



Tomorrow's Doctors, Tomorrow's Cures®

Learn

Serve

Lead

AI in Medical Education: Faculty as Learners and Educators

May 22, 2024



Association of
American Medical Colleges



Eric Weissman
Senior Director, Faculty and
Academic Society Engagement
AAMC



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



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



Jinjie Zheng, PhD, MS, MA
Assistant Dean, Digital Technology
Morehouse School of Medicine



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

AI-integrated Faculty Affairs Offices for Future-Ready Medical Schools

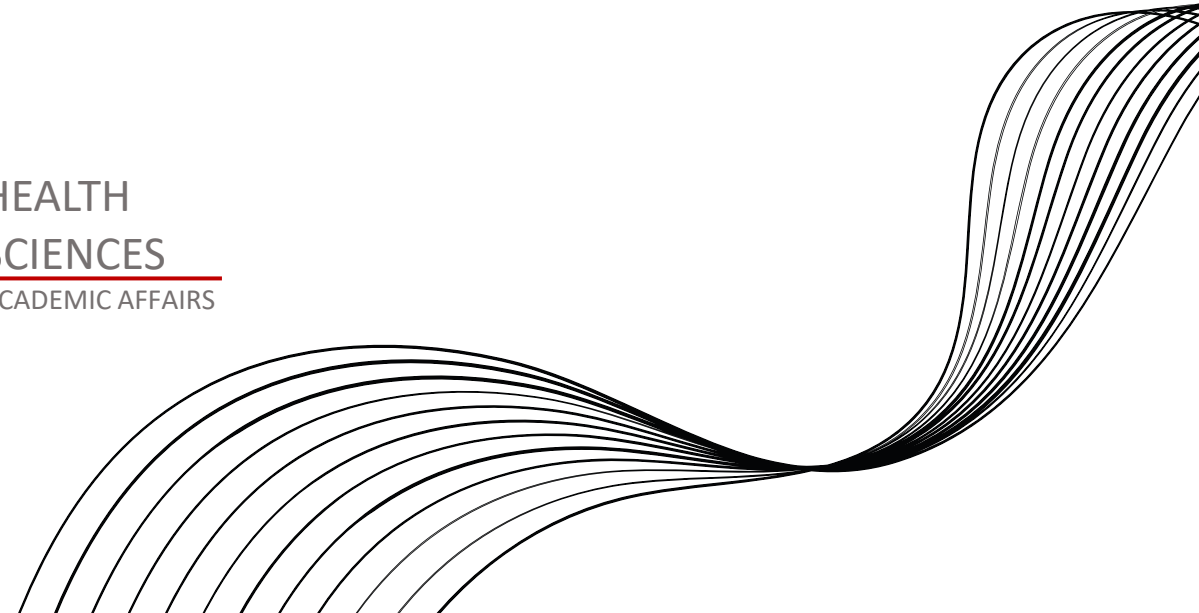
Akshay Sood, MD, MPH

Interim Director, HSC Office of Faculty Academic Affairs



HEALTH
SCIENCE

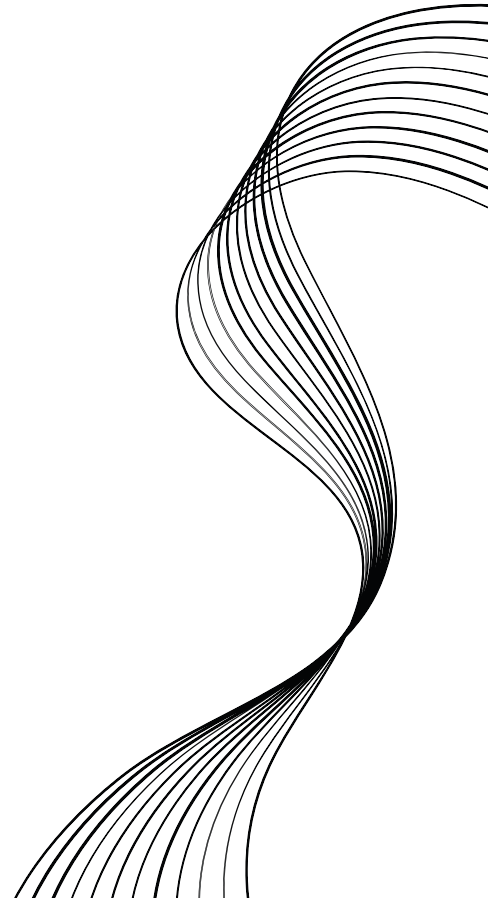
ACADEMIC AFFAIRS





Disclosures

- 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

LLM examples: ChatGPT, Gemini, etc.





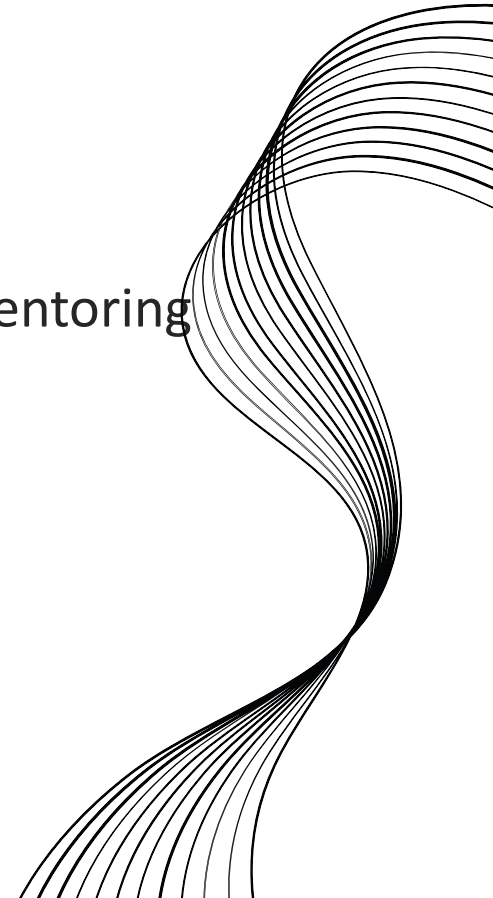
Approach

- **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

Sample IMDP: Basic Structure

Five-Year Goal 1

Six-Month Objectives

Objective 1A

Objective 1B

Objective 1C

Training needed to accomplish goal

Scholarly activities associated with the long-term goal

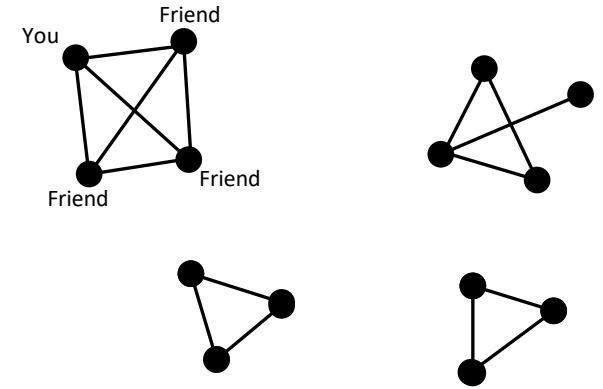
End-Product

Timeline

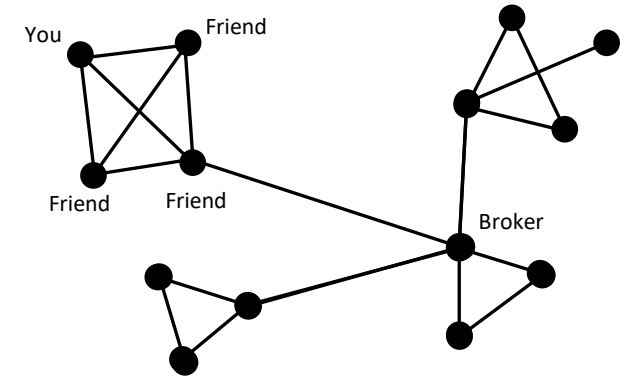
Postdoctoral scientist satisfaction and increased scientific productivity is correlated with the use of an IDP or IMDP

- ✓ 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

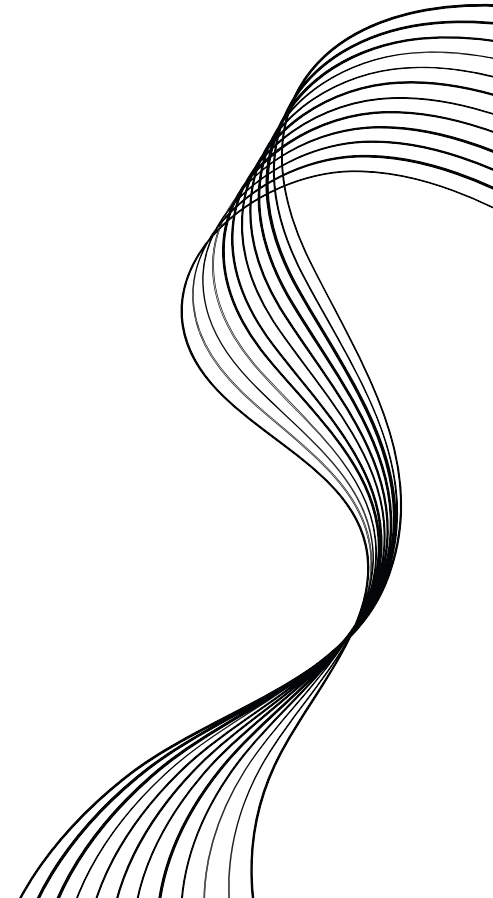


Panel B. Clusters with a Broker



Use LLM for monitoring faculty-related policies on disclosure of conflicts of interest and commitment

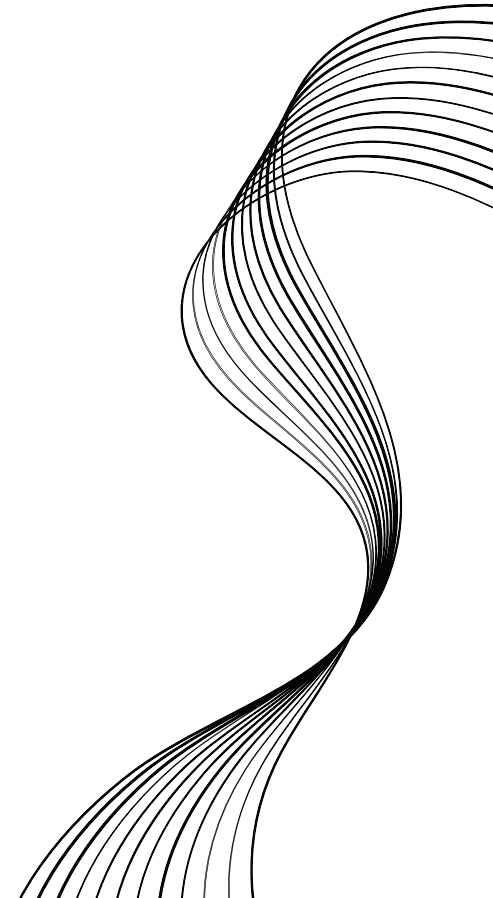
- Plan for an AI assistant for the faculty compliance office:
 - Create management plan for these disclosures
 - Create, refine and monitor management plans





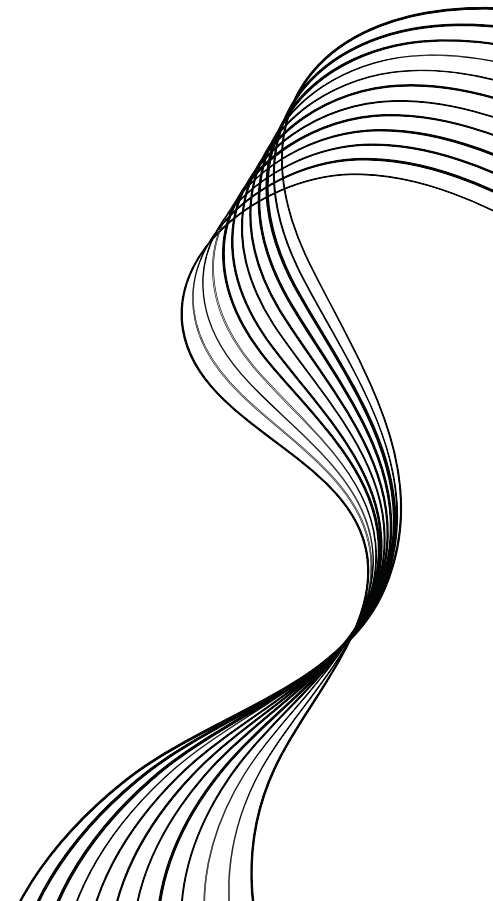
Priority 3

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?

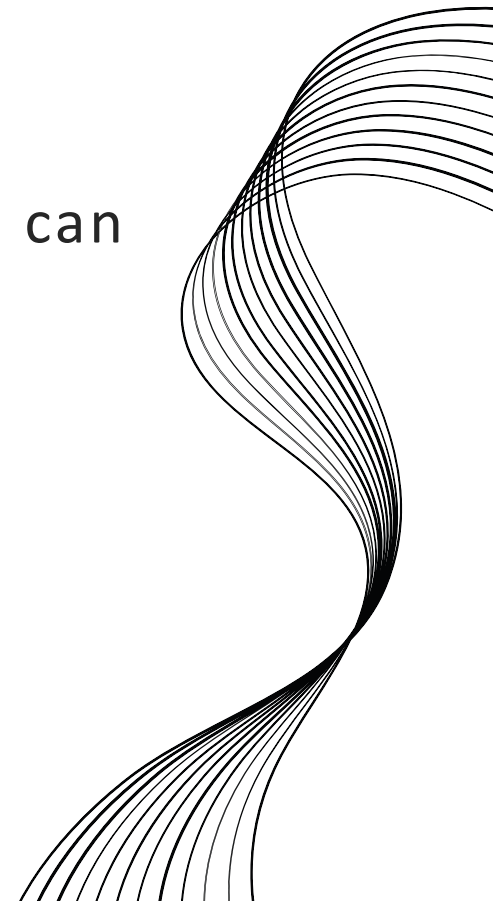




Challenge 2

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.

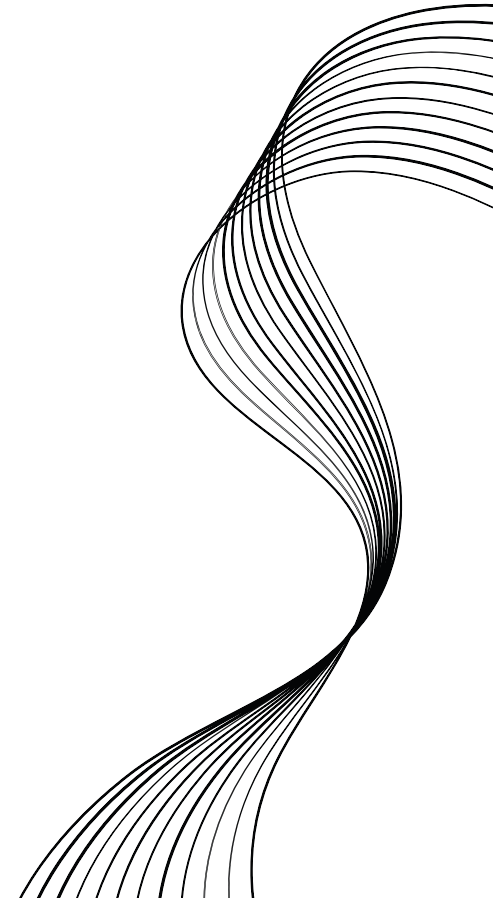


- Context shapes how LLMs respond to a prompt.

Consider These



- **TARGET AUDIENCE**
- **TONE**
- **STRUCTURE OF OUTPUT**
- **OUTPUT GOAL**

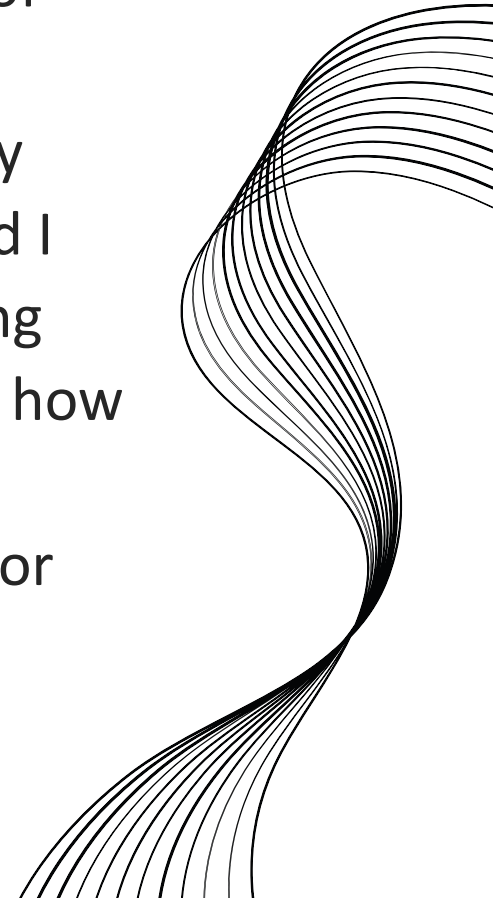




Context Example

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

Summarize the following meeting notes.

EXAMPLE



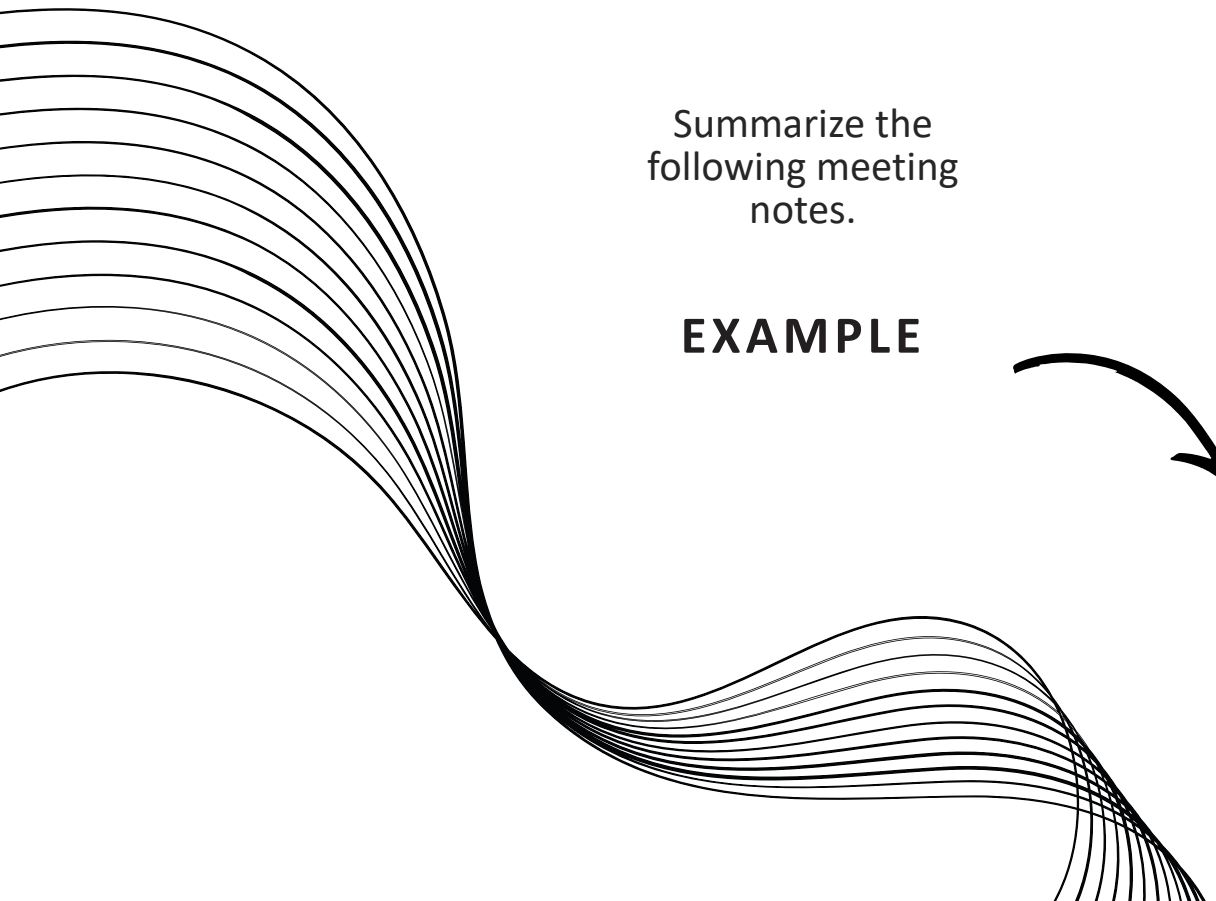
Summarize the following meeting notes **and identify the key takeaways**

ITERATION



Summarize the following meeting notes, **identify key takeaways** and **list the most urgent action items w/ their deadlines**

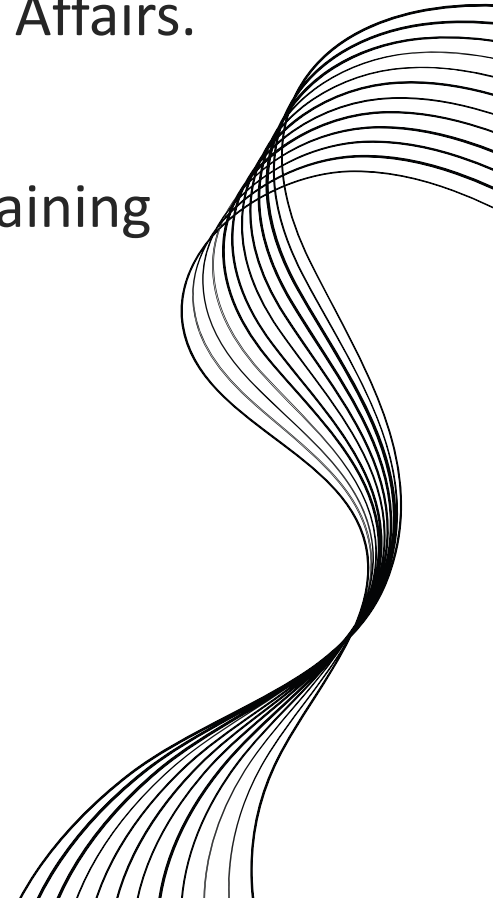
FURTHER ""



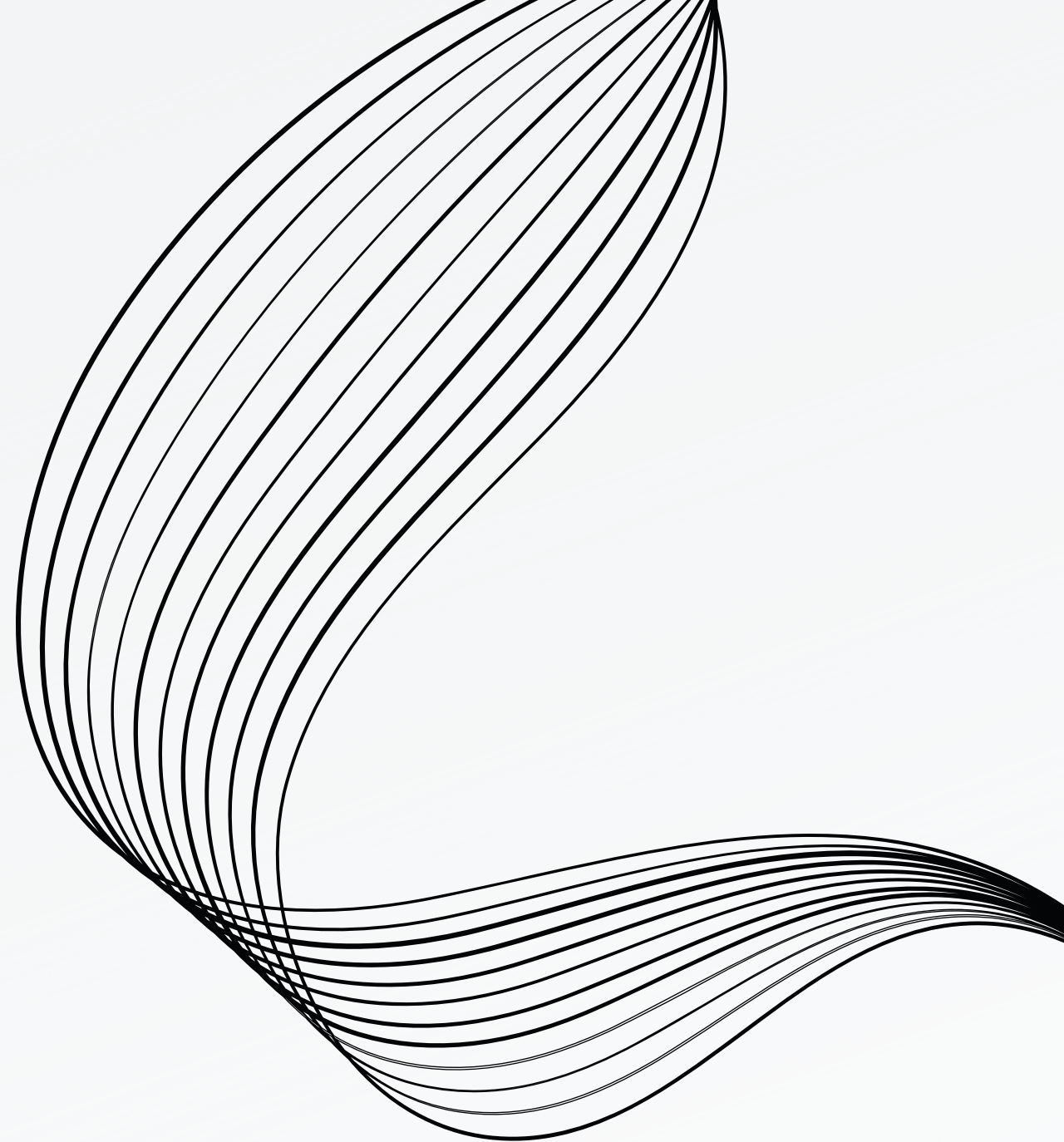


Summary

- 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

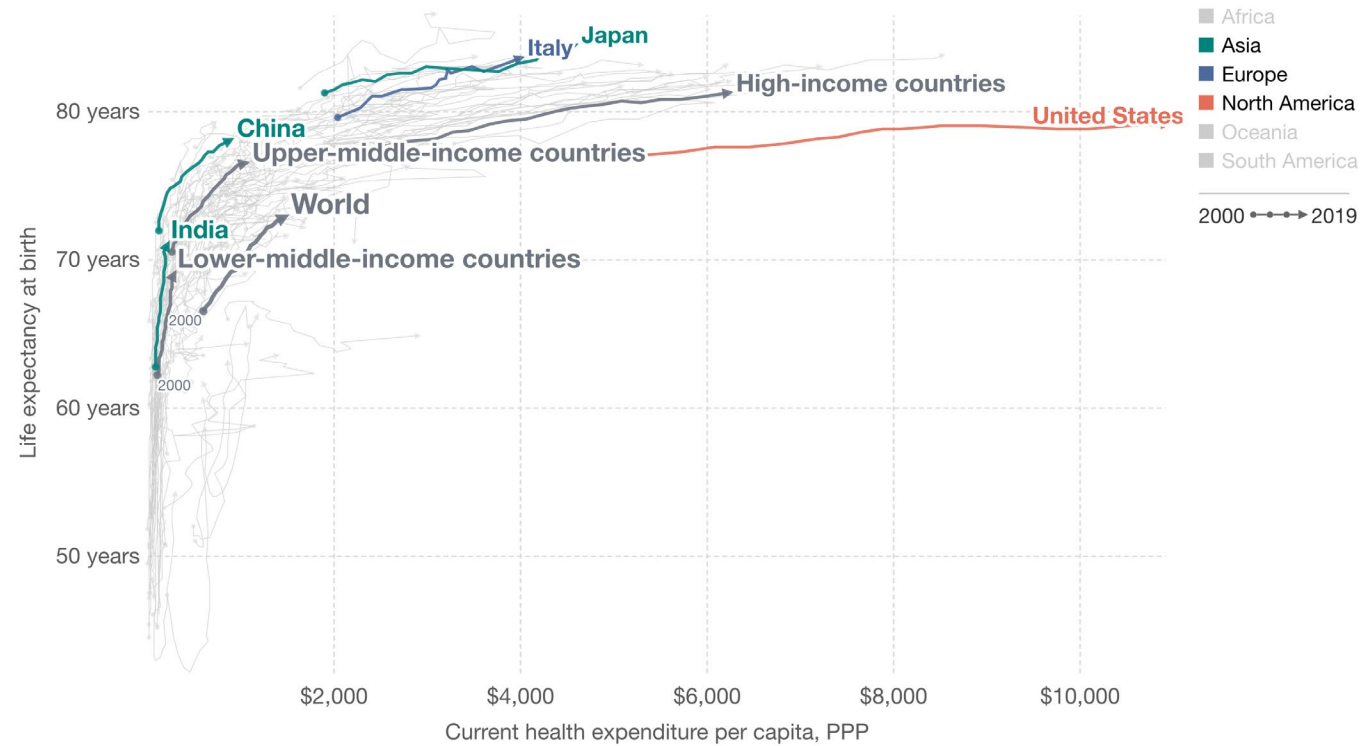
University of Texas at Tyler School of Medicine

An Industry Set for Disruption...

Life expectancy vs. healthcare expenditure, 2000 to 2019

Our World in Data

The period life expectancy¹ at birth, in a given year. Healthcare expenditure per capita is measured in current international-\$, which adjusts for price differences between countries.

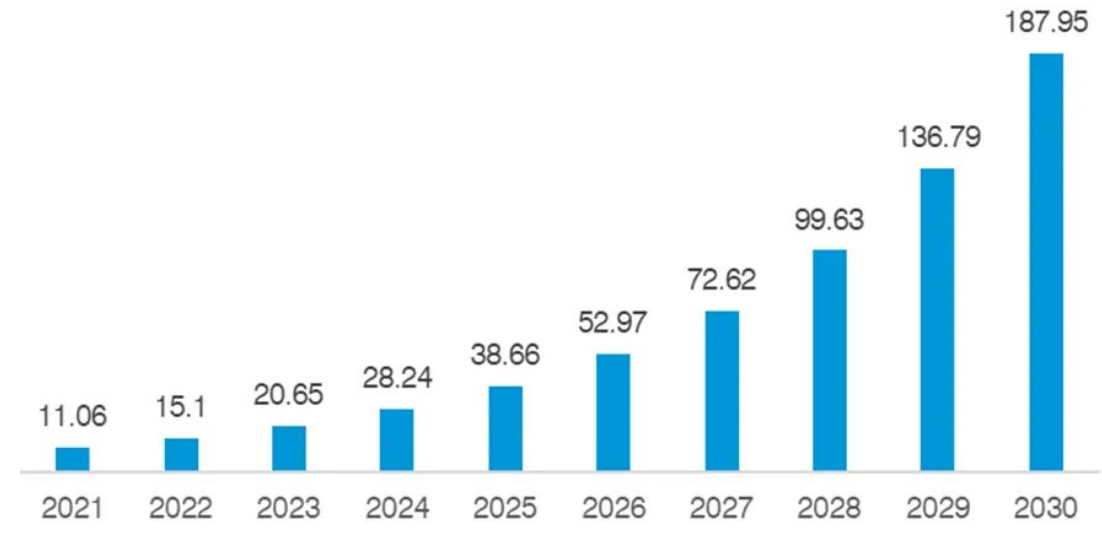


Data source: UN WPP (2022); World Health Organization (via World Bank)

OurWorldInData.org/financing-healthcare | CC BY

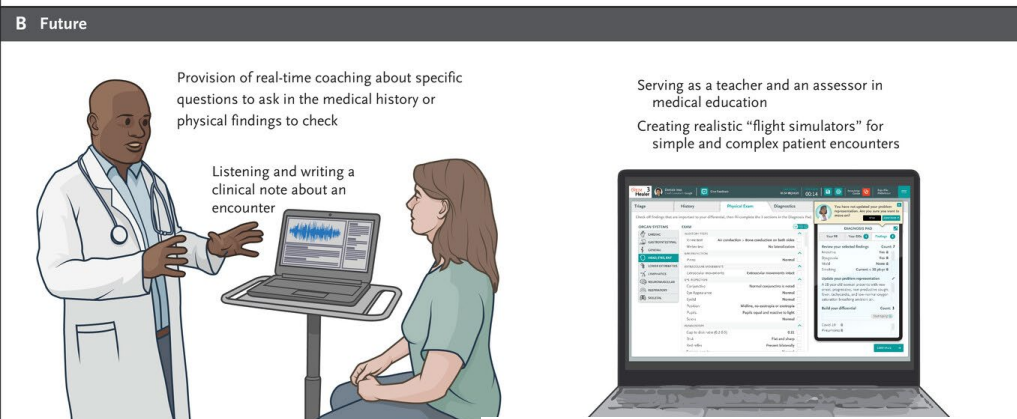
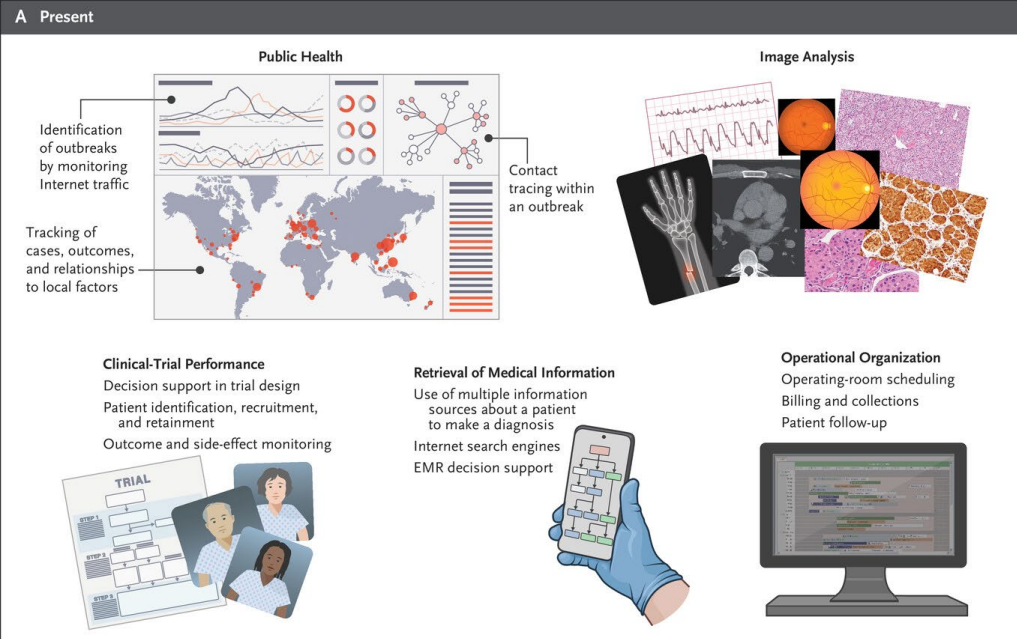
1. Period life expectancy: Period life expectancy is a metric that summarizes death rates across all age groups in one particular year. For a given year, it represents the average lifespan for a hypothetical group of people, if they experienced the same age-specific death rates throughout their whole 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)



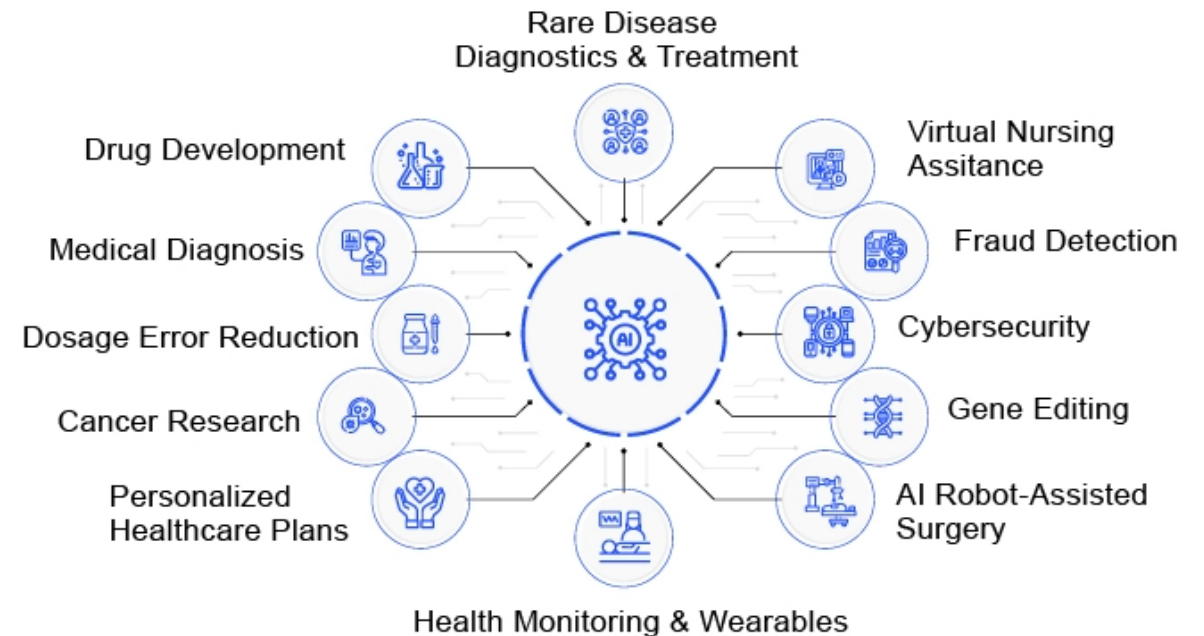
Source: Precedence Research

How Are We Addressing the Current and Future Impact of AI in Healthcare?



N Engl J Med 2023;388:1201-1208

Applications of AI in Healthcare



Source: Delveinsight

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



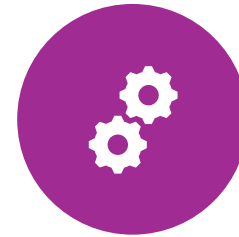
FACULTY
CONCERNS



INSIGHTS



FACULTY LED
INITIATIVES



STAGES OF
IMPLEMENTATION



THOUGHTS ON
BEST PRACTICES
AND STRATEGIES

Community of Growth on Artificial Intelligence in Health Professions Education

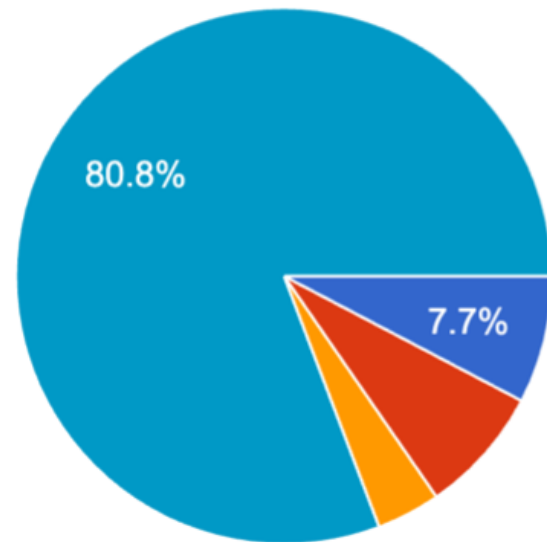
- Engage educators in critical discussion about the benefits and challenges of AI
- Share successful use cases and practical applications
- Provide access to relevant and valuable AI resources
- Support AI educational programs
- Help identify critical elements essential to the effective use of AI in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



Preliminary Results: Pilot Survey

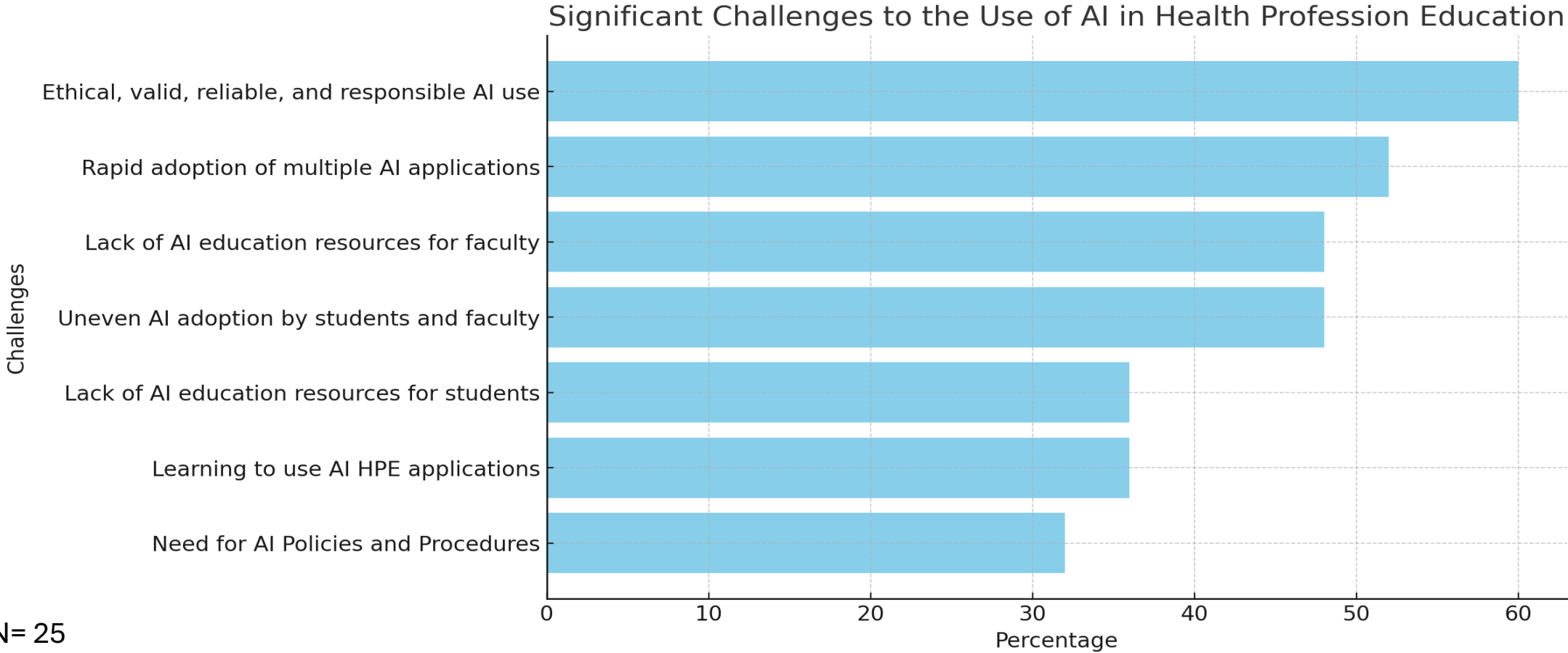
What is your PERSONAL GOAL for using AI in Health Profession Education?

26 responses



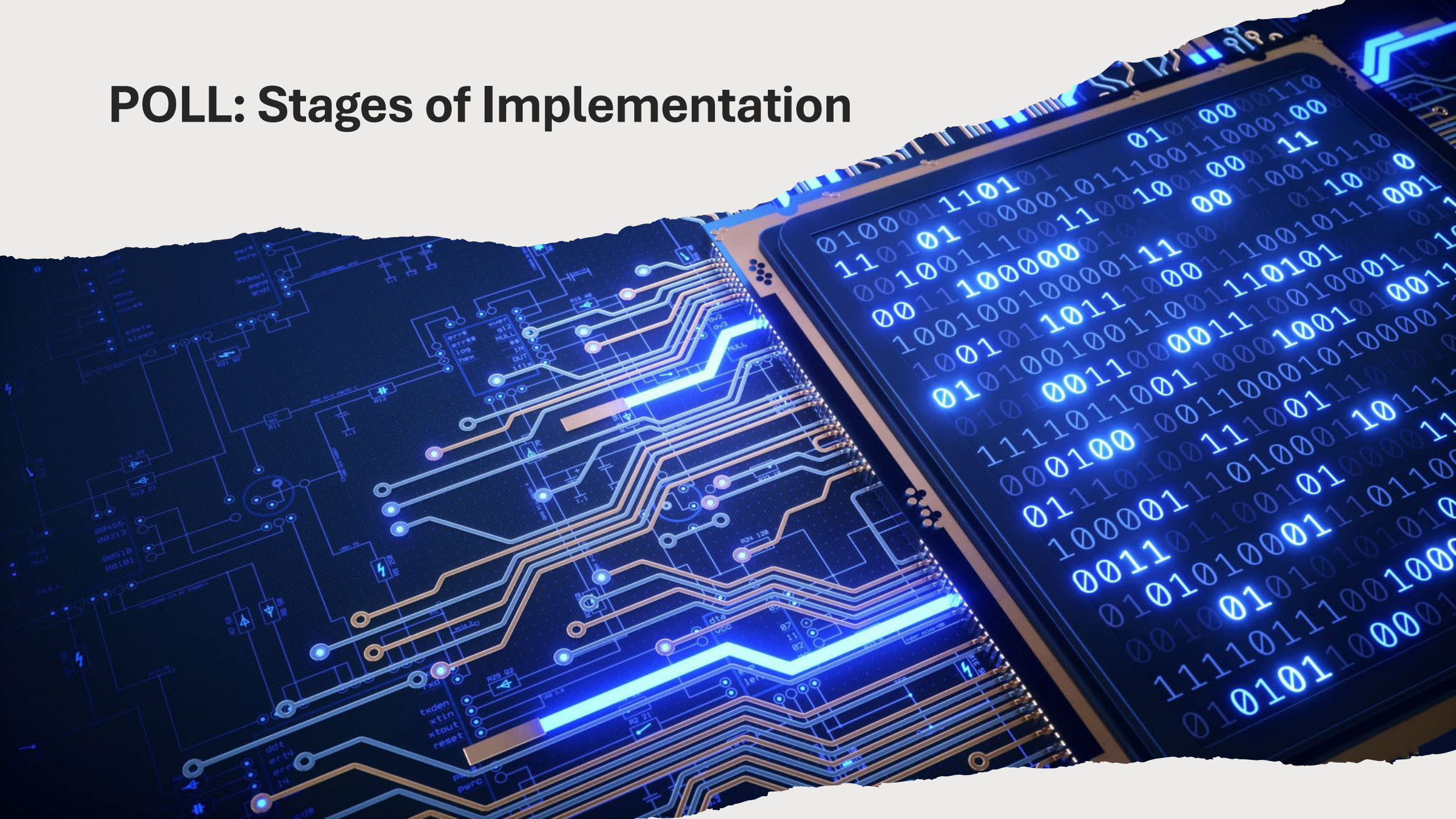
- Creating better teaching materials and presentations
- Engaging students in Active Learning (metacognition)
- Improving Assessment and Performance Feedback
- Identifying "at risk" students for Remediation
- Designing curricula to increase Learning
- All of the above

Preliminary Results: Pilot Survey



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

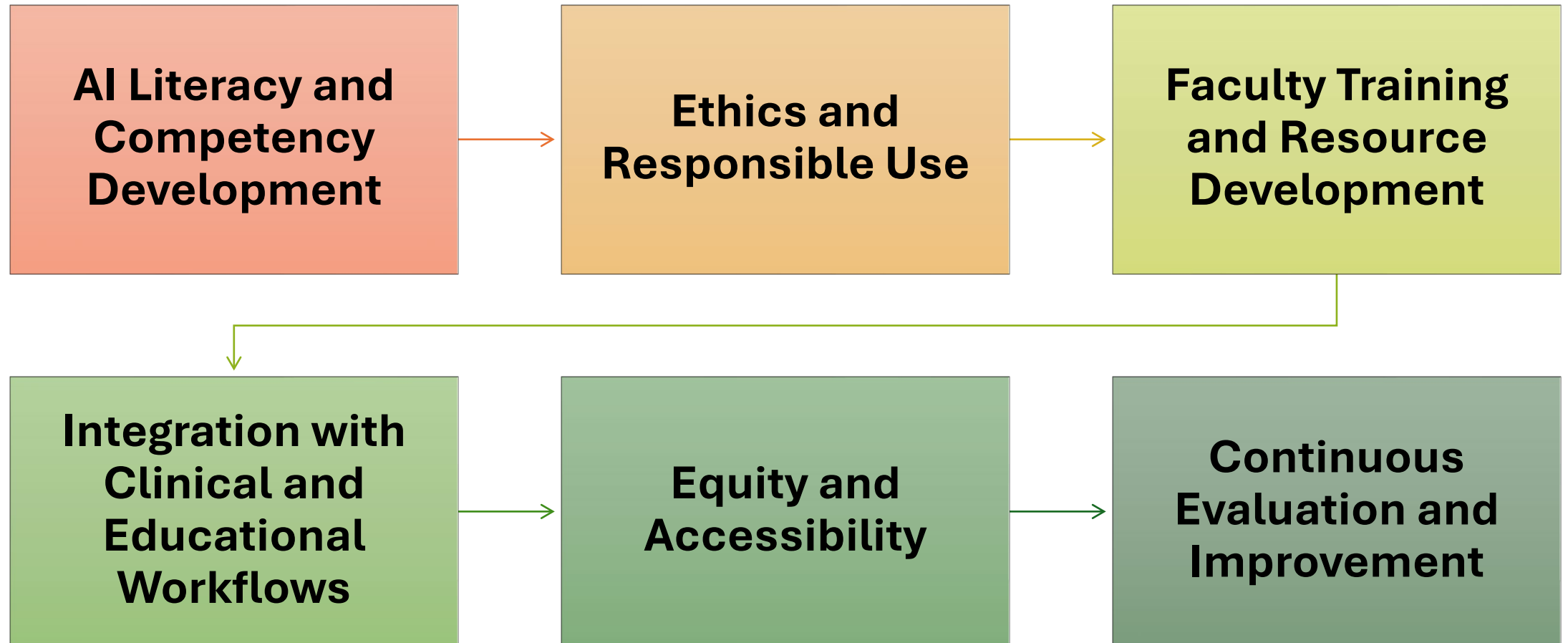


**Partial
Implementation**



Full Integration

Practical Considerations and Strategies



Resource Sharing and Collaboration

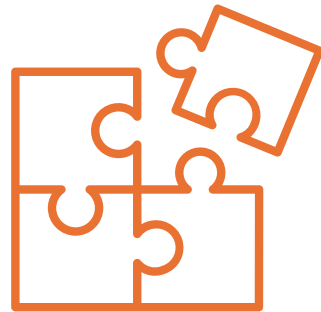


Foster partnerships to share AI educational resources, toolkits, and best practices



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

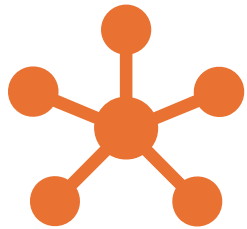


IMPACT OF AI TRAINING
INITIATIVES



REFINE AI EDUCATION AND
IMPROVE IMPLEMENTATION

Conclusion



Engage



Collaborate

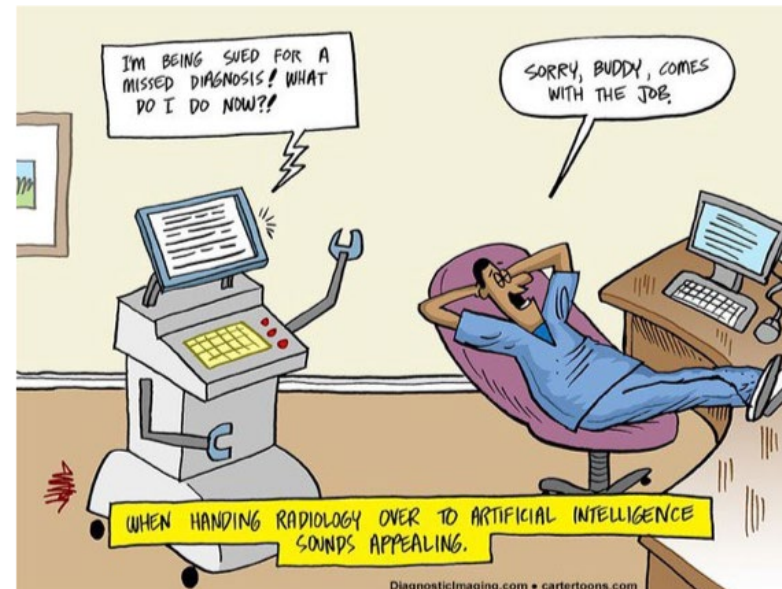


Learn

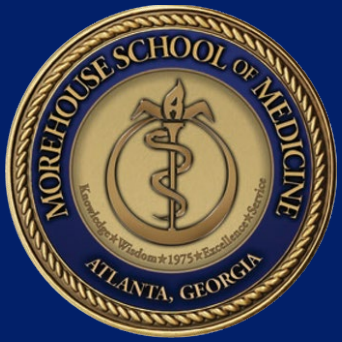
Thank you!

Diego Niño, MD, PhD

dnino@uttyler.edu

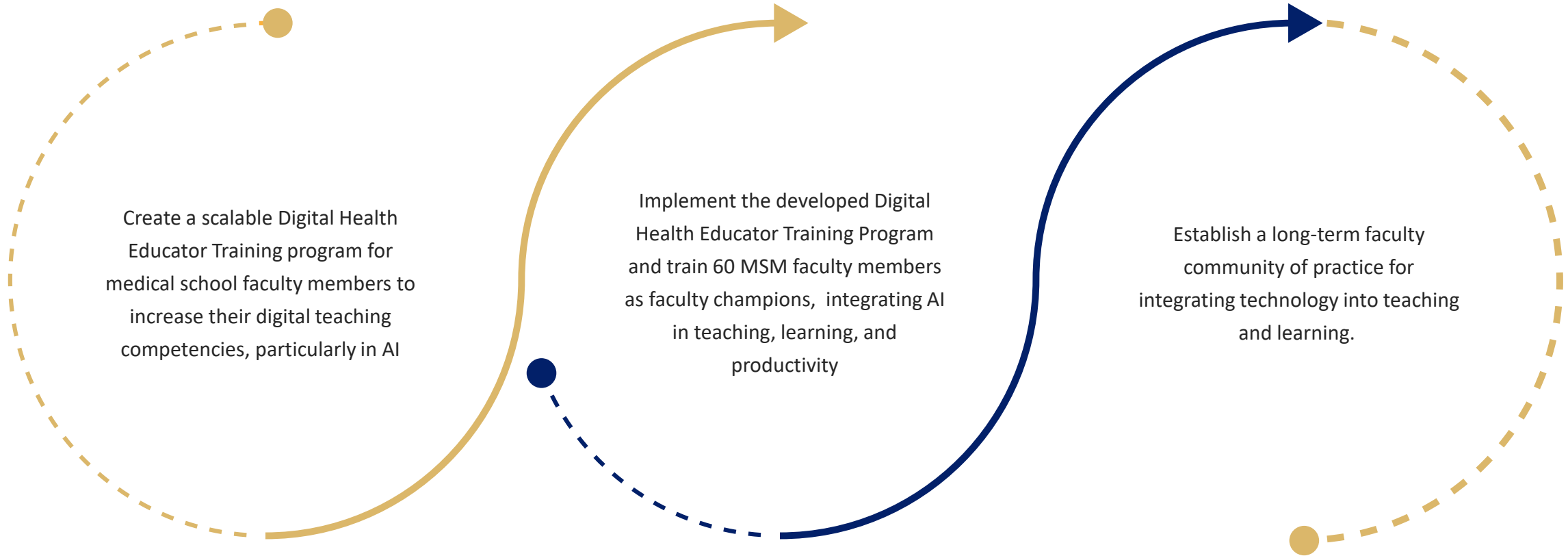


Digital Health Educator-AI Focused Faculty Curriculum

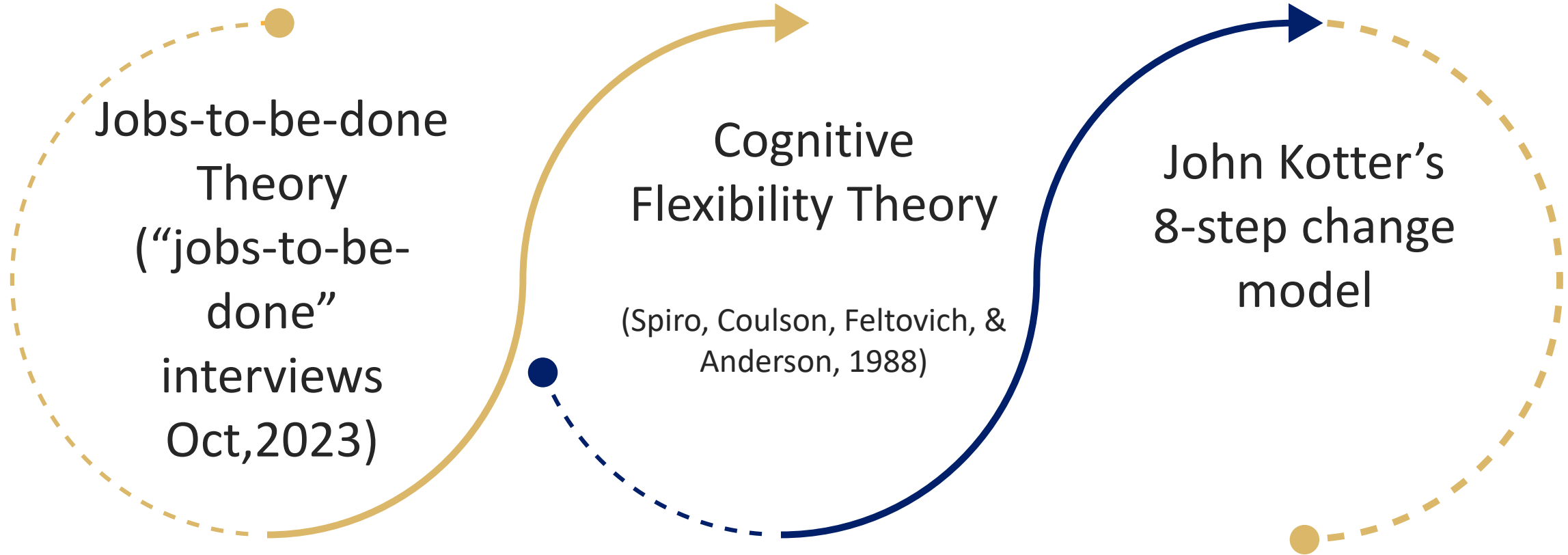


Jinjie Zheng PhD
Assistant Dean, Digital Technology
Morehouse School of Medicine
May 21, 2024

Purpose of Digital Health Educator Curriculum



Guiding Principles of Digital Health Educator Design



Digital Health Educator – AI Team





COURSE PROGRESS

- WELCOME PAGE
- LET'S WORK TOGETHER
- MODULE 1- AI AND MEDICAL EDUCATION
- 1-1 AI-POWERED TOOLS
- 1-2 GENERATING PROMPTS
- 1-3 IMPLICIT BIAS
- 1-4 FIRST HAND EXPERIENCE**
- MODULE 2- GENERATIVE AI IN MEDICAL EDUCATION
- 2-1- EXPERTS VS NOVICES
- 2-2 CONSIDERATIONS FOR BACKWARD DESIGN
- 2-3 RE-IMAGINING LEARNING TAXONOMIES
- MODULE 3- AI AND COGNITIVE FLEXIBILITY
- 3-1 A CASE OF HEALTH EQUITY AND HEART DISEASE
- 3-2 AI- A VALUABLE COGNITIVE TEAM MEMBER
- 3-3 LEVERAGING AI TO ENHANCE CREATIVITY
- MODULE 4- THE FINALE
- LIVE SESSION RECORDINGS
- GUEST SPEAKER - JOSEF & MELISSA

1-4 FIRST HAND EXPERIENCE

FIRST-HAND AI EXPERIENCE AND INITIAL CASE DEVELOPMENT

Welcome to our module on **First-hand AI Experience and Initial Case Development**. This module is designed to immerse medical educators in the practical applications of artificial intelligence within the clinical setting. You'll gain direct experience with AI tools, learn how to develop initial case studies, and understand how AI can be integrated into medical education.


LEARNING OBJECTIVES:

By the end of the module, you will be able to:

- Apply AI Tools in Clinical Education:** Participants will be able to effectively utilize artificial intelligence tools to enhance clinical case studies, demonstrating the ability to integrate these technologies into medical education curricula.
- Develop AI-Enhanced Educational Content:** Learners will create a comprehensive video presentation that outlines the integration of AI into their specific medical field, showcasing innovative approaches to incorporating AI into classroom teaching and learning experiences.

INTEGRATING AI INTO MEDICAL EDUCATION

As we approach the end of this module, you are expected to produce a 5-7 minute video that encapsulates your understanding of how artificial intelligence can be seamlessly integrated into your medical specialty and educational practices. This video should not only reflect your grasp of the AI tools and case studies discussed throughout the course but also your innovative vision for AI's role in medical education. To guide and inspire you, Dr. Jan Abraham has provided an exemplary model, demonstrating the impactful use of AI in enhancing learning experiences within the clinical setting.



Using ChatGPT 4 to grade free text answers

Method-Case X Subjective Portion of the SOAP Note Graded by ChatGPT4

- Teaching the Machine to Learn
 - Used Learning Space to find Case X SOAP notes written from Learners from years 2021-2023
 - Inputted 15 different Subjective portions (free text) from 15 different Learners.
 - 0:59 / 5:12 note also included the grade given by the "evaluator" and

COURSE PROGRESS

- WELCOME PAGE
- LET'S WORK TOGETHER
- MODULE 1- AI AND MEDICAL EDUCATION
- 1-1 AI-POWERED TOOLS
- 1-2 GENERATING PROMPTS
- 1-3 IMPLICIT BIAS
- 1-4 FIRST HAND EXPERIENCE
- MODULE 2- GENERATIVE AI IN MEDICAL EDUCATION
- 2-1- EXPERTS VS NOVICES
- 2-2 CONSIDERATIONS FOR BACKWARD DESIGN
- 2-3 RE-IMAGINING LEARNING TAXONOMIES
- MODULE 3- AI AND COGNITIVE FLEXIBILITY
- 3-1 A CASE OF HEALTH EQUITY AND HEART DISEASE
- 3-2 AI- A VALUABLE COGNITIVE TEAM MEMBER
- 3-3 LEVERAGING AI TO ENHANCE CREATIVITY**
- MODULE 4- THE FINALE
- LIVE SESSION RECORDINGS
- GUEST SPEAKER - JOSEF & MELISSA

3-3 LEVERAGING AI TO ENHANCE CREATIVITY

LEVERAGING AI TO ENHANCE CREATIVITY

Unleash your inner innovator! This module dives into the exciting potential of **artificial intelligence (AI) as a powerful tool to enhance creativity**. We'll explore how AI can go beyond automation, stepping into the realm of creative exploration and problem-solving. Prepare to break free from conventional creative boundaries and embrace the collaborative power of AI in this thought-provoking module.

LEARNING OBJECTIVES:

In this module, you will learn how AI can help

- Spark new ideas and unexpected connections.
- Streamline tedious tasks, freeing your time for deeper creative exploration.
- Personalize your creative journey with tailored suggestions and inspiration.



ACTIVITY:

Continue the previous case, bring it to the next level by applying the four aspects of Cognitive Flexibility Theory: (a) context-dependency, (b) multiple perspectives, (c) concept inter-connectivity, and (d) using technology to accelerate experience acquisition. Observe how the new information open up your ideas and understanding of the lesson plan, and compare your new lesson plan with the first one you have created in 3.1.

Example Prompts:

- Context-Dependency:** "Explore how the management of heart disease varies in different socioeconomic contexts. How does the availability of resources in a high-income area compare to a low-income area?"
- Multiple Perspectives:** "Discuss the treatment of heart disease from the perspective of a cardiologist, a public health professional, and a patient with limited healthcare access. How do their views on optimal care differ?"
- Concept Inter-Connectivity:** "Analyze how the concepts of health equity, access to care, and patient education are interconnected in managing chronic diseases. How does improving one aspect potentially impact the others?"
- Using Technology to Accelerate Experience Acquisition:** "How can digital health tools and AI be used to enhance patient education and self-management for individuals with heart disease, especially in underserved populations?"

[Upload your final plan here](#)

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.

T-A-G

TAG method: You can use the TAG method to create prompts for ChatGPT to generate content that requires a specific task, action, and goal.

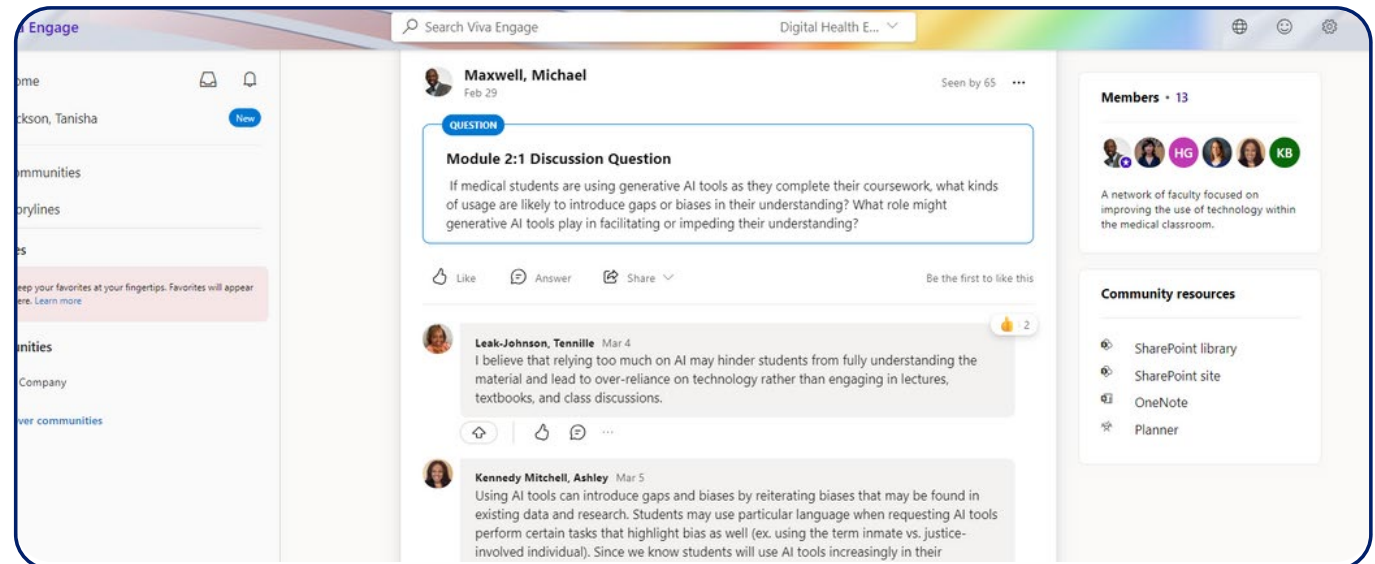
Task: you can ask ChatGPT to write a poem, a code, a story, or a review.

Action: you can ask ChatGPT to use rhyme, imagery, and metaphor for a poem, a summary, and a recommendation for a review.

Goal: you can ask ChatGPT to create feedback that is original, to create a story that is engaging, or to create a review that is informative and helpful.



By using the TAG method, you can create specific and meaningful instructions for ChatGPT that will help it to generate high-quality and relevant outputs for your needs. You can use the TAG method to create prompts for various topics 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

Ideas are Dimes a Dozen: Large Language Models for Idea Generation in Innovation

13 Pages • Posted: 2 Aug 2023

Abstract
Large language models (LLMs) such as OpenAI's GPT series have shown remarkable capabilities in generating fluent and coherent text in various domains. We compare the ideation capabilities of ChatGPT-4, a chatbot based on a state-of-the-art LLM, with those of students at an elite university. ChatGPT-4 can generate ideas much faster and **ChatGPT-4 generates ideas that are on average of higher quality** (as measured by post-hoc student surveys) and exhibit higher variance in quality. More important, **the vast majority of the best ideas as the pooled sample are generated by ChatGPT** and not by the students. Providing ChatGPT with a few examples of highly-rated ideas further increases its performance. We discuss the implications of these findings for the management of innovation.

Module 2 Pre-Assessment

- Hepatitis Lecture
- Antiarrhythmic Drugs lecture
- Patient health assessment vs Community Health assessment-similarities and differences
- Understanding Public Health Implications Guide
- Role of NTs in emotions
- Significance of Qualitative Data

TopicIdeaPromptsAITools

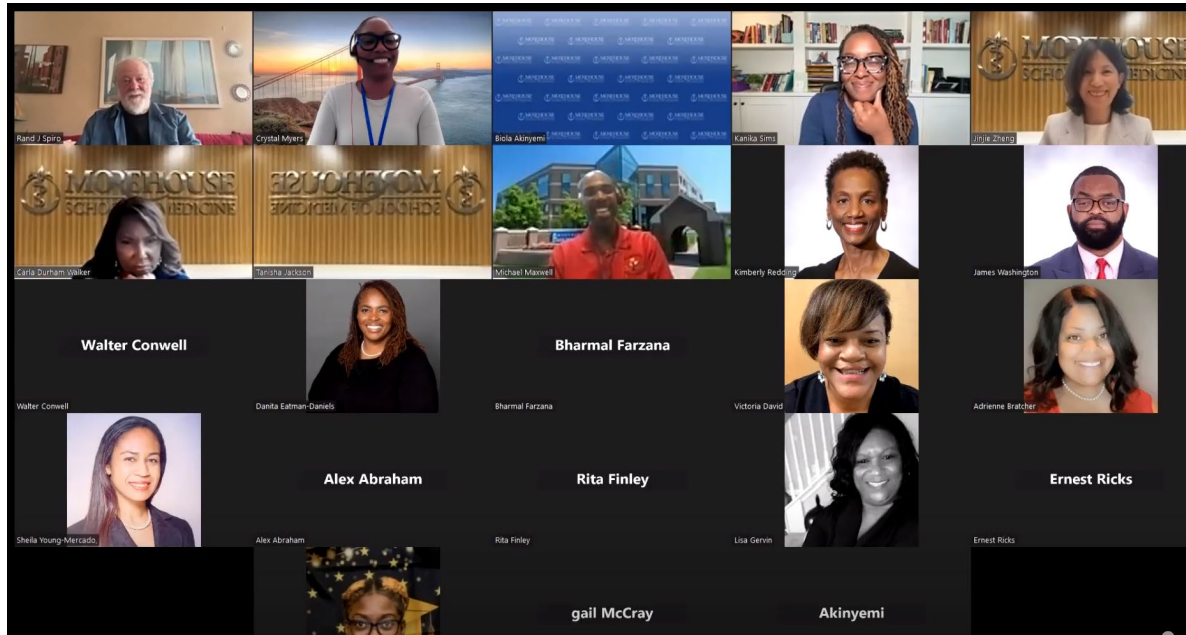


Prompt Engineering – Example – 1

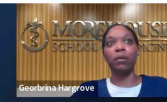
Scenario 1: Generating a Medical Research Summary

- 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

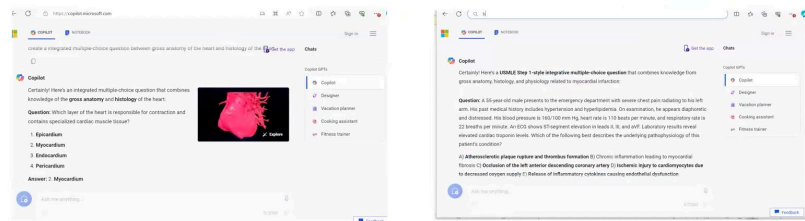
Synchronous Sessions: Faculty Scholars



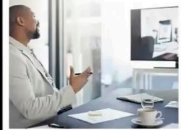
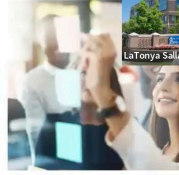
AI Tools: ChatGPT, CoPilot, and Gemini



- CoPilot:
 - Integrated MCQs.



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.

Creating Critical Thinking Activities with AI

ChatGTP Prompt:

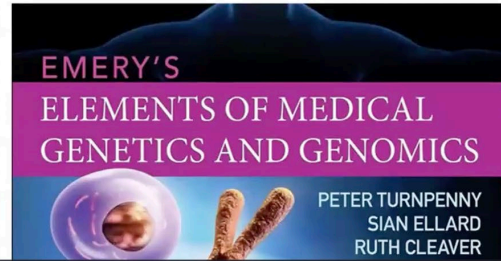
I am an assistant professor at a school of medicine trying to strengthen critical thinking skills for marginalized students seeking advanced degrees in biomedical science. List interactive activities that assist with integrating interdisciplinary knowledge and creating flexible thinking


1. **Case Studies Analysis:** Present students with complex medical cases that require them to apply and integrate knowledge from multiple disciplines such as biology, chemistry, physics, and mathematics. Encourage them to brainstorm possible diagnoses and treatment plans, considering various perspectives and approaches.
2. **Debates:** Organize debates on controversial topics in medicine, such as healthcare disparities, ethical dilemmas in research, or the role of socioeconomic factors in health outcomes. Assign students to argue different sides of the issue, challenging them to think critically about opposing viewpoints and strengthen their argumentation skills.
3. **Problem-Based Learning (PBL) Modules:** Develop PBL modules that simulate real-world scenarios encountered in biomedical research or clinical practice. These modules should require students to collaborate across disciplines to analyze data, identify problems, and propose innovative solutions.
4. **Interdisciplinary Workshops:** Invite guest speakers from diverse fields, such as public health, bioinformatics, or biomedical engineering, to lead workshops on their areas of expertise. Encourage students to actively engage with the material and explore connections between their own research interests and other disciplines.
5. **Team-Based Projects:** Assign interdisciplinary teams of students to work on research projects that address complex biomedical problems. Encourage collaboration and communication among team members with different backgrounds and expertise, fostering an appreciation for diverse perspectives and approaches.
6. **Role-Playing Scenarios:** Create role-playing scenarios where students take on different roles, such as healthcare providers, patients, policymakers, or researchers. This exercise can help students understand the complexities of healthcare systems and the diverse factors that influence health outcomes.

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

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.

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

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.

11

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

Hands On Synchronous Session

- 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

More Interaction in the Discussion from the Faculty



**POINT OF DEPARTURE:
TEACHING &
LEARNING WITH AI**

Limited Slots Available (25 - 30)
12 Hour Time Commitment





Hybrid Course
APRIL 29 - MAY 24, 2024

Connect Socially
Connect with faculty leaders to unlock innovative AI applications in teaching and productivity.

Functionality & Skills
Uncover the secrets behind Generative AI and its transformative powers.

Emotional Engagement
Experience the joy and intrigue of AI in academia. Gain the confidence to lead discussions and teach with AI.



GUEST SPEAKERS

 Dr. Melissa Forbes AI & Writing Expert	 Dr. Josef Brandauer AI & Policy Expert	 Dr. James Washington AI & Bias Expert	 Dr. Rand Spiro AI & Learning Expert
---	---	--	--

Course Highlights

- Scenario Exploration
- AI Tool Exploration
- Cross-Disciplinary Exchange
- Network with Peers

REGISTER NOW



This project is made possible by the NTIA grant "From Survivor to Innovator"

42

Participating Faculty Members



Generative AI, Cognition, and Learning

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

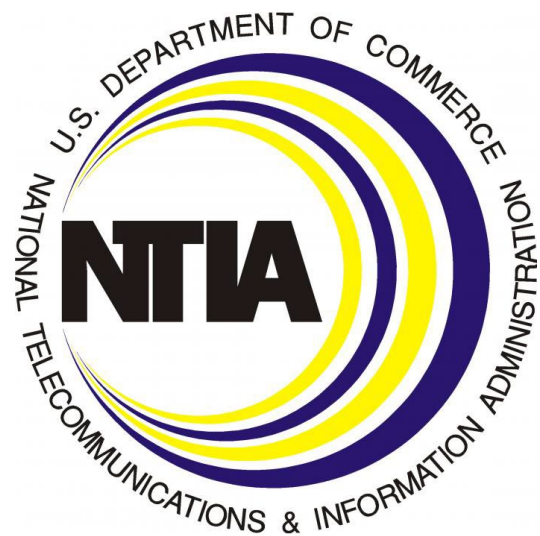
Generative AI and Healthcare Curriculum Integration

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

Generative AI and Student Engagement

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

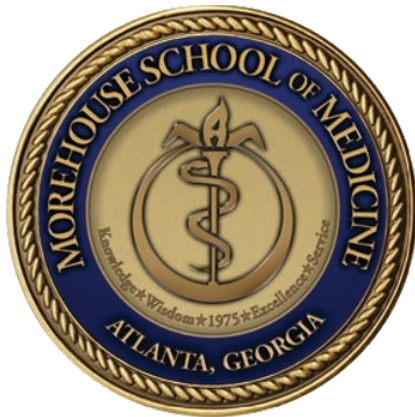
Faculty Project Presentation



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

A wireframe diagram of a space shuttle is overlaid on a background of Earth from space. The shuttle is oriented horizontally, with the nose pointing to the right. Labels in white text identify various components: 'PARACHUTE LANDING SYSTEM' on the left, 'HORIZON SENSOR' below the nose, 'ORBIT ATTITUDE CONTROL THRUSTERS (TYPICAL)' on the side of the main body, and 'RX' and 'L 234.05' near the tail. The background shows the curvature of the Earth with city lights and clouds.

AI in Medical Education

Nathan M. Cross MD MS CIIP
Neuroradiology, Clinical Informatics
Vice Chair of Informatics, Radiology
University of Washington, Seattle
nmcross@uw.edu



AI in Radiology

PubMed Artificial Intelligence AND ((Diagnostic Imaging[Mesh] OR (Radiography[MeS] X Search
Advanced Create alert Create RSS User Guide

Save Email Send to Sort by: Best match Display options

RESULTS BY YEAR 34,525 results Page 1 of 3,453

Artificial Intelligence

Year	Approximate Number of Publications
2017	100
2018	150
2019	200
2020	300
2021	450
2022	650
2023	900
2024	1100
2025	1000

RESULTS BY YEAR 21,075 results Page 1 of 2,108

Deep Learning

Year	Approximate Number of Publications
2017	100
2018	150
2019	200
2020	300
2021	450
2022	650
2023	900
2024	1100



Nathan M. Cross MD MS CIIP

AI @ UW Radiology

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



A technical wireframe diagram of a space shuttle is overlaid on a background of Earth from space. The diagram includes labels such as 'PARACHUTE LANDING SYSTEM', 'HORIZON SENSOR', 'STAGE', and 'SYSTEMS (TYPICAL)'. The shuttle is oriented horizontally across the middle of the frame.

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

Sources: [16][17] [18][19][20][21][22][23] view · talk · edit

		Predicted condition			
		Predicted Positive (PP)	Predicted Negative (PN)	Informedness, bookmaker informedness (BM) $= TPR + TNR - 1$	Prevalence threshold (PT) $= \frac{\sqrt{TPR \times FPR} - FPR}{TPR - FPR}$
Actual condition	Positive (P) ^[a]	True positive (TP), hit ^[b]	False negative (FN), miss, underestimation	True positive rate (TPR), recall, sensitivity (SEN), probability of detection, hit rate, power $= \frac{TP}{P} = 1 - FNR$	False negative rate (FNR), miss rate type II error ^[c] $= \frac{FN}{P} = 1 - TPR$
	Negative (N) ^[d]	False positive (FP), false alarm, overestimation	True negative (TN), correct rejection ^[e]	False positive rate (FPR), probability of false alarm, fall-out type I error ^[f] $= \frac{FP}{N} = 1 - TNR$	True negative rate (TNR), specificity (SPC), selectivity $= \frac{TN}{N} = 1 - FPR$
Prevalence $= \frac{P}{P + N}$	Positive predictive value (PPV), precision $= \frac{TP}{PP} = 1 - FDR$	False omission rate (FOR) $= \frac{FN}{PN} = 1 - NPV$	Positive likelihood ratio (LR+) $= \frac{TPR}{FPR}$	Negative likelihood ratio (LR-) $= \frac{FNR}{TNR}$	
Accuracy (ACC) $= \frac{TP + TN}{P + N}$	False discovery rate (FDR) $= \frac{FP}{PP} = 1 - PPV$	Negative predictive value (NPV) $= \frac{TN}{PN} = 1 - FOR$	Markedness (MK), deltaP (Δp) $= PPV + NPV - 1$	Diagnostic odds ratio (DOR) $= \frac{LR+}{LR-}$	
Balanced accuracy (BA) $= \frac{TPR + TNR}{2}$	F ₁ score $= \frac{2 \cdot PPV \times TPR}{PPV + TPR} = \frac{2 \cdot TP}{2 \cdot TP + FP + FN}$	Fowlkes–Mallows index (FM) $= \sqrt{PPV \times TPR}$	Matthews correlation coefficient (MCC) $= \frac{\sqrt{TPR \times TNR \times PPV \times NPV}}{-\sqrt{FNR \times FPR \times FOR \times FDR}}$	Threat score (TS), critical success index (CSI), Jaccard index $= \frac{TP}{TP + FN + FP}$	

https://en.wikipedia.org/wiki/Sensitivity_and_specificity



Education @ UW

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/Redit/...





Thank you!



nmcross@uw.edu

Scholarly Publishing Webinar Series

Improve your writing and learn how to successfully navigate the peer-review and publication processes

- Register for upcoming sessions
- View the recording, slides, and key takeaways from past sessions

aamc.org/publishingwebinar

Hosted by *Academic Medicine & MedEdPORTAL*



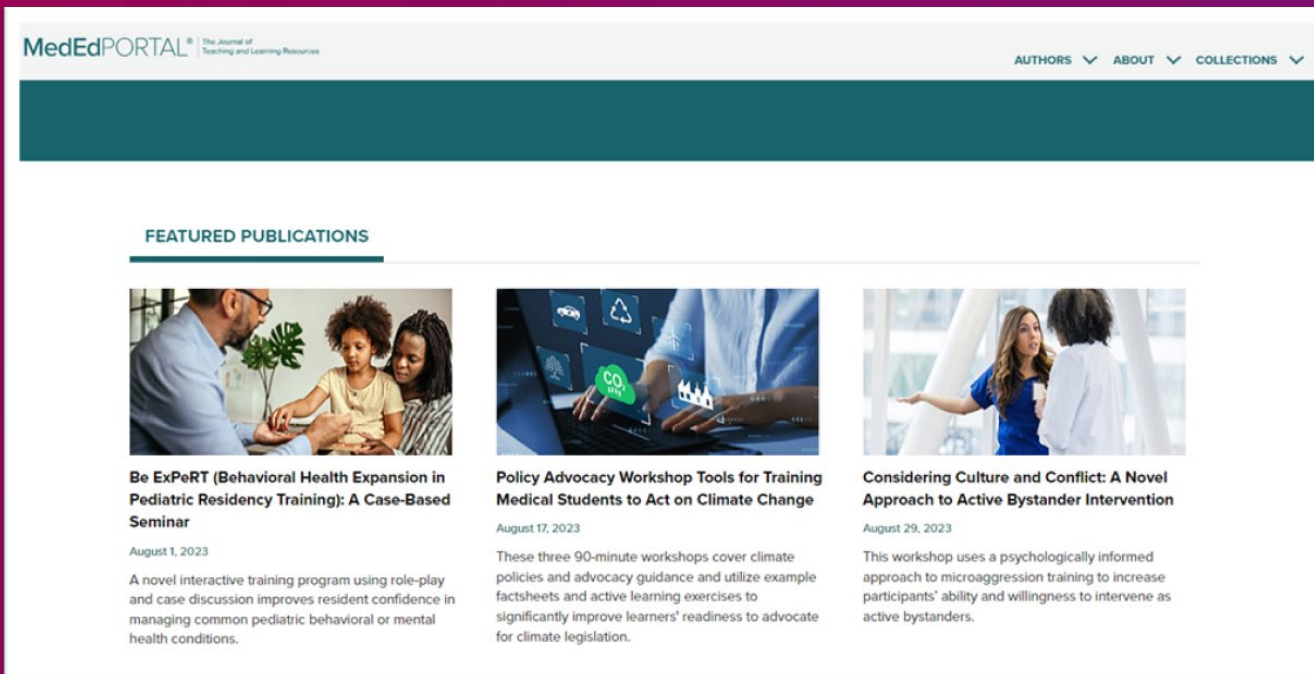
MedEdPORTAL®

The AAMC Journal of
Teaching and Learning Resources

MEDLINE-indexed journal

Open access: No fees to submit, publish, or
download. All materials are immediately available
upon publication

Author support: Creates access avenues for
diverse scholars, including trainees and faculty
historically underrepresented in medicine



The screenshot shows the MedEdPORTAL website homepage. At the top left is the logo "MedEdPORTAL® The Journal of Teaching and Learning Resources". To the right are navigation links: "AUTHORS", "ABOUT", and "COLLECTIONS". Below this is a dark teal header bar. The main content area is titled "FEATURED PUBLICATIONS" and contains three article cards. Each card has a representative image, a title, a date, and a short 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.

Submit, read, and learn more at mededportal.org

Follow us on  @MedEdPORTAL

Connect Beyond the Pages of Academic Medicine



@AcadMedJournal



Academic Medicine Journal



academicmedicineblog.org



Academic Medicine Podcast





**Get involved, advance your career, help
move the field of medical education
forward**

aamc.org/about-us/mission-areas/medical-education

**Make the AAMC Your Medical Education
Home**

Artificial Intelligence

Learn from Experts & Engage with Colleagues

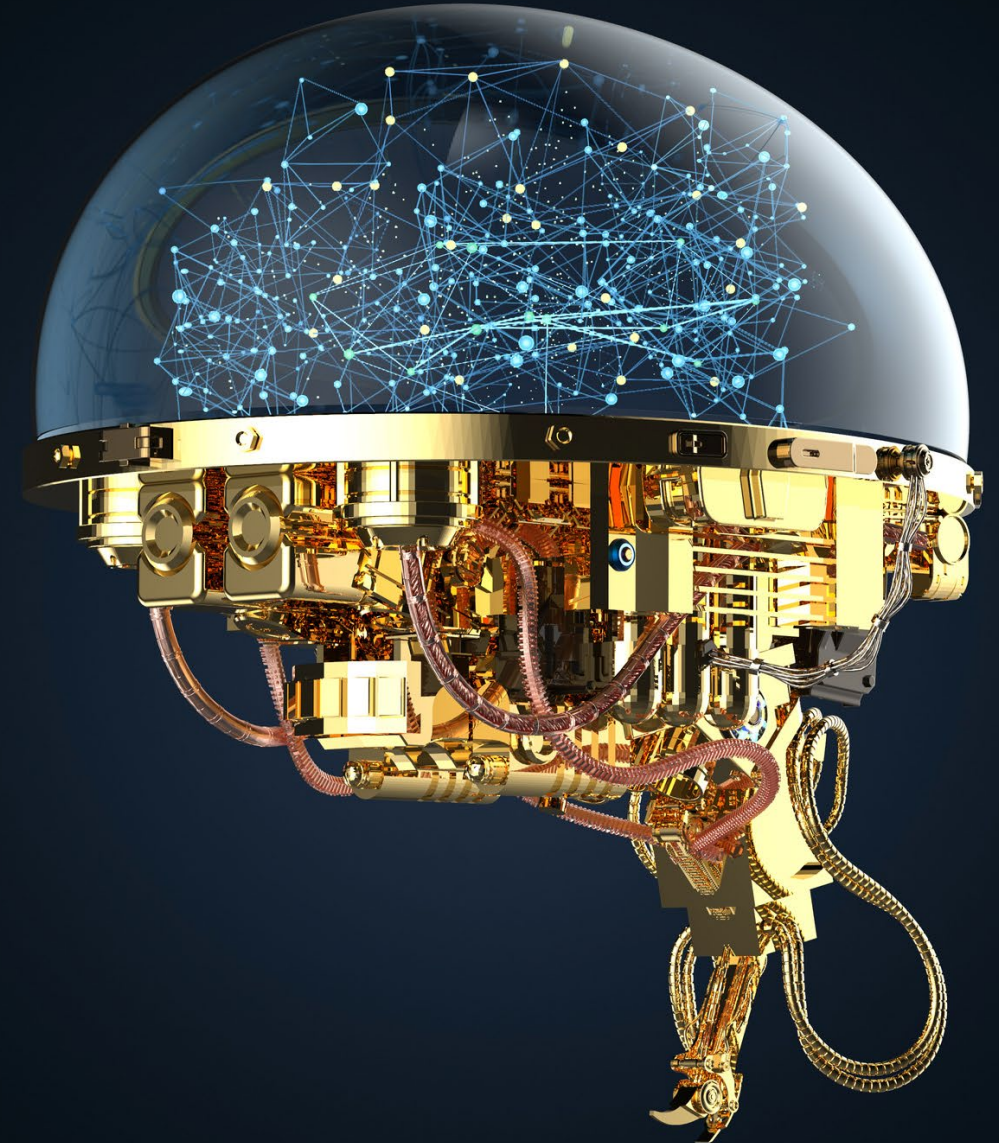
Check out our ...

- Webinar series
- Key resources collection
- Discussion threads



Check out our ...

- AI and Academic Medicine webpage



Upcoming AAMC AI Webinars

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.**

AAMC AI Resources

[AAMC AI Webinar Series](#)

[AAMC AI Resource Bundle](#)

[International Advisory Committee for Artificial Intelligence](#)

AAMC Center for Health Justice

- [Foundations for Responsible NLP Use for Maternal Health Equity](#)
- [Polling Snapshot: Artificial Intelligence - August 2023](#)

Join the AAMC Communities

Engage with colleagues through discussion threads, access useful resources, and network with peers on topics of interest in this free virtual communities network



communities.aamc.org

FIRST Program

Financial Information, Resources, Services, and Tools

Information and guidance about paying for medical school, managing money, and successfully repaying student loans



Assistance with navigating the complexities of paying for medical school.



Strategies to wisely manage student loan debt.



Resources & tools to expand financial literacy skills & knowledge of money management topics.



Education & support through onsite & virtual school sessions, webinars, publications & more.



aamc.org/first

Gain the Resources and Expertise to Achieve Organizational Transformation and Alignment

Interested in launching a strategic planning process or enhancing alignment between your research, education, and health care delivery missions? Explore Member Organization Solutions and the Aligned Institutional Mission Program.

Learn more

- aamc.org/mos
- aamc.org/aim





Careers in Medicine®

Choosing a specialty is one of the most significant decisions students will make.

We can help with resources for students and advisors.



AAMC StandPoint Surveys: 2023 State of Medical School Faculty Engagement – Now Available

Gain key insights into the most salient issues affecting faculty engagement in academic medicine, using data collected from ~ 18K full- & part-time faculty between January 2020 & December 2022.

Download your copy today.

aamc.org/facultyengagementreport



Thank you!