Building Executive Function Skills

Adapted for Facility Schools by Heather Hotchkiss and Shirley Stubbs

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Exceptional Student Services Unit
Colorado Department of Education
Vision
All students in Colorado will become educated and productive citizens capable of succeeding in society, the workforce, and life.

Mission
The mission of the CDE is to ensure that all students are prepared for success in society, work, and life by providing excellent leadership, service, and support to schools, districts, and communities across the state.

Every student, every step of the way
Presentation Objectives

- Participants Can:
  - Identify the basics about:
    - the hierarchy of neurocognitive development
    - executive functions
    - strategies for specific EF deficits
    - designing classrooms for efficiency
  - Practice and use some practical interventions
Executive Functioning

- The executive functions all serve a "command and control" function; they can be viewed as the "conductor" of all cognitive skills.

- Executive functions help you manage life tasks of all types. For example, executive functions let you organize a trip, a research project, a paper for school, and how to get dressed in the morning.
Executive Functions: Functional Definition

- Self-awareness of strengths and limitations (what’s hard to do; what’s easy to do)
- Goal setting
- Planning/organizing
- Initiating
- Inhibiting
- Self-monitoring and evaluating
- Strategic thinking
- Flexible shifting, adjusting, benefiting from feedback

(Feeney, 2005)
Who are we talking about?

Kids with...

Brain Injury
Autism
ADHD
Fetal Alcohol
Trauma Spectrum Disorder
Learning Disabilities
Communication Disorders

YOUR STUDENTS
Executive Function

CHART 2:

Frontal-Temporal Region

(Savage, 1999)
The Triune Brain (Dr. Paul MacLean)

- Neo-cortex - Intelligence
- Lymbic System - Emotion
- Reptilian System - Life
Hierarchy of Neurocognitive Development

- Attention
- Processing Speed
- Memory
- Sensory-Motor:
  - Fine Motor
  - Gross Motor

Adapted from Miller, Halstead-Reitan
Hierarchy of Neurocognitive Development

- New Learning
- Language:
  - Receptive Language
  - Expressive Language
  - Social Pragmatics
- Visual-Spatial
- Social/Emotional/Behavioral
- Executive Functioning
  - Initiation
  - Reasoning
  - Planning
  - Mental Flexibility
  - Organization

Adapted from Miller, Halstead-Reitan
Learning Processes: Unevenness

A hallmark of a brain injury on a child’s performance is an “unevenness” in abilities across different settings, over time, and across different content areas.

- **Examples:**
  - Across domains - a 10 year old may have typical abilities in fine and gross motor areas but have the social-emotional regulation of a 5 yr old.
  - Within domains - Average abilities in expressive language and difficulties with receptive language
  - Across time - a student knows material on Tuesday but cannot retrieve the same information later that same week
Executive Functions:

- Initiation
- Reasoning
- Planning
- Mental Flexibility
- Organization
Executive Functions: Initiation

Initiation: *The ability to independently start an action or activity.*

- Since the frontal regions of the brain are largely responsible for action and movement, it is not surprising these same areas are responsible for initiation. It is also not surprising that emotions help start actions, so the deeper emotional centers of the brain are implicated in initiation. A child’s inability to get tasks completed may be related to problems with initiation within the brain.
Executive Functions: Reasoning

**Reasoning:** *The use of deliberate and controlled mental operations to solve novel and on the spot problems*

- Many aspects of reasoning are similar to the process of new learning. Reasoning is the foundation for problem solving and ultimately overall intelligence. Higher order reasoning involves the effective integration and processes of the entire cerebral (brain) structure. Since the frontal cortex is considered the “manager” of the brain, this region is typically needed in reasoning as it orchestrates how information is processed. However, many areas of the brain are needed for deep thinking.
Planning:  *The ability to set a goal, identify a sequence of actions to reach the goal and carry out that sequence of steps.*

Planning is a future oriented process requiring forethought, estimation and problem solving. Similar to the same neurological structures involved with regulation, organization, and problem solving, the upper frontal lobe is intimately tied to planning.
Mental Flexibility: The ability to easily shift from one idea, train of thought, activity or way of looking at things.

- Controlling the thoughts and actions of the brain falls under the function of the frontal lobe. Although there are different brain areas that also help with initiation, organization, planning and flexibility, these four “executive functions” are primarily regulated by the upper brain areas located behind the forehead. People with damage to the frontal lobe may become more rigid in their thinking and less adaptable to change.
Executive Functions: Organization

**Organization:** The ability to create and maintain orderliness in thoughts, activities, materials and the physical environment.

- The upper frontal region of the brain, behind the forehead, controls planning and organization of thoughts and activities. The ability to sequence thoughts in a logical fashion and translate those thoughts into action to organize a person’s environment involves communication between the frontal cortex and left hemisphere of the brain. Damage to the front and/or the left hemisphere of the brain may cause disorganized thinking and ordering of materials.
Interventions
Interventions
Executive Functions: Reasoning

Suggestions:

- Teach the student how to develop a step-by-step guide for problem solving by identifying the problem, considering relevant information, listing and evaluating possible solutions, creating a plan of action, and evaluating the plan of action.

- When considering solutions, review at least two alternatives then let the student select one of the solutions, eventually move them to developing their own possible alternative solutions.

- Give consistent, neutral feedback.

- Teach use of self-monitoring questions- “What else could I do?”

- Present information in concrete and concise manner- avoid language using puns, sarcasm, and double meanings.

- Check for understanding and the need for assistance.

- Break tasks into smaller and shorter segments.

- Use graphic organizers to show relationships.

- Provide copy of guided notes or outlines with most important points highlighted.
Interventions

Executive Function: Mental Flexibility

Suggestions:

- Evaluate the assignments, worksheets and tests to see if they are requiring too many shifts in the type of questions the student is required to complete. Either reduce the different types of questions required of the student or help support them as the task demands change.

- Teach coping strategies.

- Use social stories to help teach solutions or coping strategies to different situations.

- Structured social skills groups to help identify, practice and learn more flexible coping and problem solving strategies.

- Teach thought stopping, relaxation or coping strategies (e.g., deep breaths, calming self-talk, leaving the situation until calm, etc.).

- Help them understand why strategies used in one setting or for one task may not work for another. Role-play situations ahead of time to help generate more than one outcome and more than one potential solution.
Interventions

Executive Function: Planning

Suggestions:

- Teach the student how to develop a step-by-step guide for problem solving by identifying the problem, considering relevant information, listing and evaluating possible solutions, creating a plan of action, and evaluating the plan of action.

- Provide step-by-step visual directions and instructions.

- Teach use of graphic organizers and other planning strategies to organize their thoughts.

- Model appropriate planning by verbalizing your own step by step process as you complete a task.

- Teach time management and prioritizing.

- Teach how to develop short term and long term goals.

- Support student in connecting new information with what they already know.

- Turn rubrics into checklists.
Interventions

Executive Function: Organization

Suggestions:

- Establish a daily routine as much as possible. Particularly for young students, the ability to predict what is going to be happening will help them to organize their behavior better.

- Teach the student how to develop a step-by-step guide for problem solving by identifying the problem, considering relevant information, listing and evaluating possible solutions, creating a plan of action, and evaluating the plan of action.

- Use picture schedules, planners, checklists, or electronic organizers to help them organize their day and prepare themselves for transitions.

- Use a “check-in/check-out” system to ensure that student has assignments and materials.

- Help the student break down long-term and larger projects. Start with the due date and then work backwards to determine when the smaller steps need to be completed. Mark those dates in their planner or on a calendar.
Interventions
Executive Function: Initiation

Suggestions:

- Provide assistance with getting started on school tasks - have the child then identify the first thing they are going to do.
- Provide more frequent check-ins to ensure student is completing work and to provide “jumpstarts” as the task demands change.
- Seat next to a positive peer to help them get started or if they get stuck as the task changes.
- Provide a written routine with an outline of tasks and time frame.
- Break large projects or tasks into smaller steps.
- Help student develop planning skills.
- Teach organization strategies: checklists, graphic organizer or a series of pictures indicating steps needed in task.
- Teach self advocacy skills: “Can you help me get started?” “Could you help me get started at this time?”
- May need lunch groups or support building relationships if initiation is interfering.
Activity:

- Use the Index Cards on the table
- Each person reads both sides: Executive Function, and Interventions
- Table shares with each other, the definition of each executive Function, and 3-4 interventions, in a Jig Saw process.
Activity:  Case Study
Intervention Action Plan

Diagnosis

Skill Deficit

Intervention

Adapted from McAvoy, 2011
Case #1

- Classroom teacher:
  - “This student is extremely busy and off-task. When it is time to do academic work, he is always the last to get started. He tries to engage his neighbor in shenanigans, he will try to draw the attention of the class on to him. I always try to keep him close to me when teaching because I have to give him gentle reminders to start the task, to stay on task, to keep his hands to himself ... to sit on his bottom, etc.”
Intervention Action Plan

- How Does Your Engine Run Intervention
  - Self Regulation Skill Deficit
    - Sticker Chart Intervention
  - Teacher Initiated Intervention
    - Poor Initiation Skill Deficit
- ADHD Diagnosis
- Intervention
  - Skill Deficit
    - Attention/Focus Skill Deficit
    - Preferential Seating Intervention

Adapted from McAvoy, 2011
Case # 2

- Specials PE:

  “I first met David when PE came up as specials in the middle of September. The first time he came to the gym, he walked over to the side of the gym with his hands over his ears. He walked around with his hands on his ears, humming to himself and walking and walking. I tried to go over and touch him and he kind of shrieked and pulled away. I didn't know what to do so I asked the TA for another kid to go over and follow him around the gym. She was finally able to get him to calm down and she asked him to go to the nurses office. Later I found out that he never made it to the nurse office because he said he got lost.”
Case # 3

Playground Aid:

“I am always writing up referrals on this kid. He charges out of the classroom onto the playground and he just runs over everyone else in his way. He is rough with other kids. It’s like he doesn’t care. It always happens that by the end of recess, he will come up to me pouting or crying or mad. He says that no one will play with him or he’ll say that someone was mean or unfair to him. So I started paying more attention and I saw him run right up to a kid, grab the ball away from him and run off with it. When the other kid ran after him, he yelled and kicked and screamed... I don’t know how that kid is going to get any friends that way.”
Intervention Action Plan

Role Playing Intervention
- Spatial Awareness Skill Deficit

Stop/Relax/Think Intervention
- Impulsivity Skill Deficit

ART/Peace4Kids/CB Intervention
- Conflict Resolution Skill Deficit

Skill Diagnosis
- Can’t Read Social Cues Skill Deficit
- Social Skills Group Intervention
- Limited Empathy Skill Deficit
- Why Try? Intervention
- Skill Streaming Intervention
- Turn Taking Skill Deficit

Adapted from McAvoy, 2011
The brain injury matrix is provided as a general guideline for educators and professionals. It was developed as a beginning “reference point” for professionals working with students where a brain injury is suspected or known to be present. The matrix offers a wide range of suggested assessment tools and intervention strategies for students with brain injury. It covers the domain areas of processing/learning most commonly affected by a brain injury. It does not cover all areas affected by a brain injury.

**DOMAIN AREAS COMMONLY AFFECTED**

1. **NEW LEARNING**
   - The capacity to learn new information.

2. **LANGUAGE – RECEPTIVE**
   - The ability to understand words and sentences.

3. **LANGUAGE – EXPRESSIVE**
   - The ability to express one’s thoughts and feelings into words and sentences.

4. **MEMORY**
   - The mental ability to store and retrieve words, facts, procedures, skills, concepts

**HOW TO USE THE MATRIX**

**ASSESSMENT**

The most common scenario is that a school team will be presented with a student who is struggling academically, socially, emotionally or behaviorally. The bullets in the Behavioral Impacts and the Cognitive/Academic Impacts may help teams discern between areas of concern. Once the team decides (or prioritizes) the area(s) of concern, they can go immediately to that domain within the matrix.
Activity: Student Strategy Plan

- In teams or small groups, choose a student you think might have Executive Functioning needs.
- Using the Intervention Action Plan, the Observation Forms and the TBI Matrix on your tables,
  - Identify the Neuro Developmental Domain AND/OR
  - Behavioral Impacts/Cognitive Academic Impacts of your student.
- Use the Action Plan to Identify 5 Strategies to use with your student
- Share with the Class

www.COKidswithbraininjury.com
Executive Function

Key Areas:

1. **Purposeful Structures & Routines in the Environment**
   - For individual students or whole classrooms (Dawson & Guare, 2010)
   - Classroom Zones (Sarah Ward, 2014)
   - I Do, We Do, You Do (Gradual Release of Responsibility Model)

2. **Build Time Management Skills** - an essential component to all executive function areas
   - Working Clock (Sarah Ward, 2014)
   - Calendars

3. **Replace “Think” with “Imagine“ - Create Future Thinkers**
   - “Get Ready, Do, Done” (Sarah Ward, 2014)
   - Job Talk (Heyman, 2008)
1. Purposeful Structures & Routines in the Environment
Purposeful Structures & Routines

- Purposeful zones: Identify the name and the process for each zone
  - Explicitly teach each zone - purpose, expectations, how they can use the setup to think in an organized way
- During the year involve students: keep the areas useful and dynamic
  - Have the students take down already learned materials (or move to a strategy zone) and replace with new learning visuals
  - Explain the purpose of the change
  - Demonstrate how to use the new materials
Purposeful Structures & Routines

- **Walls**: ensure they have educational or motivational value
  - Some areas are left undecorated in order to provide visual "rest" when students look up from their work to think or reflect
  - Students should be activity engaged in organizing their space
  - Help students to know where they are in the curriculum
- **Create a Strategy Wall**:  
  - Post specific strategies that are in use in the classroom
  - Helps students get “unstuck”
- **Use Borders**: to create mental organization and visual rest
  - Colored tape on whiteboards
  - Paper boarders on walls
Class Makeover

Creighton Middle School
Before

After
Before

After
Before

After
Study Zone

Upcoming Test

Topics Covered

Study Guide

Post a test question here!

Study Plan - Countdown!

Mon: Organize Notes

Tues: Write & post 3 test questions

Weds: Create a study tool

Thurs: Study Stations!

Fri: Test!

Favorite Study Strategies!

This word ___ sounds like...

Great website! www.study.com
Activity: Classroom Environment

- Visualize your classroom environment
- Given what you have heard so far, what environmental changes might you make when you get back to your schools? How might you organize the room differently?
- Share with your table
2. Building Time Management Skills

3. Creating Future Thinkers
Task Planning:
1. Done - what will it/I look like?
2. Do - what do I need to do?
3. Get Ready - what materials will I need?

Task Executing:
4. Get Ready - gather materials
5. Do - create time markers/check points
6. Done - stop and review

Sarah Ward, 2014
Get Ready, Do, Done
Get Ready

Do

- Read
- Write
- Done

Done
**Activity: Class Assignment Organizing Tool**

- In a small group at your table, identify an activity or project that will take some time.
- Identify the components of the “Get Ready, Do, Done” structure of slide 47.
See and Sense the Passage of Time

- The Working Clock
- Draw how much time the student has on a task
- Identify/sketch the “future picture image”
- Factor in time to ‘get ready’ and ‘close out’ task

Create Time Markers:
- Start Time
- Stop Time
- Mid Point

(Sarah Ward, 2014)
Time Management

» Step 1: Get Ready
  » Place the GET READY magnet on the current time to mark the start of the planning time.

» Step 2: Create Time Markers
  » Place the START magnet to mark the beginning point of a task on the clock.
  » The 1, 2 and 3 magnets can be placed when/if parts of a task or different tasks will be started within the hour.

» Step 3: Identify When to Stop
  » Place the END magnet next to the START magnet, then slide it around the clock to the identified END time on the clock.

(Sarah Ward, 2014)
Steps Continued

- **Step 4: Create a Checkpoint**
  - Slide the yellow mark on the clock to mark the 1/2 way check-point of the first part of the task.

- **Step 5: Self Monitor**
  - Am I on track with my predicted time?
  - Am I half way done?
  - Am I still focused on the goal?
  - Has my priority changed?
  - Am I still answering the question?
  - Do I have any Time Robbers?
    - Identify, Remove, Re-Plan
    - Do I need a faster or a slower pace?

(Sarah Ward, 2014)
Seeing and Holding Time

(Kristen Jacobson, 2014)
Activity: Calendar Strategy to Measure Time
Job Talk!

- Turn the action into a job and name the student their “job title”
  - Develops nonverbal working memory
  - Creates immediate structure for the student
  - Accesses procedural memory
  - Limits emotional reactions
- What is my job?
  - Reader, Writer, Mathematician
  - Summarizer
  - Detective (investigate new words; find the main ideas)
  - Psychologist (How is the character in the passage feeling?)
  - Hand washer, counter wiper
BRAIN INJURY MATRIX GUIDE

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Resources

- Youth Brain Injury Connections (YBIC)
  - Provides Care Coordination and Educational Consultation
  - biacolorado.org/support/youth-brain-injury-connections/

- Do you or your staff have questions about brain injury?
  - Contact us! We are available to answer questions, problem solve, and provide consultation for you or your staff. Join the Brain Injury List Serv!

Call or email: Hotchkiss_h@cde.state.co.
303.866.6694
Additional Resources

AutismInternetModules.org - Cognitive Difference Module

CDE TBI: www.cde.state.co.us/cdesped/sd-tbi

CDE FASD: www.cde.state.co.us/cdesped/fasd


The Center on Brain Injury Research & Training (CBIRT): http://cbirt.org/; In the Classroom Series: http://intheclassroom.cbirt.org/

LEARNet - A Problem Solving System for Teachers, Clinicians, Parents, and Students (Brain Injury Association of New York State): www.projectlearnet.org

More Resources

- The 10 Best-Ever Anxiety Management Techniques, Understanding How your Brain Makes You Anxious & What You Can Do To Change It, Margaret Wehrenberg, W.W. Norton Co, 2008


- 10 Tips To Get Your Child Organized, Executive Functioning Strategies, www.understood.org

- Assistive Technology for ADD (and other EF dysfunctions) http://www.additudemag.com/adhd/article/6585.html

- Council For Exceptional Children: Teaching Executive Function http://www.cec.sped.org/AM/Template.cfm?Section=Home&CONTENTID=10291&TEMPLATE=/CM/ContentDisplay.cfm

- Link to Teacher/class Resources: http://1drv.ms/1EYQPY4