

# Evolved Education INTEGRATED EXECUTIVE FUNCTION COACHING MODEL

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# Evolved Education

## Integrated Executive Functioning Model

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# Introduction to This Book and Methodology

I've always been fascinated with the learning process. During my career, I have worked with students from two years of age through college to help them to learn well, and I have worked with adults to ensure they can function well at work and in their adult lives. I became curious about executive functioning, as it affects so much for my clients.

Sometimes a significant problem, and other times a subtle weakness, a lack of strength with executive functioning cause so much pain for many of my school-aged and adult students. I want to ease this pain, so I initially did what most of us in our field do - I Googled it. I found various resources from Understood.com and Drs—Peg Dawson and Richard Guare's popular book *Smart Yet Scattered*. I enrolled in the SMARTS training. And yet, even with an understanding of executive functioning from these fine sources, I struggled to develop a coaching program with our students and adults that would move the needle - or have "far transference," as the researchers call it. In other words, I was seeking a way to coach so that when I did, students would build functioning that they would take and use on their own within various contexts of their lives.

I would coach executive functioning for a while, and students would still constantly need support, and it wasn't just me. All around town, we received calls into our office about students who had invested in executive function coaching and who continued to struggle with functioning. They had supposedly learned to organize their files, plan their assignments, and make to-do lists, but no one was independently functioning any better than before.

Just after the height of the pandemic in late 2020, I decided to invest in my learning. Each week I would take it upon myself to read research articles. I followed some "greats" in the executive functioning field, such as Clancy B. Blair, Stephanie M. Carlson, Adele Diamond, Kimberly Adams Espy, Megan M. McClelland, Michael T. Willoughby, and Philip David Zelazo. I focused my reading on research published in the 2000s, but sometimes the earlier articles would excite me, even if only to learn how far we've progressed.

I quickly found a fabulous document written by Philip David Zelazo, Clancy B. Blair, and Michael T. Willoughby. Everyone reading this publication should at least read the summaries of each of the chapters of this exquisite paper. This document confirmed much of what I had already read in research articles. In addition, it showed me where I needed to work and where I did not. I am excited to share my findings with you in the following few pages of this book.

However, I decided not to conclude with this report on executive functioning research available to our field in the 2020s (as exciting as it all might be). Still, instead, I would synthesize that knowledge with other learning research and professional experience to create a method for Executive Function Coaching.

I have springboarded a practical process called "Evolved Education's Integrated Executive Function Coaching Model." Simply put, this method integrates executive functioning and cognitive psychology academic research and incorporates the student's learning experiences, assessments, and strategies taught. Since it aligns with academic research and leaves room for new research to affect it, this model can evolve with us as our field develops. Maybe more branches will form, but the foundation here is strong, and I am excited to see where it takes my students, the students at Evolved Education, and your students!

The model involves four main pillars. I will go into great detail later in this publication on each of them, and I list them here to whet your palate!

Academic Research

Areas of Inquiry and Instruction

Assessment

Strategy Instruction and Skill Mastery

Further research on this method needs to be examined, of course. As such, I invite each professional to read this to keep records of their implementation and progress. I intend to evolve as we learn more about our students and their experiences and how we can help them function at their best. Even more, we can use the four pillars of this method and continue to evolve them as we go forward.

Executive Functioning is cognitive flexibility, working memory, and inhibition. These functions are carried out primarily in the brain's frontal cortex; these functions develop from birth through young adulthood.

## Cognitive Flexibility

**Cognitive Flexibility** is the process of thinking about something in many different ways. We use cognitive flexibility often in learning as we consider various perspectives as we read and use it in problem-solving for Math and Science. In writing, we may also explain an idea using various forms of evidence and change our minds as we communicate.

## Working Memory

**Working Memory** involves keeping the information in mind while manipulating it in a few ways. We use working memory when we read as we have to hold different pieces of information together to consider it a whole picture or story. As we write, we must keep our ideas in mind and connect them as we transcribe. In math, mental calculations, holding directions in mind, and using them all involve working memory. A person's working memory is measured on a continuum from small to large. We can think of it as being a Post-It note; some people have a three-by-three Post-It note, and others may have a four-by-six Post-It note and so on.

## Inhibitory Control

**Inhibitory control** is a person's ability to intentionally suppress attention, ignore a distraction, stop an impulsive action, and/or overcome a routine or action that is highly learned. Executive Functioning is essential for making predictions, identifying patterns, and drawing logical conclusions.

## Correlations

Many times, I have seen Executive Functioning confused with self-regulation and metacognition. Although Executive Functioning is a part of these areas of competence, self-regulation and metacognition are not solely affected by Executive Functioning. Executive Functioning skills are involved in self-regulation only when self-regulation is conscious and deliberate - where people modify their behaviors intentionally to achieve a goal. Executive Functioning is affected by temperament and personality, such as effortful control, conscientiousness, openness, and grit. It is also affected by self-control, reflective learning, deliberate problem-solving, emotional regulation, persistence, and planning. Thus, to support students in building Executive Functioning, we should consider temperament, personality, and behavior in addition to Executive Functioning.

# What Does Academic Research Tell Us About Executive Functioning?

## Using Executive Functioning Increases Executive Functioning.

Executive functioning skills are acquired mainly as a function of experience or practice: the repeated engagement and use of executive functioning skills in problem-solving strengthen these skills, increase the efficiency of the corresponding neural circuitry, and increase the likelihood that the skills will be achieved in the future. (Zelazo and Lee 2010)

## Temperament and Personality Affect Executive Functioning.

If you have high effortful control, high conscientiousness, openness to experience, and high self-discipline, you can display EF skills without innately having a strong EF. (Duckworth and Seligman 2005)

## Executive Functioning is Not a Stand-Alone Brain Function.

Executive Functioning overlaps with reasoning skills or fluid intelligence. (Ackerman, Beier, and Boyle 2005; Kane, Hambrick, and Conway 2005)

## Emotions Affect our Use of Executive Functions.

High levels of stress negatively impact our ability to access executive functions. Emotions affect our use of Executive Functioning (stress and emotions will either positively or negatively influence EF); it is challenging to put Executive Functioning skills into place when a person is stressed, tired, or bored—small amounts of stress or positive emotion help Executive Functioning. (Blair 2014, Blair and Ursache 2011)

## Researchers Divide Executive Functioning into Cold and Hot Categories.

Cold executive functioning involves the process we operate in more effectively neutral contexts such as the ones we use while thinking: metacognition, cognitive flexibility, inhibition, attention, working memory, and problem-solving. Hot executive functioning

involves behaviors, emotional regulation, decision-making, social skills, insight, and empathy (theory of mind). (Chavez-Arnana et. al) Both hot and cold executive Functioning influence a child's overall Functioning. (Zelazo & Carlson 2012)

## Brain Functioning Affects Executive Functioning.

Executive Functioning occurs in the Frontal Lobe of the brain. (D'Esposito and Postel 2015)

Neurotransmitters and hormones have a lot to do with working memory, but when stress is high, the increased levels of hormones do not help but rather hinder them. (Yerkes and Dodson 1908)

Chemicals of dopamine, norepinephrine, and glucocorticoid hormone cortisol increase neural activity in the Pre-frontal cortex (PFC). These chemicals help the brain to be readily engaged and facilitate Executive Functioning. This chemical stasis happens when we have well-structured experiences in the classroom when order and stimulation are in a moderate range.

However, when the system is over-stressed, the classroom is disorganized, and there is a lot of stress - the PFC is reduced, and it is hard to access Executive Functioning. (Armsten 2009)

## Development Affects Executive Functioning.

John Best is doing exciting research on school-aged children and the development of Executive Functioning. His article, published in 2009, states, "the relations among the EF components, particularly as they are recruited for complex tasks, appear to change throughout development." (Best et al. 2009)

Adolescents have a well-developed emotional reactivity system and a relatively immature pre-frontal cortical system associated with Executive Functioning skills.

(Casey et. Al. 2008, Crone and Dahl 2012; Ernst 2014; Steinberg 2010)

The Pre-frontal Cortex continues to develop through mid-adulthood. (Zelazo et. al 2013, 2014)

EF has the most dramatic growth between the ages of 2 to 6 years of age, and then the PFC reorganizes itself during adolescence.

There is a correlation between the Theory of Mind and Executive Functioning. (Sabbagh et al. 2006)

More research needs to be done to understand how Executive Functioning grows as related to child development. Still, evidence supports the notion of the 2-6 growth areas and adolescent growth areas, as well as a building of sophistication of Executive Functioning throughout a child's development.

## Executive Functioning is Affected by Academic Achievement.

Improving Executive Functioning skills improves math and reading. (Raver et al. 2011)

Improving math and reading language skills improves Executive Functioning skills.

(Welland and Yoshikawa, 2013)

A meta-analysis of self-regulation strategies showed significant effects on math.

(Dignath, Buettner and Langfeldt 2008)

## Researched Methods of Assessment.

There is not yet a "gold standard" for assessing Executive Functioning, but some researched assessment methods are available.

A performance-based task measures optimal cognitive ability in highly structured testing environments, whereas questionnaires measure behavior in everyday contexts.

Whether to use one or the other should be based on the objectives of the assessment (e.g., is it behavioral or cognitive).

We must be careful to use the questionnaires to uncover executive functioning skills rather than multi-dimensional behaviors.

Questionnaires can be useful for treatment planning. (Isquith, Roth, and Gioia 2013, Isquith et. Al. 2014)

There is a difference between what parents and students report about executive Functioning. (Soriano-Ferrer et. al 2018)

## What does Academic Research Tell us About How Students Learn Well?

### We Use Methods Adopted by Our Field to Support Effective Learning Experiences and Outcomes.

1. Students' **prior knowledge** can help or hinder learning.
2. How students **organize knowledge** influences how they learn and apply what they know.
3. Students' **motivation** determines, directs, and sustains what they do to learn.
4. **Goal-directed practice** coupled with **targeted feedback** enhances the quality of students' learning.



5. To develop mastery, students must **acquire component skills, practice integrating them, and know when to apply them.**
6. The student's **current level of development interacts with the course's social, emotional, and intellectual climate to impact learning.**
7. To become **self-directed learners**, students must learn to **monitor and adjust their approaches to learning.**

(Ambrose 2010)

## Learning Strategies Increase Successful Learning Outcomes.

There is a strong correlation between learning strategies and successful learning outcomes. ([Angel-González](#) et. al 2017)

A learning strategy is a procedure that involves intentional decision-making to choose an intended course of action to meet the expectation or goal involved in the educational situation or learning activity.

## Contextual Learning is an Impactful Process.

When I read, *Understanding How We Learn* by Weinstein et al., I was excited to confirm that my students would retain a learning strategy when it was learned within a meaningful context.

Memory is reconstructed each time. Thus, when students go into their brains to retrieve a learning strategy, they will succeed when that strategy is tied to an experience. In this way, as they construct the strategy, there will be less opportunity for it to be built incorrectly.

## Consolidation is Key to Transferring a Short-Term Memory into a Long-Term Memory.

For a learning strategy to "stick in mind," it must first be encoded deeply or meaningfully. Connections to the learning strategy are essential for memory purposes.

Long-term memory involves encoding, consolidation, storage, and retrieval. (Nader & Hardt 2009). When the brain learns something, neurons connect. And as these neural connections become stronger, neuropathways and eventually something called "engrams." For instance, you might think of the word "ice cream." Many different associations and experiences come to your mind. The collective memory you create is

formed because of engrams. (Tonegawa, Liu, Ramirez & Redondo 2015) As we continue to recollect a learning strategy, we turn it into powerful long-term memories because consolidation continues to occur each time we recall the strategy.

## Review of Learning Strategies Over Time Allows for Long-Term Retention

If the goal is to retain information over time, reviewing the material or process over a few weeks is essential. (Cepeda et al., 2008).

## Examples, Exemplars Support Strong Learning Outcomes

Providing students with more than one example helps build understanding.

(Bauerschmidt 2017)

Engaging students in the process of providing explanations for what they are learning improves understanding. (Chi et al. 1994)

Students use examples to study and strengthen their understanding. (Chi et al. 1989)

## Interleaving is a Research-Based Approach to Studying

Interleaving involves switching between various activities and studying processes during one session. Interleaving produces poorer speed and accuracy for short-term skill acquisition but stronger speed and accuracy for long-term skill acquisition. In this way, it is best to vary the work we do with students during 1-1 sessions so that they can engage in long-term progress. (Shea & Morgan, 1979) The research that drives this home is from Taylor and Rohrer 2010 who studied students who engaged with mathematics using the interleaving approach and those who used blocked approaches (just studying one concept at a time). The results are fascinating! For the students who learned using the blocked method, the student's dropped from 100% to 38% in just one day. Those who engaged in the interleaved condition maintained their performance from 81% to 78% the next day.

## Social-Emotional-Physical Well-Being Affects a Student's Ability to Learn and Utilize Learning Strategies

Rest and sleep affect the brain's ability to store and consolidate memories (and learning strategies). (Dudai, Karni, & Born, 2015)

The rate of learning pre-dictated attitudes toward school, and school attitudes predicted academic performance. (Geddes et. al. 2010)

There is a strong correlation between students who have solid social-emotional functioning and feel good about a school - we call this school well-being.

([Angel-González](#) et. al 2017)

In addition, How People Learn: Brain, Mind, Experience, and School: Expanded Edition (Informal Learning) Paperback – September 15, 2000

## What is an integrated model of executive functioning?

As I digested all that Google Scholar and Academic Journal articles could provide, and as I endeavored to work with our students, I decided to create a framework, a foundation on which to work. I classify this approach as "informed by research," and as that will continue to develop, I also classify this approach as "malleable."

As I like to say to those who work with me, "this is as far as my brain can take this, so please take these ideas and use them." Further research, amend, use, and create with them - I can't wait to see what happens next!

And, without further adieu, here are the constructs of this approach, which are also called the 4 A's:

### Academic Research

This approach contains methods that are based on current academic research. This is not all-inclusive of what will be in the future, nor is it all-inclusive of all of the world's research, but it is my best attempt at grabbing hold of the research that has connected with me during this project.

#### 1. I can understand Executive Functioning as follows:

- a. At its core: Executive Functioning involves cognitive flexibility, working memory, and inhibition. For future definitions of these terms, please refer to the section earlier in this publication, "What is Executive Functioning."
- b. It correlates to Executive Functioning as a part of self-regulation, metacognition, and social-emotional learning; however, other aspects of

Functioning also influence these areas, so I have to investigate these areas broadly and Executive Functioning.

**2. I can understand a student's Executive Functioning by:**

- a. Examining their brain functioning and cognition (Cognitive understanding can be determined through a Mindprint Learning Assessment, and Neural Functioning can be determined through a Neuropsychological Evaluation)
- b. Interviewing students and parents (knowing, however, that these results may be different from parent to student to teacher; and taking care to assess Executive Functioning purposely along with correlated areas of Functioning)
- c. Understanding my student's temperament and personality as well as emotional well-being
- d. Assessing how my student feels about learning, school, work, home life, extracurriculars, and all that he/she/they are involved in
- e. Determining stress levels when my student uses executive Functioning (know that high levels of stress will interfere with executive Functioning)
- f. Understanding how the age of my student affects their executive Functioning (ages 2-6 will see rapid growth, as well as adolescence)

**3. I can increase my student's executive functioning skills by:**

- a. Connecting with my student and establishing rapport and trust
- b. Teaching them specific learning strategies which become skills as they are mastered
- c. Having my students use them
- d. Putting the skills into context
- e. Providing opportunities for students to encode, consolidate, store, and retrieve the skills and cycling back to review over weeks of time
- f. Creating examples and exemplars for students to follow
- g. Connecting skills with other skills and using them in various constructs
- h. Building academic skills - reading, writing, math, general fund of knowledge
- i. Providing coping strategies to manage stress
- j. Goal-setting and reflecting with my student
- k. Other: \_\_\_\_\_ ( I leave room for further actions)

## Areas of Inquiry and Instruction

The Evolved Integrated Executive Functioning Model incorporates learning, work, and life experiences into the coaching. For school-aged students, I often begin with the

school as this is the central area of work and life for humans of this age, but I am open about asking students how their lives are going beyond their school work.

The following are a few examples of coaching work that steps outside of school life:

Let's say I am working with a busy working parent instead of a student. I would focus on improving Executive Functioning related to their responsibilities in various facets of their lives. Including work, use of time, home and family responsibilities, and use of space.

The strategies chosen include Categorization, Blocked Intensive Focused Work Sessions, Delegation and Systems, and Function Organization.

**Categorization** involves sorting tasks and expectations/responsibilities into up to six categories. By naming the categories, we can recall them and pay attention to them. For instance: Home care, Self-care, Child care, Partner time and projects, French learning, and Career are categories we may develop for a student.

**Blocked Intensive Focused Work Systems** occur when we create 30-90 minute work sessions using a Google Calendar. We practice intensely working on a problematic, undesired task and building a singular, intensive focus and routine. As the student accomplishes the task, we increase the sustained work time and build confidence.

**Delegation Systems** pass off routine tasks usually associated with home and child care to an employee. We often work with a work assistant to develop ways to offset tasks from my student. This strategy decreases the cognitive load for my student, which is the amount of cognitive energy needed to complete a task. When Executive Functioning is weak, it can be helpful to offload a particular set of Executive Functioning tasks to develop new skills within higher levels of Functioning.

**Functional Organization** is a fantastic way to organize things. Instead of creating a desk with school supplies, we make a desk that considers what it is used for. We look at how the student uses the space, and we create an organizational chart and system for that space based on its use. In this way, organization stems from function, not item. The key to coaching beyond the school setting is to assess and inventory a student's Functioning within other areas of their lives. Once you know how a student has to use their Executive Functioning outside of English and math classes, you can develop strategies and skills within those areas.

Just as I provide strategies for a student to manage their home, I also provide strategies and resources for them to be healthy within their social, emotional, and physical Functioning.

I ask about sleep, eating, socialization, and emotional health.

I provide connections with life coaches, therapists, doctors, neuropsychologists, and psychiatrists to support my students in their pursuit of well-being.

## Assessment

Here is a comprehensive list of [assessments](#).

I use [this questionnaire to inventory adolescents](#).

See this [completed questionnaire](#).

Then, we create [a profile](#) based on this intake information.

## Strategy Instruction & Skill Mastery

The way we teach executive functioning skills involves the following:

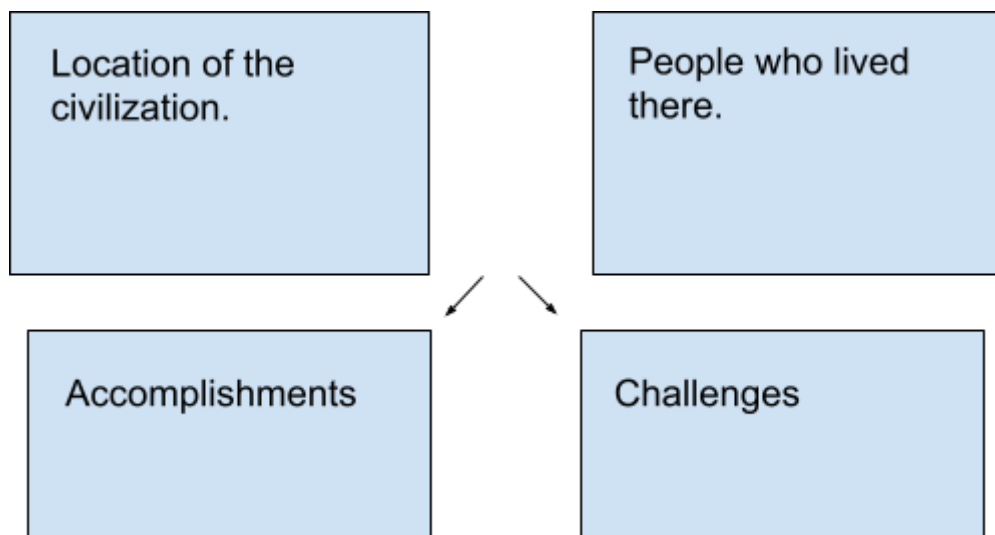
1. Teach WITHIN a subject area.
2. Have the student complete a task they need to complete and provide the strategy to support the task completion
3. Name the strategy
4. Write the strategy down and include pictures of it (screenshots and notes)
5. Each session begins with the student teaching me the previous strategies (remember this involves consolidation)
6. We try to work on at least two tasks per session and teach either one or two strategies.
7. If possible, I text my student in between sessions to remind them of the strategy and to see if they are using it or recalling it.

During the executive function coaching session, I am also involved in building academic skills. Recall that there is a strong connection between academic aptitude and executive functioning. Thus, my strategy list may include math study guides, biology content graphic organizers, and/or acronyms from Self-Regulated Strategy Development Writing.

When I teach math studying to students, I integrate metacognition practices into the document using a three-column sheet.

Problem	Solution	What "I" Need to Remember About This Problem
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When I teach content such as Biology or History to students, I try to show them ways to condense the text, place it into boxes or circles and connect the information with other pieces of the text.



I model a graphic organizer such as this, but then, I require my student to do the labor of the learning (because, hey, the research supports this!).

I love using Stickies on computers to house acronyms we are using with SRSD Writing. POWRE and TIDE are often there. Eventually, the memory of these acronyms becomes so strong that students can release the use of the post-it notes, but this usually takes months and requires consistent exposure and 'forced' use.

If you are interested, you can check out my book, 30 Strategies for Learning Well in College as well as Strategies Are Your Superpowers: Executive Functioning Strategies for Middle and High School Students: Both are available in Kindle and Paperback formats on Amazon.

# In Conclusion

I truly enjoy developing and using the Evolved Education Integrated Executive Function Model. I hope that it ignites excitement for you as well. Please keep coming back to Evolved Education Company, where I will continue to share how this model is developing and evolving within our work.

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Please enjoy this reference list! If you have time, read these articles. They have fascinated me, and I hope they also fascinate you!

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