

The Role of Cognitive Load in Learning & Attention Disorders

Understanding learners. Reducing barriers. Supporting potential.



Sam Goldstein, Ph.D.
Assistant Clinical Professor
University of Utah School of Medicine

“Advancing understanding of learning, attention, and human potential.”

Let's Connect

Research. Ideas. Conversations. Across platforms.

Same Questions. Bigger Conversations. Find me online!



MHS
ASSESS | INFORM | EMPOWER



Subscribe to my Substack!




Scan to connect!

Science. Compassion. Practical Solutions.

Support Learners | Strengthen Environments | Expand Potential

1

Learning Objectives

By the end of this session, you will be able to:

1



Explain
the basic principles of Cognitive Load Theory.

2



Connect
cognitive load to working memory, attention, and executive functioning.

3



Describe
why excessive cognitive demand may disproportionately affect some students with learning and attention difficulties.

4



Identify
sources of unnecessary cognitive load in classrooms.

5

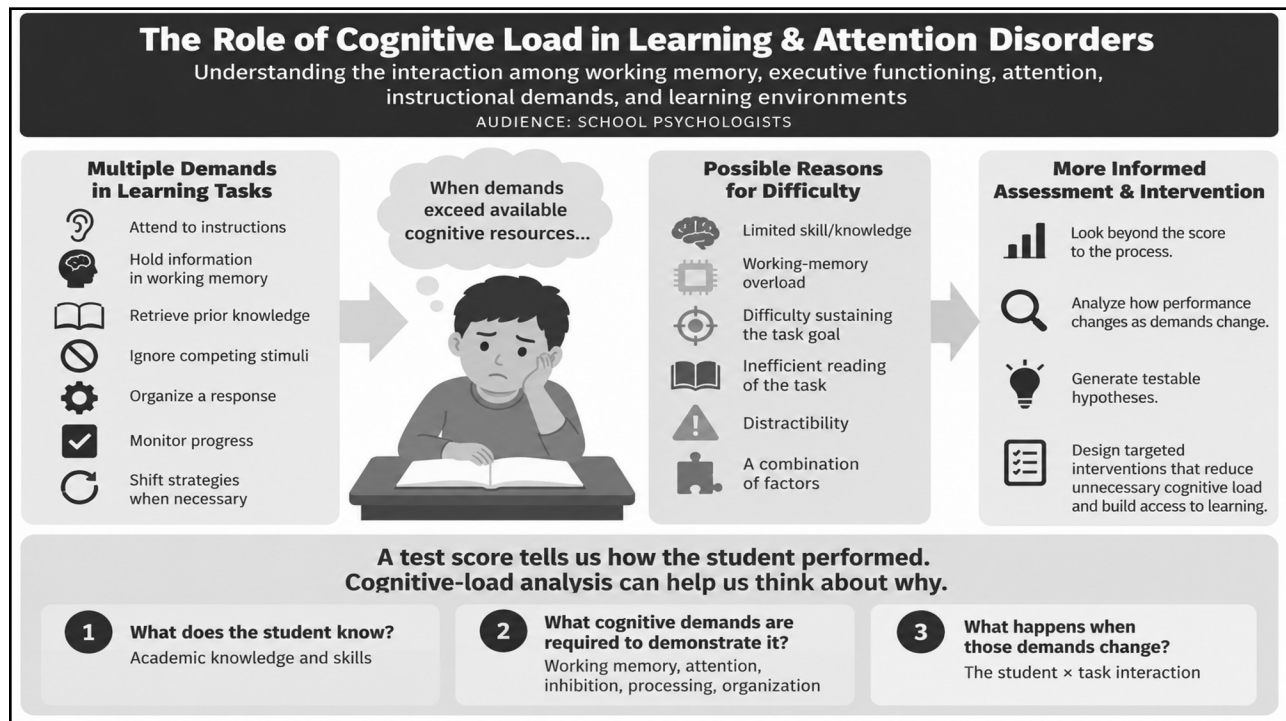


Apply
cognitive-load principles to assessment, consultation, intervention, and instructional design.

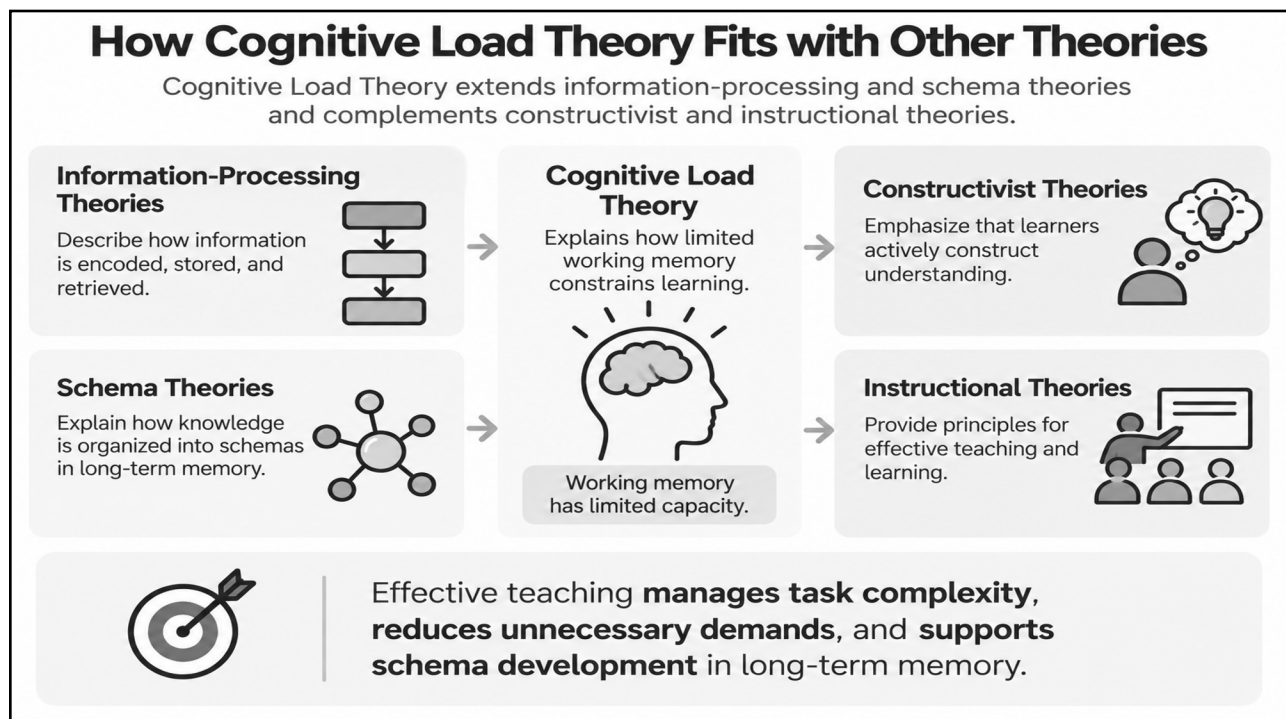


**Less unnecessary load.
More learning opportunities.**

2



3



4

What Is Cognitive Load?



Process

Take in and make sense of information.



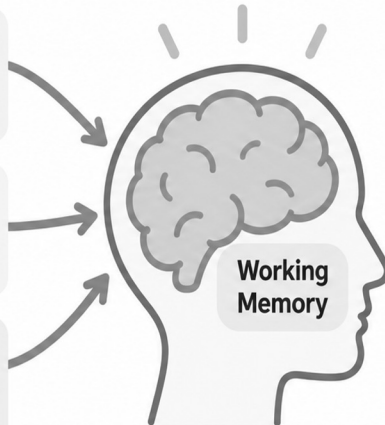
Hold

Keep information in working memory.



Use

Manipulate information to complete a task.



Cognitive load

is the amount of **mental effort** required to process, hold, and use information in working memory while completing a task.



The **more demanding** the task, the **greater** the cognitive load.

5

Why Should School Psychologists Care About Cognitive Load During Assessment?

1

Affects Performance

High cognitive load can reduce test performance, making it harder to show true ability.



2

Influences Validity

Scores may reflect cognitive load demands (e.g., complex instructions, long passages) rather than the construct being measured.



3

Helps Interpret Results

Understanding cognitive load prevents misinterpretation of low scores as lack of ability or motivation.



Is it the student's ability...
or the cognitive load
of the assessment?



4

Identifies Barriers

Assessment tasks may include unnecessary cognitive load (e.g., unfamiliar formats, complex language, multitasking), which can create barriers for some students.



5

Supports Equity

Students with learning disabilities, ADHD, or limited language skills may be more sensitive to cognitive load, making fair assessment essential.



6

Informs Recommendations

Awareness of cognitive load helps school psychologists suggest appropriate accommodations and instructional supports.



Consider the cognitive load, not just the score.

A more thoughtful assessment leads to more accurate interpretations and better support for students.

6



Why Cognitive Load Matters

Understanding the complexity behind everyday learning.

Students rarely perform academic tasks using a single cognitive

Reading


- Decode words
- Hold information in working memory
- Understand meaning
- Integrate across sentences

Math


- Recall facts
- Follow multi-step procedures
- Hold and manipulate information
- Monitor for errors



Writing


- Generate ideas
- Organize thoughts
- Hold structure in mind
- Revise and edit

Problem Solving


- Analyze
- Consider options
- Inhibit response
- Monitor strategy



Because most academic tasks draw on multiple cognitive skills at once, managing cognitive load is essential for learning, progress, and success.

7

Test Performance Is Not Identical to Underlying Ability

Every assessment task imposes secondary demands, so a low score can reflect more than weakness in the construct the test measures.

1 Multiple Demands in a Single Task

A reading task may also require working memory, sustained attention, inhibition, language processing, and efficient retrieval.



A low score does not always mean low ability.



2 Secondary Cognitive Demands

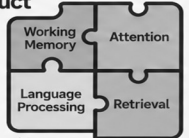
Assessment tasks often place additional demands on:

- Working memory
- Sustained attention
- Inhibition
- Language processing
- Efficient retrieval



3 Scores Reflect More Than One Construct

A low score can reflect difficulties with these secondary demands, not just weakness in the intended construct (e.g., reading comprehension).



4 Implications for Interpretation

Consider all task demands when interpreting test results. Look beyond the score to understand what may have influenced performance and to inform appropriate support.





A more thoughtful interpretation leads to more accurate conclusions and better support for students.

8

Cognitive load helps distinguish “can’t do” from “can’t manage all of this at once.”

A deeper look at the sources of difficulty leads to more targeted and effective support.

A Common Situation

A student struggles with a multistep math problem.

Solve:

1. $3(x + 2) = 15$
2. $x^2 - 4 = 0$
3. If $2x + 3 = 11$, find x and check your answer.

Multiple Factors May Contribute

- Working-memory overload**
Too many pieces of information to hold in mind at once.
- Difficulty maintaining the task goal**
Losing track of what to do next in a multistep process.
- Inefficient reading of the problem**
Trouble extracting and organizing relevant information.
- Distractibility**
Easily pulled away by internal or external distractions.
- Limited mathematical knowledge**
Gaps in foundational skills or concepts.
- Often a combination**
More than one factor may be contributing at the same time.

Why It Matters

Each explanation points toward different intervention strategies.

- **Reduce cognitive load**
(e.g., break steps down, provide visual supports).
- **Support goal maintenance**
(e.g., checklists, self-monitoring prompts).
- **Improve reading and comprehension strategies**
(e.g., highlight key information).
- **Minimize distractions**
(e.g., environmental supports, attention strategies).
- **Teach or reteach specific mathematical skills and concepts.**

Identifying the source of the difficulty is critical because each explanation points toward a different intervention.

A more accurate understanding leads to more effective, individualized support.

Different Challenges.
Brighter Possibilities.

9

Cognitive load helps explain within-child variability.

The same student may perform well on simpler tasks but struggle as cognitive demands increase.

Simple Task

- ✓ Short instructions
- ✓ Fewer elements to hold in mind
- ✓ Minimal simultaneous demands

Student performs adequately.

More Complex Task

- Longer instructions
- More information to hold in mind
- Some simultaneous processing (e.g., reading and recalling)

Performance may begin to decline.

High Cognitive Demand

- Longer, more complex instructions
- Multiple elements to hold in mind
- High simultaneous processing demands (e.g., reading, reasoning, writing)

Performance deteriorates.

An Informative Pattern

This pattern of stronger performance on simpler tasks and increased difficulty as cognitive demands rise can be **clinically and educationally informative.**

Considering cognitive load can help us better understand a student’s unique strengths and challenges — and design more effective supports.

10

Cognitive Load Improves Interpretation of ADHD-Related Performance

ADHD should not be treated as synonymous with a specific executive-function deficit. Considering cognitive load helps us understand when and why a student's performance may decline.

1 ADHD Is Heterogeneous

Research shows considerable heterogeneity in executive functioning among children with ADHD. Not all students with ADHD show the same cognitive strengths and weaknesses.



2 Performance Varies With Cognitive Demands

A student with ADHD may perform well on low-demand tasks but struggle when tasks require greater working memory, attention sustaining, inhibition, or multitasking. Cognitive load helps explain these shifts in performance.



3 A More Useful Question

Rather than asking "What cognitive deficit does ADHD cause?" the more useful question is: "Under what cognitive demands does this particular student's performance deteriorate?"



- Task complexity
- Working memory load
- Attention demands
- Inhibition requirements
- Multitasking

4 Better Interpretation, Better Support

Considering cognitive load leads to more accurate interpretation of ADHD-related performance and helps guide targeted, individualized supports.



ADHD is not a single cognitive deficit.

Look at the cognitive demands, not just the diagnosis, to understand and support each student's unique profile.

11



Cognitive load encourages analysis of process, not just scores.

Looking at how a student works provides deeper insight than scores alone.

Observe Performance During Testing



- Notice when performance begins to deteriorate.
- Identify which task changes may contribute to the decline (e.g., longer instructions, more information to hold in mind).

Look for Patterns in Errors



- Do errors increase as memory load increases?
- Does the student lose track of multistep directions?
- Does repetition improve performance?

Consider Supports and Structure



- Does external structure or support improve performance?
- Is accuracy still adequate even as speed decreases?

Connect to Real-World Functioning



- Use observations to interpret standardized assessment results.
- Link findings to the student's classroom functioning and performance.



A process-focused analysis leads to a more complete understanding of the student and more effective support.

From test observations to real-world success.



Better Insights.
Better Outcomes.

12



Cognitive load guards against over-attributing difficulties to motivation or behavior.

What looks like low effort may also be cognitive overload.

Observed Behaviors May Look Like ...



- "I don't know."
- Stops working
- Becomes restless
- Guesses
- Seems inattentive

... But Cognitive Overload Can Look Similar.



- Too much information to hold in mind
- Multiple steps to track
- Competing demands (e.g., reading, remembering, reasoning)
- Limited cognitive resources

Why It Matters



Consider cognitive load as an alternative (or contributing) explanation.



Look at the demands of the task and environment, not just the student's behavior.



This perspective leads to more accurate understanding and more helpful, targeted supports.



When demands exceed available cognitive resources, the resulting behavior can resemble poor effort or inattention.

13



Cognitive load strengthens ecological interpretation.

Performance in real-world contexts requires managing multiple demands at once.

A Quiet Testing Room

A decontextualized task.

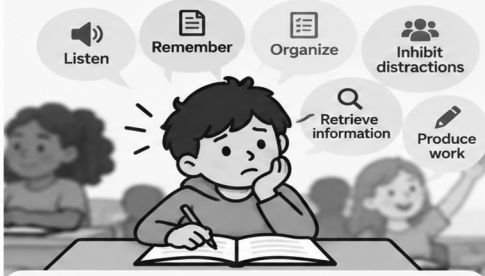
FOCUS
ONE TASK
QUIET
FEWER
DISTRACTIONS



A student may perform well on a single task in a quiet, structured environment.

A Real Classroom

Multiple cognitive demands at once.



In the classroom, listening, remembering, organizing, inhibiting distractions, retrieving information, and producing work all occur simultaneously.

The Key Question

Can the student access instruction in real-world settings?

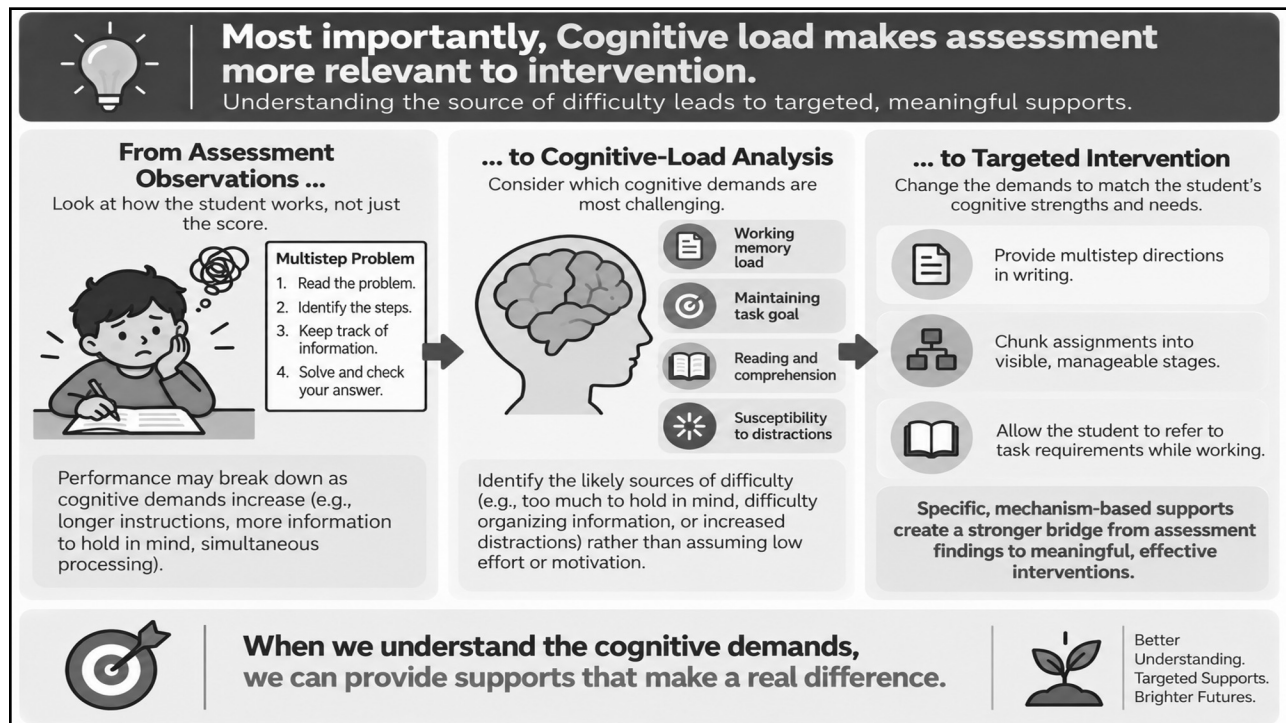
- ✓ Looks beyond test scores
- ✓ Considers the full range of demands
- ✓ Connects assessment results to classroom functioning

Ecological interpretation leads to more accurate understanding and more effective support.

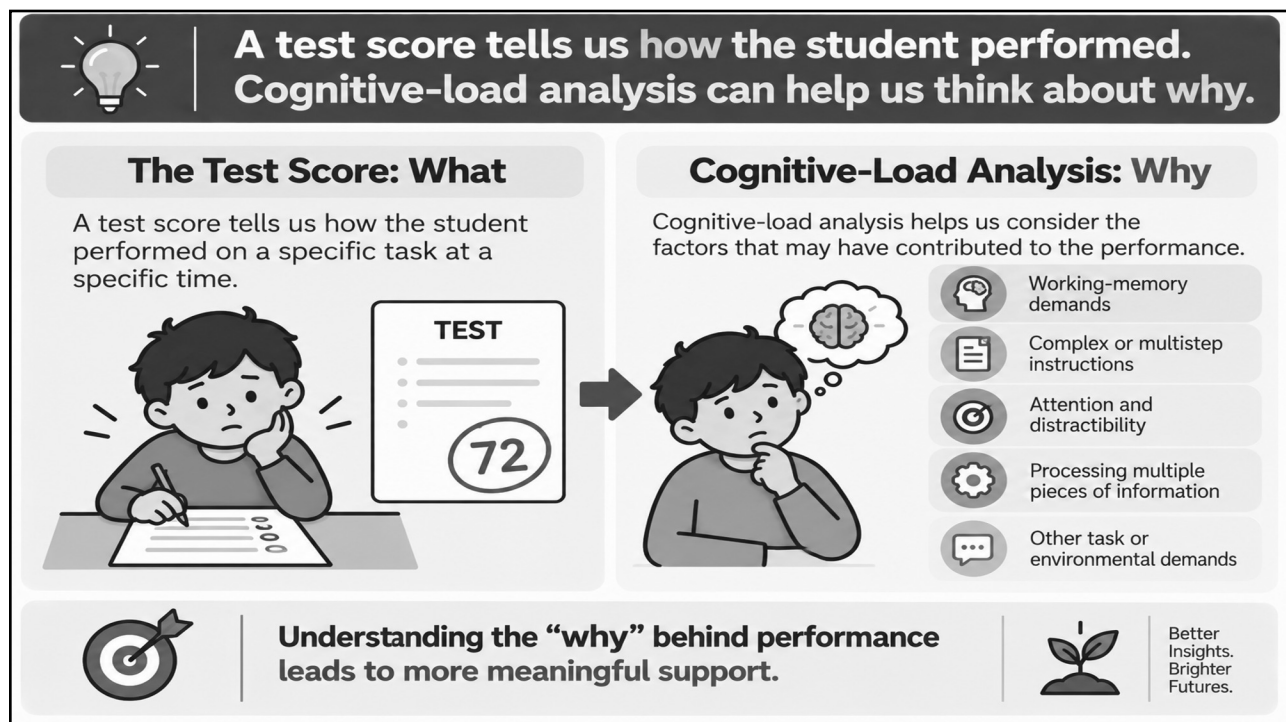


The goal is not just to know what a student can do in isolation, but whether they can access and succeed in the classroom.

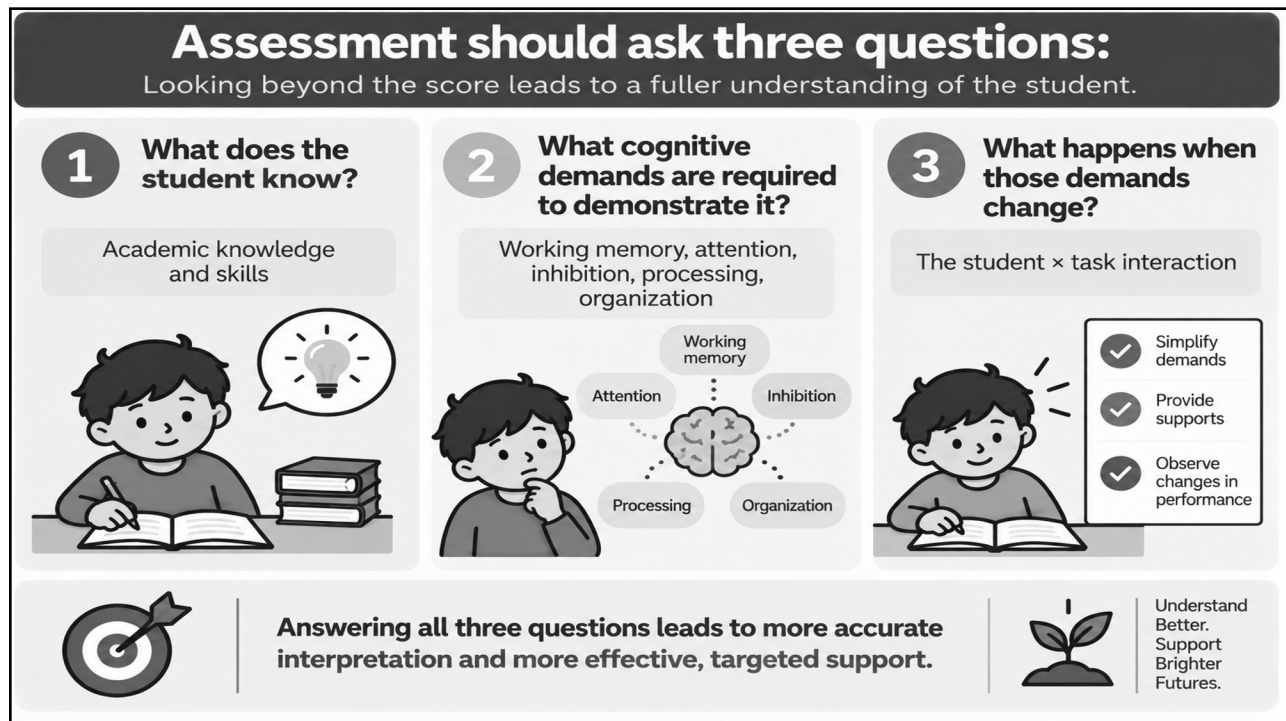
14



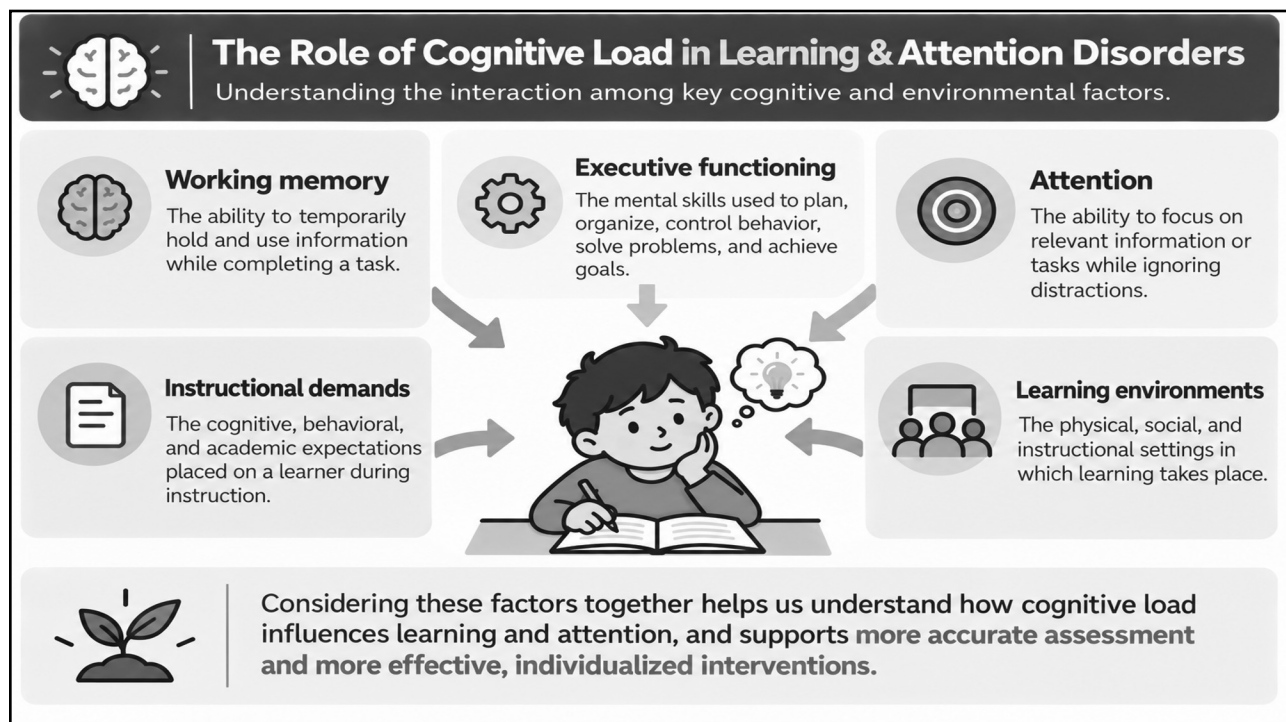
15



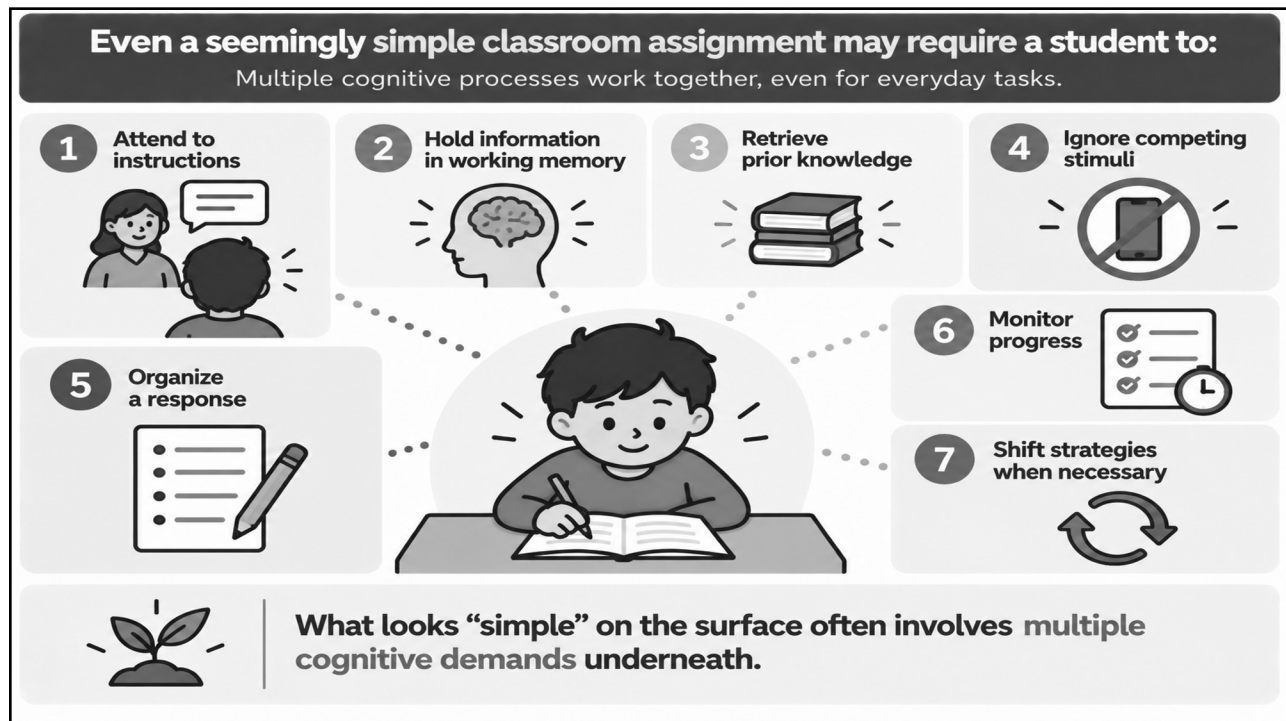
16



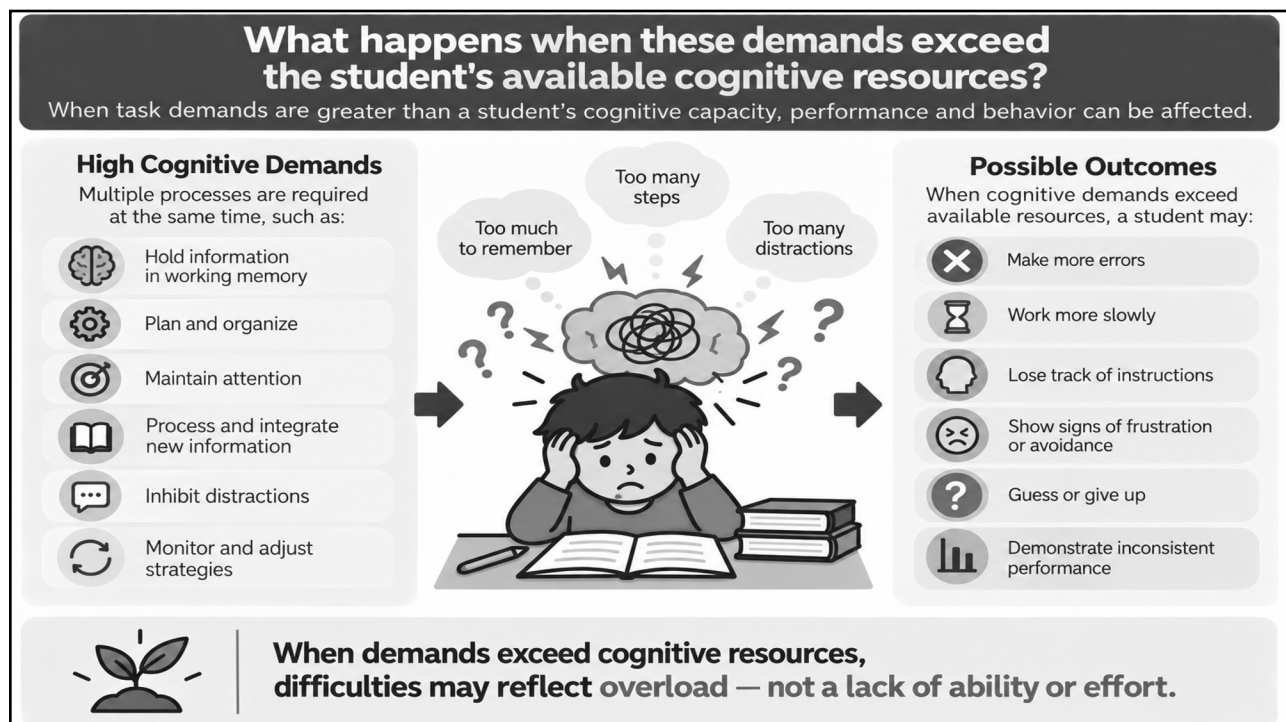
17



18



19



20



A Different Lens on Student Difficulty

When students struggle, we often ask:



Does the student have the skill?
Is the student able to perform the academic task or concept?



Is the student motivated?
Is the student willing to put in the effort?



Is the student paying attention?
Is the student focusing on the relevant information?



Does the student have ADHD or a learning disorder?
Are underlying conditions contributing to the difficulty?





A broader lens considers how cognitive demands, instructional factors, and the learning environment may be contributing to the difficulty.

More insight.
More understanding.
More effective support.

21



Cognitive Load Theory adds another question:

Looking beyond the student to the demands of the learning environment.

When students struggle, we often ask:



Does the student have the skill?



Is the student paying attention?



Is the student motivated?



Does the student have ADHD or a learning disorder?



Cognitive Load Theory adds another question:

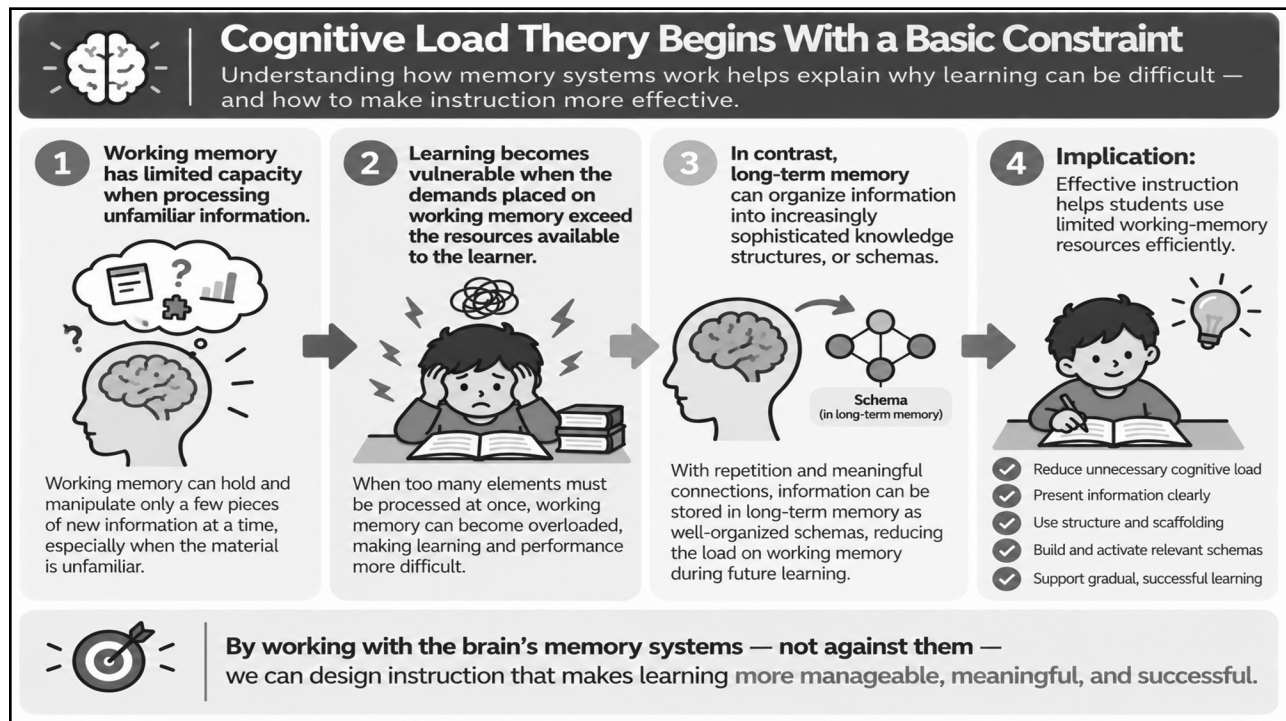


How much cognitive work does the learning environment require before the student can even demonstrate the target skill?

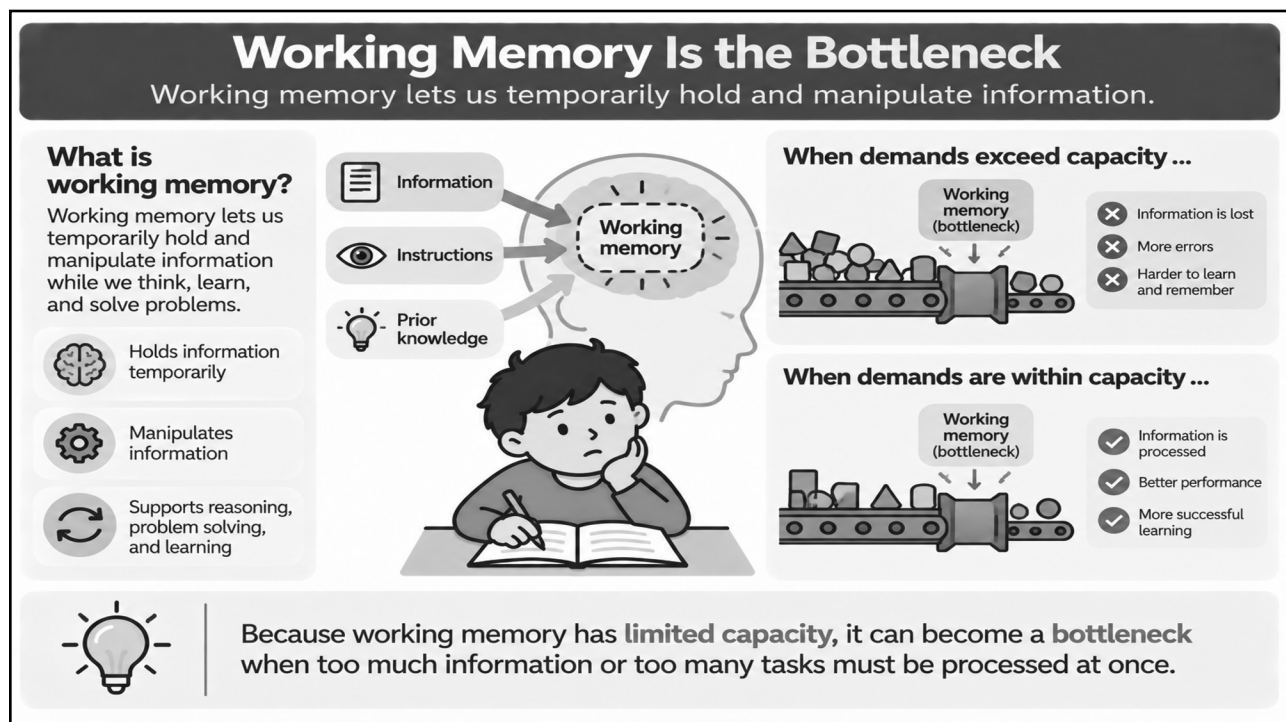


By considering cognitive demands, we gain a more complete understanding of student difficulty — and can design better supports.

22



23



24

Students Use Working Memory When:

Many everyday classroom tasks rely on working memory to hold and manipulate information.

Follow multi-step directions



1. _____
2. _____
3. _____

"First, read this, then highlight key points, and finally answer the questions."

Perform mental arithmetic



$37 + 28 = ?$

Integrate sentences while reading



"She picked up the book because it was interesting."
Working memory helps connect ideas across sentences.

Take notes while listening



Compare alternatives



A B

Weigh options and consider possible outcomes.

Organize written responses

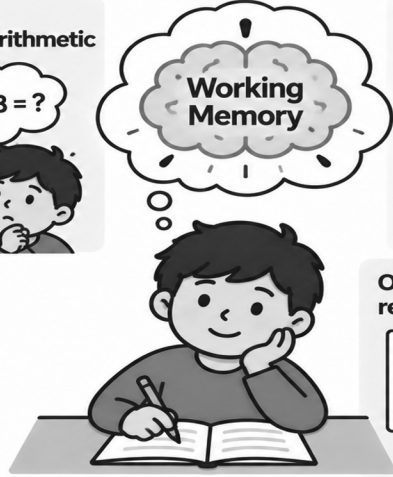


Plan, structure, and express ideas clearly.

Remember where they are in a task



Keep track of progress and what comes next.



Working Memory



Working memory helps students **hold, process, and manipulate information in the moment** — supporting successful learning across many classroom tasks.

25

When working-memory demands become excessive,

information can be lost before it is meaningfully processed.

Too much information at once

Multiple pieces of information compete for limited working-memory capacity.



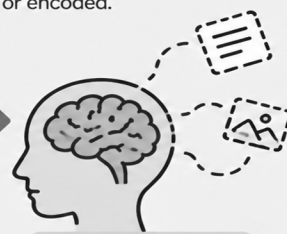
Working memory becomes overloaded

The number of demands exceeds the student's available cognitive resources.



Information can be lost

Some information fades quickly and is not meaningfully processed or encoded.



Information is lost before it can be used.

Result

The student may appear to forget, make errors, or struggle to complete the task — not because they don't know it, but because the working-memory load was too high.





When working-memory demands become excessive, **information can be lost** before it is meaningfully processed.

26



Cognitive Load Is Not the Same as Difficulty

Not all challenging tasks overload the mind — and not all high cognitive load is productive.

1 A difficult task is not necessarily a poorly designed task.



A task can be difficult because it is important, complex, or requires new learning — not because it is poorly designed.

2 Some difficulty is inherent to learning.



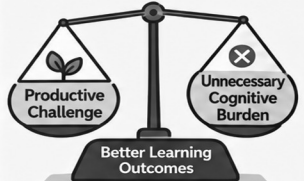
Learning often requires effort as we build new connections, practice, and move beyond our current level of understanding.

3 The goal is not to eliminate challenge.



Without challenge, there is little opportunity for growth, mastery, or deep learning.

4 The goal is to preserve productive challenge while eliminating unnecessary cognitive burden.



Design instruction that keeps meaningful challenge but reduces extraneous demands that overload working memory.



The aim is not to make learning easier, but to make it **more effective** — **challenging in the right ways.**

27

The important distinction is between:

Not all difficulty is the same. Understanding the source of difficulty helps us design better learning experiences.

Difficulty required by the learning goal.

This is the necessary cognitive effort that comes from the content and skills we want students to learn.



- ✓ Involves productive struggle
- ✓ Builds new knowledge and skills
- ✓ Leads to deeper learning and long-term growth

This kind of difficulty is desirable and should be maintained.

≠

Difficulty created by how the task is presented.

This is unnecessary cognitive load that comes from confusing instructions, clutter, or poor design — rather than the learning goal itself.



- ✗ Comes from unclear instructions, distracting formats, or irrelevant information
- ✗ Does not contribute to the intended learning goal
- ✗ Can overload working memory and interfere with learning

This kind of difficulty should be reduced or eliminated.



By keeping necessary challenge and removing unnecessary cognitive burden, we create learning experiences where students can **focus on what truly matters.**

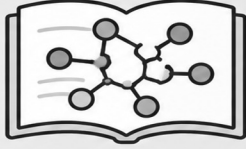
28

Three Traditional Components of Cognitive Load

Cognitive load refers to the mental effort required in working memory during learning. It is commonly described as having three components:

1 Intrinsic Load

Complexity inherent in the material or task.



Some content is naturally more complex because of the number of interacting elements that must be understood.

Example: Learning a new scientific concept with many interrelated ideas.

2 Extraneous Load

Cognitive demand created by irrelevant or inefficient instructional features.

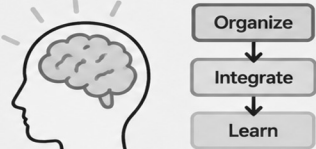


Caused by unnecessary or distracting elements that do not support learning and can overload working memory.

Example: Poorly designed slides, irrelevant information, or confusing instructions.

3 Germane Load

Mental effort devoted to organizing, integrating, and learning information.



Productive mental effort that helps build and strengthen knowledge structures (schemas) in long-term memory.

Example: Making connections between ideas or creating a summary.



Effective instruction aims to manage all three types of load — reduce unnecessary (extraneous) load, manage intrinsic load, and maximize germane load.

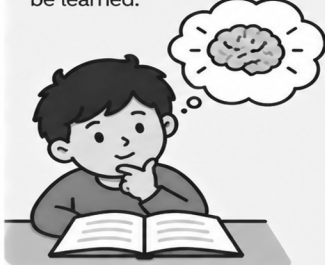
29

Intrinsic Cognitive Load

Intrinsic cognitive load reflects the complexity of what must be learned.

What is intrinsic cognitive load?

It is the mental effort required by the inherent complexity of the material itself — that is, the essential elements that must be learned.



Examples of Intrinsic Cognitive Load

$2x + 3 = 11$	Solving a multistep equation
$\frac{3}{4}$	Understanding fractions
	Analyzing a complex paragraph
	Comparing multiple historical causes
	Writing an argument using several sources

Intrinsic load depends partly on prior knowledge.

The more relevant knowledge a learner already has, the less mentally demanding the task will be.

More prior knowledge →



- ✓ Easier to understand
- ✓ Requires less working memory
- ✓ Can focus on deeper learning

A task that overwhelms a novice may be manageable for an experienced learner.



Novice

May feel overloaded by the same task.



Experienced learner

Can draw on prior knowledge to manage the task.



Intrinsic cognitive load is about the **complexity of the content**, and it varies depending on the learner's **prior knowledge**.

30

We cannot eliminate the essential complexity of cognitive load
without changing the learning objective, but **we can manage it.**

We cannot eliminate it
The essential complexity is inherent to the learning goal.

- The core concepts, processes, and skills require mental effort.
- Removing this complexity would mean simplifying the learning objective itself.
- We cannot make meaningful learning happen without some cognitive load.

Same learning goal.
Manage the load.

But we can manage it
We can design instruction to support learners in handling the necessary cognitive load.

- Sequence information effectively.
- Reduce unnecessary cognitive burden (extraneous load).
- Use supports such as examples, scaffolds, and worked solutions.
- Focus cognitive resources on what matters most for the learning goal.
- Build prior knowledge to make the essential complexity more manageable.

We cannot eliminate the essential complexity of cognitive load without changing the learning objective, but **we can manage it.**
Effective instructional design helps learners meet the necessary challenge without being overwhelmed.

31

Management Strategies Include:
We can't eliminate the essential complexity, but we can support learners in managing it.

1 Teach prerequisite knowledge
Build the foundational knowledge and skills needed for success.

2 Sequence concepts
Present material in a logical order from simple to complex.

3 Break complex tasks into stages
Divide tasks into smaller, manageable steps.

4 Use worked examples
Show complete, solved examples to reduce initial cognitive load.

5 Model processes explicitly
Think aloud and demonstrate how to approach and solve tasks.

6 Provide scaffolds initially
Offer supports such as guides, templates, or checklists.

7 Gradually increase independence
Fade supports over time as learners gain confidence and skill.

Scaffolding changes access to the task, not necessarily the rigor of the learning objective.

Scaffolds make the task more accessible.

The goal is to support learners in reaching the same learning goals with appropriate cognitive support.

Effective management of cognitive load helps learners engage with challenging content and **build lasting understanding.**

32

Extraneous Cognitive Load

Extraneous cognitive load is the mental effort caused by the way information is presented, rather than by the learning content itself.

What is extraneous cognitive load?

It is the unnecessary mental effort caused by poor design, irrelevant information, or distractions, which does not contribute to learning.

Examples of Extraneous Cognitive Load

Unclear directions Instructions are vague or confusing.	Visually cluttered worksheets Too many colors, fonts, or elements.	Irrelevant graphics Decorations that do not support learning.	Redundant explanations The same information is repeated in multiple ways.	Searching across multiple screens Information is spread out and requires constant switching.
Excessive copying Unnecessary writing or transcription tasks.	Competing notifications Alerts and messages divert attention from the task.	Poorly organized presentations Information is not structured logically or clearly.	Unnecessary task switching Frequent changes between tasks interrupt concentration.	

Extraneous cognitive load is often the **most actionable** form of cognitive load for educators.

33

Germane or Productive Effort

Not all mental effort should be reduced. Some effort is essential for learning.

What is germane cognitive load?

Germane cognitive load refers to the mental effort that contributes directly to meaningful learning by helping students process, organize, and integrate new information.

Students need cognitive effort to:

Organize information Sort and structure ideas in a meaningful way.	Make connections Link new information to prior knowledge and other concepts.	Explain reasoning Justify thinking and communicate understanding.	Retrieve knowledge Bring information to mind and apply it in new contexts.
Compare concepts Identify similarities and differences.	Construct schemas Build and integrate knowledge into larger mental frameworks.	Monitor understanding Check comprehension and adjust strategies as needed.	

Productive struggle is different from cognitive overload.

Productive Struggle	Cognitive Overload
This is challenging, but I can figure it out!	
✓ Leads to deeper understanding ✓ Builds resilience ✓ Strengthens learning	✗ Feels confusing and frustrating ✗ Blocks learning ✗ Leads to disengagement

Our goal is to make students' effort **about learning**, not navigating unnecessary barriers.

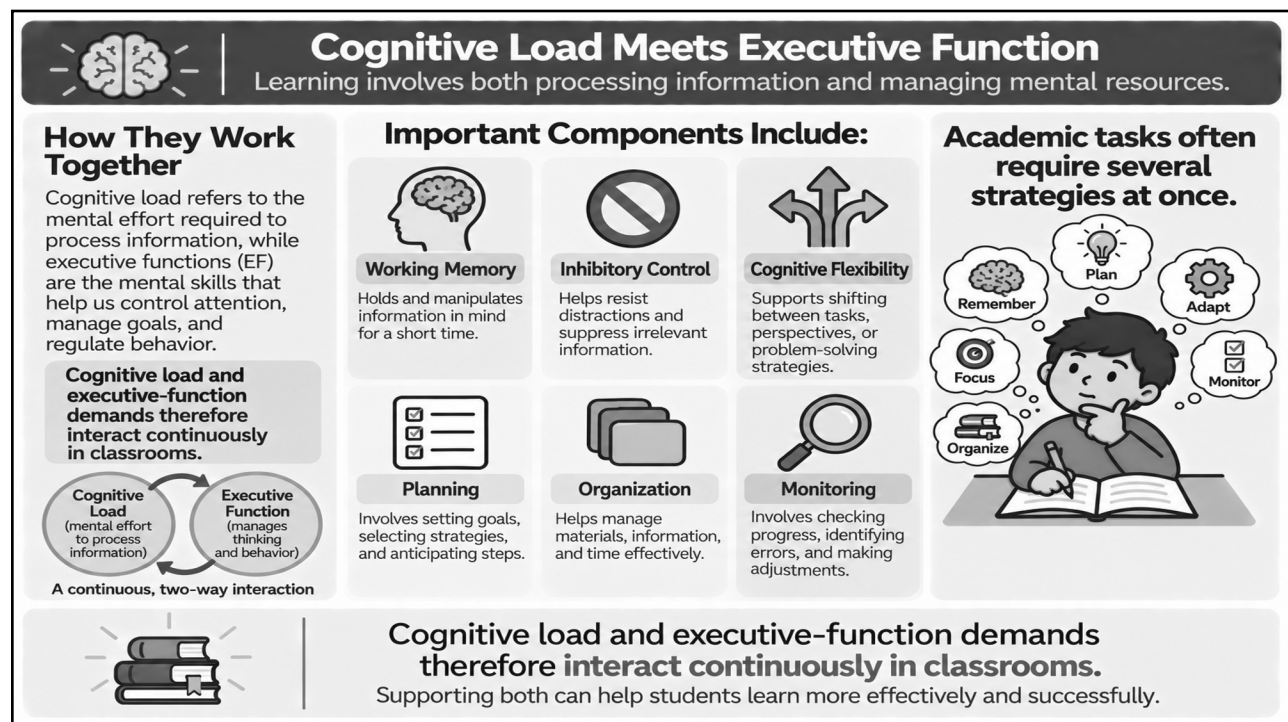
34

A Simple Cognitive Load Equation



For students with vulnerable working-memory or executive processes, the margin may be smaller.

35



36

ADHD and Executive Function

Research links ADHD with difficulties in several executive and cognitive processes.

What is ADHD?

ADHD (Attention-Deficit/Hyperactivity Disorder) is a neurodevelopmental condition characterized by persistent patterns of inattention, hyperactivity, and/or impulsivity that can affect learning, behavior, and daily functioning.



Executive and Cognitive Processes Often Affected

Research links ADHD with difficulties involving several key areas:

Working Memory	Attention Regulation	Inhibition	Organization	Goal Maintenance
				
Holding and manipulating information in mind over a short period.	Sustaining focus, shifting attention, and resisting distractions.	Suppressing impulses and resisting immediate rewards.	Managing materials, time, and information effectively.	Holding goals in mind and persisting toward them over time.
<i>E.g., remembering instructions or keeping steps in mind while working.</i>	<i>E.g., staying on task during independent work.</i>	<i>E.g., waiting for turns or thinking before acting.</i>	<i>E.g., keeping track of assignments and maintaining an organized workspace.</i>	<i>E.g., completing multistep tasks without losing sight of the goal.</i>



ADHD does not produce one universal cognitive profile.
Executive-function weaknesses vary substantially across students.



Key Takeaways

- ✓ ADHD is associated with challenges in multiple executive functions.
- ✓ Profiles differ across individuals.
- ✓ Understanding these differences helps us provide more targeted, flexible, and supportive learning environments.

37

Heterogeneity Is Critical

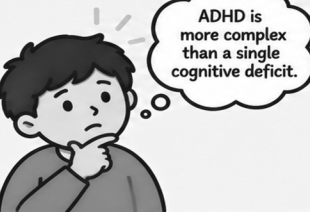
ADHD presents differently across individuals, and there is no single cognitive profile.

Avoid the assumption:



ADHD = working-memory deficit

While working-memory difficulties can occur in ADHD, they are not universal and do not define the condition.



Students With ADHD Vary Widely



Some students with ADHD

demonstrate substantial cognitive weaknesses across multiple domains.



Others do not.

Some students with ADHD show average or even above-average cognitive abilities.



Why It Matters

Co-occurring conditions and individual differences can influence attention, learning, behavior, and academic performance in diverse ways. A one-size-fits-all assumption can lead to misunderstanding and ineffective support.

Co-occurring Factors Matter

ADHD often co-occurs with other conditions, which may substantially change a student's cognitive and academic profile.

 Learning disorders (e.g., dyslexia, dyscalculia)	 Language difficulties (e.g., receptive or expressive language challenges)	 Anxiety (e.g., generalized anxiety, social anxiety)
 Developmental differences (e.g., autism spectrum disorder, developmental language disorder)	 Academic skill deficits (e.g., gaps due to missed instruction or reduced practice opportunities)	



Individual assessment remains essential.
A comprehensive evaluation helps identify each student's unique strengths and challenges, guiding effective, individualized support and instruction.

Understanding heterogeneity leads to better support, more accurate conclusions, and improved outcomes for students with ADHD.

38

ADHD + Learning Difficulties

Different profiles. Shared challenges. Individual assessment matters.

What Does the Research Show?

Recent research comparing children with ADHD, learning difficulties, combined difficulties, and comparison groups highlights an important point: These groups can show different patterns of cognitive and academic strengths and weaknesses.



Different learners. Different profiles. Same potential.

Different Patterns of Difficulties

ADHD Only



May be associated with a more circumscribed pattern of difficulties for some students, particularly in attention regulation and executive functions.

Learning Difficulties Only



May demonstrate broader impairments across:

- Memory
- Processing
- Executive functions

Combined ADHD + Learning Difficulties



Often shows compounded challenges, with difficulties in both attention/executive functions and broader learning-related cognitive skills.

Key Domains Affected in Learning Difficulties

Students with learning difficulties may show wider impacts across:



Memory

e.g., encoding, storage, retrieval



Processing

e.g., speed of processing, verbal and nonverbal processing



Executive functions

e.g., planning, inhibition, cognitive flexibility, working memory



Diagnostic labels should not substitute for cognitive and academic assessment.

Comprehensive assessment provides a clearer understanding of each student's unique profile and supports appropriate intervention.

Key Takeaways

- ✓ ADHD and learning difficulties can present differently.
- ✓ Students with learning difficulties may show broader cognitive impairments.
- ✓ ADHD alone may be more specific in its pattern for some students.
- ✓ Individual assessment is essential to understand strengths, needs, and appropriate support.

39

Cognitive Load and ADHD

Performance can change as cognitive demands increase — but the relationship is complex.

What Does the Research Suggest?

Experimental and neurophysiological research suggests that increasing cognitive demands can produce greater performance difficulties for individuals with ADHD under some conditions.



The Relationship Is Not Linear



More stimulation = worse performance.

The relationship between cognitive load and performance in ADHD is more complex than a simple “more is worse” idea.

Different Types of Load Can Produce Different Effects



Intrinsic Load

Task complexity (e.g., new or unfamiliar material).



Extraneous Load

Distractions and irrelevant information (e.g., noise, clutter, multitasking).

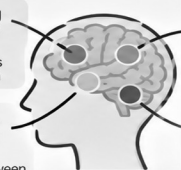


Germane Load

Effort directed toward learning and building understanding.

Working Memory and Control Resources Matter

Cognitive demands that compete for working-memory and executive-control resources are particularly important for individuals with ADHD.



Working memory

Holds and manipulates information

Inhibitory control

Helps resist distractions

Attention regulation

Helps sustain focus on goals

Context Matters

The effects of cognitive load can vary depending on the type of task, the learning environment, individual differences, and the presence of supports or scaffolds.



Key Takeaway

Increasing cognitive demands can lead to greater performance difficulties for some individuals with ADHD, but the relationship is nuanced. Different types of cognitive load have different effects, and tasks that compete for working-memory and control resources are especially important.

40

Cognitive Load vs. Perceptual Load

Fisher and colleagues found different effects for cognitive and perceptual load. This distinction matters.

Cognitive Load

Demands on processes such as working memory and cognitive control.



Examples

- Keeping and manipulating information
- Inhibiting irrelevant information
- Switching between steps
- Solving complex, multistep problems



Adding stimulation is therefore not necessarily equivalent to adding cognitively competing demands.

Perceptual Load

Demands associated with processing sensory/perceptual information.



Examples

- Processing visual details (e.g., crowded displays)
- Distinguishing sounds in noisy environments
- Filtering sensory input
- Managing the amount/complexity of sensory stimulation



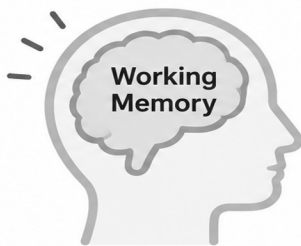
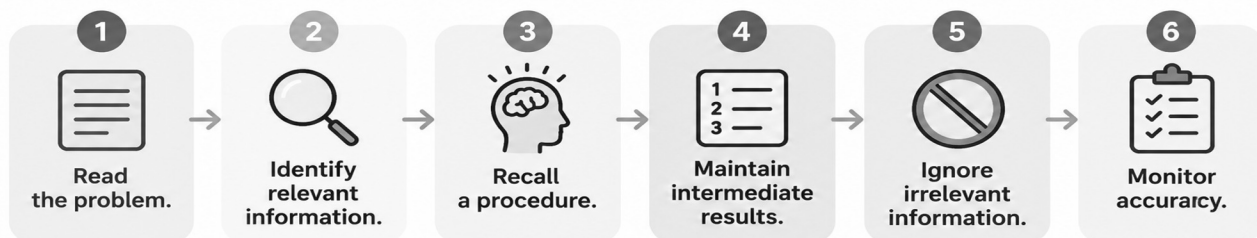
Ask what kind of demand the task creates.

41

The Working-Memory Connection

Working memory is central to academic performance because students must maintain information while doing something with it.

Consider a mathematics problem. A student may need to:



Every additional demand competes for **finite** cognitive resources.

The more demands placed on working memory, the fewer resources remain for learning.

42

Working Memory and Mathematics

Working-memory components are associated with mathematics performance in children with and without ADHD.

Relevant working-memory processes include:

Central Executive Functioning



Directs attention, coordinates information, and manages multiple steps.

Phonological Working Memory



Holds and manipulates verbal and numerical information.

Visuospatial Working Memory



Holds and manipulates visual and spatial information (e.g., shapes, diagrams, spatial relationships).



This helps explain why some students understand mathematical concepts but **break down** during complex multistep performance.



Mathematics Performance

These working-memory components are linked to mathematics performance in children with and without ADHD.

43

Working Memory and Reading

Reading also creates substantial working-memory demands.

The student must:

1



Decode or recognize words.

Convert print to meaning.

2



Maintain sentence information.

Keep earlier words in mind while reading later words.

3



Integrate ideas across sentences.

Build connections between pieces of information.

4



Retrieve vocabulary and background knowledge.

Access word meanings and prior knowledge from long-term memory.

5



Generate a coherent mental representation.

Build an overall understanding of the text.



When foundational skills are inefficient, they **consume resources** that could otherwise support comprehension.

44

Attention: Cause, Consequence, or Both?

When a student disengages during a demanding task, we may conclude:

“The student wasn’t attending.”



Attention

Attention problems can increase cognitive load.

These processes influence each other.



Cognitive Load

Excessive cognitive load may also contribute to apparent inattention.

But another possibility is:

The task exceeded the student’s capacity to maintain and manipulate the required information.



When we see inattention, consider **both**:

Is it a **cause**, a **consequence**, or a **combination** of the two?

45

When “Not Listening” May Be Overload

Imagine a student receives:

“Get your book, turn to page 74, read the first three paragraphs, underline the causes, compare them with yesterday’s notes, and answer questions 1–4.”



Successful performance requires:

1



Verbal working memory

Hold and remember the verbal instructions.

2



Sequencing

Keep the steps in order.

3



Goal maintenance

Keep the overall goal in mind while working.

4



Materials management

Get the right materials and locate the page.

5



Task initiation

Get started and move into action.

6



Attention shifting

Move between reading, underlining, comparing, and answering.



Failure at step 5 **does not necessarily** mean the student ignored the teacher.

46

Inattention During Instruction

What looks like “not paying attention” may reflect hidden cognitive processes.

What Does the Research Show?

Research has linked working-memory processes with inattentive classroom behavior among children with ADHD.



Difficulties in holding and manipulating information in mind can make it harder to stay engaged during instruction, especially when tasks are complex or presented quickly.

A Key Hypothesis for School Psychologists

Some observable off-task behavior may emerge partly from a mismatch between cognitive demands and available cognitive resources.

Look Beyond the Behavior

Behavioral observation should consider what the student was being asked to process immediately before disengagement.



Consider the Cognitive Demands

Students may become off-task when instruction requires:

- Holding information in working memory
- Processing multiple pieces of information at once
- Following multi-step directions
- Filtering out distractions
- Sustaining attention over time
- Making quick decisions or responses



Key Takeaway

Inattention during instruction may reflect a mismatch between task demands and cognitive resources, rather than a lack of motivation or effort. Understanding the cognitive context can lead to more accurate interpretation and more effective support strategies.



Consider the task. Consider the cognitive load. Look beyond the behavior.

A more informed perspective helps create better support.

47

Distraction Consumes Capacity

Competing stimuli can use up the mental resources needed for learning.

More Than an Annoyance

Distraction is not simply an annoyance. Competing stimuli can consume cognitive resources that students need in order to learn, especially when tasks are complex or unfamiliar.



Cognitive Resources Are Limited



Attention and working memory have limited capacity. When competing stimuli are present, they take up part of this capacity, leaving fewer resources available for the learning task.

Competing Stimuli Can Interfere With:



Selecting relevant information

Distractions can make it harder to focus on what is important.



Maintaining task goals

Competing stimuli can disrupt goal maintenance and lead to task drift.



Processing instructional cues

Distractions may reduce the likelihood that key instructions are noticed or encoded.



Monitoring performance

Competing information can make it more difficult to check progress and adjust strategies.

High Cognitive Load Increases Vulnerability

Under sufficiently high cognitive load, even instructional supports that are usually helpful (e.g., examples, prompts, or scaffolds) may become less effective because distraction consumes the resources needed to use them.



Context Matters

The impact of distraction depends on the type of task, the learning environment, the individual student, and the level of cognitive demand.



Key Takeaway

Distraction competes for limited cognitive resources. Reducing unnecessary distractions and managing cognitive load can help ensure that more mental capacity is available for learning.



Design learning environments that minimize distraction and support sustained attention.

48

The Classroom as a Cognitive Environment

The physical, social, and instructional environment all contribute to cognitive load.

More Than Just Curriculum

Cognitive load is produced not only by the curriculum. It can also come from many environmental factors in the classroom. These elements can increase the mental effort required to focus, process information, and complete tasks.



Sources of Cognitive Load in the Classroom

Classroom noise Background sounds can make it harder to focus and process information.	Peer activity Conversations and movement can divert attention.	Transitions Shifting between activities requires additional mental effort.	Materials management Finding, organizing, and handling materials can increase cognitive demands.	Unpredictable routines Changes or unclear routines can create uncertainty and extra mental effort.
Visual displays Busy or cluttered visual environments can be distracting and overwhelming.	Technology Devices and digital tools can both help and hinder, depending on how they are used.	Multiple simultaneous instructions Processing several directions at once can overload working memory.	Time pressure Strict deadlines can increase stress and cognitive load, reducing the ability to think deeply.	The Classroom Becomes Part of the Cognitive Task All of these environmental factors add to the mental effort required. The classroom itself becomes part of the cognitive task, influencing how much cognitive load students experience.

Key Takeaway

Cognitive load is influenced by both instructional demands and environmental factors. Designing predictable, organized, and low-distraction classrooms can help reduce unnecessary cognitive load and support students' learning.



A supportive classroom environment helps all students — especially those with attention and executive-function challenges — use their cognitive resources for learning, not for navigating unnecessary barriers.

49

Cognitive Accessibility

Clearer expectations. Less cognitive load. Greater opportunities for success.

Multiple Forms of Accessibility

We frequently discuss:

- Physical accessibility**
Access to physical spaces and materials.
- Sensory accessibility**
Support for vision, hearing, and other sensory needs.
- Language accessibility**
Clear, understandable language and communication supports.
- Technological accessibility**
Access to appropriate technology and digital tools.

We Should Also Consider:

Cognitive Accessibility
 Making learning easier to understand, organize, and manage.



Can students determine:

- What matters?
- What to do?
- Where to begin?
- What comes next?
- How to know when they are finished?

Good Instructional Design Supports Cognitive Accessibility

Effective design can make the answers to these questions more obvious by:

- Clear structure**
Organized, consistent layout and routines.
- Explicit goals**
Clearly communicate what is important.
- Step-by-step guidance**
Break tasks into manageable steps.
- Predictable routines**
Help students anticipate what comes next.
- Multiple ways to show completion**
Make it clear when a task is finished.
- Reduced unnecessary cognitive load**
Remove avoidable barriers and distractions.

Key Takeaway

Cognitive accessibility helps all learners — especially those with executive-function and attention challenges — by making the purpose, process, and next steps in learning clearer and easier to identify.

CLEARER TASKS

LESS CONFUSION

MORE SUCCESS

Design for the mind, and open the door to learning.

50

The Visual-Clutter Problem

More information is not always more supportive.

Less clutter.
More focus.
Brighter learning
opportunities.

What Is Visual Clutter?

Visual clutter refers to the presence of excessive, irrelevant, or competing visual information in the learning environment. While often well-intentioned, more information is not always more supportive — it can increase cognitive demands and make it harder for students to focus on what matters.

How Visual Clutter Increases Cognitive Demand

Visual clutter may require students to:

Search for relevant information

More items on the screen or wall can make it harder to find what is important.

Suppress irrelevant information

Students must inhibit distractions to focus on the target information.

Switch attention repeatedly

Competing stimuli can lead to frequent attention shifts, which consume mental resources.

Maintain their goal while navigating competing stimuli

Students must keep their task goal in mind despite distractions in the environment.

Students with executive-function difficulties may be particularly vulnerable to these demands, as they have fewer cognitive resources available for filtering and self-regulation.

A Classroom Example

Visually Cluttered

Simplified and Focused

Key Takeaway

Minimalism can function as an accessibility feature.

Reducing unnecessary visual information helps to lower cognitive load, making it easier for all students — especially those with executive-function difficulties — to focus, process information, and succeed.

Design With Intention

Clear, organized, and visually simple environments can support attention, reduce cognitive load, and improve access to learning for all students.

51

Digital Cognitive Load

Technology can help learning — but it can also add to cognitive load.

Use Technology Thoughtfully for Better Learning.

What Is Digital Cognitive Load?

Digital cognitive load refers to the mental effort required to use and process technology-based tools and information.

Technology can reduce cognitive demands, but it can also introduce new demands. Its impact depends on how it is designed, used, and experienced by the learner.

Technology Can Decrease Cognitive Load Through:

Individual pacing

Allows learners to work at their own speed.

Immediate feedback

Supports error correction and learning.

Read-aloud functions

Reduces decoding demands and supports comprehension.

Visual supports

Presents information in multiple formats (e.g., images, graphs).

External memory aids

Helps store and retrieve information (e.g., notes, reminders).

Adaptive practice

Adjusts to the learner's needs and provides targeted support.

Technology Can Also Increase Cognitive Load Through:

Notifications

Interrupt attention and break focus.

Multiple menus

Increase the steps needed to complete tasks.

Animation

Can be distracting and draw attention away from key information.

Pop-ups

Interrupt processing and increase frustration.

Split attention

Requires managing multiple sources of information at once.

Excessive navigation

Makes it harder to find what is needed.

Redundant multimedia

Presenting the same information in multiple formats can increase, rather than reduce, load.

Technology Is Not Cognitively Neutral.

The same tool can reduce or increase cognitive load depending on how it is designed and used, and on the learner's individual needs and context.

Key Takeaway

Technology can be a powerful support when used intentionally. Consider both the potential benefits and the potential sources of cognitive load to create more effective and accessible learning experiences.

Choose and design technology that supports focus, reduces unnecessary complexity, and aligns with learners' needs.

52

Design for the Task, Not the Platform

Focus on learning goals, cognitive support, and meaningful use.

Better Choices. Brighter Learning.

Technology Should Serve Learning Goals

Educational technology can be a powerful tool, but it should be adopted because it supports the learning task — not simply because it is new, popular, or available.

The key question is not “What can this platform do?” but “How does this tool support the specific learning goal for this student?”

Will this actually help me learn?

Before Adopting an Educational Technology, Ask:

	Does this tool make the learning goal clearer? Does it help students understand what they are expected to learn and do?	
	Does it reduce memory demands? Does it support recall, provide external memory aids, or reduce the need to remember multiple steps?	
	Does it reduce unnecessary navigation? Is the tool easy to use, with a clear and simple layout?	
	Does it focus attention? Does it minimize distractions and highlight what is important?	
	Does it provide useful feedback? Does it give timely, specific, and actionable feedback to support learning?	
	Does it increase competing stimulation? Could it introduce unnecessary visuals, sounds, notifications, or other distractions?	
	Does it require task switching? Does it lead students to switch between multiple screens, apps, or formats, increasing cognitive load?	

Look Beyond the Platform

The same tool can be helpful in one context and distracting in another. Its cognitive impact depends on:

The learning goal

The individual student's needs

How it is designed and used

The instructional context

Novelty is not evidence of cognitive efficiency.

Just because a technology is new or popular does not mean it reduces cognitive load or improves learning.

Key Takeaway

Choose educational technologies that are intentionally designed to support the learning task, reduce unnecessary cognitive load, and promote focus, understanding, and meaningful learning.

Thoughtful choice. Greater focus. Better learning outcomes.

53

Reduce Redundancy

Less unnecessary information. More meaningful learning.

Clearer Design. Lighter Load. Brighter Learning.

Why Redundancy Increases Cognitive Load

More explanation can sometimes create more cognitive load. When the same information is presented multiple times or in unnecessary formats, students must work harder to filter out what is relevant, which can reduce focus and make it more difficult to understand and remember the key ideas.

Do I really need to see this again?

Examples of Redundancy

These common practices can add unnecessary cognitive load:

Reading dense slide text aloud word-for-word

Hearing the same text that is already on the slide can be redundant and increase processing demands.

Repeating identical information in several formats

Presenting the same information in text, audio, and video at the same time may not improve understanding and can divert attention.

Adding decorative information that does not support the objective

Images, animations, or details that are not directly related to the learning goal can be distracting and compete for cognitive resources.

A Clearer, More Focused Design

Remove what is unnecessary. Keep what supports the learning goal.

Redundant Design

The Water Cycle

- Evaporation
- Condensation
- Precipitation
- Collection

The water cycle is the continuous movement of water on, above, and below the surface of the Earth... Evaporation is when water... Condensation is the process...

- Dense text
- Read aloud word-for-word
- Extra decorative images
- Multiple repeated formats

Focused Design

The Water Cycle

Condensation

Evaporation Precipitation

Collection

- Clear, simple visuals
- Minimal, focused text
- No unnecessary decoration
- Supports the learning goal

Key Takeaway

Each additional element in an instructional resource should serve a purpose. Reducing redundancy helps lower cognitive load and makes it easier for all students to focus on, process, and remember what matters.

Ask:
“Does each element contribute something necessary to understanding?”

If not, it may be competing with the learning goal.

54

Reduce Redundancy

Less unnecessary information. More meaningful learning.

Clear Content.
Lighter Load.
Brighter Futures.

Why Redundancy Can Increase Cognitive Load

More explanation is not always better. When the same information is presented multiple times or in unnecessary formats, students must work harder to filter out what is relevant. This can increase cognitive load, reduce focus, and make it more difficult to understand and remember the key ideas.

Examples of Redundancy

These common practices can add unnecessary cognitive load:

Reading dense slide text aloud word-for-word

Reading the same text that is already on the slide can be redundant and increase processing demands.

Repeating identical information in several formats

Presenting the same information in text, audio, and video at the same time may not improve understanding and can divert attention.

Adding decorative information that does not support the objective

Extra images, animations, or interesting but unrelated information can be distracting and compete with the learning goal.

Ask: Is It Necessary?

Before adding any element, consider:

- Does each element contribute something necessary to understanding?
- Does it support the learning goal?
- Does it reduce or add cognitive load?
- Does it help students focus on what matters?
- Can it be removed without losing essential meaning?

✗ If not, it may be competing with the learning goal.

Key Takeaway

Be intentional about what you include. Removing redundant or unnecessary elements can reduce cognitive load and make it easier for all students to focus on, process, and remember what matters.

Every element should serve a purpose.

Less redundancy.
More meaningful learning.

55

Externalize Working Memory

Move information out of the mind and into the environment.

Support Memory.
Support Learning.
Brighter Futures.

Why It Matters

Working memory has limited capacity. Students with executive-function difficulties may struggle to hold and manipulate information in mind while completing tasks.

By externalizing information, we reduce cognitive load, free up mental resources for learning, and increase the likelihood of success.

Examples of External Supports

Common tools to help move information from working memory into the environment:

Written directions
Clear, step-by-step instructions.

Checklists
Break tasks into manageable steps.

Visual schedules
Show what to do and when.

Graphic organizers
Support idea generation and organization.

Formula sheets
Provide key formulas and reference information.

Models
Offer concrete examples or manipulatives.

Rubrics
Clarify expectations and success criteria.

Timers
Help with time awareness and task persistence.

Progress trackers
Visualize progress and maintain motivation.

Examples of completed work
Provide a model of what success looks like.

Key Principle

Don't make remembering the instructions part of the academic test unless memory is the skill being assessed.

Key Takeaway

Strategically externalizing information helps all students — especially those with executive-function difficulties — access instructions, stay organized, and use their cognitive resources for the learning task, not for remembering what to do.

Design with Support in Mind

When information is visible, accessible, and easy to reference, students can focus on thinking, problem solving, and learning.

56



Chunk Complex Tasks

Break it down. Make it manageable. Build toward success.

Smaller Steps.
Brighter Learning.

Why Chunking Helps

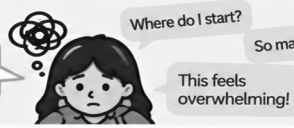
Complex tasks require planning, organization, working memory, and sustained attention — all of which can be challenging, especially for students with executive-function difficulties.

Chunking breaks a large, intimidating task into smaller, visible steps, reducing cognitive load while keeping the overall goal in sight.



Instead of:

"Complete the research project."



Create visible stages:

1 

Select question.

2 

Identify three sources.

3 

Record key evidence.

4 

Develop claim.

5 

Create outline.

6 

Draft.

7 

Revise.

8 

Submit.

Chunking reduces simultaneous planning and goal-maintenance demands while preserving the larger assignment.

Tips for Effective Chunking

-  Make steps specific and actionable.
-  Keep the sequence visible (e.g., checklist or visual timeline).
-  Use due dates for each stage to maintain momentum.
-  Celebrate progress along the way.
-  Provide examples or models when possible.

Remember



Smaller steps.
Less cognitive load.
Greater confidence.
Same big goal.



Key Takeaway

Chunk complex tasks into clear, manageable steps. This reduces cognitive load, supports focus and persistence, and helps all students move toward successful completion.



**Same goal.
Smaller steps.
Brighter outcomes.**

57



Scaffold, Then Fade

Provide support. Build skills. Foster independence.

Better Supports.
Brighter Learners.
Brighter Futures.

Why Scaffolding Matters

Students, especially those with executive-function difficulties, often need structured support to learn new skills, understand expectations, and build confidence.

Scaffolding reduces cognitive load, helps students organize their thinking, and makes learning more accessible without lowering expectations.

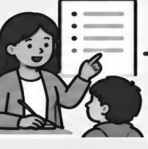


A Useful Progression

Gradually remove supports as skills and confidence grow.

1 **Model**

Show what to do.



Provide clear examples and demonstrate the process.

2 **Guide**

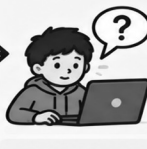
Do it together.



Support practice with feedback, reduce decision demands, and make steps explicit.

3 **Prompt**

Give less support.



Use cues, reminders, or checklists as needed.

4 **Independent Performance**

Do it on their own.



Complete the task independently, applying what has been learned.

More Support

Higher structure
Lower cognitive load

Greater Independence

Stronger skills
Lasting learning

Initially, Provide:

-  **Examples**
Show what successful work looks like.
-  **Reduce Decision Demands**
Limit choices to avoid overload.
-  **Make Steps Explicit**
Break tasks into clear, manageable steps.

Then Fade Supports



Gradually remove supports as schemas and routines develop, allowing for greater autonomy and flexibility.



Key Takeaway

Scaffolding is a temporary support that helps students build skills, confidence, and independence. The goal is not permanent simplification but greater independence through better learning.



The goal is greater independence through better learning — not permanent simplification.

58

Clearer Examples. Stronger Thinking. Brighter Futures.

Worked Examples

Learn from the solution. Build understanding. Solve with confidence.

Why Worked Examples Matter

Novices can experience overload when asked to solve complex problems before they have developed an adequate schema.

Worked examples reduce cognitive load by showing learners what to do, in what order, and why each step matters. They provide a model of successful performance, helping students build the foundational knowledge needed for independent problem solving.

Seeing the steps makes sense now!

SEE
UNDERSTAND
PRACTICE
SUCCEED

From Example to Independence

Gradually remove support as understanding grows.

1 Worked Example
Full solution with explanations.

Solve: $2x + 4 = 12$

Step 1: Subtract 4 from both sides.
 $2x + 4 - 4 = 12 - 4$
 $2x = 8$
We subtract 4 to isolate the term with x.

Step 2: Divide both sides by 2.
 $2x \div 2 = 8 \div 2$
 $x = 4$
We divide by 2 to solve for x.

Solution: $x = 4$

2 Partial Example
Some steps provided, student completes the rest.

Solve: $2x + 4 = 12$

Step 1: Subtract 4 from both sides.
 $2x + 4 - 4 = 12 - 4$
 $2x = 8$

Step 2: Divide both sides by 2.
 $x = \underline{\hspace{2cm}}$

I can finish this step!

3 Independent Problem Solving
Student solves on their own with minimal support.

Solve: $2x + 4 = 12$

Your turn!

I can do this!

What Worked Examples Show

- What steps occur
- In what order
- Why each step matters
- What successful performance looks like

Key Points

- Start with complete worked examples.
- Gradually shift to partial examples.
- Move toward independent problem solving.
- Adjust the level of support based on the learner's expertise.

Key Takeaway

Worked examples reduce cognitive load, help build schemas, and support learning. As expertise grows, gradually remove supports. Expertise changes what counts as helpful support.

Expertise changes what counts as helpful support.

59

Build Knowledge. Reduce Load. Brighter Futures.

Prior Knowledge Changes Cognitive Load

What you already know shapes how hard new information feels.

Why Prior Knowledge Matters

Prior knowledge is one of the most important moderators of cognitive load. What feels complex and overwhelming to a novice may be easy to process for an experienced learner because they can use existing knowledge structures (schemas) to make sense of the information.

Understanding a student's prior knowledge helps ensure that instruction is appropriately challenging — not too easy and not overwhelming.

Is it an attention issue or a knowledge gap?

ASSESS
SUPPORT
BUILD
SUCCEED

A Novice Learner

Many separate elements must be processed.

This is a lot to keep in mind!

Concept A, Concept B, Concept C, Concept D, Concept E, Concept F

Each element must be processed individually, which increases cognitive load and can feel overwhelming.

An Experienced Learner

Those elements may function as one organized schema.

Integrated Schema

I see how it all fits together!

Related elements are grouped into a meaningful schema, so they can be processed more efficiently, reducing cognitive load.

Key Implications

- Consider prior knowledge when introducing new content.
- Provide additional support for novices (e.g., scaffolding, worked examples).
- Help learners build foundational knowledge before increasing complexity.
- Differentiate instruction based on learners' experience and background knowledge.

Key Question

? When a student becomes overloaded, ask:
Is this an attention problem — or does the student lack prerequisite knowledge needed to process the task efficiently?

Key Takeaway

Prior knowledge changes cognitive load. The more a learner knows, the more efficiently they can process information. Before assuming a lack of attention, consider whether the student has the prerequisite knowledge needed to succeed.

Build foundations. Reduce cognitive load. Enable deeper learning.

60

Metacognition as Cognitive Load Management

Think about your thinking. Manage your learning.

More Awareness.
Less Overload.
Brighter Futures.

Why Metacognition Matters

Metacognition is the ability to think about one's own thinking. It helps students plan, monitor, and evaluate their learning, which can reduce cognitive load and improve learning outcomes.

When students use metacognitive strategies, they become more aware of what they know, what they need to learn, and how to use their cognitive resources effectively.

Let me think about my thinking!

PLAN
MONITOR
ADJUST
SUCCEED

Metacognitive Questions for Learners

Teach students to ask themselves:

1

What is my goal?
What am I trying to learn or accomplish?

2

What information matters?
What is essential for my goal?

3

What can I ignore?
What information is not relevant right now?

4

What strategy should I use?
Which approach will work best for this task?

5

Am I understanding?
Can I explain this in my own words?

6

Do I need to slow down?
Would a slower pace help me process this better?

7

What should I write down rather than remember?
How can I offload information from my memory?

8

How will I check my work?
What steps can I take to review and ensure accuracy?

Metacognitive routines make invisible regulatory processes explicit, helping students allocate their cognitive resources more effectively.

Benefits

- Reduces cognitive load
- Increases self-regulation
- Supports independent learning
- Improves problem solving
- Builds confidence and resilience

Tips for Teachers and Learners

- Model metacognitive thinking aloud.
- Use checklists or prompts regularly.
- Encourage reflection before, during, and after tasks.
- Make metacognitive routines a habit.

Key Takeaway

Students can learn to manage their cognitive resources. Metacognition helps them focus attention, make strategic choices, and reduce unnecessary cognitive load — leading to deeper learning and greater success.

**More self-awareness.
Smarter strategies.
Brighter learning.**

61

Motivation and Emotion Matter

Learning is more than cognitive capacity.

Engaged Students.
Deeper Learning.
Brighter Futures.

More Than Cognitive Capacity

Cognitive capacity alone does not determine learning. Students must also allocate effort.

I can do this!

INTEREST
CONFIDENCE
EFFORT
SUCCESS

Key Factors That Influence Learning

Motivation

Emotion

Interest

Perceived Competence

Anxiety (low or high)

Reinforcement

These Factors Can Influence:

Persistence

Attention allocation

Strategy use

Self-regulation

A Broader Perspective

Contemporary approaches increasingly argue that cognitive load should be considered within this broader learner context.

Key Takeaway

Motivation, emotion, and other learner factors influence how students allocate their cognitive resources and engage in learning.

**Support the whole learner.
Less overload.
Greater learning.**

62



Cognitive Load Is Not a Complete Theory of ADHD

A helpful lens — but not the whole picture.

Different Learners. Brighter Futures.

Important Caution

Cognitive Load Theory does not explain all ADHD-related difficulties. ADHD is complex and involves multiple, interacting factors beyond cognitive load.

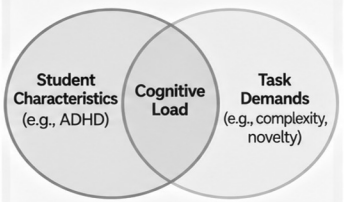


ADHD Involves Multiple, Interacting Factors

Common areas of difference include:

 Attention	 Inhibition	 Motivation	 Activity level
 Working memory	 Temporal regulation	 Emotional regulation	 Executive functioning

How Cognitive Load Fits In



Cognitive load is best understood as one lens for examining the interaction between student characteristics and task demands.



Key Takeaway

Cognitive Load Theory is valuable, but it is not a complete theory of ADHD. Consider the whole learner.



A broader perspective leads to better support and better learning.

63



Implications for Psychoeducational Assessment

Look beyond one explanation. Consider multiple possibilities.

Different Strengths. Better Support. Brighter Futures.

A Broader Evaluation

When evaluating academic difficulty, consider multiple hypotheses. Look at both student factors and task/learning demands rather than assuming a single cause.



Student Factors to Consider

 Academic skill deficits	 Working-memory vulnerability	 Attention regulation
 Executive functioning	 Language	 Motivation / emotion

Key Takeaway



A comprehensive assessment leads to more accurate understanding and more effective support.



Multiple perspectives lead to better decisions and brighter outcomes.



Understand. Support. Empower.

64



Interpret Working-Memory Scores Carefully

A useful data point — but not the whole story.

Better Questions.
Better Support.
Brighter Futures.

More Than a Number

A low working-memory score can provide useful information — but it does not automatically explain classroom performance.



It's a piece of the puzzle, not the whole picture.

Key Questions to Consider



1. Is the weakness consistent across measures?



2. Is there ecological evidence?



3. What academic tasks expose the difficulty?



4. What happens when memory demands are externalized?



5. Are attention or language demands contributing?



6. Does performance improve with structure?

Use the Information Constructively



Assessment should generate testable instructional hypotheses — not fixed conclusions.



Look beyond the score. Consider the whole learner.



Ask good questions. Find practical next steps.



Turn assessment into support. Help learners thrive.

65



Observation Through a Cognitive-Load Lens

Look deeper. Understand what's happening.

Observe. Understand. Support. Brighter Futures.

More Than "On Task"

During classroom observation, record more than whether the student is "on task." Use a cognitive-load lens to understand what might be driving disengagement.



What's really going on here?

What to Examine (Immediately Before Disengagement)



How many instructions were given?



How complex was the task?



Was prerequisite knowledge required?



Was information visually organized?



Were distractions present?



Did the student need to switch tasks?



Was external support available?

From Observation to Insight



This approach can transform observation from description into functional analysis.



Look at what happens before disengagement.



Understand the demands, not just the behavior.



Better observation leads to better support and brighter outcomes.

66



Consultation Questions for Teachers

Shift from “just pay attention” to a deeper understanding.

Support Teachers.
Support Learners.
Brighter Futures.

Look Beyond “Pay Attention”

Instead of asking only:

“How do we get this student to pay attention?”

Consider the underlying task demands.



Key Questions to Ask

 Which parts of this task require working memory?	 Which demands are essential?	 Which demands are incidental?	 Can directions be externalized?
 Can the task be chunked?	 Can visual competition be reduced?	 Does the student know the prerequisite material?	 What happens when these demands are changed?

From Questions to Solutions



These questions create intervention hypotheses.



Key Takeaway

Thoughtful questions lead to targeted supports and better learning outcomes.



Understand the demands.
Adjust the environment.
Empower success.

67



A Cognitive-Load Intervention Experiment

Small changes. Big insights.

Support Experiment.
Learn.
Brighter Futures.

School psychologists can help teachers conduct brief instructional experiments.

Step 1

Identify a recurring problem.



Pinpoint when and where the difficulty occurs.

Step 2

Identify likely unnecessary cognitive demands.



Look for task features that may increase cognitive load without being essential.

Step 3

Change one or two variables.

Examples:

 Written directions	 Fewer items visible	 Chunked assignments
 Reduced copying	 Worked example	 Reduced digital distraction

Step 4

Measure performance.



Compare performance before and after the change.

Step 5

Keep, modify, or discontinue the support based on data.



Use the results to decide next steps.



Key Takeaway

Systematic, small changes can reduce cognitive load and improve student learning.



Try.
Measure.
Learn.
Support.



Better instruction.
Brighter futures.

68



Maya, Grade 6

Understanding the full picture leads to better support.

Same Students.
Brighter Futures.

Maya

Grade 6



Concerns:
ADHD diagnosis

Key Concerns



Frequently misses assignment steps.



Starts slowly.



Leaves multistep work incomplete.



Performs much better with adult support.

Traditional Interpretation





Look Deeper. Support Smarter.

A fuller understanding leads to more effective, individualized support and better learning outcomes.



Understand. Support. Empower.

69



Maya, Grade 6

From understanding cognitive load to practical support.

Small Changes.
Big Progress.
Brighter Futures.

Maya

Grade 6



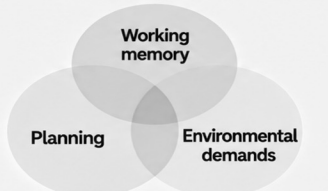
Key Concerns

- ADHD diagnosis
- Frequently misses assignment steps
- Starts slowly
- Leaves multistep work incomplete
- Performs much better with adult support

Cognitive-Load Hypothesis



Maya may lose task goals when working memory, planning, and environmental demands occur simultaneously.



Possible Supports



Written task sequence



One section visible at a time



Model of completed product



Brief check-ins



Self-monitoring checklist



Reduce unnecessary demands. Keep goals in sight.



Small supports can make a big difference.



Understand. Support. Help Maya thrive.

70


Case Example: Different Students, Same Behavior
 Three students appear "off task."
 Same Behavior.
Different Causes.
Different Supports.
Brighter Futures.

Students may look the same on the surface, but the reasons can be different.
Understanding the underlying cause leads to more effective support.

Student A	Student B	Student C
Does not understand prerequisite content.  The student is "off task" because the foundational content is not understood.	Understands the content but loses multistep directions.  The student is "off task" because they understand the material but have difficulty holding multistep directions in working memory.	Understands and remembers the task but is highly distracted by surrounding activity.  The student is "off task" because they understand and remember the task but are highly distracted by surrounding activity.



Key Takeaway
 The same behavior can have different causes.
 Look beneath the surface to provide the right support.



**Different students.
 Different needs.
 Better supports.
 Brighter futures.**

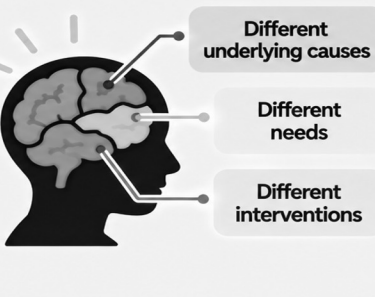
71


Same Behavior. Different Reasons. Different Support.
 Look below the surface.
 Understand.
Assess.
Collaborate.
Create Brighter Futures.

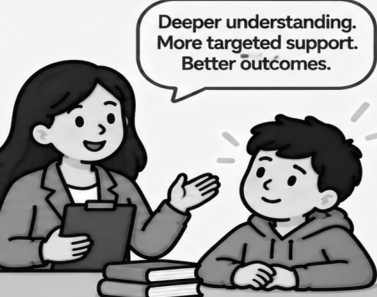
The observable behavior may look similar.



The mechanism and therefore the intervention may be very different.



This is where school psychological assessment and consultation add value.





Same behavior can have different causes.
 Thoughtful assessment and collaboration lead to the right support for each student.

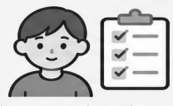


**Better Learning.
 Brighter Futures.**

72

Ten Takeaways for School Psychologists

Key points to inform assessment, consultation, and intervention.

1 Working memory is limited.  Working memory can hold only a small amount of information at one time.	2 Cognitive load depends on both the learner and the task.  The same task can be easy for one student and difficult for another, depending on individual characteristics and task demands.	3 ADHD is cognitively heterogeneous.  Children with ADHD show considerable variability in cognitive strengths and weaknesses.	4 Inattention can sometimes reflect overload.  When cognitive demands exceed a student's available resources, inattention may be a sign of overload rather than lack of effort.	5 Preserve essential intellectual challenge.  The goal is not to eliminate difficulty, but to maintain meaningful challenge that promotes learning and growth.
6 Reduce unnecessary cognitive demands.  Minimize irrelevant or inefficient instructional features that add cognitive load without supporting learning.	7 Externalize memory and organizational demands.  Use tools such as visual supports, checklists, graphic organizers, and reminders to offload memory and organization.	8 Match scaffolding to prior knowledge.  Provide the right level of support based on the student's existing knowledge and skills, and gradually remove support as mastery develops.	9 Consider motivation, emotion, and context.  Performance is influenced by interest, self-efficacy, anxiety, fatigue, and environmental factors, not just cognitive ability.	10 Use assessment data to test hypotheses about student x environment interactions.  Look for patterns in how a student's performance changes across different tasks, supports, and contexts to inform individualized recommendations.



Apply these takeaways to create more equitable assessments, more effective supports, and better outcomes for all students.
 Small changes in cognitive demands can make a big difference.

73

Core Principle:

Reduce the load that does not contribute to the learning goal.

Unnecessary Cognitive Load

-  Extraneous information (e.g., cluttered worksheets)
-  Complex or unclear directions
-  Visual distractions
-  Unnecessary time pressure
-  Nonessential digital demands



Focus on What Matters

-  Clear, concise instructions
-  One section at a time
-  Aligned with the learning goal
-  A calmer, less distracting environment
-  Essential supports only



Less unnecessary load.



More focus on learning.



Greater student success.

*Less Unnecessary Load.
More Learning.
Brighter Futures.*

74



Change the Question

A broader question leads to a deeper understanding and more effective support.

Instead of asking only:

“What is wrong with the student’s attention?”



- Focuses on the student
- Implies a deficit
- May lead to limited explanations and supports

Also ask:

“What is this environment asking the student’s attention and working memory to do?”



- Considers task demands, instructional design, and context
- Recognizes the interaction between the student and environment
- Leads to more accurate interpretations and more effective, targeted supports



A different question opens the door to new insights, stronger solutions, and better outcomes for students.

75



Change the Question

A small shift in perspective leads to more effective support.

Rethink.
 Refocus.
 Support Learning.
 Brighter Futures.

Instead of:

“How can we make the task easier?”



- ✗ May lower expectations
- ✗ Can remove valuable learning opportunities
- ✗ Might not address the real challenge
- ✗ Risk of oversimplifying

Ask:

“How can we make the cognitive effort more relevant to the learning goal?”



- ✓ Keeps high expectations with appropriate support
- ✓ Targets nonessential demands
- ✓ Maintains meaningful cognitive challenge
- ✓ Promotes deeper, more durable learning



Not just easier tasks.
More purposeful effort.



Align effort with the goal.



Greater understanding.
Brighter futures.

76



Final Thought

The objective is not a low-load classroom.

It is a classroom where students spend their limited cognitive resources thinking, understanding, practicing, and learning rather than overcoming preventable barriers.



Thinking



Understanding



Practicing



Learning



Overcoming Preventable Barriers

When we reduce unnecessary cognitive load, we free up mental resources for what really matters – learning.

77

The Role of Cognitive Load in Learning & Attention Disorders

Understanding the interaction among working memory, executive functioning, attention, instructional demands, and learning environments

AUDIENCE: SCHOOL PSYCHOLOGISTS

Multiple Demands in Learning Tasks

- Attend to instructions
- Hold information in working memory
- Retrieve prior knowledge
- Ignore competing stimuli
- Organize a response
- Monitor progress
- Shift strategies when necessary

When demands exceed available cognitive resources...



Possible Reasons for Difficulty

- Limited skill/knowledge
- Working-memory overload
- Difficulty sustaining the task goal
- Inefficient reading of the task
- Distractibility
- A combination of factors

More Informed Assessment & Intervention

- Look beyond the score to the process.
- Analyze how performance changes as demands change.
- Generate testable hypotheses.
- Design targeted interventions that reduce unnecessary cognitive load and build access to learning.

A test score tells us how the student performed.
Cognitive-load analysis can help us think about why.

1 What does the student know?
Academic knowledge and skills

2 What cognitive demands are required to demonstrate it?
Working memory, attention, inhibition, processing, organization

3 What happens when those demands change?
The student × task interaction

78

Selected Research Base

Research
Informs Practice.
Brighter Futures.

Evidence informing cognitive load, ADHD, and learning support.

1 Cai, Y., Holmes, J., & Gathercole, S. E. (2026). Associations between ADHD symptom dimensions and cognition in children with ADHD and learning difficulties. <i>Journal of Attention Disorders</i>, 30(1), 131–151. https://doi.org/10.1177/10870547251376776 2 Fisher, J. T., Hopp, F. R., & Weber, R. (2023). Cognitive and perceptual load have opposing effects on brain network efficiency and behavioral variability in ADHD. <i>Network Neuroscience</i>, 7(4), 1483–1496. https://doi.org/10.1162/netn_a_00336 3 Gaye, F., et al. (2024). Working memory and math skills in children with and without ADHD. <i>Neuropsychology</i>, 38(1), 1–16. https://doi.org/10.1037/neu0000920 4 Kofler, M. J., et al. (2019). Do working memory deficits underlie reading problems in attention-deficit/hyperactivity disorder (ADHD)? <i>Journal of Abnormal Child Psychology</i>, 47(3), 433–446. https://doi.org/10.1007/s10802-018-0447-1	Key Takeaway ADHD symptom dimensions are linked to cognitive differences in children, particularly when learning difficulties are also present, highlighting the importance of targeted support. Key Takeaway Cognitive and perceptual load affect brain network efficiency and behavior differently in ADHD, suggesting that task design and environmental demands matter for performance. Key Takeaway Working memory is closely related to math skills, and children with ADHD show particular vulnerabilities, underscoring the need for supports that reduce cognitive load in math learning. Key Takeaway Working memory deficits contribute to reading problems in children with ADHD, suggesting that interventions should address cognitive load to improve reading outcomes.
---	--

Research today. Better support tomorrow.
 Integrating evidence into school psychological practice.

**Evidence.
Understanding.
Brighter Futures.**

79

Selected References

Evidence
today.
Brighter
tomorrow.

Key research informing cognitive load, ADHD, and educational support.

1 Le Cunff, A.-L., Dommett, E., & Giampietro, V. (2024). Neurophysiological measures and correlates of cognitive load in ADHD, ASD and dyslexia. <i>European Journal of Neuroscience</i>, 59(2), 256–282. https://doi.org/10.1111/ejn.16201 2 Orban, S. A., et al. (2018). Inattentive behavior in boys with ADHD during classroom instruction: The mediating role of working memory processes. <i>Journal of Abnormal Child Psychology</i>, 46(4), 713–727. https://doi.org/10.1007/s10802-017-0338-x 3 Skulmowski, A., & Xu, K. M. (2022). Understanding cognitive load in digital and online learning. <i>Educational Psychology Review</i>, 34(1), 171–196. https://doi.org/10.1007/s10648-021-09624-7 4 Sweller, J., van Merriënboer, J. J. G., & Paas, F. (2019). Cognitive architecture and instructional design: 20 years later. <i>Educational Psychology Review</i>, 31, 261–292. https://doi.org/10.1007/s10648-019-09465-5 5 Moore, D. A., et al. (2018). School-based interventions for attention-deficit/hyperactivity disorder. <i>Review of Education</i>, 6(3), 209–263. https://doi.org/10.1002/rev3.3149	Key Takeaway Neurophysiological measures help clarify how cognitive load differs in ADHD, ASD, and dyslexia, informing more targeted and individualized educational support. Key Takeaway Working memory processes mediate inattentive behavior in boys with ADHD during classroom instruction, highlighting the importance of reducing memory demands in teaching. Key Takeaway Cognitive load plays a critical role in digital and online learning, and instructional design should minimize extraneous load while supporting germane processing. Key Takeaway Instructional design should reduce extraneous cognitive load, manage essential load, and foster germane load to support deeper learning, confirming the enduring relevance of cognitive load theory. Key Takeaway A range of school-based interventions can improve outcomes for students with ADHD, particularly when they reduce cognitive and environmental demands and are implemented consistently.
--	---

Research informs practice.
 Less cognitive load. More learning opportunities. Brighter futures.

**Understand.
Apply.
Support.
Brighter Futures.**

80

Student Cognitive Load Questionnaire – Teacher Form (SCLQ-T)

Identifying Classroom Situations. Supporting Student Success.

Observe.
Understand.
Support.
Brighter Futures.

Purpose

This questionnaire is designed to help school psychologists and educators identify classroom situations in which a student may experience increased cognitive load. It focuses on observable patterns involving working memory, task complexity, competing information, organization, and changes in performance as cognitive demands increase.

Key Areas of Observation

Working Memory

Task Complexity

Competing Information

Organization

Changes in Performance

Important Note

This questionnaire is intended to **generate hypotheses for assessment and intervention**. It is not a diagnostic instrument and should not be interpreted as evidence of ADHD, a learning disability, or another disorder by itself.

Better information. More targeted support.

Understanding cognitive load helps create learning environments where all students can succeed.

Same Students.
Brighter Futures.

81

Student Cognitive Load Questionnaire – Teacher Form (SCLQ-T)

Identifying Classroom Situations. Supporting Student Success.

Observe.
Understand.
Support.
Brighter Futures.

Directions

- 1 Think about this student's behavior and performance during typical classroom instruction and independent work **during the past 4-6 weeks.**
- 2 Rate how often each statement describes the student, particularly when the student **appears to understand** the underlying material.

1

Never

2

Rarely

3

Sometimes

4

Often

5

Almost Always

82

Student Cognitive Load Questionnaire – Teacher Form (SCLQ-T)

Items

Observe.
Understand.
Support.
Brighter Futures.

1 The student has difficulty completing tasks when several directions or steps are given at once. 2 The student loses track of what to do next during multistep assignments. 3 The student's performance declines as a task requires more information to be held in mind at the same time. 4 The student appears to understand individual parts of a task but has difficulty managing them simultaneously. 5 The student performs better when directions are written or visually available rather than requiring them to be remembered. 6 The student performs better when complex assignments are divided into smaller, clearly defined steps. 7 The student becomes less accurate, slower, or less productive as task complexity increases. 8 The student appears inattentive or disengages when tasks place high demands on remembering, organizing, or manipulating information.	9 The student has difficulty maintaining the goal of an assignment while also completing the individual steps. 10 The student has greater difficulty when listening and completing another task at the same time (for example, taking notes while listening to instruction). 11 The student's performance is negatively affected when relevant information is spread across different pages, screens, locations, or materials. 12 The student has greater difficulty working when irrelevant visual, auditory, digital, or peer distractions compete for attention. 13 The student has difficulty resuming a task or remembering where they left off after an interruption or task switch. 14 The student completes work more successfully when examples, checklists, models, organizers, or other external supports are available. 15 The student demonstrates knowledge or skills more successfully when unnecessary memory, organizational, or attentional demands are reduced.
--	---

Every learner can thrive
with the right support. ❤️

83

Student Cognitive Load Questionnaire – Teacher Form (SCLQ-T)

Preliminary Scoring

Observe.
Understand.
Support.
Brighter Futures.

1 Add the ratings for Items 1–15.
 Sum the ratings you selected for all 15 items (on a 1–5 scale).

2 Total Score:

/ 75

3 Score Range and Meaning
 Possible scores range from 15 to 75, with higher scores reflecting more frequent teacher-observed indicators that the student's classroom performance may be sensitive to cognitive-load demands.

! Important Interpretation Note
 At this stage, **do not use numerical cut scores** such as “average,” “elevated,” or “clinically significant.” The SCLQ-T has not yet been standardized or validated, and normative data have not been established.

- Instead, **examine the pattern of responses** and identify items rated **4 (Often)** or **5 (Almost Always)**.
- These ratings can help generate hypotheses about when and why the student's performance changes.

Look for patterns, not just numbers.

Use the Results to Inform Next Steps
 The SCLQ-T is intended to generate hypotheses for assessment and intervention. Use the pattern of responses, along with other information, to help identify classroom situations where the student may experience increased cognitive load and to guide support planning.

Same Students.
Brighter Futures. ❤️

84

Suggested Clinical/Consultation Interpretation

Items can be considered within four provisional domains:

Observe.
Understand.
Support.
Brighter Futures.

1 Working Memory & Simultaneous Processing Items 1–4 Does performance deteriorate when the student must maintain, manipulate, sequence, or coordinate multiple pieces of information?	2 Response to Cognitive Supports Items 5–6 and 14–15 Does performance improve when cognitive demands are externalized through written directions, chunking, models, checklists, or other environmental supports?
3 Performance Under Increasing Demand Items 7–10 Does increasing cognitive complexity correspond with slower performance, errors, disengagement, loss of task goals, or difficulty managing simultaneous demands?	4 Extraneous Load & Competing Demands Items 11–13 Does performance deteriorate when information is dispersed, distractions compete for attention, or the student must switch between tasks?

Use domain patterns to guide your next steps.

The pattern of responses can help generate hypotheses about when and why the student's performance changes and inform targeted assessment and intervention planning.

Same Students.
Brighter Futures. ♥

85

Follow-Up Questions for the Teacher

For any item rated 4 or 5, consider asking:

1	What type of task is most likely to produce this difficulty? Consider the subject, format, length, complexity, and any specific demands (e.g., reading, writing, multi-step instructions).	Examples: - Multi-step assignments - Long reading passages - Timed tasks - Tasks with lots of information	
2	What usually happens immediately before the student's performance deteriorates? Think about environmental factors, task demands, transitions, or changes in instruction.	Examples: - Increased task complexity - Longer periods of work - Transitions or changes in routine - Distractions in the environment	
3	What does the student typically do when the task becomes difficult to manage? Examples may include off-task behavior, avoidance, frustration, or requests for help.	Examples: - Becomes distracted or off-task - Avoids or gives up - Shows frustration (e.g., sighing, hiding head) - Seeks help or asks repeated questions	
4	What changes or supports noticeably improve the student's performance? Consider instructional adjustments, prompts, breaks, reduced complexity, visual supports, or additional time.	Examples: - Clearer instructions - Breaking tasks into smaller steps - Visual supports (e.g., checklists, graphic organizers) - Extra time or breaks	
5	Are there situations in which the student can complete similar academic work without difficulty? What is different about those situations? Identify conditions, supports, or contexts that lead to greater success.	Examples: - Works well in a small group but not in a large class - Performs better with hands-on activities - Completes similar work at home but not at school - Succeeds when tasks are shorter or more structured	

Your insights help identify patterns, reduce unnecessary barriers, and support the student's success.

Thank you for your observations and collaboration!

86

Interpretation Principle

Observe.
Understand.
Support.
Brighter Futures.

Use the SCLQ-T to understand patterns, not to make a diagnosis.

✗

Do Not Use the Questionnaire in a Simplistic Way

The questionnaire **should not** be used simply to ask:

“Does this student have high cognitive load?”

A single question doesn't capture the full picture.

✓

Instead, Use the Responses to Ask:

“Under what task and environmental conditions does this student's performance deteriorate, and what happens when those demands are changed?”

- ✓ Look for patterns across items.
- ✓ Identify specific situations, tasks, or environmental factors that influence performance.
- ✓ Use this information to generate hypotheses and guide targeted supports.

A More Useful Question Leads to Better Support.

Understanding when and why performance changes helps create more effective assessment, intervention, and learning environments.

Same Students.
Brighter Futures. ♥

87

Understanding the Bigger Picture

Observe.
Understand.
Support.
Brighter Futures.

Using Cognitive-Load Analysis to Inform Support

The Goal

The goal is to distinguish, when possible, among difficulties involving:

- Academic knowledge or skills
- Working-memory demands
- Attention regulation
- Task organization
- Competing information
- Prerequisite knowledge
- Other learner or environmental factors

Different Information, Different Questions

A test or classroom performance tells us...

A test or classroom performance tells us **how** the student performed.

Cognitive-load analysis can help us...

Cognitive-load analysis can help generate hypotheses about **why**.

Different information leads to better questions, which can lead to more targeted support.

Same Students.
Brighter Futures. ♥

88

44

The Role of Cognitive Load in Learning & Attention Disorders

Questions?

I'd be happy to discuss, hear your thoughts,
and explore ideas together!



Sam Goldstein, Ph.D.

Assistant Clinical Professor
University of Utah School of Medicine



Better Assessment.
Brighter Futures.



www.samgoldstein.com



info@samgoldstein.com



[@doctorsamgoldstein](https://www.facebook.com/doctorsamgoldstein)



[@drsamgoldstein](https://www.instagram.com/drsamgoldstein)



[@drsamgoldstein](https://www.linkedin.com/company/drsamgoldstein)



[@drsamgoldstein](https://twitter.com/drsamgoldstein)



[@drsamgoldstein](https://www.x.com/drsamgoldstein)



[@drsamgoldstein](https://www.youtube.com/drsamgoldstein)



[@commonsensescience](https://www.tiktok.com/@commonsensescience)

*Connect
Learn
Collaborate
Make a Difference*



Subscribe to my Substack!



Visit My Website



All Links in One Place

*Same Students.
Brighter Futures. ♥*