

Module One: What is Learning?



Cognitive Function and Learning Explained

Dear Teachers and School Facilitators,

Welcome to Module One of the Cognitive Function and Learning Explained Curriculum. This pdf is intended to provide information, activities, and visual aids to support you and your students as they endeavor to understand their minds and how to develop the skills of lifelong learners.

All content is intended to be adaptable to your environment. Within each of the module pdfs, there will be “quick facts” sheets that provide quotes, evidence-based information, and definitions of terms to help you present this information to your students.

Some activities are derived from Cognitive Behavioral Therapy (CBT) practices, but they are never intended to be used therapeutically. This curriculum incorporates therapeutic tools; however, it is not a curriculum for therapeutic practice. It is focused on learning, study tools, and self-reflection to help adolescents develop their learning skills.

Thank you for your efforts to connect education to mental health!



What is Learning?

“Acquiring knowledge and skills and having them readily available from memory so you can make sense of future problems and opportunities” (Brown et al., p. 2).

The Three Steps of Learning

1. **Encoding** - The initial learning held in the short-term working memory before being understood and utilized in long-term memory.
2. **Consolidation** - The reorganizing of memories to give them meaning and connection to past experiences already stored in long-term memory.
3. **Recall** - The ability to pull learned memories and apply them when needed.

Evidence-based Approaches to Learning

1. **Spaced Practice** - A learning method where study sessions are spread out over time to improve retention and understanding of the material.
2. **Interleaved Practice** - Mixing the sequence in which things are learned, rather than mastering a concept before moving on to another one.
3. **Varied Practice** - Including different conditions when practicing knowledge or skills.



Executive Functioning

Executive functioning refers to a set of mental skills that help people plan, focus, remember things, and manage tasks. These skills include problem-solving, staying flexible, and



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Part One Reflection

- How does understanding the three-step process of learning help us when studying or learning something new?
- How can you use spaced practice in your study routine?
- How can you use interleaved practice in your study routine?
- How can you use varied practice in your study routine?
- How do you think executive functioning skills can help you in everyday life?



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The Testing Effect

Periodic quizzing has proven to increase recall of material better than reviewing or rereading.

The Argument for Testing

“Effortful retrieval makes for stronger learning and retention. We’re easily seduced into believing that learning is better when it’s easier, but the research shows the opposite: When the mind has to work, learning sticks better.”

– Brown et al., p. 43

Desirable Difficulties

Desirable difficulties are the challenges within our capabilities and knowledge that encourage stronger and more durable learning.

The Myth of Errorless Learning

“Errorless Learning” was a theory that believed mistakes made by learners were counterproductive and resulted from bad teaching. Information was spoon-fed in small amounts and immediately tested to avoid errors.

This was shown as an ineffective learning strategy as “errors are an integral part” of mastering new material.



Brain Anatomy Quiz

1. What part of the brain is responsible for coordinating voluntary movements and balance?
 - a) Cerebellum
 - b) Frontal lobe
 - c) Occipital lobe
 - d) Brainstem
2. Which area of the brain is associated with processing sensory information such as touch, temperature, and pain?
 - a) Parietal lobe
 - b) Temporal lobe
 - c) Occipital lobe
 - d) Amygdala
3. The hippocampus is primarily involved in:
 - a) Emotional regulation
 - b) Motor control
 - c) Long-term memory formation
 - d) Vision processing
4. What part of the brain plays a crucial role in language comprehension and processing?
 - a) Frontal lobe
 - b) Temporal lobe
 - c) Parietal lobe
 - d) Cerebellum
5. The brainstem controls essential functions like breathing, heart rate, and digestion. Which of the following is part of the brainstem?
 - a) Thalamus
 - b) Hypothalamus
 - c) Midbrain
 - d) Corpus callosum



Part Two Reflection

- Have you ever felt frustrated when something was difficult to understand?
- How did you respond?
- How can we use the understanding that desirable difficulties increase learning and errorless learning decreases it?
- What are some ways to use the testing effect in a study routine?



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The Feynman Technique

Learning Through Teaching

The Four Step Process

1. Choose a Subject.
2. Explain it as if teaching to a child or beginner.
3. Reflect on gaps in your understanding.
4. Simplify and Repeat.

Why is it Effective?

The Feynman Technique helps us simplify complex or new ideas. Teaching reinforces information while developing communication and critical thinking skills. It helps us recognize where there might be gaps and allows us to gain a deeper understanding.

Who was Richard Feynman?

Richard Feynman was a Nobel Prize winning theoretical physicist who believed teaching served two important purposes: to keep him engaged in the underlying principals of his field and to contribute to the world.

"I don't believe I can really do without teaching." - Richard P. Feynman



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Mnemonic Devices

Memory aids or techniques that help individuals remember information more effectively by associating it with easy-to-recall cues, patterns, or associations.

Types of Devices



ABC

Acronyms



Mind Palace



Songs



Poetry &
Rhyme Schemes



The Executive Function Challenge

A Case Study

A high school student, Alex, is struggling to manage their academic workload and extracurricular activities effectively. They find it challenging to stay organized, prioritize tasks, and meet deadlines, leading to stress and frustration. Their grades are starting to slip, and they're worried about their academic performance and future prospects.

Case Study Questions:

1. What executive function skills is Alex struggling with?
2. What should Alex focus on to improve their academic performance and overall well-being?
3. What are some things Alex might do to address their challenges with executive function?
4. What role does metacognition play in Alex's ability to recognize and address their executive function deficits?
5. How can teachers, parents, or peers support Alex in developing their executive function skills and using effective learning strategies?

Case Study Discussion:

In small groups, analyze Alex's situation and discuss possible solutions to help them overcome their executive function challenges. Consider how Alex can break down tasks into manageable steps, create realistic schedules, and monitor their progress towards goals. Brainstorm strategies for improving Alex's self-awareness and self-regulation, as well as ways to provide support and encouragement from teachers, parents, and peers.



Module One Review

- Can you explain what executive functioning is?
- What kinds of things are considered executive functioning?
- Do you think it's helpful to have strong executive function skills? Why or why not?
- Do you think it's necessary to know how the brain learns? Why or why not?
- Are there any areas of executive functioning that you'd like to work on?

Creating a Concept Map

1. Choose a Topic: Start with the main idea or topic you want to explore
2. Write the Main Idea: Write the main idea in a large circle or box at the center of your paper/digital canvas
3. Identify Key Concepts: Think of related ideas or key concepts that connect to the main idea
4. Draw Connections: Draw lines to connect the key concepts to the main idea. Add labels to the lines to show how they are related.
5. Add Details: For each key concept. Think of supporting details or sub-concepts. Write these near each key concept and connect them with lines.

