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SUPPORTING YOUNG CHILDREN'S LEARNING OF NUMBER CONCEPTS: POSSIBLE PEDAGOGICAL APPROACHES

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ABSTRACT

Mathematical learning is inherently progressive and structured, with concepts building upon one another in a cumulative manner. Accordingly, instructional content should be aligned with children's cognitive developmental stages. At the same time, hands-on experiences and active manipulation of materials support children in developing a deeper and more durable understanding of mathematical concepts. This paper aims to explore possible pedagogical approaches to supporting young children's learning of number concepts.

Keywords: Mathematical Education, Number Concepts, Young Children

1.0 INTRODUCTION

Many teachers recognize that young children typically begin to encounter mathematics during the kindergarten years; however, they often lack clarity regarding how to effectively support children's mathematical learning within everyday contexts. In addition, teachers may be uncertain about the foundational competencies children need in order to successfully meet the demands of mathematics learning at the elementary school level. Mathematical concepts are deeply embedded in young children's daily lives. Learning approaches grounded in lived experiences and meaningful contexts enable children to recognize the connections between mathematics and everyday life and encourage them to apply mathematical concepts to solve real-life problems. Mathematical learning is inherently progressive and structured, with concepts building upon one another in a cumulative manner. Accordingly, instructional content should be aligned with children's cognitive developmental stages. At the same time, hands-on experiences and active manipulation of materials support children in developing a deeper and more durable understanding of mathematical concepts. This paper aims to explore possible pedagogical approaches to supporting young children's learning of number concepts.

2.0 POSSIBLE PEDAGOGICAL APPROACHES FOR YOUNG CHILDREN TO LEARN NUMBER CONCEPTS

2.1 Play-Based Learning: Understanding Mathematics Through Play

When children develop the ability to explore their environment, be resourceful about the materials, people, and skills that they engage with, and think flexibly about different approaches to a situation, they are better equipped for whatever challenge next confronts them (Zosh et al, 2017).

Play is the most natural mode of learning for young children and a vital pathway for developing number concepts. Play in all its rich variety is one of the highest achievements of the human species, alongside language, culture and technology. Indeed, without play, none of these other achievements would be possible. The value of play for adults as well as children is increasingly recognised by researchers and within the policy arena, as the evidence of its relationship with intellectual achievement and emotional well-being mounts. Furthermore, play is universal. Children of every culture engage in play. Regarding types of play, a variety of play-based contexts can effectively support young children's learning of number concepts. These include board games (e.g., dice games and quantity-matching games), dramatic play (e.g., pretend shops or restaurants that involve counting, ordering, and payment), and physical play (e.g., jumping a specified number of times or clapping rhythmic patterns). Such play activities provide meaningful and embodied opportunities for children to engage with numerical ideas in authentic contexts. Within these play-based learning environments, the teacher's role is not to direct children's actions but to carefully observe children's problem-solving strategies and to extend learning through timely and purposeful questioning. For example, questions such as "How did you know there were five?" encourage children to articulate their reasoning processes, thereby supporting the development of mathematical thinking and metacognitive awareness (Shih, 2024; Shih &Wu, 2016; Whitebread, 2012; Ye & Shih, 2021).

2.2 Manipulatives and Concrete Materials: Learning Through Action

The use of manipulatives and concrete materials is widely recognized as a foundational approach to supporting young children's mathematical learning. Through hands-on engagement with physical objects, children are able to construct meaningful relationships among quantities, objects, and numerical symbols (Clements & Sarama, 2014; Piaget, 1952). Commonly employed manipulatives include blocks, beads, bottle caps, stones, number rods, number cards, and number lines, as well as everyday materials readily available in classroom settings. These materials provide opportunities for children to actively explore mathematical concepts through concrete actions, thereby supporting their transition from intuitive understandings of quantity to more formal numerical representations. From a pedagogical standpoint, teachers play a critical role in guiding children's interactions with manipulatives by encouraging counting, sorting, comparing, and arranging objects in purposeful ways. Instructional practices that prioritize conceptual understanding of quantity and number relationships—rather than the premature introduction of written numerals—are consistent with constructivist learning theory and developmentally appropriate practice. Research suggests that when children are given sufficient opportunities to manipulate concrete materials, they develop deeper and more flexible number sense, which forms a crucial foundation for later symbolic mathematics learning (Copple & Bredekamp, 2009; National Research Council, 2009; Fuson, 2004; Sarama & Clements, 2009).

3.0 DISCUSSION

Mathematical learning in early childhood should be understood as a process of meaning making rather than the mere acquisition of isolated skills. From a constructivist perspective, young children actively construct mathematical knowledge through interactions with their physical and social environments. Hands-on experiences with concrete materials enable children to connect abstract numerical symbols with lived experiences, thereby supporting the

development of number sense. Such experiences are particularly critical in early childhood, when cognitive development is closely intertwined with perceptual and motor activity. Furthermore, developmentally appropriate mathematical instruction emphasizes alignment between pedagogical strategies and children's cognitive readiness. Rather than introducing formal symbolic instruction prematurely, effective teaching builds on children's existing understandings through guided exploration and scaffolded learning experiences. Within this framework, teachers function not merely as transmitters of mathematical knowledge but as facilitators who observe children's strategies, pose purposeful questions, and design learning environments that promote inquiry and reflection (Bruner, 1966; Clements & Sarama, 2014; NAEYC & NCTM, 2010; Piaget, 1952).

From a sociocultural perspective, children's mathematical learning is also mediated through language, social interaction, and shared activity. Through dialogue with teachers and peers, children are supported in articulating their reasoning, negotiating meanings, and internalizing mathematical concepts. Mathematical understanding thus emerges through participation in socially meaningful practices, reinforcing the view that number concepts are embedded within everyday contexts rather than learned in isolation (Rogoff, 2003;Vygotsky, 1978). Taken together, these theoretical perspectives suggest that effective support for young children's number concept development requires an integrated pedagogical approach. Such an approach combines developmentally appropriate sequencing of content, rich opportunities for concrete manipulation, and intentional social interaction. By situating mathematical learning within children's everyday experiences and emphasizing active engagement, educators can foster both conceptual understanding and positive dispositions toward mathematics (National Council of Teachers of Mathematics, 2020).

4.0 CONCLUSION

4.1 From ages 2 to 3: Encouraging imitation and manipulation of concrete objects

At this stage, children may be able to recite number sequences without fully understanding their meanings. Parents can support number concept development through everyday hands-on activities, such as using blocks or fruits to demonstrate "one apple" or "two blocks." These concrete experiences help children connect numerical symbols with actual quantities, thereby enhancing their conceptual understanding (Abao Teacher, 2025).

4.2 From ages 3 to 4: Emphasizing the concepts of "more" and "less"

Children at this age begin to develop the ability to match numbers with objects. Comparative activities, such as asking children to compare two groups of toys, can help build their sense of quantity. Encouraging children to discuss which group has more or fewer items supports the development of quantitative reasoning and helps prevent rote memorization of numbers without comprehension (Abao Teacher, 2025).

4.3 From ages 5 to 6: Guiding more advanced numerical operations

As children enter this stage, they become increasingly capable of engaging in simple addition and subtraction. Parents can make use of everyday contexts—such as sharing snacks or counting people—to illustrate the practical application of basic arithmetic. Encouraging

children to use their fingers or concrete objects as supportive tools can further scaffold understanding and make learning both meaningful and enjoyable (Abao Teacher, 2025).

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