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HIGHLIGHTS

Understanding Teacher Perspectives on Executive Function Skills in Mathematics

A closer look at how educators understand and support students' EF skills in service of math learning

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This study was commissioned by EF+Math, a program of the Advanced Education Research and Development Fund (AERDF), and carried out by the ETS Research Institute.

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Advanced Education Research and Development Fund

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EXECUTIVE FUNCTION SKILLS

In the context of mathematics education, executive function skills play a role in how students plan their work, shift between tasks, and persist through challenges. Below are examples of five executive function skills that students use when learning math.

What are executive function skills?

Executive functions (EF) are cognitive skills all students have, which they use to manage and direct their learning.

EF skills include the ability to:

- Maintain and manipulate information in the mind
- Focus attention based on personal priorities
- Flexibly adapt thinking strategies as needed

Students use their EF skills to:

- Exercise agency over their attention, emotions, and actions
- Set goals for their own learning and engagement
- Plan their approach to assignments in formalized learning environments
- Reflect on how well their strategies are working to achieve their goals

Why EF skills matter for math learning

EF skills can help students to learn challenging math because they support:

- Planning work
- Shifting between tasks
- Persisting through challenges

EF+Math's asset-based approach recognizes three key characteristics

- **Task-specific** – Best developed in the contexts they're used
- **Culturally relevant** – Shaped by students' values, activities and experiences
- **Dynamically engaged** – Vary by day, moment and environment

For more: aerdf.org/programs/ef-math/resources/

Focusing on students' EF skills is one approach to empowering students to succeed in mathematics, and particularly those who have historically been underserved, such as Black and Latino students and students experiencing poverty.

Our research

Goal

To better understand how teachers — who work with Black and Latino students and students experiencing poverty in grades 3 to 8 — view EF skills in mathematics and what supports they need to foster these skills in the classroom, ETS and EF+Math (the first program of the AERDF) conducted a study of math educators.

Method

- Online survey that built on existing measures of EF skills and teaching
- Survey reviewed and informed by current educators
- **121 teachers** completed the survey
- **16 teachers** joined a virtual focus group
- Data analyzed for trends, examples, and context

Participant demographics

Teacher demographics

- 100% primarily taught Black and Latino students
- 96% taught students experiencing poverty
- 44% ≤10 years of experience
- 52% taught in integrated or inclusion classrooms

School demographics

- 88% receive Title 1 funding*
- 78% public, 16% charter
- 53% urban, 35% suburban

**indicating most students qualify for free or reduced lunch due to low family income*

KEY FINDINGS

"Executive function skills...are not just important, they are mandatory and vital for success." — Focus group participant

"When incorporating EF skills in math, students were more self-aware...more focused and less likely to rush." — Survey respondent

Teacher perspectives on EF skills

Many teachers were already familiar with EF skills and saw them as important for student math learning.

They agreed that:

- Supporting EF skills enables challenging math learning for all students
- EF skills can be developed
- EF skills are best developed in math, with connections to students' cultural perspectives

82%

of teachers reported moderate to high familiarity with EF skills

42%

of teachers provided a partially or completely accurate EF skills description

There are opportunities to extend teachers' development

- Many teachers do not deeply understand some EF skills, yet still try to support them
- Most teachers are already working to support EF skills in classrooms
- There is room to deepen teachers' knowledge and strengthen how they support their students' use of EF skills

In particular, these challenges influence the extent to which teachers can support students' EFs in math

- Many teachers conflate EF skills with general behaviors like organizational skills
- Some teachers see EF supports as mainly for students with the most academic needs
- Many teachers are only prepared to notice a subset of the ways students use their EF skills, which limits their instructional capacity to support all students
- Some teachers are already using strategies that support EF skills without labeling them as such
- Most teachers indicated that other educational priorities pose a barrier to teaching EF skills
- Several teachers cited insufficient time to incorporate EF skills into their instruction

74%

of teachers said incorporating EF skills into math teaching improves student success in math

67%

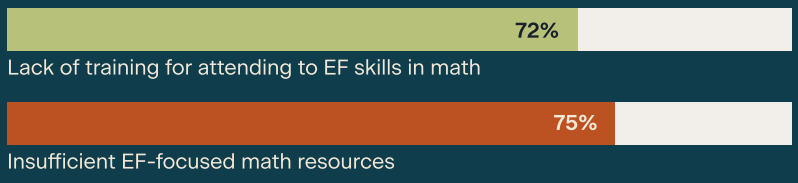
of teachers reported teaching attention-sustaining behaviors daily

62%

of teachers regularly encouraged reasoning and reflection

Challenges and barriers

Most teachers find it difficult to focus on EF skills in math classes due to:



Professional development (PD) preferences

Teachers strongly prefer PD that is:

- An ongoing series of brief sessions
- Collaborative with peer teachers
- Specific, actionable and aligned with their curriculum and standards

Interest in PD and programs:

- **88%** of teachers were very or moderately interested in PD on developing the EF skills that will help students learn challenging mathematics
- **70-77%** of teachers were very interested in supplemental math programs that also support EF skills
- **93%** of teachers said EF skills are moderately or very important when choosing a new math program/product

KEY TAKEAWAYS

Teachers are eager to help students build EF skills for math learning

Many teachers already try to support students' EF skills, even without formal training

With PD and training, teachers can be more effective in supporting students' use of their EF skills for math learning

Teachers want integrated, practical and aligned PD and resources

About EF+Math

EF+Math is an advanced, inclusive R&D program designed to dramatically improve math learning outcomes for students in grades 3–8. It focuses especially on Black and Latino students, as well as students of all races experiencing poverty. The program strengthens the core assets every student has — executive function (EF) skills. Teams of educators, students, researchers, and developers co-design and test innovative math learning products that improve outcomes and affirm student brilliance.

For more: aerdf.org/programs/ef-math/resources

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