Learning Science

Retrieval-Based Strategies for Medical Education

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RETRIEVAL STRATEGY	BRIEF DESCRIPTION
Assessment	
Final exam/midterm exam	Instructors assign practice final/midterm exams in addition to traditional final/midterm exams (paper+pencil or digital). Feedback should be provided.
Weekly/daily quizzes	Instructors assign weekly and/or daily low-stakes quizzes (paper+pencil or digital). Feedback should be provided, and students can be given blank copies of the quiz for further retrieval practice.
In-class retrieval	
Jot strategies[1]	Students put away their work and then asked to summarize information by jotting down what they can recall, making sketches of anatomical structures, or recapping older material from previous days/weeks/months.
Think–pair–share	Instructors pose a question and students first think independently about the answer, then discuss answers with another student, and lastly share their responses with the class.
Power ticket template[2]	Instructors create a table "What did we talk about today/last week/last month/last quarter?" and students summarize 3 facts in each cell.
Brain dump	Instructors ask students to write/say everything they've learned on a topic as a form of recall—students can be given requirements such as a word count or a timed response.
Whip/quickfire	Instructors ask review questions at the beginning/end of class and require all students to record their answers—provide keys or have students correct their answers—or use it as a verbal exercise with individual students, going around the classroom.
Ticket out the door/most valuable point (MVP)	Instructors ask students for their most valuable point/concept of the day/week/month—can also be used as an end-of-class practice with recent or older material.

In-class games	
Beach ball review	Instructors write generalized questions on a blow-up beach ball and students toss it to each other, answering the question that their right thumb lands on. E.g., "What structure is immediately superior to …?" and "List 3 hormonal controls of …?"
Jeopardy (or other adapted review games)	Instructors can design review games for individual or team practice. Alternatively, a student team can provide questions for the other team.
Platform-based interactive learning tools	Instructors can use such platforms as Kahoot!, Quizizz, Quizlet Live, Edpuzzle, and Socrative to provide individual or team-based quiz games.

Independent retrieval exercises	
Algorithm-driven retrieval	Students use spaced repetition decks, such as Lecturio and Anki.
SQ3R[3]	Students use this structured technique for improving reading comprehension. Students should: **S**urvey the text (headings, titles) for clues of content before reading; generate **Q**uestions that guide his/her reading (such as "What is the main topic of this section?") before reading; **R**ead the text; **R**ecite (either with a self video, audio recording or in a written format) the most important points of the content after reading; **R**eview the content after reading and answer the questions that were generated.
Build a memory palace	Students use mnemonics and/or build a mental image associated with the concepts to be memorized, such as a room that is familiar to students with multiple objects visualized in it. These mental images become the cues for the retrieval of specific information.
Leitner system of flashcards	Students structure their flashcard use to practice cards covering well-known concepts at longer intervals and cards covering lesser-known concepts more frequently.

Further Resources

- **Online seminar library for medical educators:**
  https://www.lecturio.com/re-envision/online-seminars/
- **Educational webinars for medical students:**
  https://www.lecturio.com/medical/global-student-events-on-demand/
- **Pulse Articles:**
  Retrieval-Based Learning Strategies in Medical Education ▸
  Interleaving: How to Mix Related Concepts to Make Learning in Medicine More Durable ▸
  How to Apply Spaced Practice to Make Learning in Medicine More Durable ▸

Lecturio platform demo request ▸

References

1. Oakley B, EdD BR, Sejnowski TJ. Uncommon Sense Teaching: Practical Insights in Brain Science to Help Students Learn. New York: Tarcher-Perigee; 2021. 12p.
2. Agarwal PK, Bain PM. Powerful Teaching: Unleash the Science of Learning [Internet]. 1st ed. Wiley; 2019 [cited 2021 Dec. 7]. Available from: https://onlinelibrary.wiley.com/doi/book/10.1002/9781119549031
3. The Learning Scientists- SQ3R or Read, Recite, Review [Internet]. The Learning Scientists. [cited 2021 Nov 4]. Available from: https://www.learningscientists.org/blog/2021/3/4-1?utm_source=newsletter&utm_medium=email&utm_campaign=new_post_from_the_learning_scientists&utm_term=2021-03-05SQ3R