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Bridging Psychology and Pedagogy: A Review of Cognitive Development Interventions in Early Education

Fei Mo

Faculty of Education, Universiti Malaya, Kuala Lumpur, Malaysia

Abstract

This article presents a systematic review of cognitive development interventions in early childhood education, with a focus on game-based, family-centered, and teacher-mediated approaches. It draws on empirical studies published between 2015 and 2025 in both international and Chinese academic databases. It examines how these interventions apply key psychological frameworks—including Piaget's theory of cognitive development, Vygotsky's sociocultural theory, and information processing theory—to enhance cognitive skills such as memory, attention, and executive functioning. The review also identifies key implementation challenges, including disparities in resource allocation, cultural misalignments, and the absence of longitudinal outcome assessments. Based on the synthesis of findings, this paper proposes a multidimensional framework for future research and practice, highlighting the importance of culturally responsive, context-sensitive, and theory-informed interventions for improving cognitive outcomes in early childhood education.

Keywords

Cognitive Development, Early Childhood Education, Educational Psychology, Pedagogical Interventions, Executive Function, Evidence-Based Practice.

1. Introduction

In recent years, the global education landscape has undergone significant changes. Individuals have rapidly come to realize that early cognitive advancement is vital for children's long-term scholarly execution, capacity to adjust socially, and deep-rooted learning abilities. In knowledge-based economies, early cognitive improvement has become a crucial component of human capital formation. A 2023 report from UNESCO's Global Education Monitoring shows that more than 76% of countries have included cognitive development benchmarks in their basic teaching quality standards. This shows a global move from teaching based on intuition to intervention based on evidence.

At the same time, progress in neuroscience and developmental psychology has led to new teaching methods. These methods target key mental skills like memory, focus, and self-discipline. Experts design these techniques using well-known psychological theories. For example, Piaget's idea that children learn by exploring on their own, and Vygotsky's view that social and cultural factors shape learning. The methods are designed to fit both the stage of a child's development and the specific environment they are in. From sensory-based Montessori approaches to gamified curriculum and scaffolded instruction, the integration of psychology into pedagogy has shown varied but promising outcomes across diverse settings of education.

Despite the growing interest, the use of cognitive development interventions in education still faces several challenges, especially in low-resource contexts. Insufficient teacher training, culture incongruence, and poor monitoring tools have limited the scope and efficacy of many programs, such as in developing countries, where less than 35% of pre-primary institutions

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have teachers trained in cognitive development, and there is a lack of systematic local study on cognitive stimulating in left-behind children.

Within this backdrop, this paper aims to offer a synthesizing review of the empirical research published over the past decade from 2015 to 2025 on cognitive development interventions in early childhood education. Through both gathering knowledge and proposing how the hitherto gaps can be bridged by means of comparing how such interventions implement psychological constructs against certain conditions and what contextual factors determine whether or not they are effective. Through this, the paper wants to enhance both academic discourse and policy formation to ensure equitable, theory-based, and cultural flexible cognitive interventions.

2. Theoretical Foundations

In the field of early education, the design and practice of cognitive development interventions are rooted in the classical theoretical framework in the field of educational psychology, which provides a key perspective for understanding children's learning mechanisms and optimizing teaching strategies. Piaget's theory of stages of cognitive development, Vygotsky's sociocultural theory, and information processing theory have greatly influenced the design of educational interventions aimed at promoting children's cognitive development.

2.1. Piaget's Theory of Cognitive Development

According to Jean Piaget, children's cognitive development occurs in multiple distinct stages. The sensorimotor, preoperational, concrete operational, and formal operational stages are these phases. Every stage has distinct thought patterns and boundaries for what children can comprehend.

The concept of "schemas" is central to Piaget's theory. Children use these as mental tools to help them organize and interpret the information they are given. Piaget identified two primary mechanisms through which children's cognitive development occurs. Assimilation is one method. This indicates that kids attempt to integrate new experiences into their existing cognitive framework. Accommodation is the alternative. Here, kids incorporate new information into their preexisting mental tools. Piaget's theory explains why it's critical to design learning activities for young children that correspond to their developmental stage. For instance, pretend play and activities that allow them to touch and do things are effective learning tools for kids in the preoperational stage, which spans from ages 2 to 7. They begin to think more abstractly thanks to these exercises. Piaget-inspired teaching strategies frequently emphasize discovery learning. This implies that children actively participate and learn through play.

When we use Piaget’s stages of development in early education programs, they help teachers choose the right teaching methods. In the sensorimotor stage, activities that use the senses, like feeling things with different textures or listening to various sounds, can help children learn that objects still exist even when they can’t see them. These activities also help children start to understand the world around them. In the preoperational stage, telling stories and playing with symbols help children develop the ability to think in symbols. This helps them understand and talk about their surroundings. By matching teaching methods to a child’s cognitive stage, teachers can make learning more interesting and effective. But some recent studies say that the strict stage division might make us think children can’t do as much as they can. So, teachers should use dynamic assessment to adjust how much help they give to children.

2.2. Vygotsky's sociocultural theory

Piaget paid attention to how children develop by themselves. But Vygotsky had a different view. He believed social and cultural things were very important for how children learn and think. One of Vygotsky’s most important ideas is the Zone of Proximal Development, or ZPD for short.

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The ZPD shows the gap between what a child can do alone and what they can achieve with some help. Many teachers use this idea when they plan lessons. Another idea from Vygotsky is "scaffolding." Scaffolding means giving children the right support. This support usually comes from adults or other kids. With this help, children can complete tasks that are a bit too hard for them right now.

Vygotsky emphasized that language, cultural resources, and social interactions greatly affect children's thinking. His sociocultural theory states that thinking does not happen in isolation. Instead, it is strongly shaped by the social interactions and culture where the child grows up. Teaching methods based on Vygotsky's ideas often support small - group learning, encourage guided discussions, and include materials related to students' culture.

He believed that social interaction is how learning occurs. This can be demonstrated, for instance, by facilitating class discussions, allowing students to teach one another, and utilizing traditional community stories. Vygotsky's theory places a strong emphasis on tailoring instructional methods to the cultural backgrounds of students. Community programs frequently use knowledge passed down through generations and involve families to support early learning in areas with limited educational resources. These programs utilize elder wisdom and everyday cultural customs. This establishes a learning atmosphere that resonates with kids' everyday experiences. Teachers can provide students with meaningful and life-relevant learning experiences by incorporating social connections and local customs into their lessons.

2.3. Information Processing Theory

Advances in computer science and cognitive psychology led to the emergence of information processing theory. According to this theory, learning is a sequence of mental processes. These processes include focusing on information, transforming it into a format that our brains can retain, storing it, and retrieving it when required. The theory also focuses a lot on things like working memory (the short - term memory we use to think), the ability to control our attention, and executive control (the skills that help us plan and solve problems).

In schools and classrooms, information processing theory has helped create teaching methods that make learning faster and help students become more aware of how they learn. Some of these methods are based on the ideas in this theory. For example, breaking down big pieces of information into smaller, easier parts (this is called chunking), using different senses to teach (like seeing, hearing, and touching), and giving students feedback right away. Adaptive digital games are a good example. These games get harder slowly and give players feedback while they play, which follows the rules of information processing theory.

Piaget's theory was about how children develop over time, and Vygotsky's theory was about how society and culture affect learning. But information processing theory looks at how learners handle information in a more detailed way. This detailed way of looking at things is really useful. It helps in making educational technology that can fit each learner's needs. It also helps in creating learning plans that are just right for a student's thinking abilities.

The three aforementioned theories use the concepts of biological maturity drive (Piaget), sociocultural mediation (Vygotsky), and cognitive mechanism optimization (information processing) to create an explanatory framework for cognitive development. Together, they provide a solid theoretical basis for the design of cognitive development interventions in early education. Contemporary intervention design tends to integrate all three. For example, in the gamification curriculum, age-appropriate challenges are set according to the stage theory (biological dimension), peer collaboration tasks are embedded (social dimension), and metacognitive modulation is reinforced through timed feedback (information processing dimension). This combination of different elements provides a stronger set of theories to deal with difficult situations in education. It also gives useful information about how children learn,

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grow, and interact with the world around them. This helps teachers make teaching methods that are more targeted, effective, and suitable for how children develop.

3. Methodology of Review

This study adopts a systematic literature review approach to synthesize empirical and theoretical research on cognitive development interventions in early childhood education, with a focus on the integration of psychological theories and pedagogical practices. The review aims to identify effective intervention models, underlying theoretical frameworks, and contextual challenges across diverse educational settings.

3.1. Literature Search Strategy

A comprehensive search was conducted across multiple academic databases, including Web of Science, EBSCOhost, JSTOR etc. The search spanned studies published between 2015 and 2025 to ensure the inclusion of both foundational and recent findings. English and Chinese keywords were used in combination, including but not limited to: "cognitive development interventions," "early childhood education," "Piaget," "Vygotsky," "executive function," "scaffolding," and "information processing theory."

3.2. Inclusion and Exclusion Criteria

Studies were included if they met the following criteria: (1) the research focused on cognitive development interventions in early childhood (ages 0–8); (2) the study applied or evaluated psychological or educational theories; (3) the source was peer-reviewed journal articles, academic dissertations, or book chapters; and (4) the publication date fell within the specified 10-year range (2015–2025). Studies were excluded if they (1) involved populations outside early childhood; (2) did not focus on cognitive development; or (3) were non-academic publications such as editorials, news articles, or opinion pieces.

3.3. Analysis Approach

A thematic qualitative synthesis was conducted to categorize the selected studies according to the theoretical frameworks employed: Piaget's cognitive development theory, Vygotsky's sociocultural theory, information processing theory, or hybrid models. Within each theoretical category, intervention strategies were further analyzed based on their goals, implementation processes, and cognitive outcomes. Cross-study comparisons were then performed to identify convergent findings, research gaps, and implications for future practice.

4. Findings: Review of Intervention Strategies

4.1. Scaffolding Techniques in Preschool Teaching

4.1.1. Overview of Intervention Strategy

Scaffolding in preschool teaching means splitting complex learning tasks into smaller, easier steps. Teachers offer support and guidance at every stage. As children become more capable, teachers slowly reduce this support. Take teaching a child to write as an example. First, the teacher shows the right way to hold a pencil and make strokes. Next, the teacher helps guide the child's hand while writing a simple letter. Finally, the child tries to write independently. This method helps children build on the knowledge and skills they already have. It makes the learning process easier for them to understand and manage.

4.1.2. Theoretical Framework

The idea of scaffolding comes from Vygotsky's sociocultural theory. Vygotsky talked about the Zone of Proximal Development (ZPD). This is the gap between what a child can do alone and what they can do with help from someone who knows more. Scaffolding fills this gap by giving

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the right support within the ZPD. This helps children reach higher levels of understanding and skills. When children interact with teachers or older peers, they learn new knowledge and skills. Over time, these become part of what they can do on their own, which helps their minds develop.

4.1.3. Evidence from Empirical Studies

Research by Wang (2021) in supporting kindergarten English learners' oral language development found that scaffolding - based instructional interventions were effective. Teachers used techniques such as modeling correct pronunciation, providing sentence frames, and gradually reducing prompts. The study showed that children in the intervention group made significant progress in their English oral skills compared to those in the control group. Another study by Guerrero, Núñez, & Corbacho (2023) emphasized that in early educational practice, scaffolding techniques that focused on executive function development in preschoolers led to better outcomes. By scaffolding tasks related to planning, attention, and problem-solving, children showed enhanced cognitive abilities.

4.2. Game-Based Learning and Executive Function

4.2.1. Overview of Intervention Strategy

Game-based learning involves using various play activities to promote children's learning and development. In the context of executive function, activities such as building block play, pretend play, and board games are utilized. For example, in block play, children need to plan how to build a stable structure, organize their materials, and solve problems when their structures collapse. Pretending play allows them to take on different roles. It requires them to think flexibly and control their impulses.

4.2.2. Theoretical Framework

Learning through games is strongly supported by Piaget's theory of how children think. It emphasizes how crucial active exploration is to knowledge acquisition. According to Piaget, children learn best when they actively engage with their surroundings, and play is the ideal setting for them to do just that. Children can test their theories, pick up new knowledge, and gain a deeper understanding of the world through interesting activities.

Alongside the development of executive function skills is the prefrontal cortex, a region of the brain that aids in planning and self-control. Research indicates that play-based activities can aid in the development of the neural pathways supporting these higher order thinking skills. Important parts of executive function—like working memory, planning, and the ability to control impulses—can get stronger through play that has structure but also allows flexibility. So, adding play to early education not only matches Piaget's ideas but also helps the brain develop in ways that are needed for self-regulation and solving problems.

4.2.3. Evidence from Empirical Studies

Nowadays, most people agree that game-based learning is a good method to foster young children's cognitive development. According to recent studies, games that are not digital (like puzzles or blocks) or digital (like apps or tablets) can both enhance executive functioning. These include impulse control, flexibility in thought, and working memory (short-term memory).

For example, a study by Segers and Verhoeven in 2019 found that preschoolers aged 4–5 who played structured educational games for 10 weeks got better at working memory. Another study by Dinehart and Manfra in 2020 showed that kids who played with blocks or solved puzzles did better at problem-solving and understanding space and shapes.

Mareschal et al. (2020) said that how digital games are designed matters for helping kids learn to think about their own learning (metacognition). Games that change how hard they are and give feedback can help kids learn more. Also, games can make kids more motivated to learn, especially those who might struggle. Lau et al. (2021) found that children from low-income

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families paid more attention and controlled their emotions better after using a tablet game program.

Scionti et al. (2020) conducted a systematic review and meta - analysis on the effectiveness of cognitive training interventions, including game-based learning, for improving executive functions in preschoolers. They found that game-based interventions had a positive impact on children's executive function skills. Misrahayu (2024) also explored the impact of play - based learning on cognitive development in early childhood education. The study showed that children who engaged in game-based activities demonstrated better cognitive development, including improved executive function, compared to those in more traditional, teacher-directed learning settings.

4.3. Memory and Attention Training Activities

4.3.1. Overview of Intervention Strategy

In early education, there are activities to train kids' memory and attention. These activities include memory-matching games, storytelling with questions to answer, and games that make kids focus. In memory-matching games, children see pairs of cards. They have to remember where the cards that match each other are. After that, they try to find the matching pairs.

When doing storytelling with memory tasks, an adult reads a story to children. After that, the children need to remember and share details from the story. This helps them improve their ability to hold and use information in their minds, which is called working memory. Focused-attention games like “Simon Says” ask children to listen closely to instructions. They should only follow the instructions when a specific command is given. These games help children learn to pay full attention and control when they act.

4.3.2. Theoretical Framework

The multi-store model of memory explains how the human mind processes and stores information. This model describes three main stages of memory: sensory memory, short-term memory, and long-term memory. Each stage has a different role in how information is taken in, kept, and later remembered. In education, this model has helped create activities to strengthen memory skills.

Because they facilitate the transfer of information from short-term memory to long-term memory, memory-intensive tasks are beneficial for kids. While short-term memory can only hold small amounts of information for brief periods of time, long-term memory can hold large amounts of information over an extended period of time. By using strategies like repetition, meaningful associations, and methodical practice, information can be moved to long-term memory and retrieved more readily.

According to theories of attention like the "spotlight model," practice makes perfect. These theories contend that people can develop the ability to block out distractions and concentrate on what really matters. Children can learn to manage their attention and concentrate on crucial information with the correct guidance. This improves their performance on assignments and increases the effectiveness of learning.

4.3.3. Evidence from Empirical Studies

Birtwistle et al. (2025) used a variety of cognitive training exercises in a large study. They discovered that children's cognitive abilities can be enhanced through memory and attention training. Children's early performance can be enhanced by group programs that combine language and reading skill development with memory and attention training (Phillips et al., 2021). Children were better able to retain information during learning activities and retain new words thanks to these programs.

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4.4. Technology - Assisted Cognitive Development

4.4.1. Overview of Intervention Strategy

Through interactive resources like learning applications, online games, and multimedia platforms, early childhood education can help kids develop their critical thinking abilities. For instance, a lot of educational applications present fundamental information in an entertaining manner. Youngsters can practice counting, adding, and subtracting in an entertaining and stimulating setting by utilizing the entertaining features of math applications. Their comprehension and enthusiasm for fundamental mathematical ideas are enhanced as a result.

Digital storytelling applications foster creativity and language proficiency in addition to digital tools. These platforms allow kids to create and share their own stories. They can develop their creative thinking, pick up new words, and sharpen their memory by making up stories and expressing themselves. These technologies help children learn more deeply and develop critical language and thinking skills by promoting active participation and idea sharing.

4.4.2. Theoretical Framework

There is a key idea in the multimedia learning theory. It claims that seeing text and images together enhances learning in a way that reading text alone does not. This concept emphasizes the advantages of using technology in early childhood education.

Numerous elements found in educational games and applications aid in kids' learning. They display images and videos. They produce sounds. Youngsters can also touch and interact with the screen's elements. Children can learn more efficiently and comprehend the content better because of all these features. Another concept is gamification. It’s about making learning feel like a game. For example, apps might give kids stars or stickers when they do well. They also tell kids when they make a mistake. These rewards and feedback make kids want to keep learning. When kids are excited to learn, it helps their minds grow and develop.

4.4.3. Evidence from Empirical Studies

Idris et al. (2024) in their systematic review on reading proficiency among preschool pupils found that the use of digital reading apps could improve children's reading skills. The interactive nature of these apps, which included features like sound effects, animations, and voice - overs, made reading more engaging for children. Wei & Mamat (2024) also discussed the role of technology-based language teaching in promoting educational quality in early childhood education. Their study suggested that technology-assisted language learning could enhance children's language skills, as it provided opportunities for repeated practice and immediate feedback.

4.5. Family-Centered Interventions

4.5.1. Overview of Intervention Strategy

Family-centered interventions usually have a multi-part structure. They often include sessions where parents get coaching, learning materials that can be taken home, planned learning routines between parents and children and regular feedback or support from educators or professionals.

The "Play and Learn" program, for instance, provided parent guidance through home visits and weekly learning kits. Its main goal was to support language and memory development through interactive play (Landry et al., 2019). Dialogic reading interventions are another example. They train parents to take part in storytelling that is responsive and full of language. This kind of storytelling helps with cognitive processing and comprehension (Neuman & Moland, 2020).

4.5.2. Theoretical Framework

These interventions are grounded in several key psychological theories. First, Vygotsky’s Sociocultural Theory underscores the importance of social interaction and scaffolding in the

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development of higher-order thinking. Parents act as “more knowledgeable others” who support cognitive growth within the child’s Zone of Proximal Development (ZPD). Second, Bronfenbrenner’s Ecological Systems Theory emphasizes the microsystem, particularly the family, as a critical setting for cognitive and behavioral development. Lastly, Bandura’s Social Learning Theory highlights modeling and reinforcement mechanisms, where children internalize cognitive strategies by observing and interacting with their caregivers.

4.5.3. Evidence from Empirical Studies

Parental involvement is consistently linked to children’s cognitive outcomes. A growing body of evidence supports the effectiveness of family-based cognitive interventions. Landry et al. (2019) evaluated the "Play and Learn" program targeting low-income families and found statistically significant improvements in children’s language and memory development after 12 weeks of guided home activities. Yoshikawa et al. (2018) emphasized that culturally adapted home-learning curricula led to greater gains in early numeracy and self-regulation.

Furthermore, Neuman & Moland (2020) found that structured dialogic reading interventions involving parents produced sustained cognitive and literacy benefits for preschoolers. These findings highlight the dual importance of content quality and parental consistency in executing cognitive programs at home.

5. Discussion

5.1. Practical Feasibility and Cultural Adaptability of Interventions

The interventions for cognitive development that were considered show a range of practical feasibility within the context of early education. As an example, scaffolding techniques are not particularly difficult to implement since they are based on interactions between teachers and their students. They do not require large amounts of material resources. However, these techniques are only effective if the teacher is skillful enough to gauge each child's Zone of Proximal Development (ZPD), something that is difficult in the typical large-class environment many schools operate in. As beneficial as game-based learning may be, it does not enjoy popularity because it is often resisted by the traditional system of education which tends to value learning over play.

Cultural adaptability is one of the most important elements that determine the success of these interventions. For instance, in collectivistic societies, group-based- play may have a more positive reception due to the prevailing culture of communality. Individual-centered attention and memory training activities, on the other hand, may need to be modified to be more collective to be accepted. Technology-assisted interventions have cultural limitations too; in some places, there might be a problem with too much time spent in front of the screen, while in other places having no access to such devices makes such interventions impossible. Moreover, the content of educational apps and games must be culturally sensitive, avoiding elements that may be unfamiliar or inappropriate for certain cultural groups.

5.2. Teacher Roles and Training Challenges

Educators have a crucial impact on the application of cognitive development interventions. Teachers in scaffolding teaching frameworks assume the roles of guides to help children through the learning process. In play-based learning, the teacher begins the learning activities as an authoritative figure and gradually shifts to the role of observer and supporter as their attitude changes. But many educators have not been trained on how to use these strategies.

Teacher training programs tend to concentrate on the practical aspects of teaching, allowing little or no time for the application of psychological concepts, modern teaching methods, and creative instructional design. Teachers may not be able to recognize the targeted cognitive processes underlying interventions orchestrated by educators and adjust strategies to fit the

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needs of different students. Moreover, there are few opportunities in the professional development of teachers concerning new cognitive interventions, especially in developing countries. The absence of this training does not allow these interventions to be effective.

5.3. Impact of Regional Differences: Developed vs. Developing Countries

Regional differences between developed and developing countries greatly impact the adoption and implementation of cognitive development interventions. In developed countries, resources allocated to early education are usually adequate, including master level guides, appropriate educational instruments, and sound curricula. This allows for the adoption of many cognitive interventions, including technology-based learning, which benefits from widespread investment in IT infrastructure.

However, developing countries often face challenges with resource availability. Not having easy access to technology is a big problem for using interventions that depend on educational apps and digital games. In many areas with few resources, the lack of necessary infrastructure (like the internet or electricity) and devices (like tablets or computers) stop digital tools from being used effectively in early childhood education.

Additionally, the application of customized teaching techniques like scaffolding is frequently limited by system-wide issues. For example, classrooms may be overcrowded and there may not be enough qualified teachers. Sociocultural factors complicate the adoption of teaching strategies that correspond with the developmental stages of children. In certain developing countries, traditional education prioritizes fact memorization over interactive or question-based learning. This cultural focus may make it difficult to use more modern teaching techniques that encourage children's thinking skills through play, exploration, and social interaction.

5.4. Bridging Theory and Practice

Although it's not always easy, it's essential to incorporate theories of cognitive development with early childhood teaching strategies. Theories like Piaget's emphasis on active learning and Vygotsky's sociocultural theory are more than just theoretical concepts. They are integrated into successful teaching strategies like group projects, parent supervision, and teacher-led activities that inspire children to think critically about their own learning. Numerous studies that test different strategies attest to this.

The practical implementation of these theories is supported by research. Zhou et al. (2019), for instance, demonstrated the validity of Vygotsky's Zone of Proximal Development (ZPD). According to their research, social interaction-based activities helped kids sustain the development of their working memory and attention span. Similarly, Timmons et al. (2020) showed why constructivist ideas are useful in teaching. They found that guided play helped children apply what they learned better, which shows that cognitive development theories work well in real classrooms.

Turning these theories into practice works best when teachers and parents understand the theories to guide their methods. But Peterson et al. (2022) warn that even the best theory-based activities might not work if teachers don’t get proper training.

5.5. Future Directions

Studies increasingly suggest that combining digital and traditional approaches-such as technology-assisted scaffolding or gamified parent-child learning routines-can yield synergistic effects. Future interventions should be designed as blended models that incorporate structured play, digital media, and real-world social interactions.

While most foundational theories originate in Western contexts, their application in diverse educational environments requires cultural adaptation. Future research should develop

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culturally embedded intervention frameworks that leverage indigenous knowledge systems, local narratives, and context-specific learning practices.

There is a pressing need for large-scale, longitudinal studies that track the long-term cognitive, emotional, and academic effects of early interventions. Additionally, cross-cultural comparative studies can help identify universal versus context-dependent mechanisms of cognitive development.

To bridge the gap between research and policy, collaborations among educators, psychologists, curriculum developers, and governmental stakeholders will be essential. Such partnerships can support the development of evidence-based, scalable, and context-sensitive early childhood programs capable of fostering lifelong cognitive resilience in children worldwide.

6. Conclusion

This review highlights the central role of cognitive development interventions in early childhood education and their grounding in well-established psychological theories. By synthesizing evidence from studies conducted between 2015 and 2025, the paper identified five major intervention strategies: scaffolding-based instruction, play-based executive function training, memory and attention enhancement, technology-assisted learning, and family-centered approaches. These strategies are not only theoretically robust—drawing on Piagetian, Vygotskian, and information-processing perspectives—but also practically diverse, allowing for adaptation across a wide range of cultural and educational contexts.

When implemented effectively, such interventions have demonstrated measurable improvements in children's cognitive outcomes, including working memory, attention control, executive functioning, and early literacy and numeracy skills. However, systemic challenges-such as limited teacher training, cultural misalignment, resource inequality, and the absence of long-term assessment mechanisms-continue to hinder the scalability and sustainability of these efforts.

Overall, the review underscores the necessity of integrating psychological theory with pedagogical practice to enhance the quality and equity of early childhood education. It advocates for a contextualized, theory-informed, and multidimensional approach to designing and implementing cognitive interventions.

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