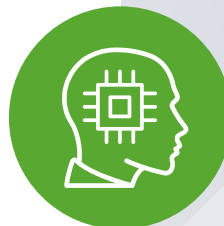Learning Science

Active Learning Strategies for Medical Education

Lecturio

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ACTIVE LEARNING STRATEGY	BRIEF DESCRIPTION
Elaboration & Generation	
Illness scripts[1]	**1.** Instructors organize students into small groups to present a patient case.
	2. Students are assigned resources (e.g. IsabelDX or UpToDate) to create an illness script (cognitive organizer table for pathophysiology, history, exam, labs/imaging/treatment), which includes the group's top 3 differential diagnoses.
	3. Each student group prepares an assessment for the patient and presents it to the rest of the class.
Summary sheet[2,3]/ "Distillation notes"	**1.** Instructors encourage elaboration by challenging students to create a "summary sheet" on a topic,
	Or
	2. Students are asked to condense materials from lectures/labs/major assignments/readings by creating "distillation notes" for which they selectively compact and elaborate/generate on concepts from broad topics to produce a 1-2 page overview document.
SEE-IT method[4]	Instructors choose a topic and have the students (individually or in groups):
	1. State the idea clearly
	2. Elaborate on the idea
	3. Exemplify (for example...)
	4. Illustrate the idea with a metaphor or image
	5. Talk with a partner and share your idea
Jigsaw[5]	**1.** A topic is divided into smaller, interrelated concepts.
	2. Each member of a home team becomes an "expert" on a different concept and may meet with other "experts" on the same concept using instructor-provided materials.
	3. Students go back to their home teams, and each expert on the concepts peer-teaches the other students on the home team their specific "jigsaw puzzle piece" of the topic using elaborative/generative strategies.

Sabotage/Sequence reconstruction[6, 7]	**1.** After teaching a concept and/procedure, the instructor purposefully removes a step/instruction or other deliberate errors from a document/slide. **2.** Students are asked to generate the corrected item.
Annotation of an image/drawing	Students are given an anatomical image and are asked to annotate it with functions of each structure in their own words (generation) or make connections with other organs in the organ system, other tissues, or specific cellular function, etc. (elaboration).
One minute writing[8]	After an instructor sets a timer for one minute, students are asked to create a short essay, audio recording, or video on a topic. Depending on the prompt, this could be an elaboration, generation, or reflection exercise.
Questioning[5, 7, 9]	**1.** Instructors can create a "Socratic classroom" by first identifying specific learning objectives and goals. **2.** Instructors then develop questions based on these learning objects/goals to engage students in active learning. **3.** Alternatively, instructors can provide students with Bloom's Taxonomy and challenge them to create questions based on learning goals at targeted domains (remembering, understanding, applying, analyzing, evaluating, or creating).
Anticipatory set[2, 10]	**1.** Instructors utilize generation by asking students at the beginning of a lesson to predict and try to explain beforehand what the topic will entail or problem will need to be solved. **2.** After the information has been presented, students will be better equipped to get meaning out of the concepts by having predicted or attempted to work out the problem on their own.

Reflection

Team-based learning exercises[5] **(includes problem-based and case-based learning)**	**1.** Preparation - instructors provide students with learning objectives and resources needed for learning exercises. **2.** Readiness assurance- individual & team readiness can be assessed by individual readiness assurance test (iRAT) and group readiness assurance test (gRAT) or other methods. **3.** Exercise application - student teams work on the same challenge, which should be significant in scope, involve specific choices by the team, and be revealed simultaneously upon completion.
Think Aloud[9]	**1.** Used primarily as an active learning reading scaffold, Instructors can pose sentence stems to students such as "I think this is…", "Where did…?", "How did…?" I realized that…", or "This is similar to…" either before, during, or after reading assignments to help with metacognition and activating prior knowledge. **2.** Students can complete sentences stems orally or in written form.
Concept Maps	Students (individually or in groups) are asked to design a diagram/graphic organizer/map that depicts relationships between concepts by utilizing the practice of reflection, elaboration, and generation.
Reflection journals[8]	**1.** Students can reflect on assignments, lectures, classroom/clinical experience, etc by writing, blogging, creating a video, and/or collaborating with a discussion forum. **2.** Reflection journal writing can be a single assignment or used as a portfolio of reflections for a whole course/semester/year
Reflection breaks[8]	Instructors can help to establish a framework for reflection by providing time for focused thought during lectures, or at the beginning or end of class.

Post assessment reflection[8]	Instructors can ask students to submit a reflection with an assessment and resubmit until they achieve mastery of the content.

Technology-enhanced active learning

Poster creation	Instructors can challenge students (individually or collaboratively) to create a virtual "poster" using **Padlet** or other online platforms to elaborate, generate, or reflect on a topic or content area.
Interviews	Instructors can utilize platforms such as **FlipGrid**/**VoiceThread** to allow students to respond to specific instructions to elaborate, generate, or reflect on a question or use peer/team interview questions.
Polling/clickers/online discussions[11]	Instructors can ask students to elaborate, generate or reflect using polling, clickers, or social media (#topic Twitter) applications.
Simulations and video case presentations	Instructors can utilize medical simulations and video case presentations and then ask students to give elaborative, generative, or reflective feedback.
E-learning platforms (Lecturio example)	Lecturio's performance center for users allows learners to self-assess and monitor their mastery of different topics, facilitating the application of reflection in their learning process.

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Resources

Seminars
- Online seminar library for health professions educators ▸
- Educational webinars for health professions students ▸

Articles
- Active Learning: Augmenting Student Engagement and Understanding ▸
- Retrieval-Based Learning Strategies in Medical Education ▸
- Interleaving: How to Mix Related Concepts to Make Learning in Medicine More Durable ▸

Lecturio platform demo request ▸