spoke to student employees- very helpful

• Established 3 CY24 priorities based on a consensus of committee members
Use of LLM for faculty professional development and networking opportunities

• Plan to create an AI assistant for faculty mentors and mentees

• Create, refine and monitor
  • Dynamic individualized development plan (IDP) or individualized mentoring development plan (IMDP)
  • Developmental network action plan
Individualized Development Plan (IDP or IMDP)

**Potential Roles of AI**

- Identification of training
- Advice on scholarly activities and end-products
- Monitoring of timelines
- Reminders

<table>
<thead>
<tr>
<th>Sample IMDP: Basic Structure</th>
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</thead>
<tbody>
<tr>
<td><strong>Five-Year Goal 1</strong></td>
</tr>
<tr>
<td><strong>Six-Month Objectives</strong></td>
</tr>
<tr>
<td>Objective 1A</td>
</tr>
<tr>
<td>Objective 1B</td>
</tr>
<tr>
<td>Objective 1C</td>
</tr>
<tr>
<td>Training needed to accomplish goal</td>
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<tr>
<td>Scholarly activities associated with the long-term goal</td>
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<tr>
<td><strong>End-Product</strong></td>
</tr>
<tr>
<td><strong>Timeline</strong></td>
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</tbody>
</table>

**Postdoctoral scientist satisfaction and increased scientific productivity is correlated with the use of an IDP or IMDP**
✓ Identify a goal
✓ Analyze how your current developmental network will help you achieve your goal?
✓ What type of help is missing in your developmental network?
✓ How can you leverage AI to meet people that could be useful to you?
✓ How can you leverage AI to find networking opportunities locally, regionally and nationally?
✓ What specific actions will you take to get things started?

Panel A. Clusters

Panel B. Clusters with a Broker
Use LLM for monitoring faculty-related policies on disclosure of conflicts of interest and commitment

• Plan for an AI assistant for the faculty compliance office:
  • Create management plan for these disclosures
  • Create, refine and monitor management plans
Use LLM to reimagine administrative tasks specifically writing letters of support, P&T processes, email responses and newsletters
Organizational policy and infrastructure is at nascent stage...

- ...yet, faculty are using it!
- ChatGPT 3 (or equivalent) is insufficient – higher (paid) versions needed to attach large files
- Data security for enterprise models better, but is it sufficient?
Little understanding and training on prompt engineering, including context and iteration

- Prompt engineering involves designing the best prompt you can to get the output **YOU** want.
• Context shapes how LLMs respond to a prompt.

Consider These

• TARGET AUDIENCE
• TONE
• STRUCTURE OF OUTPUT
• OUTPUT GOAL
EXAMPLE:

Based on the attached CV, promotion guidelines of UNM School of Medicine, and a draft template letter, write a strong letter of recommendation to the promotion and tenure committee for my colleague Dr. Jane Doe, MD, using a professional tone. Dr. Doe and I worked together on a research project assessing faculty mentoring environments at R1 research institutions in the southwest. Highlight how she demonstrated these skills so well and why her research and mentoring contributions would make her an excellent candidate for promotion to a tenured Associate Professor.
Iteration Example

Change phrasing, reorder the prompt’s components or provide additional context to narrow the LLM’s responses.
Summary

• We have identified three novel LLM priorities for our Offices of Faculty Affairs.

• We have identified challenges that require policy, infrastructure and training interventions.
QUESTIONS?
AI in Medical Education: Faculty as Learners and Educators

Artificial Intelligence in Academic Medicine
AAMC Webinar Series

Diego F. Niño, MD, PhD
Associate Professor
Department of Medical Education
University of Texas at Tyler School of Medicine
An Industry Set for Disruption...

Life expectancy vs. healthcare expenditure, 2000 to 2019

The period life expectancy at birth, in a given year. Healthcare expenditure per capita is measured in current international-$, which adjusts for price differences between countries.

Data source: UN WPP (2022); World Health Organization (via World Bank) | OurWorldInData.org/financing-healthcare | CC BY

1. Period life expectancy: Period life expectancy is a metric that summarizes death rates across all age groups in one particular year. For a given year, it represents the average lifespan for a hypothetical group of people, if they experienced the same age-specific death rates throughout their whole lives as the age-specific death rates seen in that particular year. Learn more in our article: “Life expectancy” — What does this actually mean?

AI in Healthcare - Estimated Market Size
2021 to 2030 ($Bn)

Source: Precedence Research
How Are We Addressing the Current and Future Impact of AI in Healthcare?

Applications of AI in Healthcare

Rare Disease Diagnostics & Treatment
- Drug Development
- Virtual Nursing Assistance
- Medical Diagnosis
- Fraud Detection
- Dosage Error Reduction
- Cybersecurity
- Cancer Research
- Gene Editing
- Personalized Healthcare Plans
- AI Robot-Assisted Surgery
- Health Monitoring & Wearables

Source: Delveinsight
How are We Supporting Our Faculty to Integrate AI in Med Ed?

- Faculty Concerns
- Insights
- Faculty Led Initiatives
- Stages of Implementation
- Thoughts on Best Practices and Strategies
Community of Growth on Artificial Intelligence in Health Professions Education

• Engage educators in critical discussion about the benefits and challenges of AI
• Share successful use cases and practical applications
• Provide access to relevant and valuable AI resources
• Support AI educational programs
• Help identify critical elements essential to the effective use of AI in HPE:
  • Core competencies
  • Ethical principles
  • Best practices
  • Educational effectiveness
Preliminary Results: Pilot Survey

What is your PERSONAL GOAL for using AI in Health Profession Education?
26 responses

- Creating better teaching materials and presentations (80.8%)
- Engaging students in Active Learning (metacognition) (7.7%)
- Improving Assessment and Performance Feedback
- Identifying “at risk” students for Remediation
- Designing curricula to increase Learning...
- All of the above

Data courtesy of Douglas McKell
Preliminary Results: Pilot Survey

Significant Challenges to the Use of AI in Health Profession Education

- Ethical, valid, reliable, and responsible AI use: 60%
- Rapid adoption of multiple AI applications: 52%
- Lack of AI education resources for faculty: 48%
- Uneven AI adoption by students and faculty: 46%
- Lack of AI education resources for students: 40%
- Learning to use AI HPE applications: 37%
- Need for AI Policies and Procedures: 31%

N= 25

Data courtesy of Douglas McKell
POLL: Stages of Implementation
Poll Question: How far along is your institution in adopting AI in medical education? (Check all that apply)

1. **Awareness and Exploration**
   Our institution is aware of AI and exploring potential applications.

2. **Planning and Strategy Development**
   We are in the planning phase, developing strategies and frameworks for AI integration.

3. **Pilot Testing**
   We are conducting pilot projects or limited trials of AI tools in specific areas.

4. **Partial Implementation**
   AI tools are implemented in some courses within the curriculum.

5. **Full Integration**
   AI tools are fully integrated and widely used across the entire curriculum.
Phases of AI Implementation

- Awareness
- Planning
- Pilot Testing
- Partial Implementation
- Full Integration
Practical Considerations and Strategies

- AI Literacy and Competency Development
- Ethics and Responsible Use
- Faculty Training and Resource Development
- Integration with Clinical and Educational Workflows
- Equity and Accessibility
- Continuous Evaluation and Improvement
Resource Sharing and Collaboration

Foster partnerships to share AI educational resources, toolkits, and best practices

Create centralized repositories or networks where faculty can access and contribute to AI curricula, case studies, and training materials
Standardized Frameworks and Guidelines

Standardized frameworks (competency requirements and ethical guidelines)

Accommodate diverse institutional capacities and customization based on local needs
Continuous Quality Improvement

Impact of AI Training Initiatives

Refine AI Education and Improve Implementation
Conclusion

Engage    Collaborate    Learn
Thank you!

Diego Niño, MD, PhD

dnino@uttyler.edu
Digital Health Educator-AI Focused Faculty Curriculum

Jinjie Zheng PhD
Assistant Dean, Digital Technology
Morehouse School of Medicine
May 21, 2024
Purpose of Digital Health Educator Curriculum

Create a scalable Digital Health Educator Training program for medical school faculty members to increase their digital teaching competencies, particularly in AI

Implement the developed Digital Health Educator Training Program and train 60 MSM faculty members as faculty champions, integrating AI in teaching, learning, and productivity

Establish a long-term faculty community of practice for integrating technology into teaching and learning.
Guiding Principles of Digital Health Educator Design

- Jobs-to-be-done Theory (“jobs-to-be-done” interviews Oct, 2023)
- Cognitive Flexibility Theory (Spiro, Coulson, Feltovich, & Anderson, 1988)
- John Kotter’s 8-step change model

Charting our Future
THE POINT OF DEPARTURE: TEACHING AND LEARNING WITH AI

Charting our Future
Course Core Components

- **Video Lectures**: In-depth video lectures delivered by industry experts.

- **Interactive Activities**: Interactive exercises and quizzes to assess comprehension and understanding.

- **Real World Scenarios**: Real-world case studies and practical examples to demonstrate how the learned concepts apply in practical scenarios.

- **Collaboration**: Opportunities to connect with fellow learners, ask questions, and share insights in a vibrant online community.

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T-A-G: You can use the T-A-G method to create prompts for ChatGPT that will help you generate high-quality and relevant output for your needs. You can use the T-A-G method to create prompts for various topic and scenarios in medical education, such as anatomy, physiology, pharmacology, pathology, diagnosis, treatment, ethics, and more.
Synchronous Sessions: Facilitator and Guest Speakers

Use genAI to generate options
- List of topics, research questions, designs, etc.
- Constraints, scenarios

Charting our Future

Responsible AI Development Lifecycle

Prompt Engineering – Example – 1

Scenario 1: Generating a Medical Research Summary
- Initial Prompt: Summarize the article
- Engineered Prompt: Provide a concise summary suitable for a medical professional, highlighting key findings, methodology, and implications for clinical practice, of the following research article
Synchronous Sessions: Faculty Scholars

Charting our Future
Faculty Presentations

AI Tools: ChatGPT, CoPilot, and Gemini

- CoPilot:
  - Integrated MCQs.

Creating Critical Thinking Activities with AI

ChatGPT Prompt:
I am an assistant professor at a school of medicine trying to strengthen critical thinking skills for marginalized students seeking advanced degrees in biomedical science. List interactive activities that assist with integrating interdisciplinary knowledge and creating flexible thinking.

What I Am Trying to Achieve

- Expand and optimize course offerings.
- Incorporate real-world data and scenarios.
- Foster critical thinking and problem-solving skills.
- Equip students with practical knowledge for competitive work industries.

Current Status:
The Landscape of Medical Genetics Education

- Traditional lectures and textbook learning limit adaptability to individual scholar needs.
- Grading and basic explanations consume significant instructor time.
- Limited opportunities for collaborative learning and real-time feedback.
Participating Faculty Feedback

01
This short course offered a glimpse into how the implementation of AI could potentially enhance medical learning and teaching.

02
The experience was invaluable in creating a learning environment for me to understand and explore AI in my workspace of education.

03
I originally resented several aspects of AI in educational environments due to concern of reduced learning. I now see it as a useful tool if utilized ethically.

04
This experience has taught me the value of lifelong learning in medical teaching, particularly regarding technology. Technological advances occur every day, and we owe it to ourselves as educators and our students to stay abreast of current trends and tools.

100%
Motivation
My motivation to explore further applications of AI in medical education has significantly increased as a result of this course.

100%
Impact of AI
I am convinced of the significant potential impact that AI could have on enhancing learning and teaching in the medical field.

100%
Recommendation
I would recommend this AI curriculum to colleagues as a valuable professional development opportunity.

Faculty
From Pilot Cohort
Facilitator Feedback From Course

Spread out time (4 Weeks)
Multiday In-Person Workshop

Create Sub Community
Mentorship from IAB/Faculty
Community of Practice

Excellent Context/Videos
Live Session first / then Module Work

More Hands-On Activity
Integration of the Synchronous topics

Include How are students using it and How is it beneficial
Updates From the Pilot Cohort

Spread out time (4 Weeks)
- 5 Days for Each Module – 4 Days Asynchronous / 1 Day Synchronous
- Formerly 2 days for asynchronous and 1 Day Synchronous event

Assessment Data
- 15-20 minute of Review and Discussion
- 40-45 minute – Activity (20-minute within group activity with a faculty mentor, 20-minute large group activity)
- 5 minute – Close out

Hands On Synchronous Session

More Interaction in the Discussion from the Faculty
Digital Health Educator—Introductory Curriculum Training

Point of Departure: Teaching & Learning with AI

Hybrid Course

APR 28 - MAY 14, 2022

Connect Socially
Uncover the secrets behind generative AI and its transformative powers.

Functionality & Skills
Experience the joy and intrigue of AI in academia. Gain the confidence to lead discussions and teach with AI.

Emotional Engagement

Guest Speakers

Dr. Melissa Forbes
AI & Writing Expert

Dr. Joseph Brandauer
AI & Policy Expert

Dr. James Washington
AI & Bias Expert

Dr. Rand Spiro
AI & Learning Expert

Course Highlights

Academic Exploration
Cross-Disciplinary Exchange
AI Test Exploration
Network with Peers

REGISTER NOW

Participating Faculty Members
Navigating Complexities: Teaching and Learning with AI (II)—Draft

1. Cognitive theories and AI in Medical Education
   1.1 Enhancing Cognitive Flexibility with Generative AI
   1.2 AI-Assisted Personalized Learning Paths
   1.3 Organizing Information with Generative AI

2. Advanced prompt Generation
   2.1 Basic Sciences Learning and case study with Generative AI (elective)
   2.2 Clinical Diagnostic reasoning case study with Generative AI (family medicine and surgery specialties) (elective)
   2.3. Patient encountering simulation with Generative AI (elective)
   2.4 Community Health curriculum integration with Generative AI (elective)

3. Strategies for Engaging Students with Generative AI
   3.1 Collaborative Learning with Generative AI
   3.2 Feedback Mechanism using Generative AI
   3.3 Designing AI-enhanced Lessons for Maximum Engagement

Faculty Project Presentation
The "From Survivor to Innovator: Digital Health Equity and Community Impact Grant" program:

- Expands student access to basic technology and broadband-Drs. Ryan Clark, Jarrod Lockhart.
- Improves telehealth access in the neighboring anchor communities- Dr. Chris Ervin
- Expands science and health careers exploration with our educational partners- Dr. Rhamelle Thompson
- Improves MSM faculty’s ability to integrate technology into the teaching and learning process- Dr. Jinjie Zheng
Questions
AI in Radiology

PubMed search results for 'Artificial Intelligence AND ((Diagnostic Imaging[Mesh] OR (Radiography)[MeSH])' by year:

- 34,525 results
- 2017 to 2025

PubMed search results for 'Deep Learning' by year:

- 21,075 results
- 2017 to 2024

Nathan M. Cross MD MS CIIP
Deep Learning
- Triage Detection Tools
- Reconstruction Tools

Large Language Models
- QA/QI Processing of Reports
- Research Cohort Identification
- (emerging) Electronic Medical Record Tools
- Chart summarization
- Inbasket message response
Educational Need?
Educational Need & Goal

Developers/Researchers
- Fast Paced > keep up!
  - Multi-disciplinary engagement
    - Computer Science
    - Biostatistics
    - Informatics
  - Engage with Internet Content
- Real world problems
  - Focus on clinical workflows

Consumers
- Basic Understanding Necessary
- Vendor Engagement
  - Beneficial
  - Beware
    - Implementation & workflows
    - Performance Measures
### Educational Needs

**Perspective**
- Just another diagnostic test?

**Performance Measures**
- 2x2 Truth Table
- Sensitivity/Specificity
- PPV/NPV/Prevalence
- Gold Standards

**Error Analysis**
- Investigate and Understand Failure Modes

**Implementation**
- Change Management
- Measurement and KPIs

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**Actual condition**

<table>
<thead>
<tr>
<th>True condition</th>
<th>Predicted condition</th>
<th>True positive (TP), true alarm, correct rejection</th>
<th>False positive (FP), false alarm, overestimation</th>
<th>False negative (FN), missed detection</th>
<th>True negative (TN), correct rejection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive (P) n</td>
<td>Predicted Positive (PP)</td>
<td>TP/P = 1 − FDR</td>
<td>False positive (FP)</td>
<td>FN/N = 1 − TPV</td>
<td>True negative (TN)</td>
</tr>
<tr>
<td>Negative (N) n</td>
<td>Predicted Negative (PN)</td>
<td>FP/P = 1 − PPV</td>
<td>True negative (TN)</td>
<td>FP/N = 1 − TPR</td>
<td></td>
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**Diagnostic odds ratio (DOR)**
- LR+ / LR−

**Markedness (MK)**, detect (Sensitivity) = PPV + NPV − 1

**Receiver operating characteristic (ROC)**
- AUC

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Engage - Governance
- Fast Paced - dive in
- Seek broad stakeholder engagement
- Members act as resources for others
- Provide some longitudinal teaching

Resident General Lectures

Resident Curriculum
- Imagedeep.io

Conferences

Online
- Youtube/Udemy/Pluralsight/Linkedin Learning/...
- Datacamp/Dataquest/...
- Github/Reddit/...
Thank you!
nmcross@uw.edu
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• Key resources collection
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A Disruptive Connector: Learning & Experimenting with Generative AI Together
- June 11, 2024

Past AAMC AI Webinars

Utilizing AI for the Medical Education Classroom – April 2024
AI & Healthcare Delivery: Navigating the Clinical Reality and Expectations – March 2024

- Video recording
- Presentation slides
- Q&A section summary

Register for the monthly series!
And find resources from past webinars.
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AAMC AI Webinar Series
AAMC AI Resource Bundle
International Advisory Committee for Artificial Intelligence

AAMC Center for Health Justice
  o Foundations for Responsible NLP Use for Maternal Health Equity
  o Polling Snapshot: Artificial Intelligence - August 2023
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