

PCOE



# Supporting Executive Functioning

*A summary of background information, research, best practice guidelines, and some good ideas to review before we “Tech Up”*

## What is Executive Functioning? [From Executive Function 101, an e-book developed by the National Center for Learning Disabilities (2013)]

**Executive Functions** are the set of mental, or cognitive, processes that helps us connect past experience with present action. They play a role in our ability to perform activities such as planning, organizing, strategizing, paying attention to and remembering details and managing time and space. Examples of things we do everyday that require functional executive functioning skills include:

- Making plans;
- Keeping track of time and finishing work on time;
- Keeping track of more than one thing at a time;
- Meaningfully including past knowledge in discussions;
- Evaluating ideas and reflecting on our work;
- Asking for help or seeking more information when we need it;
- Engaging in group dynamics;
- Waiting to speak until we're called on;
- Making mid-course corrections while thinking, reading and writing.



***Talk about career readiness...isn't this the same list of traits or characteristics that make us valuable in the workplace?***

Signs of “executive dysfunction” can be seen at any age, but tend to become more apparent as students move through the early elementary grades and the demands of completing schoolwork more independently trigger signs of a problem. If students have difficulty with the following tasks, they may need strategies and supports in these areas of executive functioning:

- Planning projects;
- Comprehending how much time a project will take to complete;
- Telling stories (verbally or in writing), struggling to communicate details in an organized, sequential manner;
- Memorizing and retrieving information from memory;
- Initiating activities or tasks, or generating ideas independently;
- Retaining information while doing something with it, for example remembering a phone number while dialing.

What are these “cognitive processes” that drive our executive functioning abilities...and what behaviors might we see for each if this is an area of challenge for a student?

<b>Impulse Control</b> <i>the ability to stop and think before acting</i>	<b>Emotional Control</b> <i>the ability to manage feelings by thinking about goals</i>	<b>Planning/Prioritizing</b> <i>the ability to create steps to reach a goal and to make decisions about what to focus on</i>	<b>Flexibility</b> <i>the ability to change strategies or revise plans when conditions change</i>
<ul style="list-style-type: none"> <li>• Saying or doing things without a cushion of time to reflect</li> <li>• Doing whatever is most “enjoyable” without considering obligations or commitments</li> <li>• Speeding through work, sacrificing accuracy and completeness</li> </ul>	<ul style="list-style-type: none"> <li>• Difficulty accepting even constructive criticism</li> <li>• Struggling to keep their eye on the goal when upsetting or unexpected things happen</li> <li>• Quick to call things “unfair”</li> <li>• Overreacting to losing or being called out in class</li> </ul>	<ul style="list-style-type: none"> <li>• Overwhelmed by complicated, multi-part tasks</li> <li>• Can't independently impose structure and order on ideas</li> <li>• Difficulty thinking through steps required to achieve a goal</li> <li>• Underestimating a project's complexity and time requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Difficulty when a familiar routine is disrupted or a task becomes complicated</li> <li>• Frustration sets in when a first attempt to solve a problem isn't successful</li> <li>• Unable to see new ways to do familiar tasks or to make another choice when the first choice doesn't work</li> </ul>

Working Memory	Self-Monitoring	Task Initiation	Organization
<i>the ability to hold information in mind and use it to complete a task</i>	<i>the ability to monitor and evaluate your own performance</i>	<i>the ability to recognize when it is time to get started on something and begin without procrastinating</i>	<i>the ability to create and maintain systems to keep track of information or materials</i>
<ul style="list-style-type: none"> <li>• Unable to remember and apply crucial information in order to move to the next step of a task</li> <li>• Struggling when a task requires that they remember a series of directions, generate ideas in response to the directions and then express ideas</li> </ul>	<ul style="list-style-type: none"> <li>• May not notice that they're not following directions until someone points this out</li> <li>• Tend to misjudge their own efforts and have trouble adjusting what they're doing based on feedback or cues</li> <li>• Sometimes surprised by a low grade on a test or project</li> </ul>	<ul style="list-style-type: none"> <li>• Trouble starting homework, put off projects until the last minute</li> <li>• Sometimes seen as "lazy" or unmotivated</li> <li>• Can get so overwhelmed that they tend to end up doing nothing</li> </ul>	<ul style="list-style-type: none"> <li>• Tend to lose things (e.g. permission slips, assignment sheets, notebooks, library books)</li> <li>• Don't tend to improve organizational skills in response to consequences (e.g. failing grade)</li> <li>• May see the value in being organized, but are unable to keep track of things without support</li> </ul>

### What makes things better?

- Maturation --- acquiring the executive functioning skills needed to be successful relies somewhat on development and varies from student to student; however we do know that for some students with underlying neurological deficits some of these areas may always be challenging and may need life-long support. For these students, understanding their needs and being able to identify the strategies that they need and how to access them independently is the goal.
- Good teaching --- a well-designed UDL classroom can effectively support a range of student's skills or challenges with executive functioning.
- Recognizing or identifying specific needs and then looking for strategies to support or work around these areas of challenge until a student can be successful is something we can do. For some students, these strategies are "scaffolds" ...steps towards either using the strategy independently (e.g. keeping an assignment tracker), and for some will be life-long tools. not needed a strategy at all anymore (e.g. keeping their desk organized).

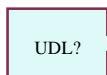
### The Importance of Executive Functioning Skills for 21<sup>st</sup> Century Students [Willis, 2011]

Academic success in our 21<sup>st</sup>-century schools is increasingly linked with a student's mastery of a wide range of skills that rely on their use of underlying executive function skills. While we continue to rapidly expand knowledge (more information), resulting in what Willis refers to as "overstuffed curriculum", the need to learn facts and procedures by rote has decreased with the digital supports we all rely on. We now recognize the need to prepare students to more effectively **analyze, create, or question**, not memorize and regurgitate. Success in tomorrow's workforce will depend on critical thinking skills, building the ability of our learners to make complex decisions using new and ever-changing information.



The human brain **IS** equipped for this new set of skill sets that are needed, these *higher order thinking or critical thinking* skills. These are essentially what we have known under the terminology of *executive functions* (foundational cognitive processes that develop in the prefrontal cortex). What we need to know about our developing students is that:

- The prefrontal cortex is the last part of the brain to mature. This maturation continues well into the twenties, with the **most critical changes happening from ages 8 through 16**.
- Unlike other parts of the brain that develop automatically, over time, the circuits that direct executive functions require appropriate stimuli (or experiences) to develop appropriate response capabilities. Without these experiences, these skills do not develop. These experiences include: evaluating and doing something with information while you are learning it (e.g. exploring the relationships between new and previously learned information and transferring new learning into another form such as writing about math or symbolically transforming a story into a drawing).



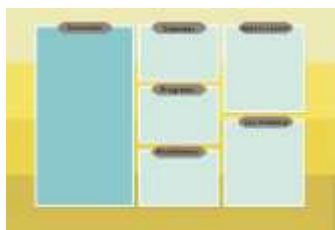
*Memorization without mental manipulation results in isolated, rote fact memories that can only be retrieved by the specific cues through which they are learned in repetitive drills. When facts (or ideas or concepts) are connected in other ways, to other information, rich networks are created. Remember that quote “neurons that fire together, wire together”?*

Changing our educational model to one that incorporates UDL strategies is a great place to start in terms of building these critical skills in students. Building executive function skills in students should include:

- Providing as many opportunities as you can to *apply* learning (e.g. using authentic and/or personally meaningful activities; providing formative assessment and feedback throughout the learning activity);
- Providing explicit opportunities to model and practice using skills like planning, organizing, prioritizing, reviewing, and self-monitoring. Structuring activities, with opportunity for group collaboration and open-ended discussions, that involve:
  - Making predictions;
  - Solving a variety of types of problems;
  - Pursuing inquiries;
  - Analyzing what information they need;
  - Considering how to gain skills or knowledge needed to reach the goal.

### Let’s talk about some specific areas where we may need to look more specifically at strategies and tools for diverse learners:

For the organization of our tools and strategies, we’re going to use the FOUR main categories, and descriptions, identified in Executive Function 101, as well as talk about how executive functioning affects behavior, emotions, and social relationships.



**ORGANIZING & PRIORITIZING:** Not only are these important skills to have in order to be successful students, they are important skills for *LIFE*. Think about the tools you use to organize and prioritize. You really can’t do this well (or at least we know of few people who do) without tools. Calendars, file cabinets, binders, smart phone apps, cloud storage...(and even a desktop organizer...see an example to the left)...there are so many ways in which we use supports to help us keep on track and on schedule, manage tasks, and keep track of information and things.

For students, the following are four key areas in which organizational challenges occur:

- Homework (writing down assignments correctly, bringing home materials needed to complete homework, completing it on time and remembering to turn it in);
- Managing long-term projects (keeping track of many details and managing multiple elements of their projects simultaneously);
- Studying (organizing class notes, homework and other materials to prepare for tests and quizzes);
- Writing (produce cohesive, integrated, analytical compositions that are well organized and prioritize important details).



**Why is prioritizing important?** In order to be successful with complex tasks, or even competing tasks (I have 2 pages of math to do, 20 minutes of reading, a spelling test to study for, soccer practice from 3:30 – 6:00, and I really want to watch my favorite TV show tonight...), students need to be able to **juggle** long-term and short-term tasks day to day; **select** the most important information for notetaking, studying or writing; and **manage** the competing demands of school, homework and activities without losing track of important deadlines. In other words, school is rehearsal for real-life (doesn’t that sound just like what we all do day after day?)

For organizing and prioritizing, we also typically look at the parameters of **time** (e.g. managing a schedule and due dates, estimating how much time is left, getting work done in an allotted time period, knowing how long something takes to complete), **tasks** (e.g. doing things in the right order, figuring out what is wrong if you forget or skip a step, remembering the steps to do something, keep the big goal in mind rather than the details, managing larger projects) and **materials** (e.g. putting things in the right folders, deciding what tools or resources you need to get something done and knowing where you keep them, keeping workspaces neat and organized, keeping track of worksheets and homework).

**SHIFTING/THINKING FLEXIBLY:** Students who have difficulty shifting tend to have difficulty coping with unexpected changes in their schedules, routines or homework. They tend to be viewed as rigid. Flexible thinking increases in importance as students advance through grade levels and the curriculum becomes more complex. Students need to be able to interpret information in more than one way, and to change their approaches and strategies if something is not working. Think about this concept in terms of specific curricular areas:



- **Reading:** requires a student to go back and forth between the major themes and supporting details and to sift and sort information while reading;
- **Writing:** requires balancing important concepts and main ideas with the supporting details a student wants to communicate;
- **Math:** involves shifting between word meanings, procedures and operations and to do something differently if one approach is not working;
- **Science and History:** requires students to use context clues to prioritize and focus on the most relevant information;
- **Foreign language learning:** requires students to shift between their native language and the language they are learning;

#### ACCESSING WORKING MEMORY:

**What is it?** Have you ever gone to the store without a list, thinking you know what you need to get but then return home to find you've forgotten an item? In this example, your working memory failed you. Working memory is essentially a temporary workspace where we can manipulate and process information until it is stored in long-term memory or is no longer needed. There is a lot of information about how many items you can hold in working memory at one time (can vary by many variables, such as the length of the unit, e.g. letters, numbers, words, length of words; whether the information can be chunked, etc.), but a good benchmark is **four to five elements of "new" information**. Working memory decreases if, at the same time, the individual is also working to retrieve information from long-term storage. Working memory works in tandem with long-term memory...the goal for much of the information we are providing to students is to transfer or encode information we are giving into long-term memory. And then we know there is that loop --- something new is presented and a student has to be able to access that stored information to make sense of new information. All of this leads to "cognitive load". For teaching, we need to consider **intrinsic load** (how hard is the learning task in and of itself) and **extraneous load** (demands that are caused by the format of the instruction itself, e.g. all lecture?) in order to not overload students. This is where considering different UDL strategies as well as tools to accommodate the learning task make all the difference. [Malamed, summarized in the "20 Facts You Must Know About Working Memory"]



Signs of a student who may be struggling with working memory include: abandoning activities before completing them; appearing to daydream; failing to complete assignments; raising their hand to answer a question, but forgetting what they wanted to say; mixing up material inappropriately; forgetting how to continue an activity that they've started even though the teacher explained the steps. A good example of when working memory can be a major challenge is a 5<sup>th</sup> grader who's still struggling with decoding skills. In order to read a passage, he is still relying on working memory to compensate for that inability to look at a word and recognize it. All working memory goes towards this task, rather than focusing on understanding and comprehending the content.

**SELF-MONITORING/SELF-CHECKING:** Self-monitoring requires some learned behaviors:

- Recognizing when to use a specific strategy;
- Recognizing how to use a specific strategy;
- Being able to judge the effectiveness of a strategy;
- Adjusting strategies in relation to the task at hand.

Students must be mindful of the task, how they're approaching it, as well as the outcomes of their effort. These strategies become increasingly more important as students advance through grade levels. Think about approaching a high school writing assignment. Does the student understand the elements of the assignment? Have a plan for what research they need to conduct? Understand how to organize the information collected? Know how to formulate a main idea (or theme) and organize supporting information?



Have the ability to read through their draft to identify any errors with spelling, grammar or sentence structure? When finished, check to make sure their product matches the goals of the assignment?



### **The Effect of Executive Functioning Challenges on Behavior, Emotions and Social**

**Relationships:** In addition to having an impact on academic success, challenges with executive functioning skills can affect behavior and emotions. A lack of motivation is a key sign that a student may be experiencing challenges in executive functioning. Frustration is also a natural outcome, as often students do not know why they are having the difficulties that they are. At the far end of the continuum, you may see meltdown or breakdowns. We know that impulse control and emotional control are highly correlated. Students with these challenges also experience a range of problems in their friendships, peer relationships and other social interactions. Sharing, turn-taking, picking up on subtle social cues, staying on task and remaining attentive in class can be difficult for students who struggle with executive skills. Making and keeping friends can be impacted. Socially competent students need to learn how

to:

- Read body language and nonverbal communication;
- Stop and think before reacting;
- Think through a situation and recognize others' points of view;
- Show flexibility in the face of changed plans and unexpected situations;
- Anticipate what will happen as a result of their words or actions
- Take responsibility for their behavior.

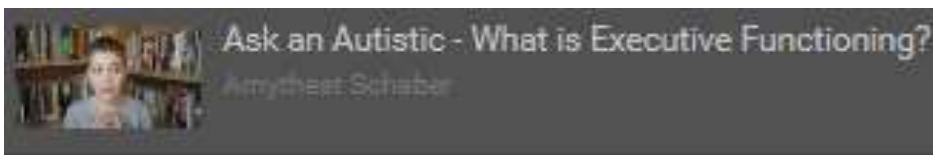
Executive dysfunction can negatively impact all of these skills and students may need opportunities for explicit instruction and supportive strategies to mitigate these challenges.

**A final word about teaching strategies:** With ALL strategy teaching that supports the development of executive function skills, be mindful of incorporating the following essential components:

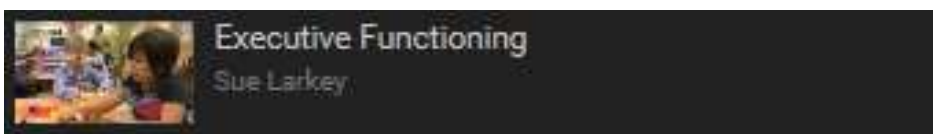
1. Identify the specific skill(s) to be taught;
2. Demonstrate for the student how to use the skill/strategy;
3. Provide guided practice;
4. Provide error repair by demonstrating how to use the skill or strategy correctly if a mistake is made;
5. Provide more opportunity for practice until the skill is automatic;
6. Fade instructional support as the student masters the strategy.



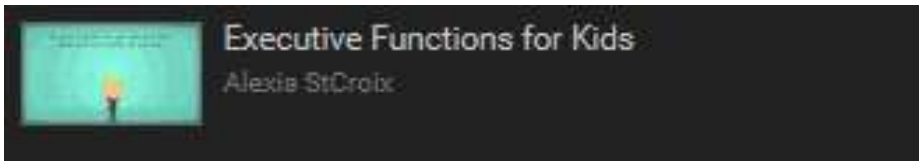
**Interested in seeing/watching examples of UDL principles applied to xxx? We have some great videos in our ACA website → Resources → You Tube Video Channel. Check out the section on xxx, and take a look at:**



or...



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