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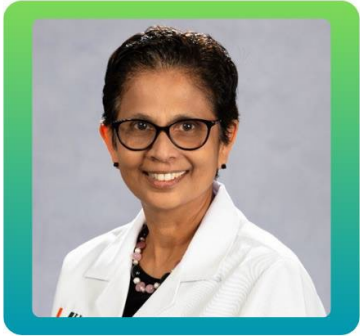
Utilizing AI for the Medical Education Classroom

April 30, 2024



Association of
American Medical Colleges

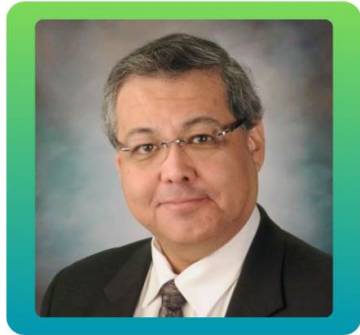
Speakers



Latha Chandran, MD, MPH, MBA
Executive Dean for Education and
Policy Founding Chair
Department of Medical Education
University of Miami Miller School of
Medicine



Kathleen Everling, PhD
Senior Medical Educator
Office of Educational Development
Adjunct
Assistant Professor of Pediatrics
University of Texas Medical Branch
(UTMB) Health



Ronald Rodriguez, MD, PhD
Professor
Henry B. & Edna S. Dielmann
Memorial Professor of Urologic
Science
UT Health San Antonio



Annelise M. Silva, MD, EdM
National President
The American Medical Student
Association

AI Uses in Medical Education at UMMSM

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Latha Chandran MD, MPH, MBA

Executive Dean for Education and Policy

Bernard J Fogel Endowed Chair and Professor

Departments of Medical Education and Pediatrics

University of Miami Miller School of Medicine

Categories of Use

- Learning and Assessment
- Curriculum Operations and Administration
- Academic Activities

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Learning and Assessment

- Developing OSCEs and Clinical Vignettes for testing clinical skills
- Learning Specialists using Chat GPT for clinical context when supporting students
- Summarizing key messages
 - Student feedback- Courses, AAMC GQ
 - Qualitative studies- Qualtrics- using homegrown model
- MSPE finalization
 - Preceptor notes> Summary Notes (Phase 3)
 - Summary narratives> MSPE narratives (Phase 2)

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Learning and Assessment

- Facilitating Adaptive Learning
 - ASLS blended course with UM Gordon Center and American Heart Association- aligns training with learner knowledge level using AI, content tailoring, and individualized instruction for stroke management
- AI- OSCE
 - Developing AI supported application to augment OSCE assessments/ ratings for observers
- Interprofessional Session on Visual Thinking strategies using AI tools and AR/VR
 - Med Ed Portal submission in the works

Curriculum Operations and Administration

- Task automation
 - ECC meeting minutes using a protected version of Co-Pilot
- Student chatbots
 - Home-grown system for medical knowledge- customizable
 - Enhancing communication with the students just in time
- Standardizing meeting transcripts, minutes

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Enhancing communication

- Students do not read messages from administration
- They report lack of satisfaction without being aware
- Student chat bots
 - Recruitment
 - Ongoing communication
 - Just in time access to relevant information

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Plans for the near future

- Performance Tracking across competencies
- Predictive Analytics for early at-risk identification
- Analysis of communication skills- speech patterns, tone and body language

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Academic work



- Alrassi J, Katsufakis P, Chandran L. Technology can augment, but not replace, critical human skills needed for patient care. *Academic Medicine* 2020 doi 10.1097/ACM.0000000000003733
- J Frenk J, LC Chen L, L Chandran et al. Challenges and Opportunities for educating health professionals after the COVID-19 pandemic. *Lancet*, 400 (2022), pp.1539-1556.
- SM Jacobs, NN Lundy, SB Issenberg, L Chandran. Reimagining Core Entrustable Professional Activities for Undergraduate Medical Education in the Era of Artificial Intelligence. *JMIR Medical Education* 9 (2023): e50903.
- Two distinct roles for AI
 - What AI training do health professionals need?
 - How can we use AI to improve such training?

Lomis, K., et al. 2021. Artificial Intelligence for Health Professions Educators. *NAM Perspectives*. National Academy of Medicine, Washington, DC. <https://doi.org/10.31478/202109a>



The impact of facial recognition technology in a prehospital setting: A randomized control simulation-based study

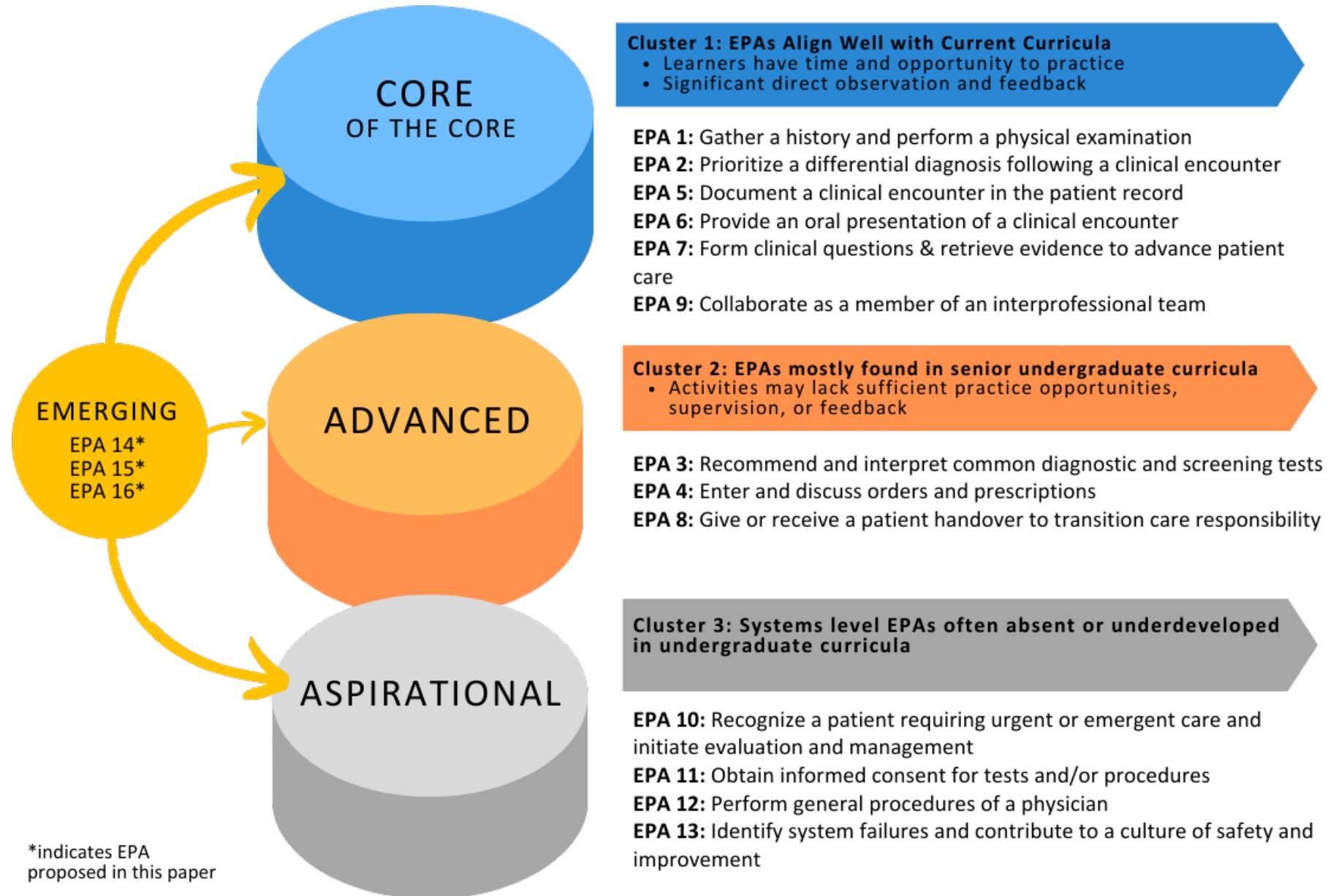
- Misra A, Cabeceiras R, Rodriguez R et al, UMMSM and Gordon Center for Simulation and Innovation in Medical Education
- Can paramedics' use of facial recognition technology improve the identification of unknown patients and their medical histories?
- The experimental group was 13.9 and 15.8 times more likely to self-report identifying the patient and their important medical information, respectively.
- 4.1 times more likely to transport the patient to their choice hospital.
- 80% participants reported the technology could benefit their day-to-day work

Society for Simulation in Health Care 2024

New EPAs that may arise

EPA	Description	Objectives
14	Proficient use of health care technologies	The medical graduate should be able to use current and emerging technologies effectively and responsibly in health care, including electronic health record, telemedicine platforms, and AI-driven diagnostic tools, to enhance patient care and improve health outcomes.
15	Understanding and applying health informatics	The medical graduate should be able to understand and apply principles of health informatics, including data management, data privacy, and the use of data for quality improvement and research.
16	Demonstrating team skills for transdisciplinary interactions in health care settings	The medical graduate should be able to effectively collaborate within transdisciplinary health care teams, which include other health care professionals as well as experts from other disciplines such as data scientists and bioinformatics specialists.

Figure 1. Integration of emerging EPAs into different EPA clusters



New skills needed for HP graduates

- Skills to evaluate new technologies
- Skills to interpret outputs from AI understanding sources of error, bias and context appropriateness
- Skills to communicate AI facilitated results to patients
- Skills to advocate for ethical and equitable systems ensuring data security and privacy for patients

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Additional thoughts

- Data security
- Costs
- Equitable access
- Ability to customize based on experience
- Threats to “experts”, job loss
- AI integration into EMR
- Black box
- Knowledge management vs information acquisition

Utilizing AI in the Medical Education Classroom

Ron Rodriguez, M.D., Ph.D.
Professor, Medical Education & Urology
Ashbel Smith Professor of Urologic Science



Disclosures & Disclaimers: None.

Goals:

- Where is AI heading in Med Ed
- What Students and Faculty need to know about AI
- Examples of AI Development at UTHSA
- What role should physicians have in the development of AI Tools
- Why did we develop a Dual Degree Program MD/MSAI?

Where is AI heading in Med Ed

AI in Med ED: Use Cases

- **Active Learning**
- **Role Playing & Simulations**
- **Student Note Evaluation**
- **Curricular Alignment in of Sequenced Content**
 - **Milestone Assessments**
 - **Mastery of Material**
- **Personalized Tutor**
- **Adaptive Learning Tools**
- **Procedural Proficiency Assessments**

SORA

Prompt: A gorgeously rendered papercraft world of a coral reef, rife with colorful fish and sea creatures

What Do Students and Faculty Need to know About AI ?

LLM Limitations

- Information is only as recent as the day the training started
- GPT-4 Trained Sept 2021, updated Jan 2022, released March 14, 2023
- Very Expensive to create pre-trained LLMs and tedious
- Does not have expert content
- Content not vetted for accuracy.
- When the information is sparse for a knowledge representation, it is prone to “hallucinations”
- When it gives incorrect answers, the language can be extremely compelling (i.e., not always possible to tell when it is correct if you are not already knowledgeable.) This is because the statistical models of the groups of words generated as optimized to sound good together.

LLM Fine Tuning, RAG, KG

- LLM performance can be improved by “fine-tuning” information
- Specialty Content can be used by Retrieval Associated Generation (RAG), which incorporates a secondary knowledge graph
 - KG encapsulates the specialty knowledge
 - The specialty knowledge is used to find detailed information, and uses the LLM base model to interpret and generate response.
- Fine-tuning and RAG are not mutually exclusive. Likely specialty apps will incorporate BOTH as hardware and software tools improve.

What role should physicians have in the development of AI Tools?

Physicians Should Lead to Prevent:

- Propagation of Systemic Bias
- Over reliance on technology (prevents practitioners from mastering their trade)
- Inappropriate liability of AI generated responses
- Health Inequity from access to care with these technologies
 - Creation of two tiered healthcare system
 - Use cases driven by the financial incentives
 - Use by third party payors in models which parse benefits in unethical ways

Financial Concerns about AI in Healthcare

- The race is on to capitalize on AI in Healthcare
- The “game” had always been controlled by big Tech, but not anymore
- Current costs for EMRs have been skyrocketing.
- Average cost for EPIC is \$8,000-\$10,000 per user per year
- Next Gen AI for EPIC (DAX) is currently estimated at \$10,000 per user per year
- The current emphasis for companies developing in this space is NOT to reduce healthcare costs but to optimize profits
- *Our data is the currency for these companies to gain proficiency*
- *Our expertise is necessary to provide meaningful RLHF and fine-tuned models*

Examples of AI Development at UTHSA

Content trained LLMs as general information source (answers vetted)

Objective Structured Clinical Examination

Independent Learning Tools with Adaptive Learning

Dual Degree Program with Masters in AI

Requires integration of training from UTHSA & UTSA

Capstone requires two mentors across campuses

Capstone II option, thesis with submission for publication

Summary

- AI is already here; we can't stop it or ignore it
- The most important steps necessary for accuracy and cost-control will be how we handle our data and our expertise
- Institution of FHIR by CMS occurred in Dec 2023.
- After this, it will be ILLEGAL to block our access to the data as providers AND patients.
- Healthcare costs are already too high, and the current models for advancing AI will exacerbate this, unless we intervene
- As users, we are best positioned to advance these technologies responsibly:
 - Patient centered
 - Improves outcomes
 - Enhances care
 - Advances Education
 - Advances Science

Acknowledgements:

UTSA:

Reyna Tostado
Administrative Assistant

Jianwei Niu, Ph.D.
Professor Computer Science
Associate Dean, SODS

Rebecca Schroeder, Ph.D.
Professor of Instruction
Interim Assoc Dean University College

Ambika Mathur, PhD
Dean of the Graduate School & Vice Provost
for Graduate Studies

UTHSA:

Ron Rodriguez, MD., Ph.D.
Professor of Medical Education
Program Director, MS in AI

Stephanie Gutierrez
Asst. Director, Dual Degree Programs

Ramiro Ramirez, Ph.D.

Eri Osta, MD, MSAI

Robert Hromas, MD
Dean, School of Medicine

Applying AI in the Classroom

Kathleen M. Everling, PhD
Senior Medical Educator
John Sealy School of Medicine
University of Texas Medical Branch





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Learning Objectives

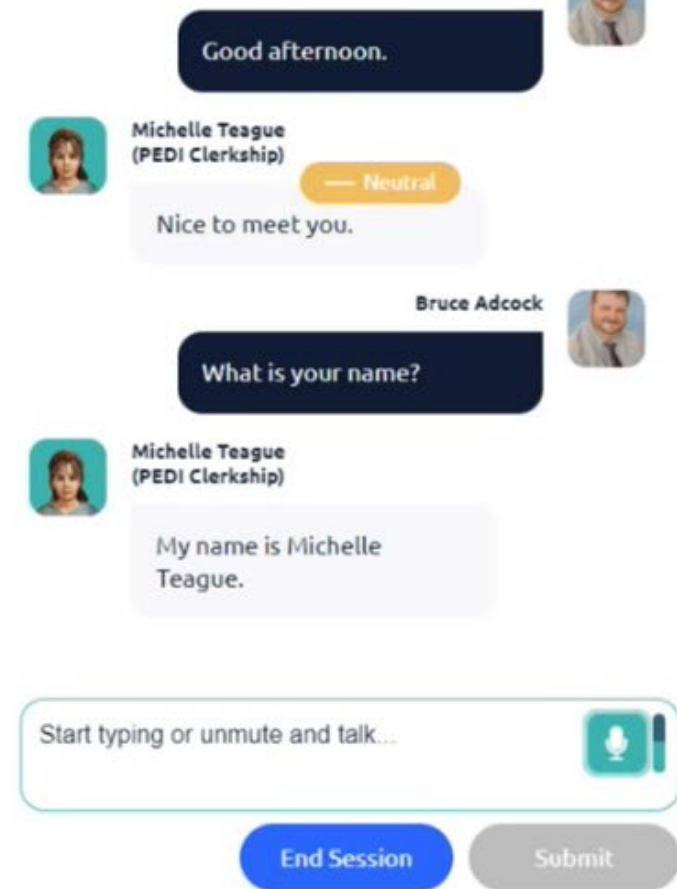
- AI can search curriculum standards and suggest objectives based on your topic and learners
- AI can help refine objectives

Planning and creating activities

- AI can't replace your creativity, but it can search for lesson ideas, suggest activities that align with your objectives, and even generate quizzes or worksheets.
- Consensus (Semantic Scholar), Evidence Hunt (PubMed), and other AIs embedded search engines can help with researching topics
- AI embedded in modern LMS can create modules, discussion boards, and quiz question.



Image created by AI tool in Adobe Firefly

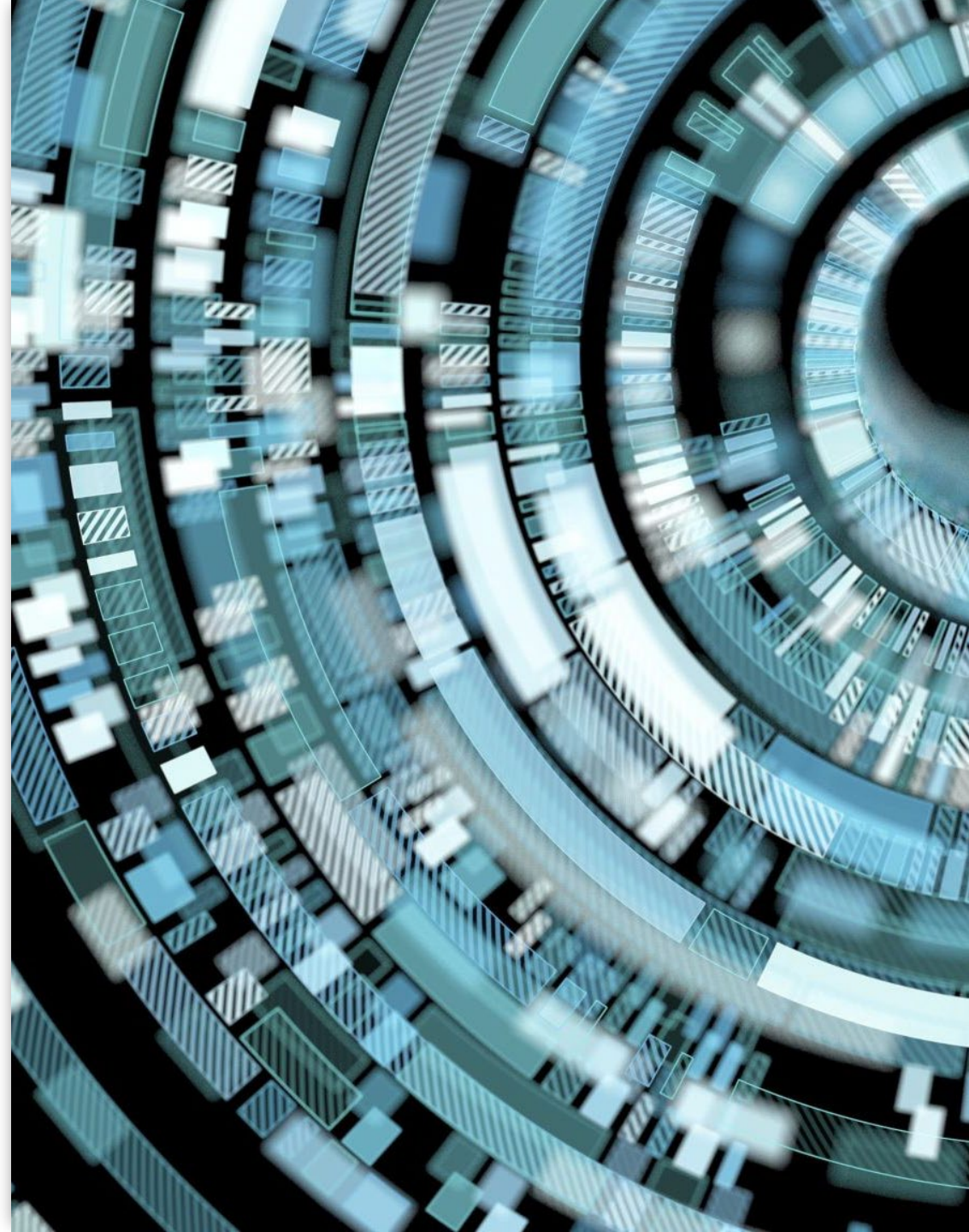


Beyond Text

- Virtual Patients and simulations
- Images creation
- Sound enhancement

Moving forward

- Lifelong learning
- HIPPA, FERPA, Data Security
- Who is making the decisions
- Human touch



AI and the Medical Student Perspective

“Utilizing AI for the Medical Education Classroom”

AAMC AI in Academic Medicine Webinar Series

Annelise M. Silva, MD EdM

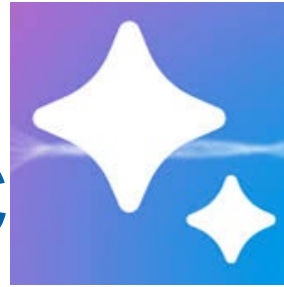
Financial Disclosures

- None

Objectives

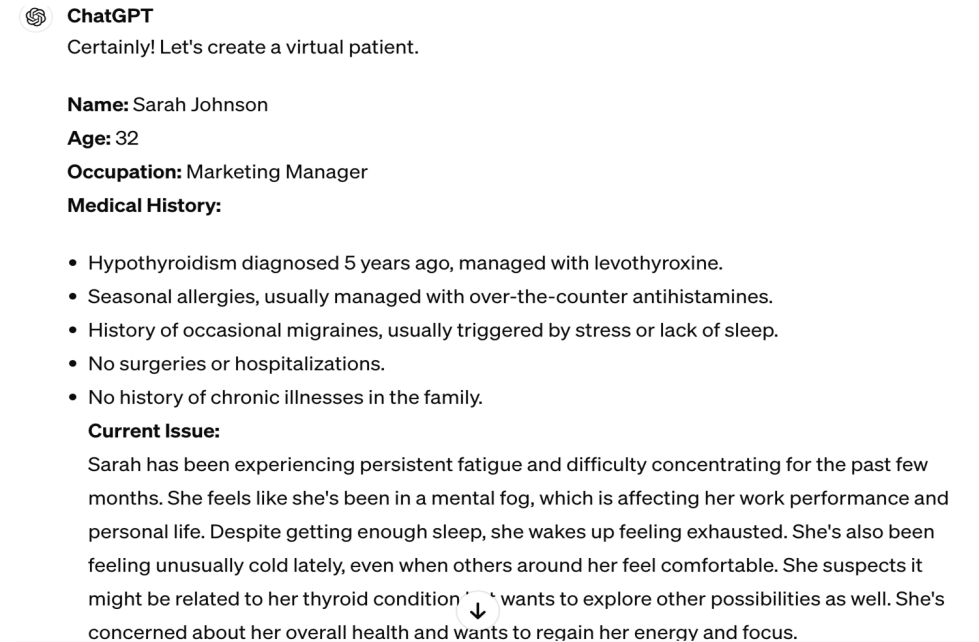
1. **Discuss** current perspectives and opinions about AI from the medical student perspective
2. **Identify** examples of current uses of AI by medical students pre-clinically and clinically
3. **Discuss** AI's potential impact on medical student education
4. **Suggest** opportunities for increased support in medical student AI use

Pulse Chec




- Medical students are **overwhelmingly aware, but lack training** for effective utilization
- Some students express **wariness on accuracy** or comprehensiveness of responses
 - ‘Is this just another resource for us to learn how to use?’
- Other students use it to **augment learning** – and this is trending



- Breaks down **difficult topics**
- Devises **study plans**
- Creates content for **flash cards** (ANKI)
- Creates **virtual patients** for feedback and practice
- **Easy to share** with other students



Benefits for Career Development

- Help students explore different specialties
- Identify potential research areas of interest and mentors
- Map out goals and requirements to become a competitive applicant
- Connect students with other resources to learn further

 create a 4 year plan for me in medical school to become a competitive applicant for diagnostic radiology residency programs.

Show drafts  

4-Year Medical School Plan for Diagnostic Radiology Residency

This plan outlines steps you can take throughout medical school to become a competitive applicant for diagnostic radiology residency programs.

Year 1:

- **Academics:** Focus on building a strong foundation in core medical sciences like anatomy, physiology, and pathology. These are crucial for understanding the diseases radiologists diagnose.
- **Research:** Explore research opportunities in radiology departments. Look for faculty with research interests aligning with yours. Early research involvement demonstrates initiative and interest in the field.
- **Extracurricular Activities:** Join radiology interest groups or student-run radiology societies. Attend national radiology conferences (e.g., RSNA) to network with professionals and learn about the latest advancements.

Year 2:

Copilot

As a medical student interested in radiology, there are several valuable resources and steps you can take to enhance your knowledge in this field. Here are some recommendations:

1. Online Radiology Courses and Websites:

- **LearningRadiology:** This award-winning teaching site offers lectures, quizzes, hand-out notes, and interactive material focused on chest, GI, cardiac, and musculoskeletal diseases. It's an excellent resource for medical students starting out in radiology ¹.
- **Radiology Basics:** A free e-learning resource covering CT, MRI, and ultrasound, including anatomy, pathology, and quizzes ².
- **Coursera:** Explore online radiology courses from reputable institutions. Some popular options include "Visualizing the Living Body: Diagnostic Imaging" from Yale University and "MRI Fundamentals" from the Korea Advanced Institute of Science and Technology (KAIST) ³.
- **Radiology Cafe:** Another useful website with tutorials and resources for junior doctors and medical students ².
- **Radiology Master Class:** While not mentioned in the search results, this website is also highly regarded for radiology learning ⁴.

2. Textbooks and Books:

- Consider reading textbooks like "Learning Radiology: Recognizing the Basics." The 4th edition covers ultrasound, interventional radiology, and mammography ¹.

3. Clinical Experience and Electives:

AI: A tool or a trap?

bombarded with resources



and 'how to learn'

- No training on how to critically appraise output
 - Still learning how to sift through curricular content itself
- Easier for preclinical medical students to pick up, more difficult for clinical medical students
 - Do not substitute AI for clinical decision

making

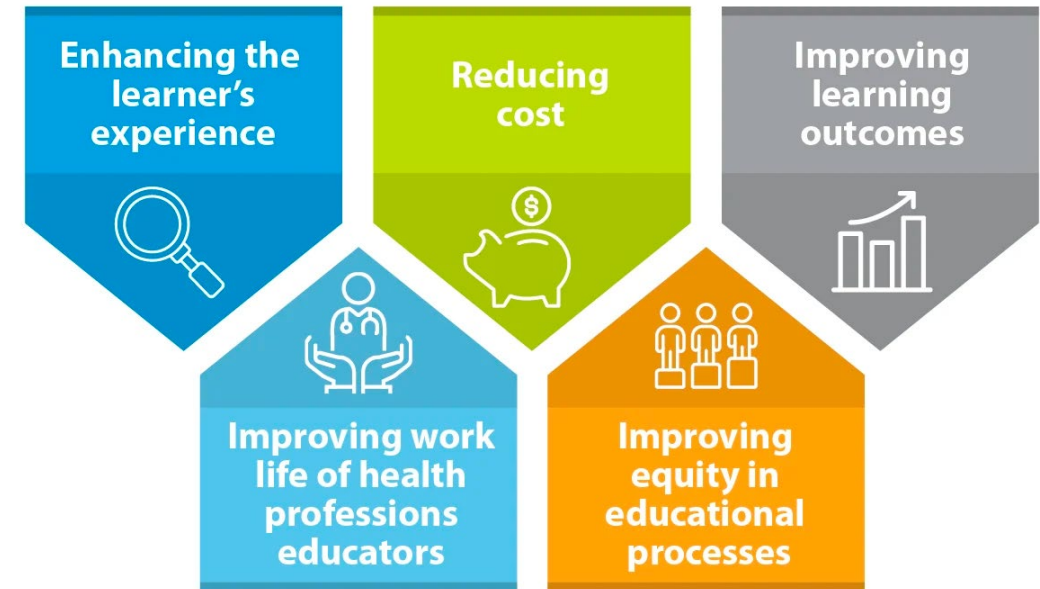
So what do we need?

- **Incorporation** into current resources (First Aid, Sketchy, UWorld, etc.)
- **Integration** with institution-based and standardized test content
- **Guidance** on how to effectively use and critically appraise AI output
- **Support** on preparing students to use AI in clinical practice

So what do we need?

- **Guidance** on how to effectively use and critically appraise AI output
- **Support** on preparing students to use AI in clinical practice

Responsibility	Innovation project team	Educational administration (deans, curric cmte.)	Educator
PLANNING AND DEVELOPMENT			
Ensure the AI system addresses a meaningful educational goal	<input type="radio"/>		<input type="radio"/>
Ensure the AI system works as intended	<input type="radio"/>		<input type="radio"/>
Explore and resolve legal implications of the AI system ¹ prior to implementation and agree upon appropriate safe, effective and equitable use of and access to education AI	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Develop a clear protocol to identify and correct for potential bias	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ensure appropriate learner safeguards are in place for direct-to-consumer tools that lack educator oversight	<input type="radio"/>		
IMPLEMENTATION AND MONITORING			
Make educational decisions such as advancement and remediation		<input type="radio"/>	<input type="radio"/>
Have the authority and ability to override the AI system			<input type="radio"/>
Ensure meaningful oversight is in place for ongoing monitoring		<input type="radio"/>	<input type="radio"/>
Ensure the AI system continues to perform as intended through performance monitoring and maintenance	<input type="radio"/>	<input type="radio"/>	
Ensure ethical issues identified at the time of purchase and during use have been addressed ²		<input type="radio"/>	
Ensure clear protocols exist for enforcement and accountability, including a clear protocol to ensure equitable implementation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

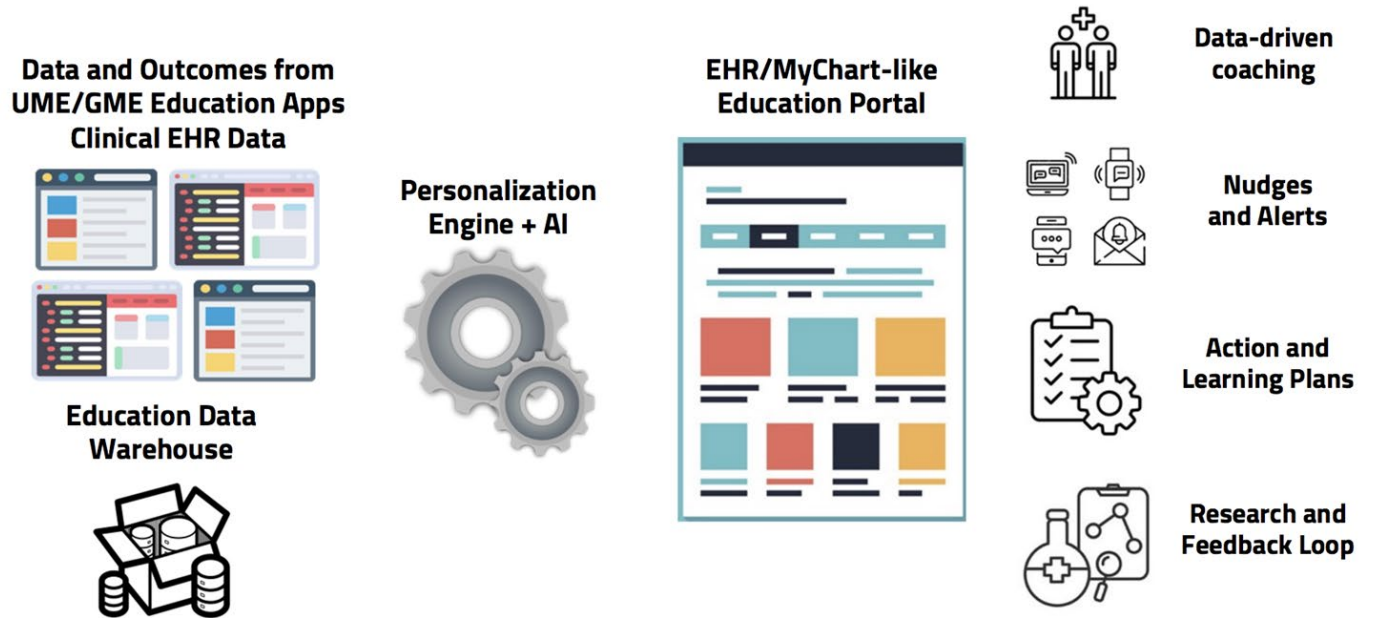


Precision Education and Precision Medicine

- **Guidance** on how to effectively use and critically appraise AI output
- **Support** on preparing students to use AI in clinical practice



What is Precision Medical Education?



Takeaways

- Students are **aware and interested in utilizing AI** in medical education
- There is a **wariness of how to use this** as a tool effectively (trust is still key for students)
- **Guidance is needed** on how to incorporate AI into medical student training both on the educator side and on the student side
- **Precision education** is an exciting glimpse into what the future of medical education could look like



Thank you!

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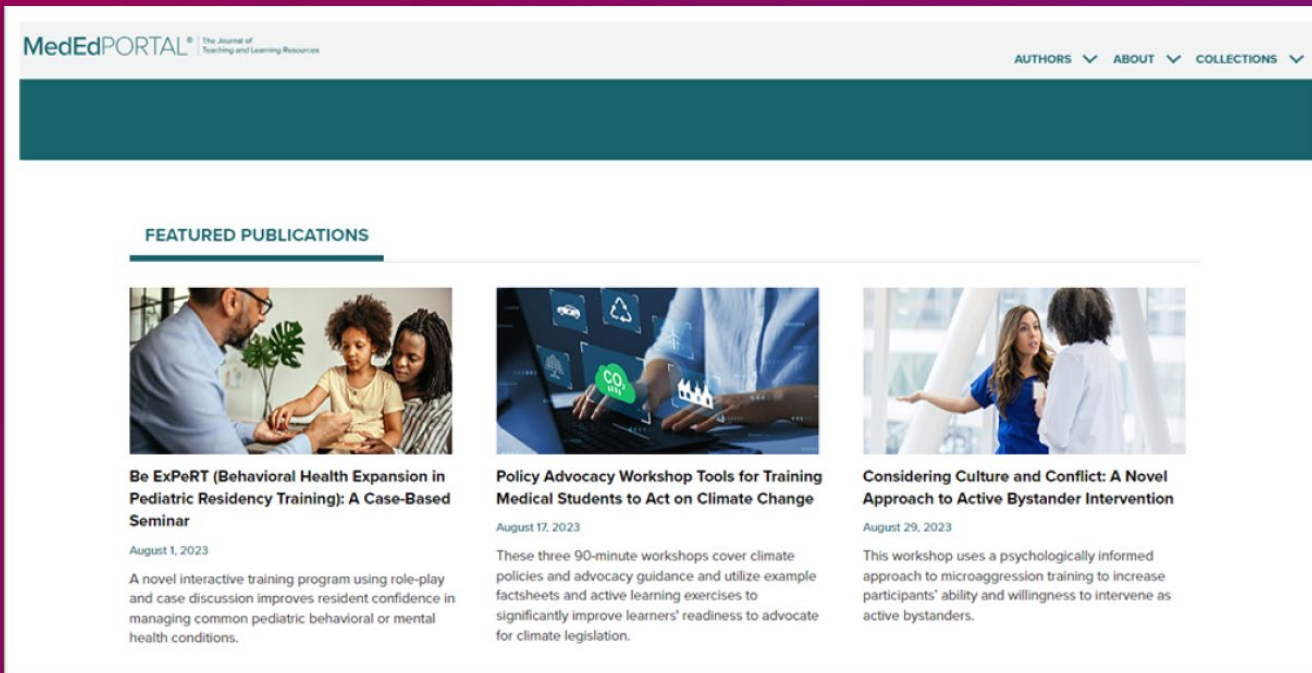
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Thumbnail Image	Title	Date	Description
	Be ExPeRT (Behavioral Health Expansion in Pediatric Residency Training): A Case-Based Seminar	August 1, 2023	A novel interactive training program using role-play and case discussion improves resident confidence in managing common pediatric behavioral or mental health conditions.
	Policy Advocacy Workshop Tools for Training Medical Students to Act on Climate Change	August 17, 2023	These three 90-minute workshops cover climate policies and advocacy guidance and utilize example factsheets and active learning exercises to significantly improve learners' readiness to advocate for climate legislation.
	Considering Culture and Conflict: A Novel Approach to Active Bystander Intervention	August 29, 2023	This workshop uses a psychologically informed approach to microaggression training to increase participants' ability and willingness to intervene as active bystanders.

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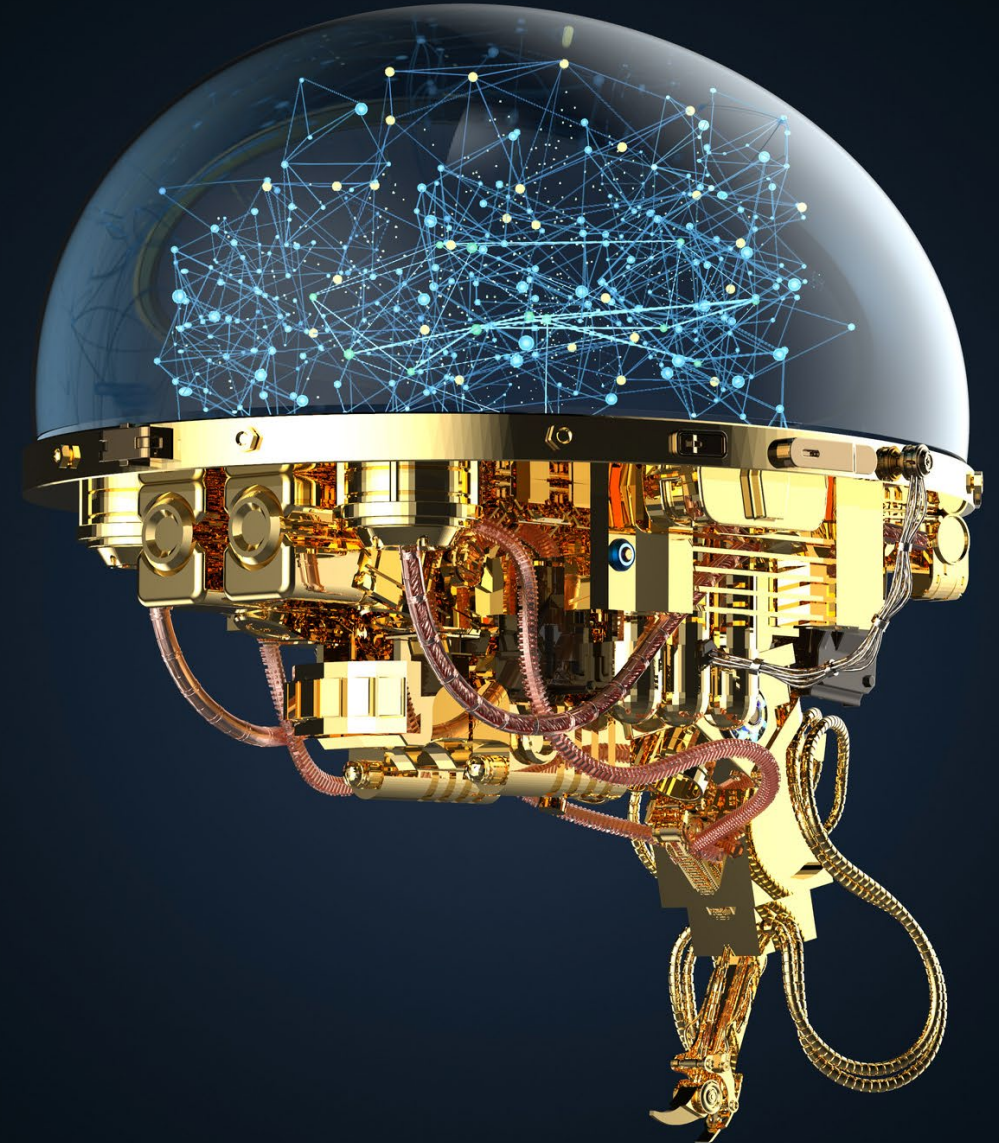
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- AI in Medical Education: Faculty as Learners and Educators
— *May 22, 2024*

Past AAMC AI Webinar

- *AI & Healthcare Delivery: Navigating the Clinical Reality and Expectations – March 2024*
- *Building Trust & Transparency in the Age of AI: Behind the Data Curtain – February 2024*
 - *Video recording*
 - *Presentation slides*
 - *Q&A section summary*



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