Learning to Learn Handbook: Meta-Learning Strategies

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https://www.oakland.edu/cetl/resources/
Table of Contents

Why a Learning to Learn Handbook?

Strategies for Faculty: Teaching Tips
  Behaviors and Conditions for Learning
  Mind Your Cues: Learning with Class Rituals
  While It Simmers: Engaging Focused and Diffuse Modes of Thinking
  Small, Frequent Practice Makes Permanent
  The Power of Chunking: Meaningful Groups and the Memory Palace
  Procrastination: Changing Small Habits Has Big Payoffs
  Empower Students with Habit Creation
  Retrieval Practice Makes It Stick
  Identify Bottlenecks to Student Learning to Develop Improved Learning Strategies
  Techniques to Help Students Think About Their Learning

Strategies for Students
  What’s in It for Me?
  Goal Setting and Action Plan
  Organizing for Success: Templates
  Accountability Coach
  Metacognitive Note-Taking Template
  Class Content Note-Taking Templates
  Productive Motions for Studying

Strategies for College-Level Reading

Strategies for Studying
  Practice Testing
  Distributed Practice

Reflections and Takeaways

References for Learning to Learn
**Why a Learning to Learn Handbook?**

We hope this handbook will assist students, advisors, mentors and instructors in promoting successful learning experiences by providing some simple meta-cognitive or meta-learning strategies.

Meta-cognitive or meta-learning strategies are ways in which we “think about thinking” or “learn to learn” to become successful learners in class, at university, and most importantly, can assist us in lifelong learning and success in our personal and professional world.

We hope this will help:

- **Instructors** by providing strategies that they can teach their students at the beginning of the first semesters, and will provide practice opportunities and reinforce these strategies throughout the semester.
- **Advisors and Mentors** by reinforcing and reviewing strategies that instructors are using with their students.
- **Students** by empowering you to become independent and self-directed successful learners.

A few things to keep in mind for Meta-Learning Strategies to be effective:

- **Time**—It takes time upfront to learn some of these strategies but great pay off in time and results in the long run. Instructors: Take time during first few classes to teach “learning to learn” strategies.

- **Practice**—For a new behavior to become a habit, must practice for 21 days. Instructors: Remind and give students opportunities to practice.

- **Individual Preference**—We all have our own preferences and styles. Not all techniques work the same for each person. Try and see if these “fit” and what strategies might each person prefer

Good luck to all of you. To paraphrase R. Emerson’s “Life is a journey, not a destination”: Learning, too, is a journey and not a destination, as our learning never ends. Enjoy the journey!

Respectfully,

Judy Ableser

Director of the Center for Excellence in Teaching and Learning
What can you contribute?

How do you hope to apply it in the future?

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Strategies for Faculty: Teaching Tips

These Learning to Learn teaching strategies apply brain science related to learning. They offer ways to pace, frame, and engage students in ways that promote learning strategies that will benefit them in your class and their other courses.
Behaviors and Conditions for Learning

*There is no reason that any student should suffer alone, and I want them to know, both as president and as a physician, that we have help available for every single student.*” - Ora Pescovitz, OU President

Research continually finds that certain conditions and behaviors are essential to learning, such as safety, sleep, peace, planning ahead, and a growth mindset. Make sure these conditions and behaviors are in place so that all of your studying and hard work pays off. If you feel like some of these conditions are out of your control, take advantage of the support offered right here on campus.

1. **Safety**

   We cannot focus on learning if our basic physical and emotional needs are not met. It can be a vicious cycle: If we are suffering physically or emotionally, we may not be able to pass our courses, which can cause financial hardship that worsens our problems. Oakland University is very aware of how physical and mental well-being are essential to being able to learn. If you or a fellow student carries the burden of a significant life issue (housing, food security, unhealthy relationships, illness, trauma), contact campus support to get assistance (listed below).
2. **Sleep**

   More than just a wellness luxury, sleep plays an integral role in learning. It is difficult to overstate its power: by clearing toxins it literally solidifies the facts you memorized and applies what you have studied to other life contexts. In some ways, it does your homework for you, with no conscious effort on your part! If you are in a situation where you say you cannot get enough sleep, dig deeper:
   
   ○ Is sleep lost at the expense of less healthy habits, like TV or parties?
   ○ Are other good but non-essential priorities overshadowing sleep?
   ○ Is sleep reduced for other life needs (child care, financial needs)?

   While there can be complicated issues surrounding lack of sleep, do everything in your capacity to get a solid night’s sleep every night, and consider other solutions to ensure you get this sleep. Naps can help compensate for getting less than seven hours at night, but nothing beats a good night’s sleep.

3. **Peace, Not Anxiety**

   You may be sitting in your PSYC 1000 class trying to take notes, but if you are worried about something else, your notes might not make sense to you the next day. In short, anxiety blocks our brain from learning. Anxiety comes in different forms, such as something temporary around one situation (situational) or a heavy feeling that consumes most of your waking moments (chronic).

   **Test Jitters: Situational Anxiety**

   In her MOOC [Learning How to Learn](#), OU professor Barbara Oakley addresses strategies for test-taking, specifically how to address this anxiety. While we usually can’t control our body’s reaction to stress, we can control what to do with stress. Instead of interpreting stress as fear of failure, interpret stress as the opportunity to do your best, to grow, and to achieve. This can also be distinguished as “good worry,” the type that drives motivation and focus, as opposed to “bad worry,” which only paralyzes action.

   **Chronic Anxiety**

   College life often brings swift and significant life changes, creating prime conditions for anxiety. Anxiety can creep into our lives as stress builds up from relationships, grades, and other responsibilities. If you find that your anxiety stays for long periods of time, regardless of whether you are in class or away from campus, call the [Counseling Center](#) to use one of your free visits--let a professional hear you out and provide some support.

4. **Procrastination**

   Why do we procrastinate? It gives our brain a satisfaction “bump,” almost like a drug, because doing the task ahead makes us wince with pain. But procrastination ultimately leads to more stress, poorer performance, and inability to enjoy the learning experience.
you’re here for! Even if you manage to eek out a decent grade while procrastinating, the cramming required to procrastinate shows that you remember only a small fraction of what you learned, and what you remember is entirely random.

So how do you beat the bad habit? Think about the challenging work ahead in terms of *process* rather than *product*: Instead of telling yourself, “I have to sit down and write four pages,” try “I’ll work on this for 20 minutes.” This has been called the *pomodoro technique*, named after a “tomato” timer, which makes a dreaded task less daunting and tricks your brain into getting started. What’s likely to happen at the end of 20 minutes? You’re in the groove—no point in stopping now! OU professor Barbara Oakley talks about this strategy and more about procrastination in her fun videos on procrastination (available in her free MOOC on Learning How to Learn).

5. **Failure and Growth Mindset**

**Failure**—why the ugly word? Let’s put it this way: it’s important to get stuff wrong if you want to learn. You don’t have to fail a class, but learning requires trial and error, and a willingness to swing and miss. Learners have to check their understanding early and often if they want to know the material well enough to score high on the exam. This means you

- Ask and answer questions in class.
- Do the practice problems in your reading—don’t skip them! The act of reading might make you feel like you know it (called the illusion of competence), but you don’t know until you have to do something with what you have read.
- Go to supplemental instruction and other practice-based sessions offered with your class.
- Seek out practice exams and problems online related to what you are learning.
- Form a study group dedicated to testing your knowledge.

This does not require a lot of extra time! The key is in how you study and what it means to know the course material. It’s better to study for 75 minutes and have a solid understanding of the material instead of spending 40 minutes reading only to forget everything!

We might avoid challenging ourselves because failure is unpleasant. The power of failure depends on how you react to it. People with a *growth mindset* look at their ability as something that can be cultivated and expanded, while those with a *fixed mindset* concede that they can never get better. When a student gets a C on a math test, a growth mindset will determine how the next test can earn a B or A while a fixed mindset will make the student accept that they’re simply bad at math. A growth mindset will get you further than you can imagine!

**OU Support**

Not sure where to start? Your academic adviser can point you in the right direction. Depending on your major, each school has advisers that help students.

- **OU Counseling Center** (in Graham Health Building)
○ Counseling does not impact academic records
○ Six counseling sessions are free to registered OU students
○ Counseling is confidential

- [Graham Health Center](#) - medical assistance
- [Common Ground Crisis Center](#)
- [Macomb County Crisis Center](#)
- [Crittenton Medical Center](#)

**References and Resources on Conditions for Learning**

Oakley, B. (n.d.) [Learning How to Learn MOOC](#), with Barbara Oakley and Terrence Sejnowski.
Mind Your Cues: Learning with Class Rituals

Different disciplines, from behavioral science and neuroscience to education and psychology, contribute research to a similar conclusion: cues have powerful effects on the brain. Cues experienced through our senses solidify habits, ignite physiological reactions, and aid memory.

What does this mean for students? Cues can contribute to students’ good and bad habits. By recognizing cues and applying them strategically, students can focus attention, redirect bad habits, and ensure their learning is flexible. If students evaluate a bad habit, such as procrastination, they might find a cue that enables procrastination, such as TV, social media, or eating. By relocating the behavior from cue to reward, the procrastination habit might turn into productive behavior.

Beware! Cues can be so powerful that they can make learners stuck in rigid routines. If a student only studies content in a specific environment (the library’s cafe with background noise and coffee smell) and then takes a final exam on that content in an unfamiliar room, studies have shown that the student could perform poorly. Therefore, students should have some variation in their study environments.

What does this mean for faculty? Faculty can use cues to focus student attention, prepare students for challenges, and engage reflection to solidify learning. Faculty could find numerous ways to use cues, routines, and habit loops to prime a learning environment. Start by considering a few, simple class rituals that can improve the class experience.

How to Cue Learning with Class Rituals

1. Start ritual in the minutes before class.
   - Have a prompt on the board or projection screen that starts class-related inquiry.
   - Instruct students to prepare learning objects as a way to prepare for the class environment (note-taking items, pen).
   - Set the same stage: have students arrange desks in a way that fits your class structure, place a bowl of mints at the front of class, or adjust lighting.
   - Make the five minutes before class a silent handwriting time. Writing can be related or unrelated to class, but suggest that class-related writing reach back to last class or ask
questions, while writing not related to class could be used to recognize distraction and release it for the class period.

- For a more extroverted exercise, start every class with a trash-can basketball game, best silly video from YouTube, name that tune, or other fun ritual.
- If class is a phone-free zone, have the class collectively do a silly goodbye to their phones before they make phones silent and place them out of sight.

2. Plan an opening ritual.
   - Greet the class with the same phrase, statement, or question.
   - Use the same starting slide, such as the course learning outcomes followed by questions of “How did last class contribute to these?” and “How do you think this class will relate to these?”
   - Engage the class in a mindfulness activity, usually involving reflective prompts, silence, awareness of breathing, and posture.

3. Close class with cues.
   - Conclude with tried-and-true reflection exercises such as one-minute papers, muddiest/stickiest points.
   - In writing or verbally, ask students, “How does this session fits into the bigger picture (course, degree, career, life)?”
   - Use counterpart rituals to your opening rituals (using the same farewell line, end with the same slide with which you began, happily reunite students with their phones).

**Procrastination and Memory, from OU’s Barbara Oakley’s Learning How to Learn MOOC**

For more on the content presented in this strategy, watch the “Tackling Procrastination” video (Week 3) in the Learning How to Learn MOOC, featuring OU engineering professor Barbara Oakley and Terrence Sejnowski, UC San Diego biological studies professor.
While It Simmers: Engaging Focused and Diffuse Modes of Thinking

The brain is structured to use different modes of thinking in order to better accomplish tasks. The diffuse mode allows the brain to work on an idea “in the background” or unconsciously while we also operate in focused mode, which is a thought task that has our direct attention. While focused mode allows us to sketch a picture, diffuse mode alerts us if someone knocks on the door or reminds us that we have to call a friend.

In order to work through a complex mental challenge, such as those we want students to experience in our courses, learners have to engage both modes of thinking over a period of time. Within one complex problem, there are likely some parts that are more challenging than others. To most effectively work through the problem, we start by engaging the diffuse mode to work on the most challenging and time-consuming aspects. Then, we can shift our focused attention to smaller tasks while our brain works out the previous aspect “in the background.” Out of the blue, we may suddenly hit the “eureka” moment because our brain has worked toward a solution.

This is similar to making soup: while part of the soup has to simmer for a long stretch of time, we can clean ingredients, chop vegetables, and add the ingredients to the soup in order to achieve the best flavor.

What does this mean for students? If students can discern the hard and easier parts of a learning activity, they should first direct their “focused mode” to the hardest problems, but not for too much time. When the focused mode has started to stall, let that problem “simmer” and move onto the easier tasks. While working on these easier tasks and letting the brain simultaneously work on the other problem in the background, students will more effectively arrive at a solution. When taking a test, start with the hardest problems first in order to let the brain get an early start on those problems.

What does this mean for faculty? In order to get the most out of focused and diffuse modes in class, faculty should consider how class activities are structured and how to teach students to break down learning activities into its easier and harder parts. When faculty see students getting stuck on a problem,
encourage them to shift their focused mode to something else. Faculty can also allow both modes of
thinking based on the structure of students’ learning activities.

How to Engage Focused and Diffuse Modes of Thinking

1. **Use assessments that let students determine a path of action.**

   Consider the structure of your assessments (essays, quizzes, exams) and whether they allow
   students to move through the work in their own order, at their own pace. Are students required
to complete questions in a certain order? If so, is the order necessary to the learning? If the
order is important, use prompts at the beginning of an exam to help students start thinking
about the harder questions. Then, if possible, place those questions at the end so that students’
diffuse mode will have had time to work through a particularly difficult question.

2. **Start class with hard questions, and answer them at the end.**

   By giving students a significant learning challenge at the beginning of class, you will bring their
focused attention to the class content and likely get them to a stalling point. After a brief period
of time, have them move away from that problem to smaller problems that will likely help them
solve the larger challenge. After allowing the hard question to “simmer,” students can work on
smaller tasks. The diffuse mode is in action, working on the problem in the background. At the
end of class, go back to the challenge you opened class with and see if they have had any
breakthroughs. This strategy not only shows students how the class material has furthered their
learning, but also gets them into the habit of solving problems on a varied timeline.

3. **Ask students to identify difficult and easy tasks, and plan accordingly.**

   Be transparent about diffuse and focused modes and how they can help students not only learn
but most effectively take tests and avoid test anxiety. Whether in practice problems or research
projects, habitually ask students to create an action plan for the path they will take through the
learning activity. Consider these prompts:
   - What are the most challenging aspects of this work? How much time will you spend on
     these before moving onto easier aspects? *This also helps with circumventing procrastination.*
   - What are the easier aspects of this work? How do they fit in with the challenging aspects,
     and how can you work through them to help with the more challenging aspects?
   - If you have two hours to take a 45-question test, how much time should you let yourself
     be “stuck” on a question before moving onto a new one?
Focused and Diffuse Modes, from OU’s Barbara Oakley’s Learning How to Learn MOOC

For more on the content presented in this strategy, watch the “Using the Focused and Diffuse Modes” video (Week 1) in the Learning How to Learn MOOC, featuring OU engineering professor Barbara Oakley and Terrence Sejnowski, UC San Diego biological studies professor.
Small, Frequent Practice Makes Permanent

“Practice makes perfect” is an axiom for a reason: the brain has a remarkable capacity when knowledge or actions are repeated many times. But it is more accurate and useful to revise this saying to “practice makes permanent,” since practice only ensures that what you practice will be solidified in your mind by paving permanent neural pathways in your brain.

This amazing brain ability is only possible if something is practiced under three conditions: in small measure, often, and over time. The neurons involved in learning something have to trek a path many times and allow time in between “treks” in order to let the learning solidify. It’s like building a brick wall: it has to be done brick by brick, with time for the binding mortar to solidify before adding more bricks. Without time to settle, the wall will be nothing but a pile of mush.

What does this mean for students? Procrastination does not work. The brain that has procrastinated might be able to hold onto a random chunk of knowledge over a short period of time, but not enough to score very well and not enough to remember most of it past a week. The college learning environment often sets students up to procrastinate.

What does this mean for faculty? The college learning environment teaches students that learning happens in large chunks when the syllabus only lists large projects and reading assignments, or when we instruct students to “read the next five chapters by next week.” Even if we do not want to structure every learning experience for students, the way we word assignment directions, structure readings, scaffold projects, and discuss work management with students can make a significant impact in how well students do in our courses and beyond.

How to Design Small, Frequent Practice in Your Classes

1. Evaluate the course for small, frequent practice.

   Identify the most important concepts or skills (3-5) students must learn to succeed in the course. Evaluate how often students are actively practicing and applying those concepts using these questions:
   - How many times is this practiced?
   - In how many ways is this practiced?
   - How frequently is this practiced?
Over what span of time is this practiced? Be as specific as possible in your answers. The concept is likely practiced intensively during one week in which you are “covering” it, but identify if it is brought back into future weeks. These significant concepts will need to be introduced early in the semester in order to build many layers in the “brick wall.”

Reading and listening to lectures does not count as practice, but working out a practice problem within a reading or posing a problem within a lecture, in observable ways, does count as practice.

2. Embed small, frequent practice into lectures.

Provide an opportunity for students to test their ability to use the knowledge you are providing. This can be accomplished in very small ways, but they should give every student some form of feedback. For example, an open class discussion question only practices the knowledge of students who volunteer an answer, but requiring all students to spend 30 seconds writing an answer requires students to compare their response to the class discussion and your answer.

3. Embed small, frequent practice into reading.

Reading is a major learning responsibility faculty place on their students in order for students to come to class prepared to learn. But students’ reading practices are often not conducive to learning. In short, they passively move over the words without checking their understanding, which can be called the “illusion of competence,” or believing they know it because they have “read” it. There are many simple, but powerful ways to make sure students are benefiting from the reading:

- Require completion of practice activities in the textbook. These are often designed specifically for learning, but ask your students how often they do these on their own!
- Use “Check Your Understanding” quizzes. Use a few questions to test students’ ability to recall definitions, translate ideas to different contexts, and compare multiple concepts in the reading. These can be low-stakes so that grading is minimal or complete/incomplete.
- Assign end-of-reading summaries, with a class preparation question

These measures will require some form of “checking” on your part, but this can be a minimal effort with maximum reward. Helena Riha, linguistics faculty at OU, provides a model for this type of reading accountability in her larger courses.

Practice Makes Perfect, from OU’s Barbara Oakley’s Learning How to Learn MOOC

For more on the content presented in this CETL Teaching Tip, watch the “Practice Make Permanent” video (Week 1) in the Learning How to Learn MOOC, featuring OU engineering professor Barbara Oakley and Terrence Sejnowski, UC San Diego biological studies professor.
The Power of Chunking: Meaningful Groups and the Memory Palace

We often seek the limits of our memories, from how many names and numbers we can hold in our heads to how far back our memories can reach. We marvel at how much some students can hold in their minds. At other times, we might wonder how our students could forget the point we have covered multiple times. While we are right to reject the notion that rote memorization is the goal of learning, recall is an important skill for performing higher levels of thinking. So, how do we get the most out of our memory? Consider the challenge below: recall 13 letters.

Which group of letters is easiest to remember?

| HYBYAPIAPRDHT | AA B D HH I PP R T YY | HAPPY BIRTHDAY |

Each of the three groups holds the same letters, but most English language speakers would agree that these groups get increasingly easier to remember based on how the letters are arranged and spaced. This is the power of chunking: if we know enough about a knowledge area, such as the English language, to know how concepts are typically grouped and how those groups relate to one another, we can recall an astounding amount of information. With no chunking system in place, we could hardly function. While 13 randomly arranged letters would be very difficult to memorize in one minute, literate English speakers could easily memorize the letters when arranged to make two words. They could memorize 100 letters in a minute—as long as the letters formed words whose meaning fit together.

Build a Memory Palace

One popular chunking strategy is the Memory Palace, which involves organizing concepts one wants to recall by mentally visualizing a palace with many floors, rooms, and closets—even drawers!—in which to place each concept. This visualization gives someone a limitless capacity to recall a vast array of memories. Students can use such a strategy to memorize vocabulary, historical dates, and formulas.

What does this mean for students?

If students are very new to a content area, they start with a very limited capacity to chunk information presented to them in a lecture or textbook. They might be able to do some chunking, such as the progress made from the first group of letters to the second group of letters, but they will still not only struggle to recall the content (nine letters from the English alphabet, some repeated twice), but also be
able to figure out the ultimate concept (well wishes on the anniversary of your birth!). We use chunks to understand what tools are required to assemble a chair or what a group of molecules form compounds and other organic matter.

Students who are more advanced in their degree programs should be expected to not only make advanced chunks, but create new chunking systems. These chunking systems can be individualized to each student to increase capacity.

**What does this mean for faculty?**

As an expert in your field, you likely chunk information related to your field without realizing it. When course content requires students to memorize and connect concepts, be explicit in how concepts can be grouped and how they are related. Depending on your students’ proficiency levels, determine when to model chunking and when to have students chunk material.

### How to Use Use Chunks in Class to Boost Memory

1. **Explicitly model chunks at the beginning of a course, starting with the syllabus and Day 1.**

   Day 1 of a semester sets expectations for how the whole semester will operate. Start with the syllabus, an often long document that can strike students as a random splatter of information. Ask students to chunk its content:
   - How is the syllabus organized?
   - How would you “chunk” the course schedule (e.g. *Weeks 1-4 introduce rhetorical terms; Weeks 5-8 connect rhetorical strategies to different media...*)
   - How would you chunk this coursework with past coursework? (e.g. *Interview projects: This class’s research project requires primary research, such as an interview. I have done interviews as part of a research project before: 10th grade interview with veteran and 12th grade research project with two interviews.*)

2. **Have students create chunks as a repeated homework task.**

   Use frequency to communicate the value of chunking as a thinking skill. Make chunking a component every period of out-of-class work, from locating how a reading chunks information to chunking how class activities match up with required reading.

3. **Open class with a chunking activity.**

   Since textbooks often chunk material for students, they can often have the illusion of competence, or make students believe they know the material just because they have seen it. To prime critical thinking in your class session, open with an exercise that requires students to chunk class concepts. Students could organize concepts related to one or four units of course content. They could also chunk course concepts with events, media, and material beyond the course.
   - Simple example: “What do [concept 1], [concept 2], and [concept 3] have to do with one another?”
   - Intermediate example: “Organize these 15 concepts into groups. In five minutes, be ready to explain the groups you created.”
4. **Conclude class by asking students to chunk material learned over several class sessions.**

Based on your students’ knowledge and skill level, challenge students to chunk material in structured or unstructured ways:

- **Structured:** “How does [concept 1, 2, and 3] from this class session fit with [concept 4, 5, and 6] from earlier this week?
- **Unstructured:** “Consult your class notes to draw a concept map of this week’s material.”

**Construct a Memory Palace.** A good memory palace is an ongoing construction. As a method of concluding a class session or unit, ask students to construct a memory palace that can be built upon incrementally.

5. **Challenge students to “chunk” questions on a practice test.**

Have students analyze a practice test to identify areas of the most importance. Ask them to identify patterns in question form, vocabulary, and concept and how these patterns can inform their study strategy.

- If most questions are multiple choice, how can you best prepare for this type of assessment?
- Do these tests require working knowledge of 10 formulas or proficiency in four formulas?
- The phrase “choose the best answer” is used multiple times. What separates a “good” and “best” answer?

**For other projects and assessments**

Students can do a similar exercise to best prepare for other types of assessments. For research papers, have students chunk their draft components based on the rubric to determine if they have prioritized the correct elements.

6. **End the semester with a “memory palace.”**

Research and experience suggests that unless students employ strategic study and reflective skills, they will retain a small fraction of the material they learned during a semester. Give students a creative project that challenges them to translate the memory palace to the course content they learned. Since visualization is important to memory, encourage students to choose a structure fitting of the course—a biome, a neighborhood, a school, a library. Assess students based on the accuracy of their chunks and the varying layers of grouping (e.g. memory palaces that go from large hallways to individual shelves).

**Chunking and Memory, from OU’s Barbara Oakley’s Learning How to Learn MOOC**

For more on the content presented in this CETL Teaching Tip, view the videos and readings on Chunking (Week 2) in the Learning How to Learn MOOC, featuring OU engineering professor Barbara Oakley and Terrence Sejnowski, UC San Diego biological studies professor.
Procrastination: Changing Small Habits Has Big Payoffs

Procrastination is too often perceived as an inevitable condition of university classes. Sometimes it is worn as a badge of honor, students bragging that they crammed work designed for a two-week work span into six hours. But students and faculty lose out on rich learning opportunities. Students are less likely to retrain and transfer what they have learned: while cramming can result in the type of short-term memory required to score well on an exam, that knowledge is not solidified in a meaningful way (see the Small, Frequent Practice Makes Permanent teaching tip). Faculty can also be disappointed at a lack of depth in the work and connection to concepts covered across the semester.

The good news is that procrastination is predictable and can be rewired. We can also consider how course design can either encourage or prevent procrastination.

1. Evaluate course design for procrastination traps.

   College courses can set up students for procrastination’s grasp. By scaffolding larger projects with smaller checkpoints, or at least providing tips on how much progress students should be making, students will better sidestep procrastination traps. If you want students to practice this skill for themselves, prompt them to make a plan. Questions like these can help:
   - How much time do you spend reading per week?
   - How long is a typical study session?¹

2. Invite students to use the Pomodoro Technique for getting started.

   Procrastination makes it literally painful to start a task, especially if it is overwhelming in scope or challenge. The Pomodoro Technique, which comes from a “tomato”-shaped timer, meets this challenge by encouraging students to spend a small amount of time on a task. “Just spend 20 minutes working on this part. That’s it! Anyone can work on this for 20 minutes!” This technique shifts the focus from product (finishing a 20-page research paper) to process (a set amount of time to identify which research studies on a similar topic relevant to the paper). Once students

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¹(Smaller, more frequent practice sessions not only stave off procrastination, but also help us learn the material better.)
get going, they’ll be surprised that they are on a roll and don’t want to stop once the 20 minutes has expired.

3. **Help students identify procrastination cues and rewards, and rewire them.**

Habit loops are developed by a cue, routine, and reward. The procrastination cue is the stress of difficult work, which often leads to a routine of controllable tasks, such as browsing social media, checking messages, or cleaning. Ask students what new routines can replace these less-productive routines, such as the pomodoro technique or focusing on smaller tasks. Then, by placing a reward after this work, good habits are taking place! See a more developed example in the Habit Creation teaching tip.

4. **Share your own trials and tribulations with procrastination.**

Let’s admit it: some of us are procrastinators, and maybe even proud of it! While we have different learning and working preferences--and procrastination may sometimes work for us sometimes--it is not a productive habit for sustaining high productivity and deep learning. Share with students your own cautionary tales of procrastination and how you work to prevent procrastination.

**Focused and Diffuse Modes, from OU’s Barbara Oakley’s Learning How to Learn MOOC**

For more on the content presented in this CETL Teaching Tip, watch the “Create a Lively Visual Metaphor or Analogy” video (Week 4) in the Learning How to Learn MOOC, featuring OU engineering professor Barbara Oakley and Terrence Sejnowski, UC San Diego biological studies professor.
Empower Students with Habit Creation

Neurological studies of the brain show that habits leave a permanent impact on the brain, meaning that old habits never truly die, but they can be replaced if rewarded with new ones. Teach students the basic science of habit, and empower them to own their learning and plot their success. Charles Duhigg’s best-selling Power of Habit (2012) states that in order to modify old habits, it is necessary to:

- Identify the cue, routine, and reward of a habit
- Control old routines by modifying parts of this cycle
- Craft new habits with a plan at each part of the loop

1. **Cue:** The stimulus that triggers a behavior
   
   “*[stimulus] Everytime I eat a snack, [behavior] I get bored and watch TV.”

2. **Routine:** The observable behavior of the habit
   
   “*While snacking, [new behavior] I will study notes from class [old behavior] instead of watching TV.”

3. **Reward:** The completion of a routine that offers sense of fulfillment
   
   “*[reward] I can watch TV and unwind now that I have reviewed my notes.”

**Consider The Habit Loop for Student Learning**

Planning a few habit loops in class on a regular basis can help get students focused faster, solidify what they have learned at the end of class, and even subvert negative reactions to assessments. Help students identify habits that hinder overall success as a student. Ask them to identify the cue, routine and reward, and have them consider how they can either supplant parts of this loop or override the loop with a new habit.

**Resources**

Retrieval Practice Makes It Stick

“As unless we remember, we cannot understand.” - E.M. Forster

As we attempt to challenge students’ skills in critical thinking, we must keep in mind that memory is a foundation for learning. Connecting questions to new material, or engaging in retrieval practice, does more to promote long-term retention than re-reading.

Retrieval practice in a classroom setting proves important for student success because students already practice retrieval practice independently with principle study strategies such as highlighting and re-reading. The most common form of retrieval practice in a classroom is building frequent low-stakes quizzes into a course. However, some simple, ungraded activities can also provide retrieval practice. Other methods include:

- Begin class by asking students to recall, without checking their notes, what they learned in the previous session.
- Pause every 15 minutes and ask students to share with a partner the important points made so far, a personal example of the principle under discussion, or their own definition of a key term.
- End class with a “one-minute paper,” a short and anonymous paragraph that explains the main point of the day’s class and mentions any lingering questions.

Use retrieval practice regularly, as it is wise to select strategies that fit our personal teaching styles. To help students commit, explain how retrieval practice can enhance their learning. While answering any kind of question aids retention, remember that open-ended questions are more powerful than multiple-choice items. Written by Susan Hall from the University of Incarnate Word. Banner image from ElisaRiva within copyright permission.

Resources


Identify Bottlenecks to Student Learning to Develop Improved Learning Strategies

From a student’s perspective, teachers solve problems through processes that seem mysterious and hidden. Students might not comprehend all the intermediate steps hidden below the surface of your teaching methodology. This may create barriers to your students learning. As you internalize disciplinary cognitive skills and procedures through extensive practice and repetition, you may begin to automate steps in your teaching process without deliberate thought.

The “curse of expertise” sometimes prevents experts such as yourself from accurately anticipating the obstacles that impair the learning of novices (Hinds, 1999). Experts tend to represent and describe their knowledge in abstract language that interferes with clear communication with novices (Hinds, Patterson, & Pfeffer, 2001; Nickerson, 1999). The challenge facing teaching experts is to articulate their implicit knowledge explicitly so that it may be accessible to students.

Researchers at Indiana University have been exploring ways to make implicit expert knowledge explicit through a process called Decoding the Disciplines. They identify three types of bottlenecks or obstacles to learning:

- **Procedural bottlenecks** occur when successful completion of a task requires multiple steps. Students may not have identified and/or mastered all of the steps required to complete the task (e.g., the steps involved in formulating a hypothesis, identifying competing hypotheses, and determining which variables must be manipulated, etc.).

- **Epistemological bottlenecks** occur when students do not understand how knowledge is constructed within a discipline (e.g., the nature of what “counts” as evidence to support an argument).

- **Emotional bottlenecks** occur when students have emotional responses to the discipline or subject matter that hinders learning (e.g., when students feel that their religious beliefs are threatened if they study or accept the concept of evolution in biology).

The Decoding the Disciplines process helps expert faculty identify conceptual bottlenecks and discover strategies to help make implicit expert strategies explicit. The process involves the following steps:

1. Identify a bottleneck concept
2. Define the processes students must learn to overcome the bottleneck
3. Identify ways to model these processes
4. Create activities and assignments that give students practice with these processes
5. Processes and feedback on their performance
6. Identify strategies to maintain student motivation while learning these processes
7. Assess student progress in acquiring these processes
Resources


Submitted by Claudia J. Stanny, Ph.D., Director, Center for University Teaching, Learning, and Assessment, University of West Florida, uwf.edu/cutla.
Techniques to Help Students Think About Their Learning

An essential component for student comprehension is the initialization of thought towards learning, or metacognition. Although metacognition ties directly to student success, it is often not taught externally, and it is a skill that many college students do not develop. To structure a fulfilling course which students may become more aware of their own learning, consider the following three strategies to foster metacognition:

- **ConcepTests (or clicker questions):** These multiple-choice questions are asked during a break in lecture, students individually answer them (anonymously), they debate the answer with their peers, and they vote again. These allow students to find out how well they understand concepts as they are taught in class.

- **Online Quizzes:** Multiple-choice quizzes test the students on concepts they learned in class, but are completed by students on their own time outside of class. Students may retake them up to three times, with a different selection of questions each time. Students can use this as a way to self-test their understanding for concepts, which is useful immediately after class and as a way to study for an exam.

- **Exam Wrappers:** After each exam, students are to reflect on how well they studied and methods they could implement in the future to study smarter. This technique encourages students to think about the effectiveness of their studying and how they might want to study differently to be more successful on the next exam.

**Why Practice Metacognition?**

As measured by the Motivated Strategies for Learning Questionnaire survey instrument, students in classes do not experience a decline in motivation and attitudes during the semester, as is commonly seen in other introductory classes, which is significant because research increasingly shows the importance of student affective domain (motivation and attitudes) on their learning.

Students report using many of these strategies for studying before a test, such as reviewing quizzes and focusing on their weaknesses in course content. These techniques give students immediate feedback on how well they understand concepts, help them take charge of their own learning, and consider what topics they need to spend more time on. After the initial set up, none of these methods take extensive amounts of time, and there is no manual grading required.
Strategies for Students

These Learning to Learn strategies for students utilizes what we know about how motivation, organization, procrastination, and strategies related to reading and writing can significantly impact how much students get out of their study periods. Give these exercises and guides to students to empower them to learn in your class and other courses.
What’s in It for Me?

These questions can improve learning outcomes by increasing motivation. For a more visual version of this exercise, download and print the Learning to Learn handouts.

1. Why are you here?

2. What is motivating you to be here?
   - **INTRINSIC** (personal motivation):
   - **EXTRINSIC** (rewards from others):

3. What do you hope to gain from this?

4. What can you contribute?

5. How do you hope to apply it in the future?
Goal Setting and Action Plan

Students who regularly set goals for themselves build the belief that they can succeed in their courses, which leads to the motivation to not only work harder, but enjoy the work (Zimmerman, 2000)! List three goals that you hope to gain from this experience. After each goal, list strategies that will help you meet that goal. For a more visual version of this exercise, download and print the [Learning to Learn handouts](#).

<table>
<thead>
<tr>
<th>GOAL 1:</th>
<th>Strategies:</th>
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<tbody>
<tr>
<td>GOAL 2:</td>
<td>Strategies:</td>
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<tr>
<td>GOAL 3:</td>
<td>Strategies:</td>
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Organizing for Success: Templates

For a more visual version of these templates, download and print the Learning to Learn handouts.

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<thead>
<tr>
<th>TO-DO TASK LIST</th>
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<tr>
<th>WEEKLY TASK LIST</th>
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<tbody>
<tr>
<td>DATE RANGE:</td>
</tr>
<tr>
<td>School</td>
</tr>
<tr>
<td>❏</td>
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<tr>
<td>❏</td>
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<td>Personal/Work</td>
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<tr>
<th>MONTHLY TASK LIST</th>
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<tbody>
<tr>
<td>October Tasks for School</td>
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<td>October Tasks for Work/Other</td>
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**TIP:** Make your smartphone smarter by using organization apps that give reminders and organize task lists across all devices you use for school.
Accountability Coach

An accountability coach can be anyone who cares about your success and can motivate you to keep working toward your goals. Identify a coach or mentor, and make a plan for how to work with this coach.

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<td>Type of Contact:</td>
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Consider working with more than one accountability coach for a variety of goals and needs.

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<td>Frequency of Contact</td>
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# Metacognitive Note-Taking Template

For a visual guide on the rationale for this note-taking template and more instruction, download the [Learning to Learn handouts](#).

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<thead>
<tr>
<th>Topic:</th>
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<td>Date:</td>
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### Writing Notes and Reflections Together

As you take notes on material shared during class, simultaneously write your reactions to this material (reflections, thoughts, connections).

<table>
<thead>
<tr>
<th>Reflections/Thoughts</th>
<th>Notes</th>
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### Summary and Takeaways

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Class Content Note-Taking Templates

If multi-directional diagrams work well for you, try some of these templates, which can help you draw connections to ideas in a way that makes the concepts stronger and more permanent. For a print-friendly version of these visual templates, download the Learning to Learn handouts.

**Venn Diagram**

**Web**

**Linear**

I. ________________________________

A. ______________________________

1. ______________________________

2. ______________________________

B. ______________________________

**Productive Motions for Studying**

**HUG:**
Give yourself a hug. It’s good for the brain, and might draw some attention at the library.
STRETCH:
It’s good for the body and for focus to stretch since studying often keeps you sedentary.

BREATHE:
Intentional breathing can give your brain a break, which helps you refocus, relax, and go back at it re-energized.

MOVE:
Our brain is most energized when the body is in motion. Walk, do some pushups, or play with your dog.

INDULGE:
Go ahead and send a text or grab a snack, but make sure this is only done during the break. When it’s time to get back at it, put away the phone and turn off notifications.

TIME:
In class, use mini-lectures to ensure a change of activity every 20 minutes. At home, take a quick stretch break work and study for 20 minutes, or work for 45 minutes and take a 15-minute break.

Strategies for College-Level Reading

Pre-Read: Understand the landscape of the text.
- Scan the text to understand its structure and types of data.
- Articulate the context and purpose. More than what does it say, identify why it is saying it. What is most important to the text? Why are we reading it at this point in the class?
- Think about the topic at hand. What do you already know about this? What does it make you think of?
Read Critically: Be active participants rather than passive reading sponges.

- Use **two highlighters**, one to note key concepts; the other to note questions.
- Keep a **reading journal**, or space to write reactions to the text and ideas based on the text.

Post-Read: Make sure it sticks.

- Review and reflect (pre-reading and notes)
- Summary before switching gears/before sleep
- Review within 24 hours

**Strategies for Studying**

See the full list of study strategies with descriptions of each, or Dunlosky et al.’s (2013) original study.

- **L**= low impact  (Summarization, Highlighting, Keyword Mnemonic, Imagery for Text)
- **M**= medium impact  (Elaborative Interrogation, Self-Explanation, Interleaved Practice)
- **H**= High Impact  (Practice Testing and Distributed Practice)

**Practice Testing**

Create your own test questions.
Prompts

- Why ...
- Describe ...
- Compare and Contrast ...
- Outline ...

**Distributed Practice**

Spread out studying over several days and periods. Calendar planning helps automate this productive study habit.
Debrief

Reflections and Takeaways

How did this learning experience add to/change my

- Knowledge/understanding?
- Skills (including meta-cognitive skills)?
- Behaviors, dispositions, attitudes?
- How (when and where) will I use this in the future? Next steps?

Additional Reflections
References for Learning to Learn


