3 Proven Strategies
to Teach Executive Function
from a Harvard Fellow

An Interview with **Catherine R. Chase, M.A. LDTC**

Harvard Fellow, Psycho-Educational Diagnostician
and Interventionist

Digitability.com

JOBS

Monthly Webinar Series

Catherine Chase, MA LDTC

HARVARD
MEDICAL SCHOOL

- Psycho-educational diagnostician and interventionist

- **1st educator** to receive a fellowship in Developmental and Behavioral Pediatrics at Harvard Medical School

Catherine Chase, MA LDTC

- Master of Curriculum and Instruction from Catholic University of America

- Advanced training in educational diagnostics from Tufts

- Additional fellowship work at Children's Hospital of Boston

Catherine Chase, MA LDTC

PEDIATRIC
Wellness.Network
and Adult Rehab

Digitability.com

- **Over 30 years experience** in the field of education, diagnostics, and intervention

- Associate practitioner and interventionist at the Pediatrics Wellness Network

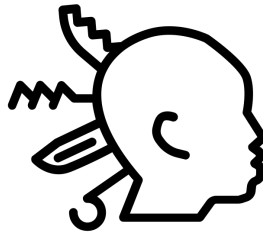- Currently a curriculum advisor to Digitability.com

What is Executive Function?

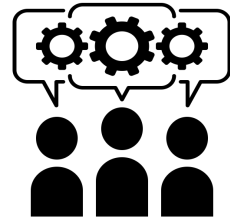Executive function is a **complex system of processing** in the brain.

Executive functions allows us to:
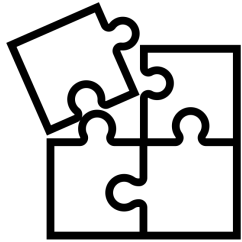
Retain Information
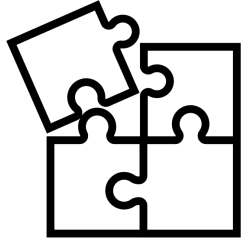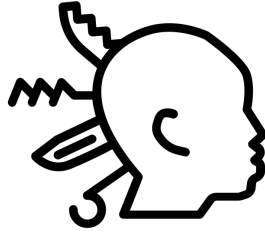
Focus attention/ Filter Distractions

Switch Mental Gears

What is Executive Function?

Retain Information
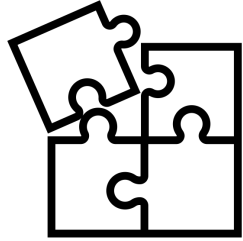
Focus attention/ Filter Distractions

Switch Mental Gears

These functions **integrate** with each other to control our cognitive processes.

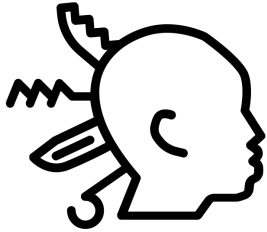They provide **critical support** for learning and development.
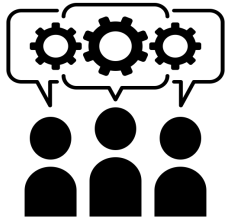
3 Basic Parts of EF

Working Memory

The ability to hold information in mind use it.

Sustained Attention

The ability to master impulses to resist temptations, distractions, and habits, and to pause and think before acting.

Mental Flexibility

The capacity to switch gears and adjust to changing demands, priorities, or perspectives.

Executive Function Metaphor

There is a classic metaphor that helps us to understand the role of executive function in **thinking and behavior**.

The metaphor was coined by **Dr. Thomas Brown, PhD**., a clinical psychologist who received his Ph.D. from Yale University and Director of the Brown Clinic for Attention & Related Disorders in Hamden, Connecticut.

Brown specializes in assessment and treatment of high-IQ children, adolescents and adults with ADD/ADHD and related problems.

Executive Function Metaphor

Dr. Brown asks us to imagine an **orchestra conductor**.

The conductor…

- **chooses** what work the orchestra will perform

- **decides** how to interpret that work

- **sets** the tempo for the performance

- **directs** each section of musicians to contribute at the appropriate time.

Executive Function Metaphor

Dr. Brown asks us to imagine an **orchestra conductor**.

In the same way, executive functioning allows us to **self-regulate** by cueing, directing, and coordinating the various cognitive skills necessary for moment-to-moment functioning.

EF + Learning and Behavioral Disabilities

Catherine Chase, M.A. with one of her students.

Executive functions play a **dynamic role** in students with learning and behavioral disabilities.

They have a **major impact** on **school and social success**.

Working Memory + Reading Comprehension

When students are reading a passage, paragraph or even an entire book, they are doing a few things at once.

They are holding on to the theme of the content, while simultaneously processing new information.

For example, "Who was Walt Disney?" is a biography and when our student is reading it, she is first, holding on to the theme of who Walt Disney was (who had dyslexia, by the way), but then simultaneously identifying other main characters in the story, recalling the setting, the plot, and understanding the conflict as she reads through the new content and then processes the new content for comprehension.

Working Memory + Reading Comprehension

To go back to our orchestra metaphor, that means that the violins are all playing in harmony.

But as you move up through the school system, the memory load requirements **increase significantly**.

That means that more violins are being added to the orchestra AND playing at a faster tempo.

Thus, the efficiency in working memory is increasingly essential.
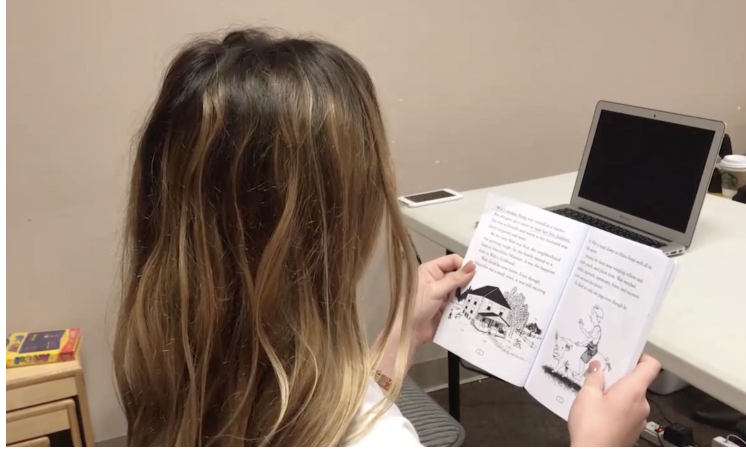
Working Memory + Reading Comprehension

As drums are added to our orchestra, that's our **sustained attention** keeping the beat so we stay focused.

While the brain is using working memory to hold on to themes and manage new information, the brain will also need to sustain attention to complete the task.

Working Memory + Reading Comprehension

As the student is reading and using **working memory** to process the many elements of the story, the student must sustain her attention to the current task of reading.

In order to sustain, the student is using her **self-regulation skills** to avoid distractions and impulses.

For example, if the student is not sustaining their attention, then they will be leaking information from their working memory. They won't be able to recall important information from the text. When the percussion section is off beat, the violins skip or loose notes from the song.

Mental Flexibility

Now, we'll focus on **mental flexibility**, which is the capacity to switch gears and adjust to changing demands, priorities, or perspectives.

As the student is reading the passage, they are still using working memory and sustaining their attention, but they are **also shifting gears** from main idea to the supporting details then to identifying known vocabulary, as well as potentially unknown vocabulary.

Mental Flexibility
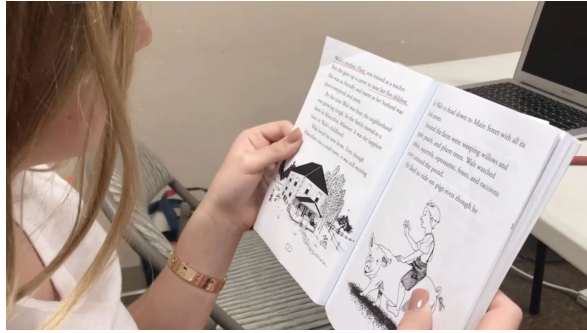
Mental flexibility means that even as a student is teasing out the supporting detail, they are shifting back to how that detail relates to that main idea.

Another example of mental flexibility is when a new character is introduced, the student will shift flexibility back to the memory of the main character to process the relationship between the two characters.

Mental Flexibility

To go back to our metaphor, the percussion will keep the tempo, meaning the brain will **sustaining mental effort** and **self-regulating**.

With this tempo or sustained effort, all of the string instruments play to the theme together, flexibly shifting all the time to maintain the harmony and at the direction of the conductor.

This is executive functioning.

Capacity to Develop Executive Functions

Often, society holds a view of intelligence or ability to be fixed; it's the view that we are born with a specific capacity that has a limit.

In other words, you have a fixed IQ and that will determine your success in the school system or in life.

However, we know that **the brain has the capacity to change** and our thinking abilities are not fixed and can be developed.

It's the same with executive functioning.

Executive Function Research

That is why so many researchers are increasingly emphasizing how crucial it is for all learners to **develop their executive function**s and for **educators to utilize** these executive functioning strategies.

Executive functions **impact all aspects of student learning**, especially as students approach adolescence and their **transition to independence**.

Executive Function Research

Researchers are now recommending that **all children be taught executive function processes** systematically starting in the elementary grades.

According to Lynn Meltzer, who is the co-founder of the Research Institute for Learning and Development, she reports that "in early elementary grades teachers are requiring students to complete long-term projects, as well as lengthy reading and writing assignments-all of which require executive functions. We live in an Internet-driven society and students are not taught from information that is pre-organized by experts… therefore, it is critical that every child is taught these kinds of strategies because they impact all aspects of student work as they move up in grade levels."

This instruction is even more critical for students with disabilities, especially in light of the research showing that student with cognitive disabilities and behavior disorders often demonstrate weaknesses in executive functions, thus, depressing social and academic success.
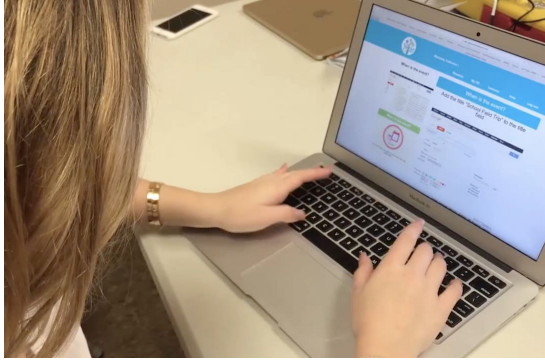
Strategies for Working Memory

One strategy for developing working memory is **chunking information**.

When students struggles with working memory, they are not fully managing to hold on to all of those elements of the story and therefore score low in reading comprehension.

Strategies for Working Memory

For example, Digitability's online learning program chunks information through the process of **task analysis**.

In other words, it's breaking down the information or the tasks into the smallest, manageable chunks to process.

For instance, the lesson on using a Google Calendar app breaks down each step to creating a calendar event.

With the structure and repetition throughout the program, students increase their capacity in working memory.

Strategies for Sustaining Attention + Self-regulation

Now, using this same Digitability module on using an online calendar, we can look at strategies for sustaining attention and self-regulation.

Nothing is more fun than unlocking reward badges and playing games during the school day.

This alone helps increase motivation, which promotes sustained attention.

Motivation is just one part of sustained attention. Other components consist of self-monitoring, prioritizing, time management.

Strategies for Sustaining Attention + Self-regulation

In addition, the **classroom economy** portion of the Digitability program positively reinforces student behavior and increases self-regulation.

Strategies for Sustaining Attention + Self-regulation

Students using the Digitability Curriculum keep a calendar of project deadlines and steps along the way will promote **self-monitoring, prioritizing and time management**.

Today, calendar apps such as Google Calendar can not only be accessed on the computer, but also on a phone or other device.

When you have a visual tool like this, you can break down a project into manageable parts.

Strategies for Mental Flexibility

Finally, we can look at mental flexibility and, specifically, teasing out saliency (the important information).

Digitability builds the capacity to tease out important information. Through the interactive assessments at the end of each chunked lesson, students are required to identify the important information before receiving their reward of the badge.

To answer the activity correctly, they will need to flexibly shift back to the information taught in the lesson. And if they are struggling, the Digitability program has built in visual and verbal prompts to help to shift flexibly.

Strategies for Mental Flexibility
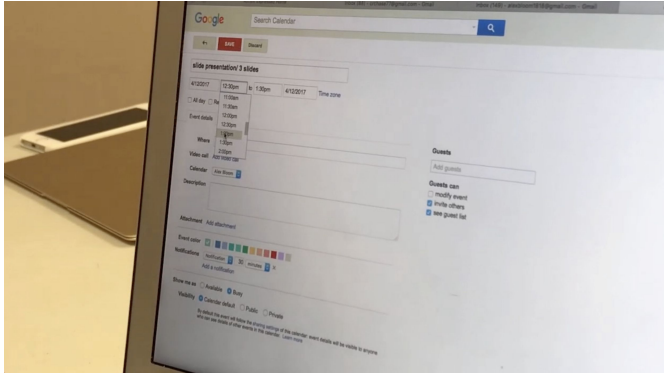
Flexibility is key because this is what allows the learner to generalize this behavior into a number of social and academic activities.

Our student now generalizes her learning of Google Calendar on Digitability to the application of the skills on Google Calendar.

This demonstrates how mental flexibility is essential to maximizing school success in areas such as time management, prioritizing, and self-regulation.

Strategies for Mental Flexibility
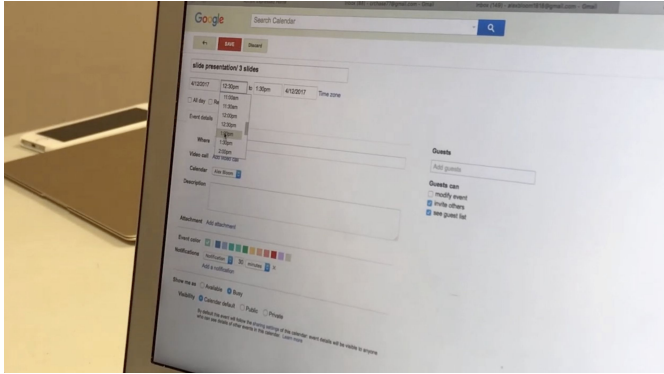
For example, the student is logging into her Gmail and must shift flexibly to get to Google Drive.

Then, the student shifts to Google Calendar and locates the correct date that she wants to schedule her Book Report Presentation.

She then begins to enter information onto her Google Calendar.

The student must make several other mental shifts to complete the task efficiently. She then locates the subject box and types information onto the calendar such as the event title. Then, the student shifts to type the date of the event, and then the student flexibly shifts to the address box to type in the address, and then another mental shift to where the event is located.

Following these shifts, the student shifts to the description section and types what the event will entail. Next, she shifts to save the information and finally must flexibly shift again to send it to the person who is invited to her book report presentation.

The Digitability's calendar lessons **enhance mental flexibility**, while simultaneously promoting executive function in time management, prioritizing and self-regulation, ultimately **maximizes educational success**.

Strategies for Mental Flexibility
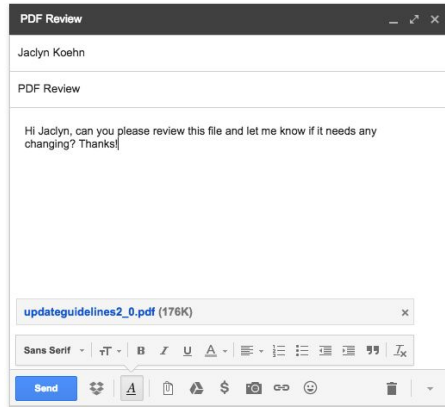
Now let's look at how mental flexibly plays out when a student is completing a task like sending email.

The amount of shifting that occurs in email is enormous.

Logging into your email account is a process in itself. Then, you're navigating the email interface to find the compose button.

You will eventually shift from entering the email address of the person you need to send the email to. Next, you'll need to write a subject line that is relevant to the content of the email, along with the actual content of the email.

The mental flexibility needed become even more complicated if you want to send an attachment, or include a Google Drive doc to your email.

Strategies for Mental Flexibility

Sending emails wasn't always an intuitive process.

While today, sending an email is completely intuitive for me and for many people, as anyone who has tried to learn something new understand, that wasn't the case when I started using email.

I wasn't always comfortable using technology with my students. The reason that I have this strong understanding of technology is because I learned it through the Digitability program.

Strategies for Mental Flexibility

Student testimonial: http://bit.ly/2pWnAPj

Students who don't have a strong executive functioning capacity like some students with autism, ADHD, language processing delays, and intellectual disabilities, it's these students that really require the type of digital instruction that Digitability provides.

Let's hear from our student why this type of instruction is so important:

"When people talk slow, I can get what they're saying. Like with Digitability, when the audio starts talking, the girl… she talks very slow, and then I get it all in my mind.

It's like when you save something in a calendar — you save it and it's going right into my memory because it's going really slow."

# Technology as a Means of Learning

When students walk into my office, they **prefer to use technology** as a **means of learning**.

As an diagnostician and interventionist, it was imperative that I could strategically use technology to **support their growth**.

I have really become a stronger interventionist because of Digitability. Using technology to support learning and behavioral interventions has truly increased both academic and social outcomes for the students that I work with.

Bring Digitability to Your School
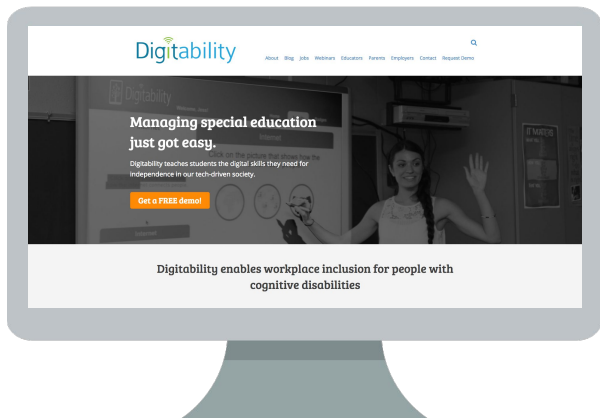
Learn More or Request a Free Demo of Digitability:

digitability.com/education