



# OUR RESEARCH

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A Research Brief on the Evidence Base, Framework,  
and Measured Impact of CogniKids Cognitive  
Training Programs



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# 1. Introduction



CogniKids develops cognitive training programs grounded in neuroscience, educational psychology, and developmental science. Our research examines how strengthening foundational cognitive processes—attention, memory, executive functioning, and visual-spatial perception—improves academic performance, supports self-regulation, and enhances long-term learning outcomes.

The purpose of this research brief is to present the theoretical foundation, conceptual model, and empirical findings from CogniKids interventions, with specific reference to the 2025 six-week cognitive training pilot conducted in a low-fee South African school (Grades 4–6,  $N = 249$ ).

This document synthesizes findings, highlights implications, and positions the research within existing global literature.

## 2. Theoretical Foundations

Decades of research show that learning is directly shaped by underlying mental processes that enable children to sustain attention, organize information, remember details, and interpret visual and spatial cues.

“Cognitive skills form the architecture of learning. Strengthening them is like strengthening the roots of a tree—everything above grows stronger.”

— **Dr. Yardaena Osband**, Pediatrician and Child Development Specialist

Modern cognitive science emphasizes that improvements in these processes—particularly attention and working memory—yield measurable gains in reading, mathematics, and problem-solving (Diamond, 2013; Meltzoff et al., 2009). These findings inform the structure and focus of CogniKids programs.



### 3. Core Cognitive Domains and Subdomains

CogniKids interventions target four major cognitive domains. Each is associated with specific learning outcomes and is supported by global evidence on neurocognitive development:

#### 3.1 Attention and Focus

*Subdomains:* selective attention, sustained attention, divided attention

*Purpose:* Improved concentration, reduced distractibility, better task persistence

*Relevance:* Central for reading comprehension, classroom behavior, and learning stamina

#### 3.2 Memory

*Subdomains:* short-term memory, long-term memory, working memory

*Purpose:* Strengthened recall, improved comprehension, better learning fluency

*Relevance:* Essential for following multi-step instructions, decoding text, and retaining concepts

#### 3.3 Executive Functioning

*Subdomains:* planning, organizing, problem-solving, sorting/categorization

*Purpose:* Enhanced reasoning, decision-making, flexible thinking

*Relevance:* Core to mathematics, writing, self-regulation, and independent learning “Cognitive training provides the mental scaffolding that allows children to manage information, solve problems, and build deeper understanding.”

— **Dr. Adele Diamond**, Professor of Developmental Cognitive Neuroscience

#### 3.4 Spatial and Visual Perception

*Subdomains:* visual discrimination, spatial awareness, directional understanding

*Purpose:* Improved visual processing, symbol recognition, and spatial reasoning

*Relevance:* Strong predictor of mathematical performance, handwriting, reading accuracy, and navigation



## 4. Conceptual Model: The CogniKids Cognitive Architecture

To clarify how these domains interact, CogniKids research uses a conceptual map called the **CogniKids Cognitive Architecture**, which illustrates the progression from foundational cognitive processes to academic and functional outcomes.

### The Architecture Includes:

#### 1. Foundational Cognitive Processes

Attention → Memory → Executive Function → Visual–Spatial Skills

#### 2. Integrated Cognitive Systems

- Reading for Meaning
- Mathematical Reasoning
- Language Processing
- Problem–Solving

#### 3. Academic and Behavioral Outcomes

- Improved comprehension
- Stronger numeracy
- Better task persistence
- Enhanced self-regulation and confidence

This framework is used to structure intervention design, track progress, and evaluate cognitive transfer into academic performance.

## 5. Research Context: South Africa’s Educational Landscape

The research aligns with urgent national needs. According to PIRLS 2021, **81% of South African Grade 4 learners cannot read for meaning**, the lowest result among 57 countries. Causes include:

- limited attentional control
- poor working memory
- weak executive functioning
- language diversity and overcrowded classrooms

These challenges underscore the importance of strengthening foundational cognitive skills early—particularly in Grade 4.



## 6. Empirical Findings: Six-Week Cognitive Training Pilot (N = 249)

A six-week cognitive training intervention was conducted with Grades 4–6 learners in a multilingual, low-fee school. The intervention targeted attentional control with secondary effects across memory and executive functioning.

### 6.1 Overall Outcomes Across All Grades

Subject	% Improved	% Regressed	% Same
Reading for Meaning	50.9%	28.5%	20.6%
Mathematics	46.3%	37.6%	16.1%
English Essay/Comprehension	41.2%	41.7%	17.1%

These results indicate broad cognitive transfer across subjects within six weeks.

### 6.2 Key Highlights Across Grades

#### Grade 4 – Foundational Gains

- **62% improved in Reading for Meaning**
- Average reading gain: **+2.26 points**
- Top individual gains exceeded **+300%**  
This aligns with global research showing younger learners exhibit the strongest neuroplastic response.

#### Grade 5 – Teacher-Dependent Outcomes

- Mathematics: **54.9% improved**
- Reading outcomes varied widely depending on teacher integration
- One class achieved a Mathematics effect size of **d = 0.49** (moderate to large)

#### Grade 6 – Cognitive Transfer with Classroom Support

- Mathematics: **+0.84 gain** (46.1% improved)
- Reading: modest overall gains but large improvements in classes with supportive teachers
- Individual improvements reached **+600%** for struggling learners



## 7. Interpretation of Findings

### Alignment with Global Evidence

The results match international effect sizes for cognitive training ( $d = 0.3-0.6$ ), signaling:

- measurable improvements
- meaningful cognitive transfer
- significant impacts even in resource-constrained environments

“When students improve in core cognitive skills—especially attention and working memory—we see clear transfer to academic performance.”

— **Dr. Torkel Klingberg**, Cognitive Neuroscience, Karolinska Institute

### Teacher Integration Matters

Classes where teachers tied cognitive training to ongoing lessons showed the strongest outcomes—consistent with global findings on cognitive transfer.

### Impact on Struggling Learners

Learners with the lowest starting scores exhibited the highest relative improvements (e.g., +500–600%), reflecting well-documented principles of neuroplasticity.

## 8. Strategic Insights from the Research

### 1. Cognitive Skills Are Foundational

Strengthening attention, memory, and executive functioning supports comprehension, mathematical reasoning, persistence, and confidence.

### 2. Early Intervention is Critical

Grade 4 results confirm that earlier cognitive training yields stronger and more durable learning outcomes.

### 3. Integration Enhances Retention

Cognitive gains become academically meaningful when reinforced in daily classroom practice.

### 4. Personalization Supports Mastery

Adaptive training enables learners to progress at their own cognitive level—an evidence-based pathway to mastery learning.



## 9. Ongoing Research, Collaboration, and Monitoring

CogniKids research follows an iterative model involving:

- continuous monitoring
- feedback loops
- collaborations with educational psychologists, pediatric professionals, therapists, and teachers
- refinement based on developmental appropriateness and clinical validity

“By combining clinical insight with digital innovation, CogniKids ensures every child’s learning experience is both evidence-based and deeply human.”

— **Eli Katz**, MSc Innovation Technology

## 10. Conclusion

The CogniKids cognitive training model demonstrates:

- strong alignment with established neuroscience
- measurable gains within short intervention periods
- applicability in low-resource classrooms
- significant potential to address South Africa’s reading and learning crisis

By grounding interventions in evidence, structuring them around core cognitive domains, and validating outcomes with real-world data, CogniKids contributes to a robust, scalable, and scientifically sound approach to improving children’s learning trajectories.

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