

Designing, Directing and Assessing Learning Experiences

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Entrustable Professional Activities (EPA)

EPAs are units of professional practice, defined as tasks or responsibilities to be entrusted to the unsupervised execution by a trainee once he or she has attained sufficient specific competence

- **Integration of knowledge, skills, attitudes**
- **Represent essential work of a discipline**

ten Cate. Acad Med 2007; 86: 542-547



Core Entrustable Professional Activities

- Gather a history and perform a physical exam**
- Prioritize a differential diagnosis following a clinical encounter**
- Recommend and interpret common diagnostic and screening tests**
- Enter and discuss orders / prescriptions**
- Document a clinical encounter in the patient record**



Core Entrustable Professional Activities

- Provide an oral presentation of a clinical encounter**
- Form clinical questions and retrieve evidence to advance patient care**
- Give or receive a patient handover to transition care responsibly**
- Collaborate as a member of an interprofessional team**



Core Entrustable Professional Activities

- Recognize a patient requiring urgent or emergent care and initiate evaluation and management**
- Obtain informed consent for tests and / or procedures**
- Perform general procedures of a physician**
- Identify system failures and contribute to a culture of safety and improvement**



Competency - definition

“ Professional competence is the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and the community being served”

Epstein and Hundert
JAMA 2002; 287:226-235



Competency

Competency is demonstrated when

- an individual's capabilities
- encounter tasks
- in a context (which may vary)

Competency is a Learner Outcome



Outcome-based Education

Outcome (competency) defines:

- Content
- Instructional methods
- Time allocation and sequence
- Learning strategies
- Assessment strategies



Outcome-based Education 3 key components

- 1) Communication of explicit learning outcomes and standards that must be achieved
- 2) Learning experiences designed and directed to facilitate the desired level of achievement of the learning outcomes
- 3) Assessment processes that ensure that individual students have achieved the learning outcomes and standards



Outcome-based Education Key Components

- 1) Communication of explicit learning outcomes and standards that must be achieved

Learning Objectives



Competency

Competency is demonstrated when

- an individual's capabilities
- encounter tasks
- in a context (which may vary)



Objectives – 3 Elements

- Behavior – What the learner should be able to do (Capability)
- Performance criteria – describe the criteria for acceptable performance (Task)
- Conditions – The conditions, if any, under which the learner is able to do it (Context)



Cognitive Domain

- Knowledge
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation



Progression of Cognitive Domain

- Fact
- Application
- Understanding



Psychomotor Domain

- Imitation
- Manipulation
- Precision
- Articulation
- Naturalization



Progression of Psychomotor Domain

- Imitation
- Practice
- Habit



Affective Domain

- Receiving
- Responding
- Valuing
- Organization
- Characterization (by Value Complex)



Progression of Affective Domain

- Awareness
- Distinction
- Integration



Achieving Competency

To achieve competency, learners must

- Acquire component knowledge, skills, attitudes
- Practice integrating knowledge, skills and attitudes to perform authentic (real world) tasks
- Understand when and how to apply knowledge, skills and skills and attitudes to authentic tasks in a variety of contexts (procedural knowledge)



Helping Learners Achieve Competency

- Deconstruct competencies or tasks into component knowledge, skills and attitudes
- Provide practice and feedback on both isolated skills and multiple integrated skills
- Discuss principles of application, and vary conditions and contexts for applying skills



Outcome-based Education Key Components

- 2) Learning experiences designed and directed to facilitate the desired level of achievement of the learning outcomes

Curriculum



“Our major problem is not what to teach,
it is how to teach it.”

Charles William Eliot
President, Harvard University 1869



Evidence-Based Education

We should integrate existing knowledge from the neurobiology and science of learning into the design of learning experiences and the curriculum

Acad Med 2011;86:415-420



Goals of Learning

What do we want students to do with the knowledge, skills, and attitudes they learn?

- 1) Remember → Retention
- 2) Use to solve problems → Application
- 3) Apply in new situations → Transfer



Goals of Learning

What do we want students to do with the knowledge, skills, and attitudes they learn?

- 1) Retention → Memory
- 2) Application → Construction of knowledge
- 3) Transfer → Construction of knowledge



Working Memory and Learning

2 criteria determine whether or not cognitive processing of information in working memory results in long term memory

- Sense – Does this make sense? Does this fit with my understanding?
- Meaning – Will this be useful or relevant? Will I use this?

Meaning is most important



Prior Knowledge Determines Sense and Meaning

The learner must connect new information to prior knowledge and experience to determine if it makes sense and has meaning



Prior Knowledge and Experience

Knowledge consists of an amalgam of facts, concepts, models, perceptions, beliefs, values, and attitudes that influence how students filter and interpret new information



Activate Relevant Prior Knowledge

Teachers activate relevant prior knowledge by

- Prompts
- Questions
- Summarize relevant prior knowledge
- Explicitly link prior knowledge to new material
- Critical thinking with prior knowledge exercises



Learning – Construction of Meaning

- Learning involves the active construction of meaning
- Meaning is constructed by making multiple connections between the information being acquired and prior knowledge and experience
- Meaning is not transmitted by instruction, it is created by the learner's cognitive activities



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Active Learning

“Learning results from what the student does and thinks and only from what the student does and thinks. The teacher can advance learning only by influencing what the student does to learn”

**Herbert A. Simon
1978 Nobel Prize in Economics
Carnegie Mellon University**



Active Learning and Retention

The more actively involved a learner is in learning activities:

- **the greater the sensory input**
- **more processing is required**
- **larger knowledge representation (storage)**



Retention and Involvement

We remember

- 10% reading
- 20% listening
- 30% seeing pictures

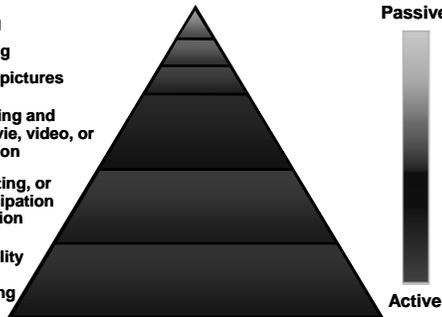
50% observing and hearing movie, video, or demonstration

70% presenting, or active participation in a discussion

90% high fidelity simulation, teaching, doing

Our involvement

Passive



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**“Tell me, and I will forget.
Show me, and I may remember.
Involve me, and I will understand.”**

Confucius 430 B.C.



Understanding

“What is important is not just the ‘performance’, but the understanding of why they are doing what they are doing, and what they are learning from it.”

Keith Morrow



Understanding

Students may know facts and concepts but not know how or when to apply them

Students can often perform procedural tasks without being able to articulate a clear understanding of what they are doing or why they are doing it



Understanding

“Understanding is being able to carry out a variety of actions or "performances" that show one's grasp of a topic and at the same time advance it. It is being able to take knowledge and use it in new ways”

“Understanding is the ability to think and act flexibly with what one knows”

Harvard Teaching for Understanding



Active Learning and Understanding

- Understanding is an interpretive process in which students must actively participate
- Understanding enables transfer of learning to new situations
- Understanding is a "flexible performance capability”



Student Centered Active Learning

“The process of building mental models of whatever is being learned, consciously and deliberately testing those models to determine whether they work, and then repairing the models that appear to be faulty”

Michael and Modell 2003



Active Learning Strategies

Engage the learner in the higher order thinking skills

- Application
- Analysis
- Synthesis
- Evaluation
- Creation



Active Learning Methods

- Problem-Based Learning
- Team-Based Learning
- Case Method Teaching – Discussion
- Application of Knowledge Exercises
- Simulations
- “Debriefing”



Social Construction of Meaning

- Making sense of the world and constructing meaning is facilitated by interpersonal communication and learning in groups
- In groups, learners discuss, elaborate and refine their conceptual understanding by exploring the views of others
- Role models – professional behaviors
- Culture – authentic learning activities



Knowledge Structures

Learners connect between bits of information to form knowledge structures

Knowledge structures that are accurate and meaningfully organized facilitates retrieval and application

Usefulness of knowledge structures depends on how well matched they are to support the requirements of the desired task



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Novice vs Expert Knowledge Structures

Novices have sparsely connected, superficial knowledge structures

Experts have densely interconnected facts, concepts, skills and understandings in richly meaningful knowledge structures



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Novice vs Expert Problem Solving

- Novices attempt to make connections and consider a wide range of random options
- Experts quickly recognize features and patterns and consider a very select set of high quality options
- Experts spend time assessing the pros and cons of high quality options
- Experts can very flexibly use multiple knowledge structures



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Problem Solving

- When learners are given solved problems and asked to explain the solutions, they learn the principles that guide the solution
- Guiding learners through analogical reasoning helps them make connections and see relationships
- Analyzing contrasting cases develops more elaborate and flexible knowledge structures



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Helping Learners Organize Knowledge

- Provide the “big picture” or framework of key concepts and relationships
- Ask students to categorize or organize knowledge for different purposes
- Use exercises, problems or cases that compare and contrast key concepts



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Practice at Retrieval

“Practice at retrieval” – the learner accesses memory to retrieve information

- Information that is frequently retrieved becomes more easily retrievable
- Practice at retrieval is the single most important variable in promoting long term retention, application and transfer



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Practice at Retrieval

- Time - space practice over longer intervals of time “*Distributed practice*”
- Context - alter the context for retrieval to increase transfer to new situations
- Testing - tests improve retrieval of information but only for information that was recalled for the test

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Learning and Context

“It is a safe rule to have no teaching without a patient as a text, and the best teaching is taught by the patient himself.”

Sir William Osler

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Patients as Cases

Patients or (Cases) are the “unit” of :

- Clinical work
- Clinical teaching
- Consultation
- Continuing education
- Clinical examinations
- Clinical memory – expertise

Cox. Med Ed 2001; 35, 862-866

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Case-based Teaching

Case-based teaching

- a meaningful problem
- that requires authentic action on the part of the learner
- in the process of understanding
- and resolving the problem.

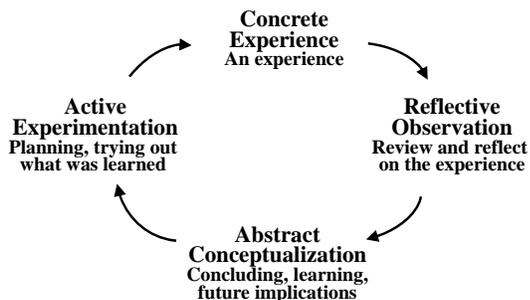
Challenge learners with cases that create cognitive dissonance

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Experiential Learning

(Reflective Thought and Action)



Kolb

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Implication for Curriculum Design Experiential Learning

- Encourage questions
- Ask probing questions for critical thinking
- Explain why answers are not correct
- Encourage self-assessment and reflection
- Provide formative and summative feedback
- Coach

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Experience

- Experience alone can be a poor teacher
- Experience with formative and corrective feedback (“guided or deliberate practice”) is the best teacher

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Deliberate Practice

- Identify well-defined task
- Appropriate level of difficulty
- Informative feedback
- Opportunity for repetition
- Opportunity to correct errors

Ericsson. Psychological Review. 1993

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Clinical Education

“ Health Professions students and their faculty should learn in clinical settings that reflect the best achievable patient care”

AAMC Institute for Improving Clinical Care

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Exemplary Clinical Education

- Active, experience-based learning
- Interdisciplinary teams, collaboration
- Learning in context of meaningful work
- Teachers as coaches
- Reflection

Interdisciplinary Professional Education Collaborative
Academic Medicine 1996; 71(9): 973-978

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Outcome-based Education Key Components

3) Assessment processes that ensure that individual students have achieved the learning outcomes and standards

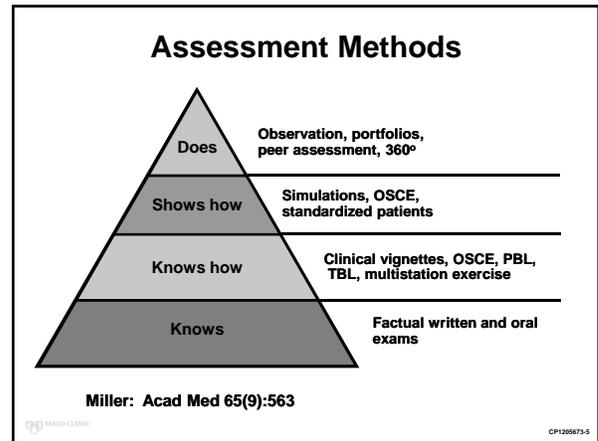
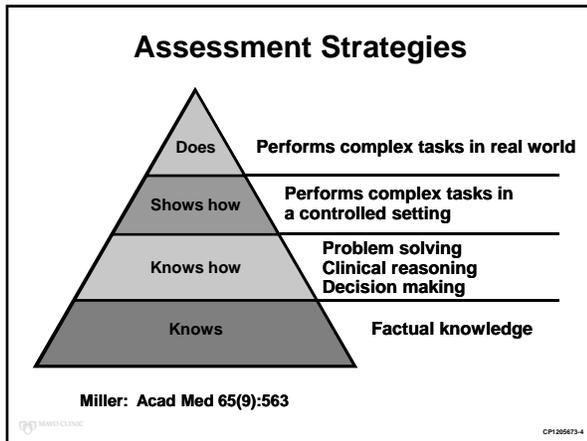
“Assessment drives learning”

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Framework for Assessment

Miller: Acad Med 65(9):563

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Formative Assessment

3 components of Formative Assessment

- **Constructive feedback**
- **Direction to facilitate desired learning**
- **Encouragement to create a supportive learning environment**

Self-Regulated Professional

As educators, we should:

- engage our learners in **self-assessment**
- encourage **self-direction**
- foster the development of **self-regulation**

Faculty mentors should model these behaviors and help develop these skills

Mentoring for Self-Regulation

- **How are you doing in school? How are you progressing on your goals? (self-assessment)**
- **What opportunities for improvement have you identified? (self-direction)**
- **What plans do you have for working on these improvement opportunities? (self-regulation)**
- **Provide feedback from actual performance and progress on previous self-improvement plans. Provide direction as appropriate.**
- **How can we help? (support)**

Modeling Behavior

“Learning by observing and imitating experts in the culture is a powerful social learning mechanism”

Meltzoff

Faculty as Role Models

- **Faculty are role models in an apprenticeship system**
- **We must be what we want our students to become**

