

The Connection between Metacognition and Practice Tests

Metacognitive knowledge can be thought of as an understanding and awareness of what you know, and to what depth. A student who reflects about their knowledge and understanding to check whether or not they have learned something uses metacognition. This is what students begin to understand when working on practice tests. They should be asking themselves

1. ...questions about what they know and don't know.
2. They should reflect on what they have learned.
3. Is their strategy working or is there a better way?
4. Are there unfamiliar terms or formulas they could review?

QUOTE OF THE MONTH

"There are two ways of meeting difficulties: you alter the difficulties, or you alter yourself to meet them."

Phyllis Bottome,
Author



The Benefits of Practice Tests

Practice makes perfect, the saying goes, and it is true for improving math achievement as well. Practice tests are a powerful tool for learning and self-assessment. Whether your students are preparing for a big exam, mastering a new skill, or simply testing knowledge, practice tests can boost confidence and improve performance.

The benefits of practice tests go beyond memorization—they help reinforce information, identify weak areas, and build familiarity with different question formats. By simulating real test conditions, they also reduce test anxiety and sharpen problem-solving abilities. Studies have shown that those who take practice tests perform significantly better than those students who don't (Binks, 2018). Practice tests allow students to see where they still have learning gaps, adjust their pacing, and increase long-term retention.

Frequent, spread-out practice is more effective than cramming in one long session. Reviewing mistakes and learning from them can lead to deeper understanding and long-term retention. So, if your students are gearing up for an important test, you might suggest that planning and carrying out regular practice test sessions before the test can set them up for success.

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Where do your students find good practice tests?

1. A good resource for this is their textbook (hard copy or online). Chapter summaries provide collections of representative problems students will likely see on their test. One added benefit is that most show answers to odd numbered problems in the back of the book, and give a reference to where in the chapter a particular topic was introduced. In the event your students don't know how to work a problem, they can refer back and reintroduce themselves to the concept for relearning.
2. The math help center on your campus is another good source for practice tests. Often help centers or other student groups have test banks for certain courses. Encourage your students to research these on-campus sources. Independent websites such as Khan Academy give students a chance to try out new problems of a specific type. Suggest they use the chapter or section titles when looking for certain concepts on web searches.
3. You as their professor could easily create a practice test for your students.
4. Learners can also create their own practice tests for themselves or for study groups by using a variety of problems from homework assignments.

Binks, S. (2018). Testing enhances learning: A review of the literature. *Journal of Professional Nursing* 34(3), 205 – 210.

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We will be attending
MathFest
August 6 – 9

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NEWSLETTER FOR
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Cognitive stamina or endurance is the ability to sustain focus on a cognitive task. This is especially relevant for math students who in one study (Cornell University, 2025), missed more problems at the end of a test than at the beginning even though the factor of task difficulty was controlled. You may have witnessed your students' tendency to fade during an assignment or assessment and therefore scoring lower on tests than actual learning would indicate. Incomplete homework assignments is another sign that your students may lack cognitive stamina.

The brain can be trained to focus for longer and longer stretches of time. If we could boost stamina when working math problems, we have the potential to boost test scores. It is important to recognize the brain *can improve* in cognitive

stamina. According to Howard LeWine, (2024) the brain adapts to more demanding activities as a person experiences them. Almost anyone can make those improvements in cognitive stamina with some practice. Keep a goal in mind of increasing focus for longer periods of time and try the following ideas:

Practice sustained cognitive tasks. The University of Chicago study (Brown, 2024) noted that performance improved when opportunities for sustained cognitive tasks increased within a class period. Students who are accustomed to thinking for long stretches of time were able to transfer that skill to test-taking resulting in improved achievement.

Try the Pomodoro Technique. This time-management technique developed in the 1980s suggests that a person work for a set amount of time followed by a short break. An example of this is to work on an assignment for 15 minutes and then take a 5-minute break. Students will find it easier to maintain attention and focus for short bursts when working on assignments independently. Students also anticipate a break is coming up and learn to push themselves to persist in the effort to complete assignments, improving stamina.

Cognitive Stamina

Gradually increase the time on task to 25 minutes with a 5-minute break.

Play games that require sustained focus. Another surprising finding of the Chicago study (Brown, 2024) was that persisted attention, such as playing games, also improved cognitive stamina for more academic tasks. Any way of training the brain to be attentive and focused seemed to help stamina in other areas.

Make learning high interest. The appeal of games is their high interest and persistent urgency to stay with the game. Even though the game is not real, the brain learns to persevere past fatigue because of the interest in the task.

Increase confidence and knowledge. Confidence can play a part in persistence and cognitive stamina. If students know they can solve problems on a test, there is little room for discouragement and a wandering mind when taking a test.

Practice for fluency. Related to confidence and knowledge is fluency, or the ability to make decisions and solve problems accurately and quickly with little hesitation or roadblocks. Without fluency, work can be sporadic, making it difficult for the student to get into a flow of ideas and procedures. With practice, students can be more fluent with math facts, formulas, and using mathematical algorithms.

Way to Succeed Can Help!

We designed [Way to Succeed](#) to accompany first-year math and other STEM classes. Our goal is to help your students become aware of and develop their learning skills and strategies in a personal way while freeing you to focus on your math or other STEM content. The online program works concurrently with your class, providing students with personal learning profiles and targeted actions for improvement, short, thought-provoking readings, videos, and short quizzes that highlight the skills, attitudes, cognitions, and learning strategies in which successful students engage. Students can quickly make changes to become better learners and improve their academic achievement.

Two Common Learning Disabilities

and Strategies for Student Success (Part 1 of 3)



Learning disabilities can make learning math difficult, and can indeed become barriers to achievement and success in your math classes for students who have these disabilities. Learning disabilities change the *perception*, *memorization*, and *expression* of your content, interfering with understanding, learning and with testing of your students' knowledge.

Following are two common learning disabilities that affect math students, and how you can help these students process your course material better. An added benefit to using these suggestions is they help all your students.

Dyslexia.

Students who have dyslexia read slowly, often losing the meaning of what they have read. Dyslexia also can cause learners to store words and their meanings in ways that are difficult to retrieve. Because of this, students have a lot of trouble deciphering math word problems, test directions, and explanations in textbooks.

Strategies:

- ◆ Enable the audio version of your textbook or the auto-reader function for online texts.
- ◆ Take advantage of online help videos such as Khan Academy and YouTube for spoken instead of written directions.
- ◆ Explain your thought processes about approaching word problems—strategies that work for low-level readers.
- ◆ Be clear about vocabulary and their meanings, and use new words often, especially if those new terms will be on your written directions on tests.
- ◆ Encourage your students to create vocabulary cards with definitions and examples.
- ◆ Use diagrams and other visuals when teaching.
- ◆ Encourage your students to read directions and word problems aloud when they can so they can hear and see the directions.

Dysgraphia.

Often co-existing with dyslexia, dysgraphia is characterized by poor or illegible handwriting and other issues with writing and drawing. Students can have difficulty reading what they have written at a later time, making their notes unusable. Writing is laborious and slow, and letter and number formation is often inconsistent. Students with dysgraphia have difficulty transcribing diagrams and other visual aids into their notes. Those who suffer from dysgraphia frequently demonstrate unusual ways of holding their pen or pencil which may exacerbate their struggle with writing.

Strategies:

- ◆ Prepare guided notes for your lessons and post them online.
- ◆ Include visual diagrams and sketches you will be using in your class into your outlines.
- ◆ Ask for volunteer note-takers for those who struggle with this disability.
- ◆ Record and post your lectures. Students can review concepts from class without having to write everything down.

Next Issue will include strategies for two more learning disabilities that interfere with learning math: Dyscalculia and Organizational disabilities

Q&A About Way to Succeed

Q: I can't make the students change their learning behaviors.

A: **That's true**, but your students want success! Even though you do not have direct control over your students' learning behaviors, you can influence them to understand they are the ones who ultimately determine their own level of success. However, they do not always know what to do to be successful. That is where we help!



Way to Succeed emphasizes that the student has the responsibility to understand and control their own learning behaviors that lead to greater academic success, and we show them what they need to do. Students then make the decisions. You can provide a learning guide through the Way to Succeed curriculum so they know the way to succeed!





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We offer a unique research-supported approach to helping students become more independent and successful in your classes.

Visit [Way to Succeed](http://www.waytosucceed.com) for more information about our product, pricing, and how to order.

You can be ready for Bridge and Fall Semester 2025 classes!

First-year, at-risk, and probationary students typically need more support than most other returning students, especially when these students enroll in online classes. [Way to Succeed](http://www.waytosucceed.com) can help you to assist your students with a personalized, stand-alone success program designed for mathematics and other STEM courses. [Way to Succeed](http://www.waytosucceed.com) helps students develop their own self-regulating and metacognitive skills so they can become more independent and effective learners.

- Students learn how to learn, especially in their math or STEM class.
- Our focus is on improving self-regulation, time-management skills, metacognition in your students, and how to access extra help resources.
- Nothing to grade. Nothing to plan. No essays for your students.
- Personalized learning diagnostics and recommendations for each student.
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- Research-based process establishes significant improvement in grades.
- Low department and per-student costs.
- Compatible with any STEM course or curriculum, online or face-to-face.
- Easy-to-access instructor reports.
- **Quick and easy set-up for your school, by department, course, or class.**

Upcoming Articles in the next issue of *Learning Insights*

1. Bringing the Overconfident Student Back to Reality...Gently
2. Two more Learning Disabilities and Effective Strategies that helpand more!

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