POOJA AGARWAL

How to Make Learning Really Stick for Your Students

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A little bit about Pooja….

- Cognitive scientist
- Teaches Cognitive Science at Berkeley College of Music to college age and higher education students
- Former K-12 teacher (4th and 5th grade)
- Some experience in Ed Policy

Background:

- Teachers, though best intentioned with good advice, need to make sure to give advice in line with how the brain works.
- Cognitive science helps us work and learn smarter (not just harder) in the classroom.
    - Huge boom in research over the last 15 years that offers great insight instructionally both inside and outside of the classroom.
    - Moving from basic research inside of labs to applied research
    - **Book Recommendation:** Make it Stick by Peter C. Brown and Henry L. Roediger III

What is retrieval practice?

- Retrieving or bringing information present to mind so that we can practice using it.
- In the context of student learning, it is how we as educators bring things out in our students and especially retrieval for assessment (e.g. exams, project etc.).
- Research shows that the act of bringing information out and using it helps improve student learning. **Therefore, it's not just about getting ideas into our students' heads but also getting it out of their heads.**
- Students predict that easier initial learning strategies will lead to most amount of long term learning. However, the reality is that students that struggle to learn something will have more long term learning.

    - During a study by **Jeffrey Karpicke and Janell Blunt** they asked students if they thought the concept mapping exercise was going to work. Only 25% of participants thought retrieval was going to be effective over intuition.
    - Cramming works for short term,however, it gives the illusion of fluency and competency.
    - Retrieval practice is more challenging but has greater long term benefits. Therefore, as teachers, we need to help students understand this reality and be ok with the idea that challenging our students is actually good for them.
    - **Robert Bjork:** Researcher that focuses on desirable difficulty. (I.e learning is a task that requires a considerable but desirable amount of effort, thereby improving long-term performance).

- Metacognition: What students think will help them and what actually helps them are two very different things. As educators we need to close this gap.
    - Students need a clear picture on what they know and also what they don't know.

- **Andrew Butler:** Feedback after retrieval is critical to develop awareness of our own learning. His research focuses on types of feedback and frequency after retrieval.

- How does retrieval practice fit into the classroom setting?
    - Braindumps: Have students close books/notes and write down what they remember and then check or discuss. Provides formative assessment.
        - Lab and K12 research- writing down what they remember helps students learn.
        - Patrice Bain (6th grade SS teacher) does a brain dump at the beginning of a unit and the end of a unit. She allows students to review both so they can see their own progress. (Pre and post feedback is great motivation for students.)
    - Sketchnoting: Visual note taking is a great tool that can be done during and after the learning session.
    - Dual coding theory: verbal and visual paired together is a powerful way for students to learn.
    - Important part of notetaking is to make sure that retrieval is included.
        - Research shows that notetaking is not an effective study strategy for students.
            - Taking notes on laptops is even more ineffective because it's closer to transcription.
            - Notes are happening during reading or while listening to lectures ; If students are going back to review their notes it's not necessarily retrieval.
            - Visual sketchnoting what they can remember is a great retrieval practice for students.

- Best practices/optimization for space retrieval:
    - Revisit content over the course of a semester or school year.
    - Spaced re-reading is beneficial (crammed is less beneficial); spaced retrieval is even more beneficial
    - Spiral curriculum: returning back to things. Even more beneficial when there is retrieval.
    - Work with our students to retrieve information rather than just reviewing it.
    - Kids like challenges. As educators we need to encourage our students to think hard.
    - Flashcards are still very relevant in learning however students tend to drop their flashcards too quickly.
        - Research shows tying an idea successfully to retrieval 3 times before dropping flashcards is a better strategy as opposed to one and done
        - Just because a student gets something correct doesn't mean that they know it. They could have just been guessing.
        - Tools Recommendation: Kahoot, Quizlet and Quizlet Live
        - Single experiment completed using Quia (learning tool) resulted in higher learning when using Quia rather than when not; demonstrated the benefits of learning autonomously.
        - Researchers now looking at how flashcard apps are being built so that we can try to make them more powerful learning tools.

- Focus on how to keep learning low stakes with an emphasis that retrieval is a learning strategy not an assessment strategy.
    - Teachers need to focus on topics as learning activities not an assessment with a grade tied to it.
    - Retrieval in our classrooms as entry and exit tickets.
    - Games like Jeopardy or cold calling on students have some retrieval benefits but there is the concern of social high stakes; affective filters/social anxiety clouds what students are thinking
    - Tool Recommendation: TodaysMeet is a great formative assessment tool that can give kids anonymity to share what they know (or don't) and allows a teacher to determine if a reteach is helpful.

- https://www.retrievalpractice.org/: Resource for teachers to go to keep up with the research that is being done on retrieval practice.
    - All curated content from other scientists
    - Specific to educators
    - Resource for all the major experts in the field (researcher scientists and educational specialists)
    - Free downloadable guides
    - Sign up for their newsletters