

The ScholarRx Approach to Teaching:

Special Topic: CBME and Pre-Clerkship Education
in the Foundational Sciences





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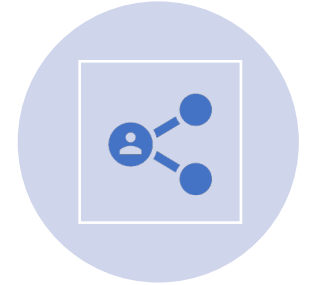
Education platform
providing integrated
teaching and learning
modalities



INSTRUCTIONAL
CONTENT



CONTENT
CREATION



SHARING



PERFORMANCE &
ANALYTICS



ASSESSMENT



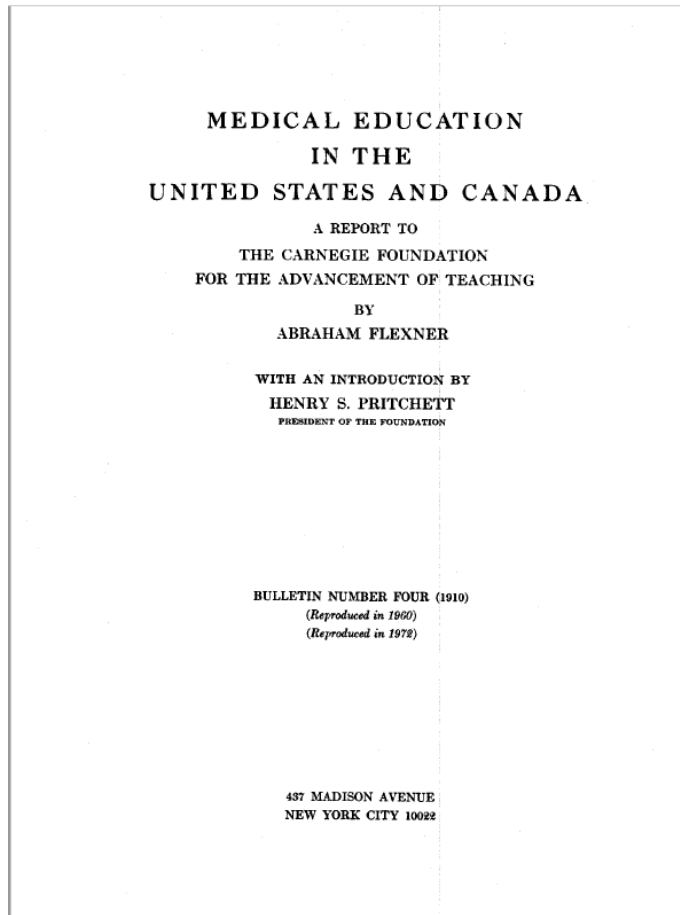
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CBME and Pre-Clerkship Education in the Foundation Sciences

Definitions:

- **CBME:** Competency-based medical education
- **Pre-clerkship:** Prior to required clerkships
 - Generally:
 - Basic science education
 - Doctoring
 - Population Health and Epidemiology
 - Generally: Before required “core” clerkships
- **Foundational Sciences:**
 - Basic Sciences
 - Health Systems Science

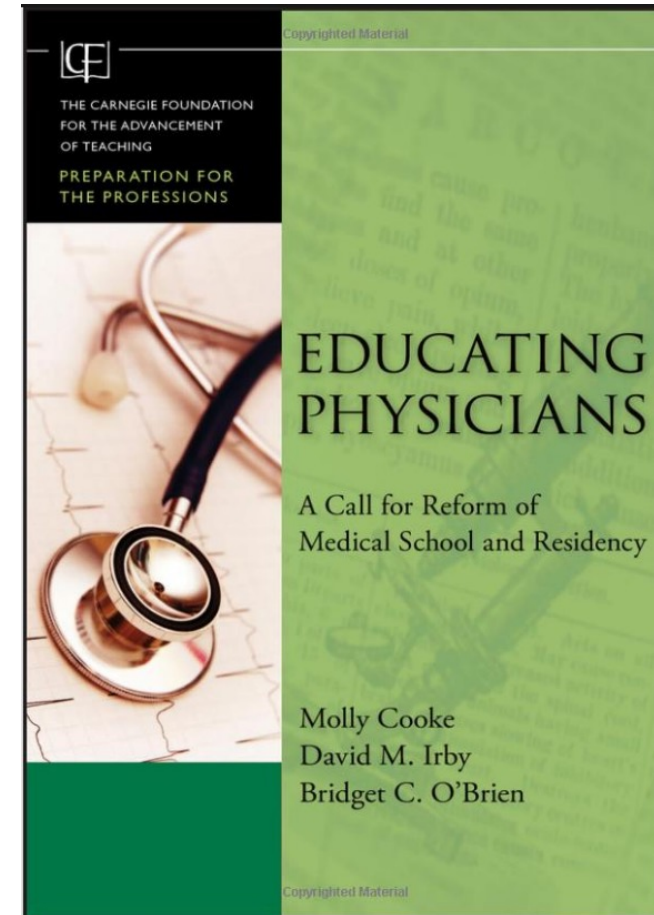
Historical Change in Medical Education



Flexner Report

1910

2010



Cooke Report

Summary of (some of the) recommendations

- Set clear, progressive expectations for learning outcomes, and assess competencies over time.
- Closely connect formal knowledge and clinical experience, including provisions of early clinical immersion and later revisiting of the sciences.
- Examine diseases and clinical situations from multiple perspectives.
- Create collaborative learning and practice environments committed to excellence and continuous improvement.

Conclusion: Learners and faculty need to be able to tell how well they are progressing toward the educational objectives.

Transition to CBME

- Tradition:
 - Define a curriculum, teach it, and the student “learns” the curriculum
- Change:
 - Outcome is important:
 - It doesn’t matter where the learner gained the knowledge, skills, or attitudes (KSAs). Demonstrating achievement of the outcome is the most important.
 - Abilities is important:
 - Competencies are the organizing principle for a curriculum.
 - Time is less important:
 - Learners need to demonstrate skills and abilities.
 - Learner centeredness is important
 - Make the learner responsible for their learning.

Purpose of CBME

- “Identifying, defining and communicating the skills and qualities we want doctors to have [are] fundamentally important.” (Harden et al., 1999)
- “competency-based medical education” is “[a]n outcomes-based approach to the design, implementation, assessment, and evaluation of medical education programs, using an organizing framework of competencies.” (Frank et al., 2010)

What is a competency?

An observable ability of a health professional, integrating multiple components such as knowledge, skills, values, and attitudes.

Frank et al., 2010

A statement describing a specific ability, or set of abilities, requiring specific knowledge, skill and/or attitude. Competencies are used to set performance standards that must be met.

MedBiquitous, 2016

Competency is the set of skills and behaviors required in the performance of a task or activity within a specific context.

IEEE, 2022

Recommended Practices for Well-Defined Competencies Workgroup

What is competence?

- The array of abilities (knowledge, skills, and attitudes) across multiple domains or aspects of performance in a certain context. Statements about competence require descriptive qualifiers to define the relevant abilities, context, and stage of training. Competence is multi-dimensional and dynamic. It changes with time, experience, and setting.

Frank et al., 2010

- The level of ability required to perform a task or activity.

IEEE, 2022

Thus, “competent” is:

Possessing the minimum required abilities in all domains in a certain context at a defined stage of medical education, training, or practice.

Frank et al., 2010

Essential Corollary

- There must be evidence of achieving competence for every competency listed.
 - For every listed competency, there must be a statistically valid demonstration of achieving competence.

Comparison between Learning Objectives and Competencies

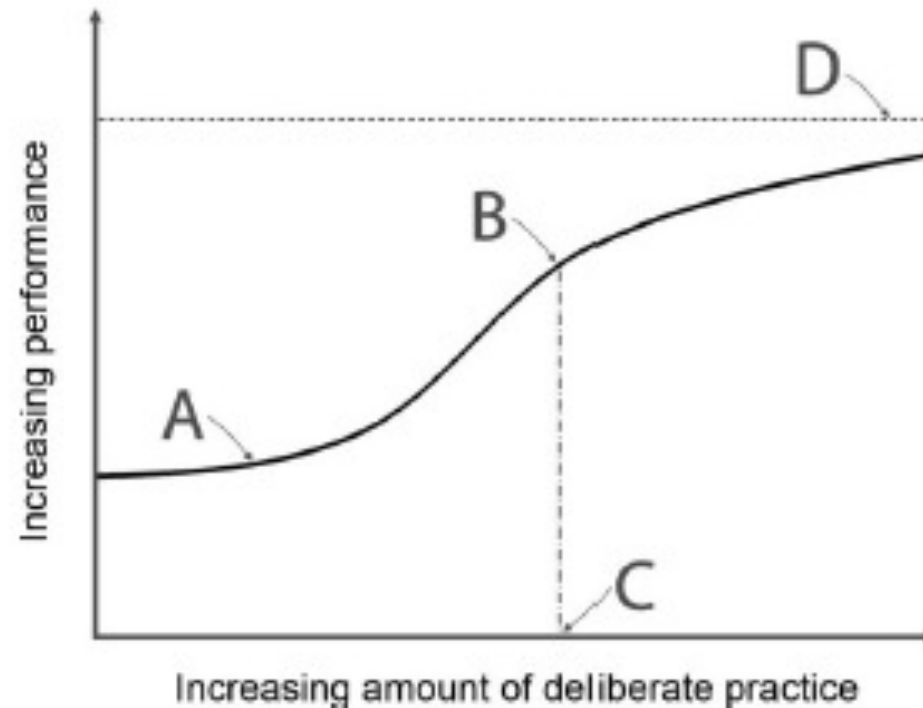
Learning objectives

- Founded on Bloom's Taxonomy
 - Verbs used to describe expected achievement.
 - Based on a specific (or set of) learning experiences.
- What the learner is expected to learn
 - Achieving the learning objective is the goal
 - Evidence is typically based on one observation
 - Not always assessed
- Time dependent (e.g., by the end of the session, you will)

Competencies

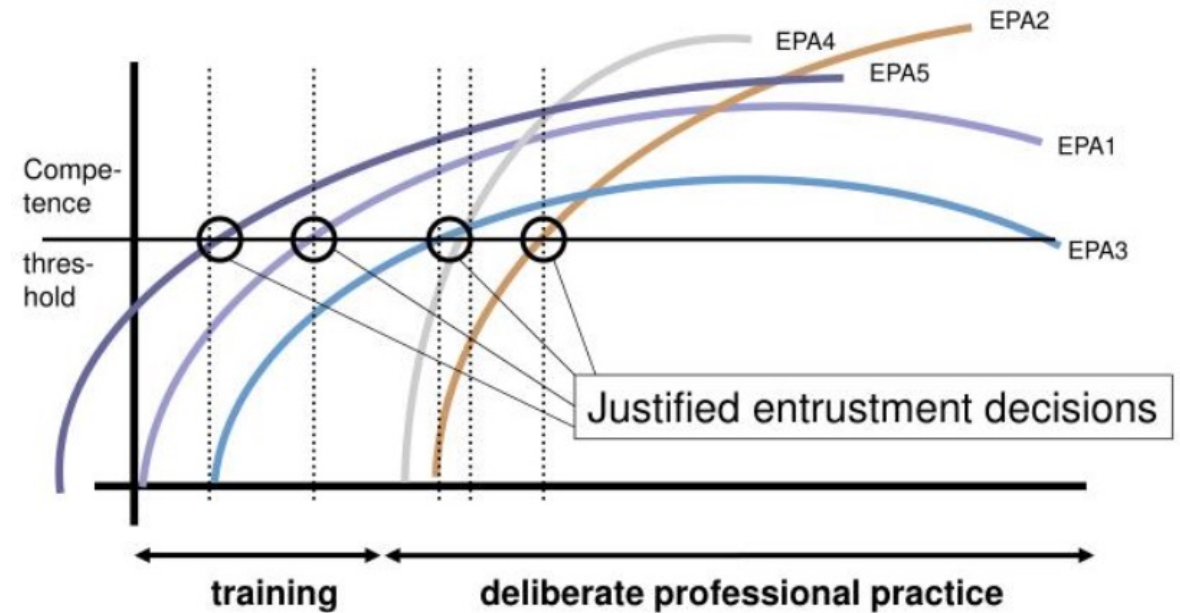
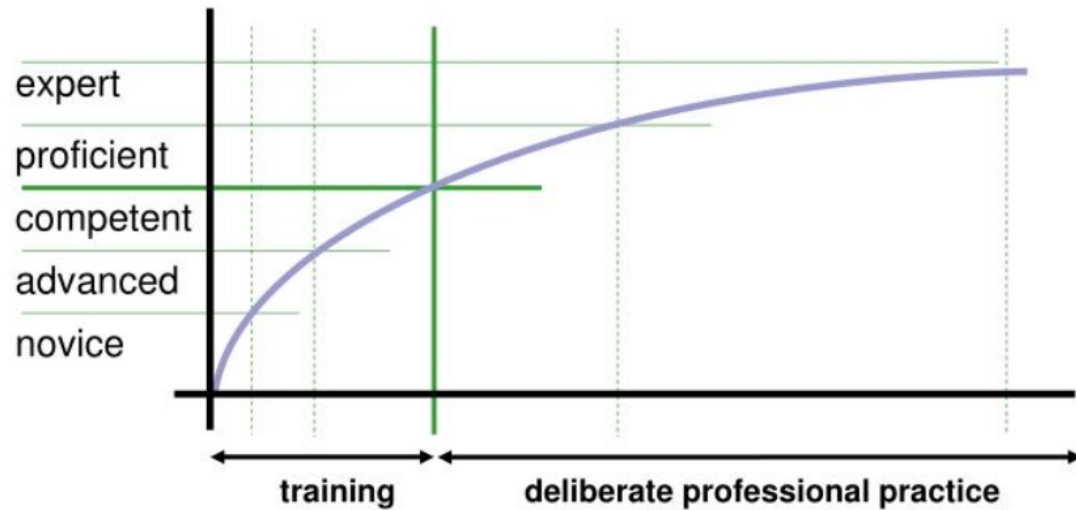
- Based on learning curves
 - Levels are set along a learning curve
 - Demonstration of the outcome can come from any learning experience (formal or informal)
- What the learner can demonstrate
 - The minimum required for competence ("passing")
 - Evidence is observed multiple times
 - Must be assessed
- Time independent
 - Just means that learners should learn at their own pace.
 - Doesn't mean that a time limit cannot be set.

Thurstone Learning Curve



This curve illustrates a measure of performance graphed against time spent learning. Point A is the amount of practice before a learner reaches the efficient phase of learning. The slope from A to B represents the most efficient phase of learning. Point C is the number of repetitions required to reach a level of performance after which learning becomes less efficient. Line D is the upper asymptote representing maximal performance.

Learning Curves over Time



Note: While these figures refer to EPAs, the concept of learning curves are equally applicable to competencies.

Modified from ten Cate, 2010
Based on Dreyfus & Dreyfus, 1986

Comment on Entrustable Professional Activities (EPAs)

- EPAs are units of professional practice that constitute the daily practice of health care professionals.
- EPAs are work descriptors and only reflect the work, tasks and activities that are to be carried out in health care irrespective of who does that work.
- EPAs refer to work that must be done; Skills and individual competencies are attributes of individual people.
- While we can add “nested” EPAs (European) or “milestones” (US-GME) as “steps along the way,” an EPA still needs to address a work/job activity (not individual KSAs).
- Ergo, foundational science knowledge are competencies, not EPAs.

Competencies in EPAs

	EPA 1	EPA 2	EPA 3	EPA 4
Competency 1	X		X	X
Competency 2		X	X	X
Competency 3	X	X	X	X
Competency 4		X		
Competency 5		X	X	
Competency 6	X		X	X

Ma and ten Cate, 2022

- Just because an individual has all the competencies of an EPA, it does not mean that the person can perform the EPA.
- Just because an individual can perform the activity of the EPA, it does not mean that person can be trusted to perform the activity unsupervised.

Conclusion on EPAs

- Foundational science knowledge are competencies, not EPAs.
 - They are not professional activities.
 - They are not activities we trust a learner to do unsupervised.

Challenge of applying to the Knowledge Domain in Foundational Sciences

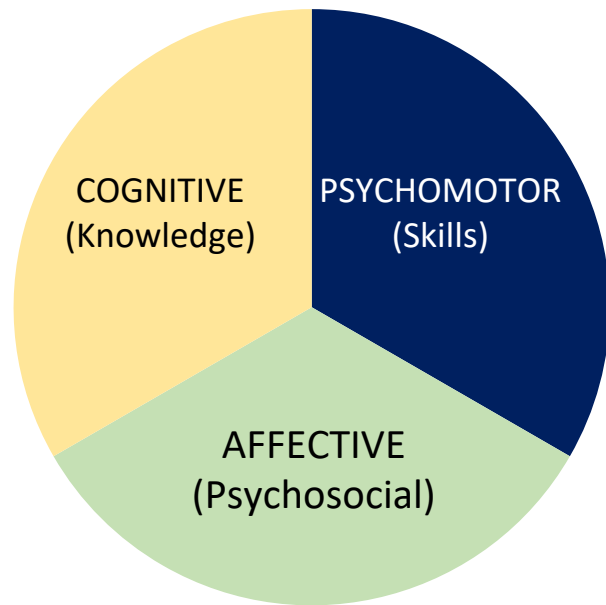
Change of mindset is required:

- Should be looking at progress in learning.
 - Collect and analyze data about the progress of learning in each learner.
 - Focus is more on formative assessments.
 - Assessments are a means of learning and providing feedback.
- Data needs to be collected for every competency.
 - Conclusion must be statistically valid.
- Criterion-referenced and not norm-referenced:
 - Passing is based on a set of pre-established criteria.
 - Achievement of their peers is irrelevant.
 - (no curves)

Approach to Competency in Foundational Sciences

1. Have a model for levels of learning achievement where the outcome is in the middle of the learning achievement scale.
2. Develop a *limited* set of competencies that represent the outcomes of the “course.”
 - Write competencies as the expected outcome at the end of the course.
 - Be aware of how you can document that the learner achieved the expected outcome.
 - If necessary, develop “subcompetencies” or “milestones.”
 - Can use “learning objectives” as subcompetencies.
3. Assess competencies.
 - Plan to assess all competencies adequately.
 - All “subcompetencies” or “milestones” must be assessed adequately.
 - Plan for a means of multiple observations to determine competence.

Proposed Levels of Achievement for Foundational Sciences



1. Know

2. Assemble

3. Use

4. Analyze

5. Integrate

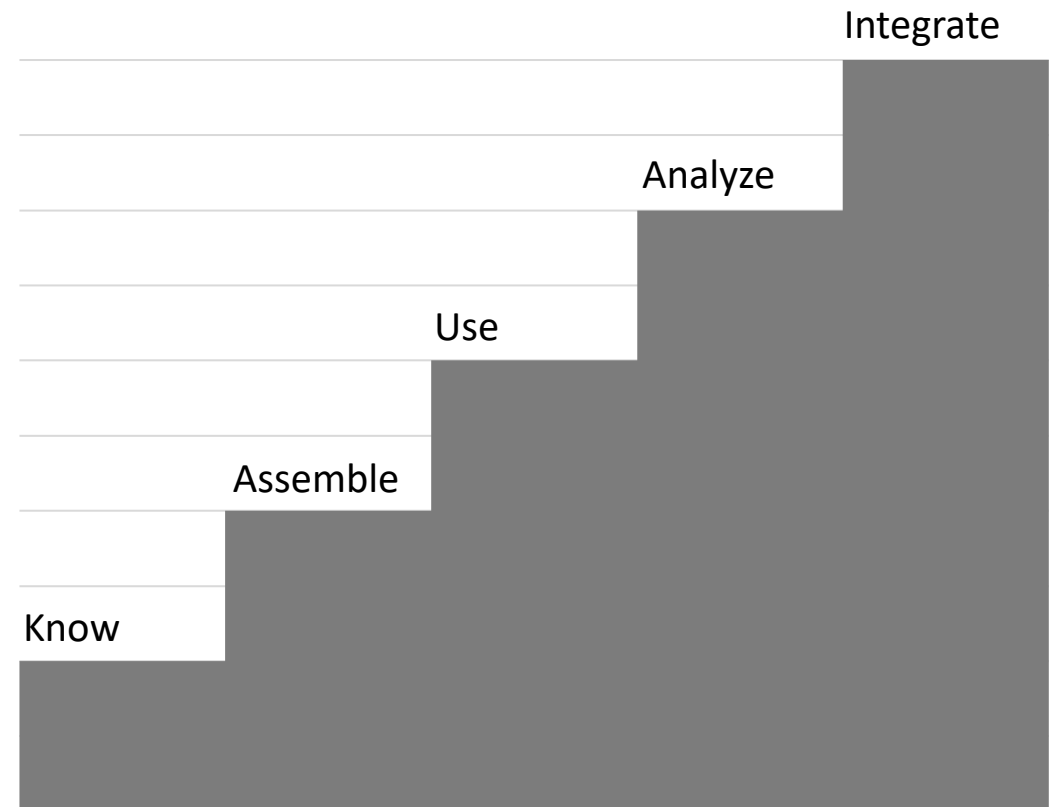
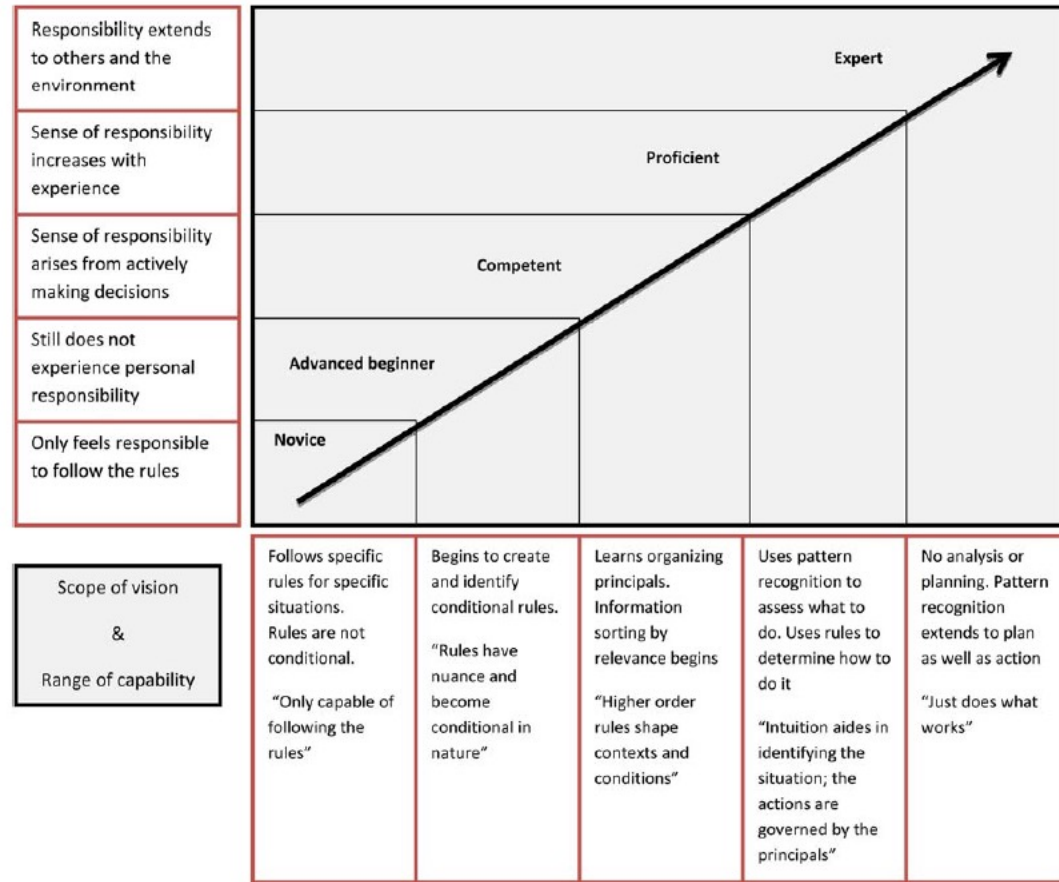
Levels of Achievement for a Subcompetency

Level	Explanation
Know	Learners <u>know</u> the elements of that comprise the subcompetency.
Assemble	Learners can <u>assemble</u> the elements of the subcompetency together.
Use	Learners can <u>use</u> the elements of the subcompetency.
Analyze	Learners can <u>analyze</u> the elements of the subcompetency to address a challenge (knowledge, skill, or behavioral).
Integrate	Learners can <u>integrate</u> the elements of the subcompetency with other competencies or subcompetencies to address a challenge.

Levels of Achievement for a Subcompetency

Level	Explanation	Example: Discuss the coronary blood supply
Know	Learners <u>know</u> the elements of that comprise the subcompetency.	Be able to list the coronary vessels.
Assemble	Learners can <u>assemble</u> the elements of the subcompetency together.	Be able to describe the distribution of blood supply and common variations.
Use	Learners can <u>use</u> the elements of the subcompetency.	Be able to describe the interruption of blood flow due to loss of specific coronary vessels.
Analyze	Learners can <u>analyze</u> the elements of the subcompetency to address a challenge (knowledge, skill, or behavioral).	Be able to discuss myocardial ischemia and the use of percutaneous coronary intervention (PCI, angioplasty).
Integrate	Learners can <u>integrate</u> the elements of the subcompetency with other competencies or subcompetencies to address a challenge.	Describe what sources of blood can be used for the heart in a CABG procedure (e.g., internal thoracic arteries).

Modeled after Dreyfus & Dreyfus Model for Skills Acquisition used for Clinical Skills



The KansasCOM Curriculum – Years 1 & 2

Patient Presentation (PP) Track

Integrated Anatomical Sciences (IAS) Track

Osteopathic Manipulative Medicine (OMM) Track

Physicianship Track

Population Health and Evidence-Based Medicine (PH) Track

Year 1 and 2 modules: PPT and IAS

	Weeks 1-4	Weeks 5-8	Weeks 9-12	
Year 1 – Trimester 1	Introduction to Medicine		Blood	
Year 1 – Trimester 2	Gastrointestinal	Cardiovascular	Respiratory	
Year 1 – Trimester 3	Musculoskeletal	Renal	Endocrine	
Year 2 – Trimester 1	Neuroscience and Special Senses		Psychiatry	Dermatology
Year 2 – Trimester 2	Reproductive Health		Pediatrics	Geriatrics
Year 2 – Trimester 3	Integrative Medicine and Onramp to Clerkship (include COMLEX Level I prep)			

Learner Expectations before Sessions

- Pre-readings
 - ScholarRx (primary source)
 - Most have been cloned and modified specifically for KansasCOM by our faculty.
 - Assigned reading in textbooks
 - Faculty-developed materials (including voice over PowerPoint)
- Additional materials (some are required)
 - Qmax quizzes
 - LMS (Canvas) quizzes
 - TrueLearn quizzes

*thank
you*

Q&A

ScholarRx Office Hours

Biweekly virtual
training for Rx Bricks
and Qmax
Assessment



Thank you for joining!

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