ASSESSMENT LEARNING NETWORK

LEARNING POINT

How do authentic assessments deepen learning?

This Learning Point draws from the science of learning to describe how authentic assessments help students to embed their learning into long-term memory.

Understanding 3 guiding principles of deep learning

Students forget as much as 90 percent of what they learn in the classroom within 30 days of learning. As it turns out, our brains are hard-wired to forget most of the new information that enters them (i.e., where we parked at the store yesterday) so that they can clear away room for new information (i.e., where we parked today). By design, very little of what we learn sticks in our long-term memory. Scientists call this "the forgetting curve." So, how do we help students break through the forgetting curve and retain new learning? Here are three key guiding principles:

1. **Repetition is key.** To commit something to long-term memory, we must repeat it multiple times over days and weeks. One or two practice sessions, no matter how focused, rarely get new learning to stick. At best, fast learning leads to fast forgetting.
2. **Memory storage is not the same thing as memory retrieval.** We've all experienced storing a memory (e.g., learning a person's name) but then later being unable to retrieve it until something jogs the memory loose. This shows that it's possible to store memory yet have too few "hooks" to retrieve it. Often, that's because we've learned it in just one setting, one place, or one way.
3. **Mental models are the key to long-term memory.** Typically, if we want to commit new learning to long-term memory, we must embed it into larger mental models. When we embed a new idea, word, or concept into an existing (or evolving) mental model, we have multiple "hooks" we can use to retrieve it.

> "For students to learn something deeply (i.e., be able to store and retrieve it), they need to engage with new learning multiple times and in multiple ways spread over time."

What all of this adds up to is that for students to learn something deeply (i.e., be able to store and retrieve it), they need to engage with new learning multiple times and in multiple ways spread over time. Doing so helps them embed their new learning into rich neural networks (e.g., mental models) so that they can, for example, understand how to compute a math formula as well as when to apply it, or how a historical event fits into a larger narrative or theme.

Classroom assessments often fail to support deep learning

As the adage goes, what you measure is what you get. When the modus operandi of instruction is teach-study-test, we tend to get fast learning followed by fast forgetting. Students cram for the test, but do not engage with their new learning multiple times and in multiple ways spread over time. Moreover, classroom assessments often tend to measure (and thus, yield) mostly superficial learning. For example, if all it takes to ace a test is circling the correct definition of oligarchy or writing a short answer for how mitosis differs from meiosis, students may, via repetition, store the new learning. Yet because they've learned those concepts in just one way, setting, or application, they may struggle to retrieve it later, especially when it occurs in a different format than a classroom test. In short, they won't have embedded those concepts into mental models. Hence, they may be unable to recognize an oligarchy when they see one or understand the relationship between mitosis and the spread of cancer cells.

Understanding the link between authentic assessments and deep learning

For students to develop deep learning, we need to engage them in learning tasks that require them to return to new knowledge and skills multiple times and in multiple ways and demonstrate a deeper level of learning. In short, we need to use authentic assessments. Drawing on an analysis of scientific research in classrooms with diverse learners, we have identified three types of learning tasks (anchored in authentic assessments) that support deeper learning for all students:

- **Cognitive writing**—extended writing assignments that prompt students to think deeply about what they've learned—synthesizing learning into mental models, developing and defending original arguments, or explaining how they arrived at a solution.
- **Structured problem solving**—guiding students in using math and quantitative reasoning skills to solve real-life problems, and thereby developing mental models for solving similar problems in the future.
- **Guided investigations**—engaging students in observing and/or exploring scientific, cultural, or historical phenomena and, afterward, demonstrating their learning through presentations, extended writing assignments, or similar projects.

Design steps for authentic assessments

Here are some steps teachers can take to embed authentic assessments into challenging learning tasks:

- **Identify what you want students to know and be able to do.** What are the big ideas, core concepts, and key vocabulary that you want students to master?
- **Identify what it will look like for students to demonstrate mastery of their learning.** How will you (and your students) know when they've mastered the big ideas, core concepts and key vocabulary? How will they demonstrate that they have learned the material deeply?
- **Develop a challenging learning task.** Once you're clear what learning students must demonstrate, design a challenging learning task that engages students in deep learning and demonstration of their new knowledge and/or skills (e.g., through cognitive writing, guided investigation or structured problem solving).
- **Create and share a rubric with students.** An essential element of authentic assessment is showing students how their learning will be evaluated by sharing a grading rubric with them well before they turn in their assignments. Rubrics, as it turns out, do much more than standardize your grading, they motivate and encourage higher levels of learning by giving students opportunities to self-assess progress and improve their final product.

Conclusion

If what we measure is what we get—and if what we get in many classrooms is a lot of fast learning and fast forgetting—it's time to rethink how we measure learning. And by measuring student learning in more authentic ways, we give them opportunities to explore compelling ideas and concepts, connect learning to their own interests, and share their own ideas, which in turn, can make learning not only deeper, but also more joyful.

Endnote references

[i] Medina, J. (2011). *Brain rules: 12 principles for surviving and thriving at work, home, and school.* Pear Tree Press.

[ii] Bjork, E. L., & Bjork, R. A. (2011). Making things hard on yourself, but in a good way: Creating desirable difficulties to enhance learning. In M. A. Gernsbacher, R. W. Pew, L. M. Hough, & J. R. Pomerantz (Eds.), *Psychology and the real world: Essays illustrating fundamental contributions to society* (pp. 56-64). Worth Publishers.

[iii] Nokes, T. J., Schunn, C. D., & Chi, M. T. (2010). Problem solving and human expertise. Interna¬tional *Encyclopedia of Education* (Vol. 5, pp. 265–272). Elsevier. https://doi.org/10.1016/B978-0-08-044894-7.00486-3

[iv] Goodwin, B., Rouleau, K., Abla, C., Baptiste, K., Gibson, T., & Kimball, M. (2022). *The new classroom instruction that works: The best research-based strategies for increasing student achievement.* ASCD.

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The New Classroom Instruction that Works (book)
www.mcrel.org/citw

Learning that Sticks (book)
www.mcrel.org/learningthatsticks

Student Learning That Works: How brain science informs a student learning model (free paper)
www.mcrel.org/student-learning-that-works-wp

Unleashing the Power of Best First Instruction (free paper)
www.mcrel.org/unleashing-the-power-of-best-first-instruction

Re-Balancing Formative Assessment: Placing Formative Assessment at the Heart of Learning and Accountability (free paper)
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