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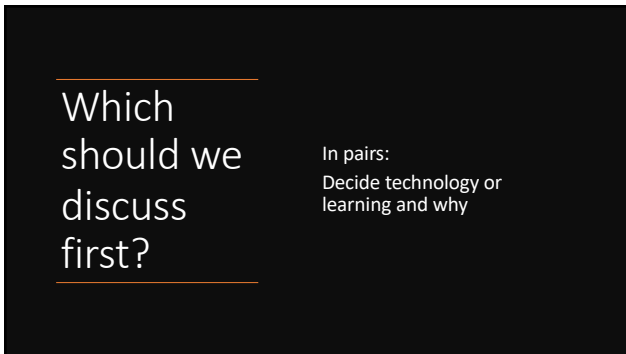
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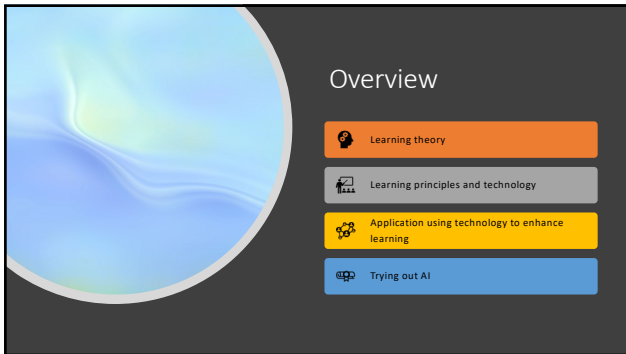
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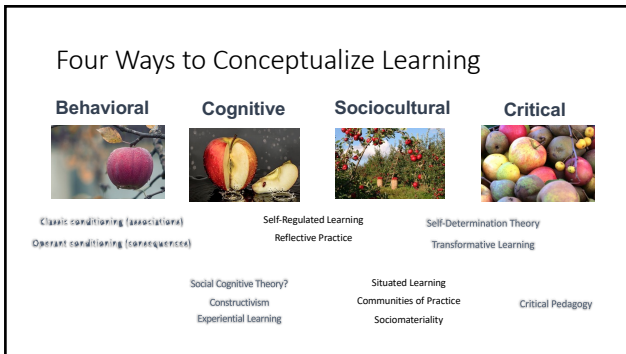
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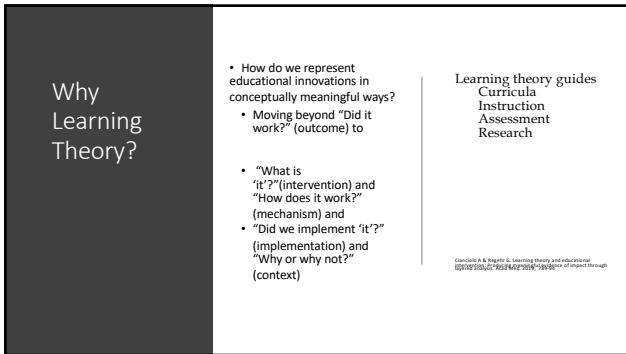
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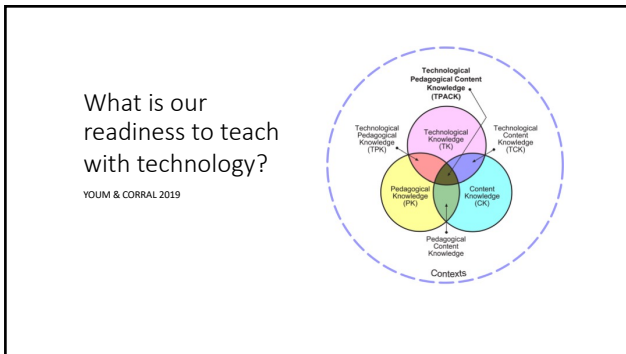
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Some technologies I thought of

- Electronic Health Record
- Smartphones
  - Apps
  - Polleverywhere
  - Text messages
- Simulation
  - 3D printed materials
  - Simulators
  - Virtual reality
- OR
  - Robot
  - Laparoscopic
- AI
  - Chatbots
  - Assessments
  - Standardized Patient Interaction
  - Literature searching

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And the most obvious technology, AI

Curriculum	Identify gaps, Design curriculum, Assignments Course components (e.g. syllabus, timeline, revised objectives)
Personalized learning/ Studying	Pre/post; compare closely related topics; analyzed patient scenarios, treatment plans
Feedback	Realtime feedback; structured feedback to written activities
Assessments	MQOs, OSPI/Practicals, grading clinical notes, essays, reflections
Content Creation	Teacher created cases, student care plans, images, comics, videos, music
Content Delivery	Simulated patients, virtual patient avatars

Basil M (2026) A scoping review of the use of generative AI in health professions education

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Literature Searching	Tools to implement Boyer's Framework		
	Tools	Functionality	Scholarly Activities
Discovery	PubMed	Create feeds specific to keyword searches and topics of interest	Open
	Intracader	Feed generator, review abstracts	Open upto 150 feeds, Subscription
Research Rabbit	Research Rabbit	Citation mapping tool amplified searcher	Open
	Scite	Provides supporting and disputing facts with smart citations	Open Subscription
Litmaps	Research Rabbit	Citation mapping tool to identify authors or other specialties	Open
	Litmaps	Provides mapping based on citations	Open- 20 searches Subscription
Integration	Connected Paper	Provides expanded search on a topic, provides prior and derivative citations	Open- 10 results/ month Subscription
	Consensus	Summarizes, performs initial literature review	Open- 10 results/ month Subscription
Application	Khanmigo	Takes notes and provides list of concepts from article collections and generates summaries	Open limited searches, Subscription
	NotebookLM	Creates podcast and lesson plans from articles	Open
Teaching	Open Evidence (OE)	Provides latest evidence on patient care management questions, suggests work up, and hand balance calculations	Open to health care professionals with license
	Custom GPT	Interactive GPT that can be tailored to needs of the learner	ChatGPT Subscription

Benjamin et al. (2025) <https://doi.org/10.1093/advances/knab001> Research, 4(7-6), 948-954.

Figure 2. AI tools to implement Boyer's Framework.

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Activity 1: Think of a way that technology could be used to enhance learning based on one of the evidence-based principle?

- Meet in small groups
  - Choose a principle from *How Learning Works*
- Complete the session worksheet as a group. Make sure to be clear about:
  - Technology application
  - How the technology enhances learning



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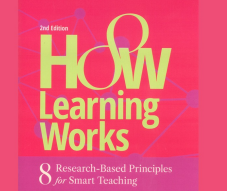
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### 8 research-based principles

1. Students differ from each other in multiple dimensions—for example, in their identities, stages of development, and personal histories—and these **individual differences** influence how they experience the world and, in turn, their learning and performance.
2. Students' **prior knowledge** can help or hinder learning.
3. How students **organize knowledge** influences how they learn and apply what they know.
4. Students' **motivation** determines, directs, and sustains what they do to learn.
5. To develop **mastery**, students must acquire component skills, practice integrating them, and know when to apply what they have learned.
6. Goal-directed **practice**, coupled with targeted **feedback**, enhances the quality of students' learning.
7. The **classroom environment** we create can profoundly affect student's learning, positively or negatively.
8. To become **self-directed learners**, students must learn to monitor and adjust their approaches to learning.

<https://facultydevelopment.kennesaw.edu/teaching-resources/teaching-essentials/eight-principles.php>



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### COMFORT WITH NEW TECHNOLOGY

#### DIFFUSION OF INNOVATION MODEL

WHICHES 15%	EARLY ADOPTERS 13%	EARLY MAJORITY 34%	LATE MAJORITY 34%	LAGGARDS 2%
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March 24, 2011— (Left to Right) Jackson Shanks, 4, plays "Little Things" on an iPad with his mother Jamie Donnelly, 33, of St. Louis Wednesday night while husband Anthony Shanks, 37, builds a puzzle with daughter Sadie Shanks, 1. "Little Things" is a search and find game for the iPad. For the Shanks' family the iPad is replacing television in many ways. They play games together as a family, they read books and watch television with the iPad. Dawn Majora [dmajora@post-press.com](mailto:dmajora@post-press.com)

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**ARTIFICIAL INTELLIGENCE**

- First seen in 1927 movie Metropolis
- "Simulation of human intelligence processes by machines"

Timeline: 2006 to 2026

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ACADEMIC MEDICINE 2020

AI HAS A LONG HISTORY OF BEING "THE NEXT BIG THING"...

Popularity vs. Time (1900-2020)

Timeline of AI Development:

- 1950s-1960s: First AI boom - the age of creating prototype AI developed
- 1970s: AI winter 1
- 1980s-1990s: Second AI boom: the age of knowledge representation (appearance of expert systems capable of replicating human decision-making)
- 1990s: AI winter 2
- 1997: Deep Blue beats Gary Kasparov
- 2006: University of Toronto develops Deep Learning
- 2011: IBM Watson wins Jeopardy!
- 2016: Go software based on Deep Learning beats world's champion

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AI, MACHINE LEARNING, LLM

Diagram illustrating the relationship between AI, ML, DL, Generative AI, and LLMs.

Artificial Intelligence (AI) contains Machine Learning (ML), which contains Deep Learning (DL), which contains Generative AI, which contains Large Language Models (LLMs).

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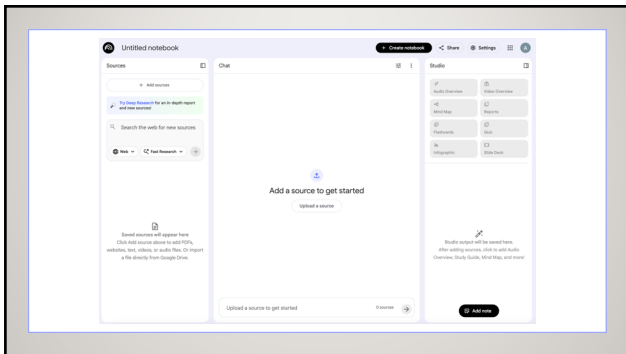
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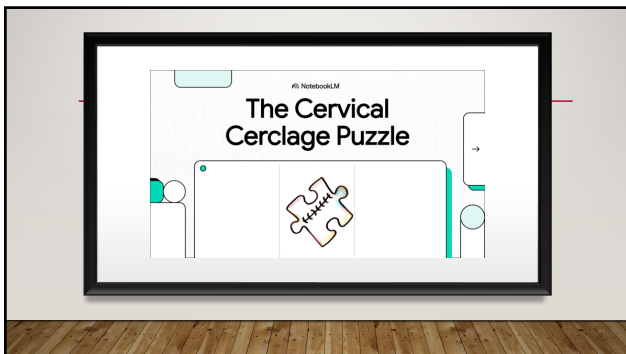
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### CLINICAL USE

- Retrieval Augmented Generation (RAG) model
- RAG = AI + Trusted source

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### Demonstration

OB Protocols Agent

INDIANA UNIVERSITY SCHOOL OF MEDICINE

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### Chatbot usage

Theme	Example Questions
Obstetric Terminology & Acronyms	What does PROM stand for; what does AROM mean; what is POPs; What is IV CDA
Fetal Assessments	How often to do growth ultrasounds; when to suspect fetal growth restriction; fetal growth percentile determination; different MCA Dopplers for monochorionic twins;
Management of preterm labor	when to give betamethasone; what is BMTZ; protocol for steroids in preterm labor; treatment for preterm labor; tocolytic for 33 weeks; first-line tocolytic at 28 weeks

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### THE LEARNING ENVIRONMENT

- "I feel prepared to care for pregnant patients on labor and delivery."
- "I felt supported by instructors and peers when making care related decisions."
- "I had the opportunity to discuss clinical cases with my supervisors."
- Statistically significant increase:
- "I feel confident in my clinical decisions on labor and delivery" (Post 3.84±0.61 vs Pre 3.44±0.96 (z=0.40; p=0.024))

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### ASSISTING WITH FIGURES

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### Bronchial casts from forest-fire smoke

Retraction: Bronchial Casts from Inhalation of Forest-Fire Smoke. N Engl J Med 2026;394:1634.

Authors: Yuting Wang, M.D., and Xianglong Ma, M.D. Author Info & Affiliations  
Published April 29, 2026  
DOI: 10.1056/NEJMc2605963 | Copyright © 2026

To the Editor: We were unaware of journal policies on image manipulation and had altered our submission by using an artificial intelligence (AI) tool to move the ruler to the top of the image. We therefore wish to retract our image and case report.<sup>1</sup>  
Yuting Wang, M.D.  
Xianglong Ma, M.D.

NOTES

Editor's note: Authors are required to disclose any use of AI tools and any changes made to images. Please consult our editorial policy at NEJM.org for details regarding the use of AI-assisted technology. (<https://www.nejm.org/doi/full/10.1056/NEJMc2605963>)

This letter was published on April 29, 2026, at NEJM.org.

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### AI IMPLEMENTATION IN MEDICAL EDUCATION

- JAMA 2020: AI-powered virtual patient sims improved diagnostic skills
- JMIR 2019: AI-powered virtual patient sims improved diagnostic skills
- J Ed Tech 2019: AI-powered virtual patient sims improved diagnostic skills
- J Med Sys 2019: AI-powered virtual patient sims improved diagnostic skills
- J Med Ed Cult 2019: AI-powered virtual patient sims improved diagnostic skills

DOUBLE  
CHECK

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### BIAS & SECURITY

SCHOOL OF MEDICINE			
PUBLIC	UNIVERSITY-INTERNAL	RESTRICTED	CRITICAL
<p>Data with no restrictions on access or usage</p> <p>Examples</p> <ul style="list-style-type: none"> <li>• Username and email</li> <li>• Campus map</li> </ul>	<p>Data intended only for the IU community</p> <p>Examples</p> <ul style="list-style-type: none"> <li>• University ID number</li> <li>• Faculty office letters</li> </ul>	<p>Data subject to contractual, legal or ethical restrictions</p> <p>Examples</p> <ul style="list-style-type: none"> <li>• Examiners</li> <li>• Basic contact information</li> <li>• Individual student/supervisor grades</li> </ul>	<p>Highly sensitive data with significant access restrictions</p> <p>Examples</p> <ul style="list-style-type: none"> <li>• Social Security number</li> <li>• Medical records</li> </ul>

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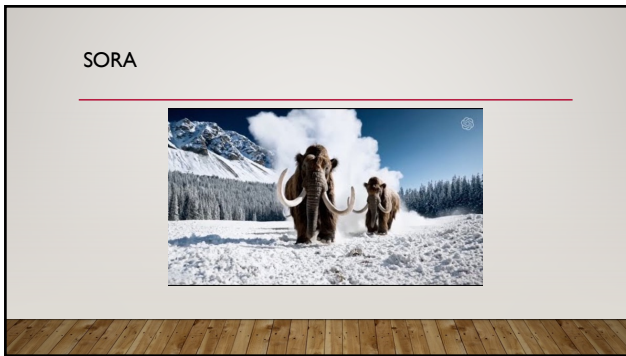
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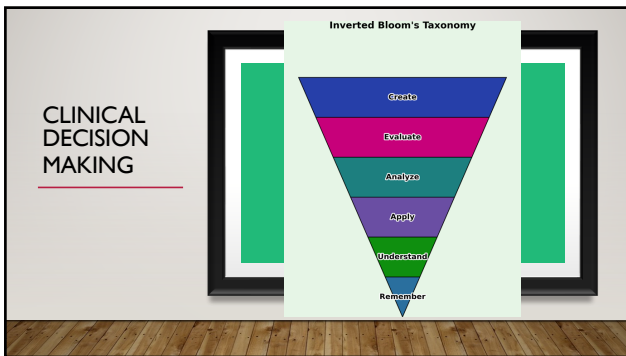
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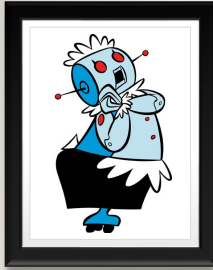
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### PROMPT ENGINEERING

- "Prompt" is the words that a user types
- Starting place for GenAI's computational decisions
- Default persona is "helpful information assistant". Specificity may be helpful.

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### PROMPT ENGINEERING TIPS

- GenAI has recency bias
  - Last thing typed = More important
- Temperature
- Reproducibility concerns



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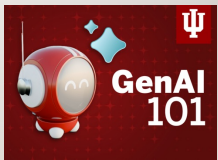
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### CORE FRAMEWORK

- Context – establishes role, background and scenario
- Output – defines format, length and tone
- Rules – set boundaries or constraints
- Example – illustrates desired structure and style



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**CONTEXT**

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- Enter this prompt: "Write a sample teaching philosophy"
- Now specify a role: "You are a faculty member in \_\_\_\_ department at an academic medical school going up for promotion and tenure. Write a sample teaching philosophy."
- What differences do you notice between the two outputs?

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**OUTPUT**

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- Specify: Provide format (length/style/genre) characteristics in your prompt
- Example formal characteristics instructions:
  - Return as a list of questions
  - Write 2-3 paragraphs or sentences
  - Use a word limit statement
  - Create a scenario where...

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**RULES**

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- Enter this or a similar prompt:
  - Write a newsletter including the following information:
    - Address the department of obstetrics and gynecology
    - Note the Resident Research day & Kudos for recent publication on medical image generation
    - Welcome new program coordinator
- New prompt: "Limit to 300 words". Now try "Limit to 100 words". Which do you prefer?
- BONUS:
  - Try adding a bullet with further information such as "Suggest topic for staff meeting discussion".

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### EXAMPLES

- Providing a previous example can help specificity
- Iteration is identifying areas for improvement then refining or extending the previous prompt to get desired output

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Create a multiple choice question about ultrasound in pregnancy.

**Copilot**

Here's a clear, high-quality multiple-choice question on ultrasound in pregnancy—useful for medical students or residents:

**Multiple-Choice Question: Ultrasound in Pregnancy**

Which of the following is the most accurate ultrasound parameter for estimating gestational age in the first trimester?

- A. Biparietal diameter (BPD)
- B. Femur length (FL)
- C. Crown-rump length (CRL)
- D. Abdominal circumference (AC)

**Correct Answer: C. Crown-rump length (CRL)**

**Explanation:**  
CRL is the most precise measurement for dating a pregnancy in the first trimester, typically accurate to within ±3.7 days. Other biometric measures such as BPD, FL, and AC are used later in pregnancy but have wider margins of error.

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I am a Maternal-Fetal Medicine physician working with OBGYN residents. Create 3 multiple choice questions with 4 choices. The questions should be at the level of a third year OBGYN resident. Use CREOG examples. Includes questions on preterm rupture of membranes, preeclampsia and postpartum hemorrhage.

**Copilot**

Here are three CREOG-style multiple-choice questions appropriate for a PGY-3 OBGYN resident, covering PPROM, preeclampsia, and postpartum hemorrhage. Each has 4 answer choices, the correct answer, and brief teaching pearls aligned with what you'd expect at the CREOG level.

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**2. Preeclampsia with Severe Features**


A 35-year-old G3P2 at 37 weeks presents with severe-range blood pressures (168/112 mmHg) and new-onset headache unrelieved by acetaminophen. Labs show: platelets 138k, creatinine 0.8, AST/ALT normal, and a urine protein/creatinine ratio of 0.9. Which of the following is the **next best step**?

A. Begin magnesium sulfate and proceed with delivery  
 B. Repeat labs and recheck blood pressure in 4 hours  
 C. Initiate antihypertensive therapy only  
 D. Administer betamethasone and expectantly manage

**Correct Answer: A. Begin magnesium sulfate and proceed with delivery**

**Teaching Pearl:**  
 At ≥34 weeks, preeclampsia with severe features warrants immediate delivery, regardless of cervical status. Magnesium sulfate is used for seizure prophylaxis, and antihypertensives should be administered for acute severe hypertension—yet delivery remains the definitive management.

**Prompt document**




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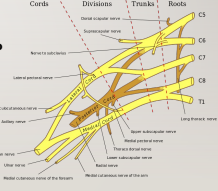
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**EXERCISE: WHAT TOOLS OR TECHNIQUES MIGHT IMPROVE THIS PROMPT?**

- Prompt: "Make a quiz on brachial plexus traction"
- **Context** – establishes role, background and scenario
- **Output** – defines format, length and tone
- **Rules** – set boundaries or constraints
- **Example** – illustrates desired structure and style




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**NEXT STEPS FOR LLMs:**



- Personalized tutoring/precision education
- Assessments – will have added importance
- Promote transparency
- Provide guidance

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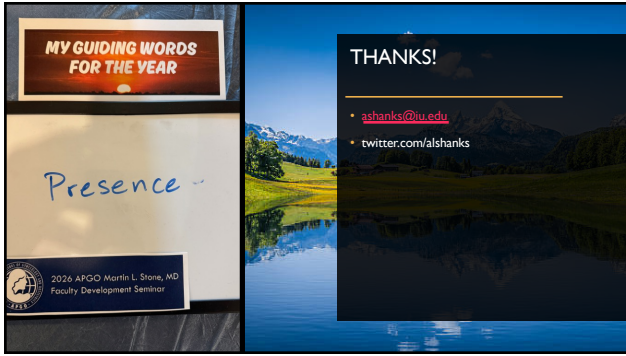
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