ARTIFICIAL INTELLIGENCE IN CLINICAL MEDICAL EDUCATION

Enhancing the Student and Preceptor Experience

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April 17, 2026

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4th Friday Preceptor Development Series

DISCLOSURES: NONE*
CONFLICTS: NONE

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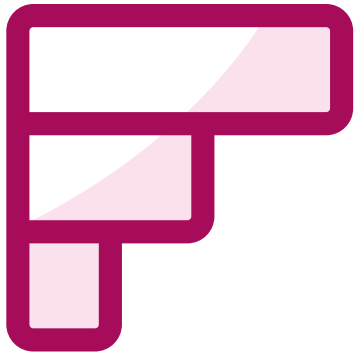
OBJECTIVE: 1. NAME AND DEFINE LEARNING THEORIES THAT AFFECT MEDICAL EDUCATION
2. IDENTIFY THE OPPORTUNITIES OF AI AS IT RELATES TO TEACHING MEDICAL STUDENTS
3. RECOGNIZE THE PITFALLS OF AI AS IT RELATES TO TEACHING MEDICAL STUDENTS
4. DEVELOP STRATEGIES TO UTILIZE AI AS IT RELATES TO TEACHING MEDICAL STUDENTS

What challenges are you facing to educating students?

CHANGING LANDSCAPE OF MEDICAL EDUCATION

- Explosion of medical knowledge
- Students trained in digital-first environments
- Increasing documentation burden
- Less bedside teaching time



What kind of learner are you?

LEARNING THEORY IN MODERN MEDICAL EDUCATION

- Constructivism: learners build knowledge through experience
- Cognitive apprenticeship: modeling expert reasoning
- Experiential learning (Kolb)
- Self-directed learning (Knowles)

EXPERIENTIAL LEARNING (KOLB) VS SELF-DIRECTED LEARNING (KNOWLES)

Kolb – Experiential Learning

- Learning through experience and reflection
- 4-stage cycle: Experience → Reflect → Conceptualize → Experiment
- Teacher designs meaningful experiences
- Common in simulations, clinical rotations, case learning

Knowles – Self-Directed Learning

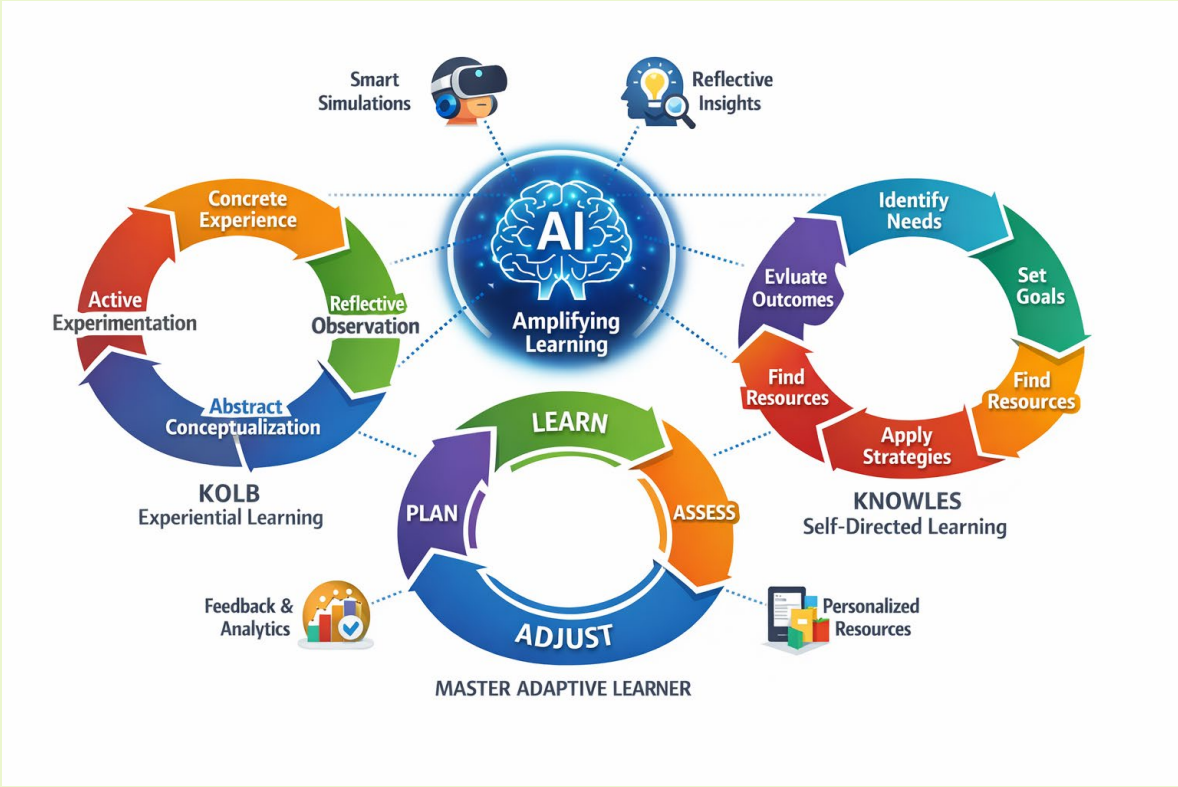
- Adults take responsibility for their learning
- Learner identifies needs and goals
- Finds resources and learning strategies
- Evaluates progress independently

LINKING KOLB & KNOWLES TO AI-ASSISTED LEARNING

- AI accelerates reflection in Kolb's cycle by providing immediate feedback after clinical encounters or simulations.
- AI tools help learners identify knowledge gaps, supporting Knowles' self-directed learning model.
- Adaptive AI tutoring systems personalize learning pathways based on learner performance.
- Clinical learners can simulate cases with AI, reflect, refine concepts, and re-apply knowledge quickly.
- AI acts as a 'cognitive coach,' augmenting metacognition and lifelong learning habits.

INTEGRATED LEARNING FRAMEWORK: KOLB + KNOWLES + MASTER ADAPTIVE LEARNER

Master Adaptive Learner (MAL): Plan → Learn → Assess → Adjust
Knowles contributes learner autonomy: identifying learning needs and goals.
Kolb contributes the experiential cycle: experience, reflection, conceptualization, experimentation.
AI enhances each stage: gap analysis, adaptive resources, simulation practice, and performance feedback.
Together they create a continuous professional learning loop for clinicians.



How comfortable are you using any form of AI?

LARGE LANGUAGE MODELS

- Neural networks trained on large text corpora
- Generate explanations, summaries, and reasoning dialogue
- Examples: ChatGPT, Claude, Gemini, Llama, Mistral
- Pitfalls: they are language models not "non-cognitive processors" nor "probabilistic engines”

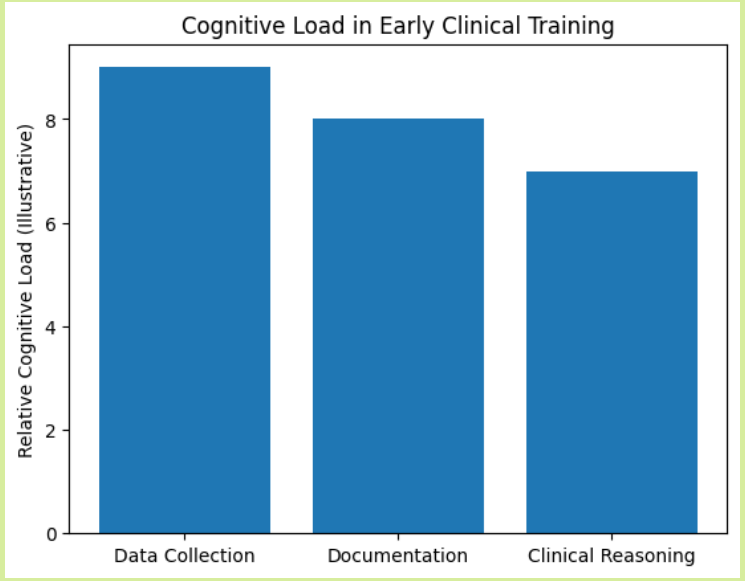
CLINICAL EVIDENCE AI TOOLS

- OpenEvidence: evidence synthesis assistant
- Doximity AI: workflow and documentation support
- Overlapping End User Experience
- Differing roles in clinical education

AI TRANSCRIPTION IN CLINICAL TRAINING

- Gain: Automated note generation
- Gain/Pitfall: Clinical encounter summarization
- Gain/Pitfall: Reduced documentation burden
- Gain: Improved learner focus on patient interaction
- Pitfalls:
  - overreliance on tools over skills
  - AI transcription Hallucination
  - tendency to include data that is not accurate
  - increased clinician review

COGNITIVE LOAD IN EARLY CLINICAL TRAINING

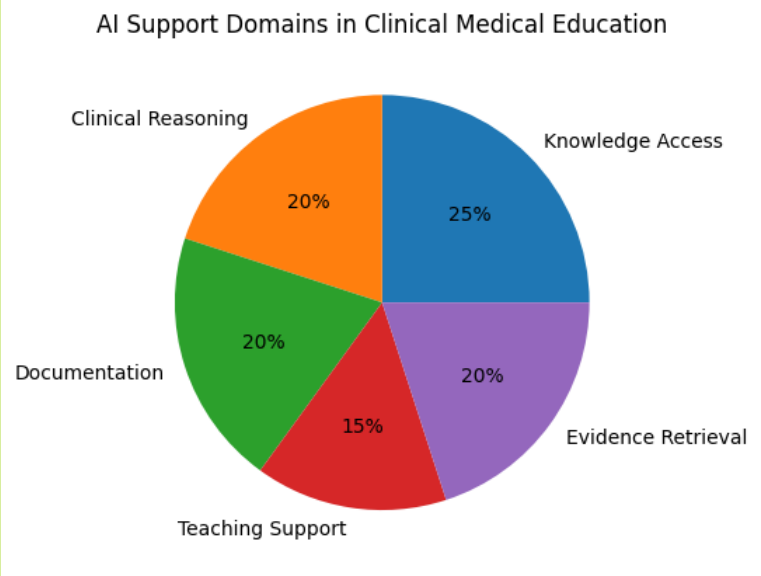


- Students must learn data collection and interpretation simultaneously
- Documentation requirements increase cognitive load
- AI tools can reduce transcription burden

NOTEBOOKLM AND AI LEARNING TOOLS

- AI-powered research assistant
- Generates summaries, quizzes, and study guides
- Grounds answers in uploaded documents
- Supports active learning

AI SUPPORT DOMAINS IN CLINICAL EDUCATION



- Knowledge retrieval
- Clinical reasoning development
- Documentation support
- Teaching augmentation
- Evidence synthesis

❖ Pitfall: students may skip the part where they learn how to do all of the above and may develop a false sense of skill

CLINICAL CASE EXAMPLE 1 – CHEST PAIN

- Patient: 54-year-old male with exertional chest discomfort
- Student obtains history and physical and then asks AI for differential diagnosis
- While AI generates prioritized differential list
- Preceptor reviews the case and verbalizes a differential list
  - Student and preceptor critiques AI reasoning

CLINICAL CASE EXAMPLE 2 – DIABETES MANAGEMENT

- Patient with uncontrolled Type 2 diabetes
- Student performs H&P and recognizes poorly managed disease then queries AI for guideline-based therapy
- Compare response with ADA recommendations
- Discuss medication selection and comorbidities

CLINICAL CASE EXAMPLE 3 – DIAGNOSTIC REASONING

- Young woman with fatigue and anemia
- Student explores differential with AI
- AI suggests iron deficiency, chronic disease, B12 deficiency
- Student uses clinical data to refine diagnosis

RISKS AND LIMITATIONS

- Hallucinated information
- Overreliance by learners
- Privacy considerations
- Need for critical appraisal
- Malpractice implications of we abdicate responsibility

FUTURE OF AI IN MEDICAL EDUCATION

- Personalized AI tutoring
- Real-time clinical evidence retrieval
- Improved clinical simulations
- Expanded teaching capacity

CURRENT USE OF AI IN MEDICAL EDUCATION *DISCLOSURES:

- Most of this presentation was created with ChatGPT via entering prompts
- Substantial reduction in burden of composition
- Allowed for rapid retrieval of models and rough draft writing
- Revisions correct and elevate to personal
- Final Draft was proofread by Gemini

Please share your thoughts on utilizing AI in the future of Medical Education?

THANK YOU

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Citations:

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