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Implementation of the Magic Fingers Extracurricular Program as a Stimulation for Early Numeracy Skills of Children Aged 5–6 Years at TK Negeri Pembina Kepanjen

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Abstract

Early numeracy competence is a fundamental component of young children's cognitive development and provides an essential foundation for subsequent learning in primary education. However, early counting instruction is often dominated by memorization-based approaches that may be less compatible with children's developmental characteristics and need for concrete learning experiences. This study aims to describe the implementation of the Magic Fingers extracurricular program as a strategy for stimulating early numeracy competence among children aged 5–6 years and to identify the supporting and inhibiting factors influencing its implementation at TK Negeri Pembina Kepanjen. A qualitative approach with a case study design was employed. Data were collected through observations, interviews, and documentation and analyzed using the interactive model of Miles, Huberman, and Saldaña, comprising data condensation, data display, and conclusion drawing. The findings indicate that the Magic Fingers extracurricular program was systematically implemented through planning, implementation, and evaluation stages by using finger formations as concrete learning media to introduce

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number concepts, addition, and subtraction. The program supported the development of children's early numeracy competence while also strengthening concentration, self-confidence, and active participation. Its implementation was facilitated by strong collaboration among educators, institutional support, and gradual instructional strategies, whereas variations in children's characteristics and limited learning media constituted the main challenges. These findings demonstrate that the Magic Fingers method offers a developmentally appropriate and concrete learning strategy for strengthening early numeracy competence in early childhood education. This study contributes practical insights into the implementation of extracurricular numeracy activities that align instructional strategies with young children's developmental needs.

Keywords: Early Childhood Education; Early Numeracy Competence; Extracurricular Learning; Magic Fingers; Numeracy Stimulation

INTRODUCTION

Early childhood represents a critical period during which the foundations of cognitive competence are established. Cognitive development plays a central role because it enables children to think logically, solve problems, recognize symbols, and construct fundamental concepts that support future learning (Almudzalifah et al., 2025). Children aged five to six years experience rapid cognitive growth, making this stage particularly important for providing appropriate educational stimulation. Therefore, early childhood education should facilitate meaningful learning experiences that are developmentally appropriate rather than focusing solely on academic achievement.

One of the essential components of cognitive development is early numeracy competence. Early numeracy competence refers to children's ability to understand number concepts through activities such as sequencing numbers, naming numbers, and understanding the concepts of addition and subtraction. It also represents an essential ability that enables young children to develop problem-solving skills in basic addition and subtraction through interactions with their surrounding environment (Anwar, 2025). Early numeracy forms the foundation for children's mathematical understanding and broader numeracy skills required throughout their educational journey (Rahayu et al., 2026). It involves recognizing numerical symbols, understanding quantities, performing simple arithmetic operations, and connecting numbers with concrete objects encountered in everyday life (Utami & Izzah, 2025). In early childhood, the development of numeracy

progresses gradually from memorizing number sequences, counting objects rationally, recognizing quantities, counting forward and backward, to skip counting according to children's cognitive development (Fitri et al., 2025). Consequently, early numeracy competence is widely regarded as an important indicator of children's readiness for elementary education.

The significance of early numeracy extends beyond school readiness because mathematical competence supports logical reasoning and everyday problem-solving (Astuti et al., 2023). Children who receive meaningful mathematical experiences generally develop stronger reasoning skills, better pattern recognition, and greater confidence in solving simple mathematical tasks. Therefore, numeracy instruction should emphasize conceptual understanding instead of rote memorization.

The growing expectation that children possess basic literacy and numeracy skills before entering elementary school has increased the urgency of strengthening early numeracy. This situation encourages early childhood education institutions to design learning programs that prepare children for academic transition while maintaining developmentally appropriate practices. As a result, numeracy instruction should remain enjoyable, meaningful, and aligned with children's natural learning processes.

According to Jean Piaget's theory, children aged five to six years are in the preoperational stage, during which symbolic thinking develops while abstract reasoning remains limited. At this stage, children learn mathematical concepts more effectively through direct interaction with concrete objects than through abstract instruction alone. Consequently, numeracy learning should be supported by instructional media that children can manipulate directly. This developmental characteristic indicates that mathematical learning should begin with concrete experiences before children are introduced to symbolic representations and arithmetic procedures, enabling them to gradually construct meaningful numerical concepts (Fitri et al., 2025).

This perspective suggests that learning numbers should involve meaningful experiences rather than repetitive memorization or worksheet-based activities. Therefore, early numeracy stimulation should be implemented through concrete, interactive, and contextual learning activities that actively engage children in constructing mathematical concepts (Nopiana & Misgiyati, 2025). Through concrete exploration, children are able to connect numerical symbols with real-life objects and gradually construct mathematical

understanding. Such experiences make mathematics more engaging and less intimidating during early childhood.

Previous studies have consistently demonstrated that concrete learning media facilitate children's mathematical understanding. Clements and Sarama argue that children develop mathematical competence more naturally when learning activities involve concrete and manipulative objects that allow them to explore mathematical ideas directly (Puspita, 2025). Among the most accessible instructional media are children's own fingers, which naturally function as practical tools for representing numerical concepts (Hasanah et al., 2022). Finger-based learning integrates motor activities with cognitive processes, allowing children to experience mathematical concepts physically while using an inexpensive and readily available learning medium.

The effectiveness of concrete learning has also been emphasized by studies showing that mathematical instruction should correspond to children's developmental characteristics. Excessive reliance on symbolic instruction may encourage memorization without conceptual understanding, whereas concrete learning experiences promote deeper comprehension and increase children's learning motivation (Karuniah et al., 2023).

Despite these recommendations, early numeracy instruction continues to face several practical challenges. Instruction in many early childhood education institutions still relies heavily on repetitive activities and worksheets, limiting children's opportunities to explore mathematical concepts through direct interaction with concrete learning materials. Such practices are inconsistent with the developmental characteristics of young children, who naturally learn through play, exploration, and active engagement.

Limited use of concrete instructional media often prevents children from understanding the relationship between numerical symbols and actual quantities. Although some children can recite numbers sequentially, they may still struggle to interpret the meaning represented by each numeral. This condition indicates that successful numeracy instruction depends on the appropriateness of instructional methods rather than the amount of repetitive practice alone.

In addition to classroom instruction, extracurricular activities may also provide opportunities to strengthen children's cognitive development through meaningful learning experiences. Extracurricular activities are educational programs conducted outside regular classroom hours to enrich children's knowledge, develop their interests and talents, and

support children's holistic development (Karunia et al., 2022). Furthermore, extracurricular activities are designed to provide learning experiences that accommodate children's interests, talents, and abilities while complementing formal classroom instruction. Therefore, implementing an extracurricular program based on concrete learning media represents an alternative strategy for stimulating early numeracy competence in developmentally appropriate ways.

Preliminary observations conducted during the researcher's teaching assistance program at TK Negeri Pembina Kepanjen between August and December 2025 identified an innovative learning program known as the Magic Fingers Extracurricular Program. The program was specifically developed to stimulate early numeracy competence among Group B children aged five to six years by utilizing fingers as concrete instructional media through structured learning techniques.

The Magic Fingers Extracurricular Program was designed to provide enjoyable, active, and contextual mathematical learning experiences. Instead of encouraging children to memorize numbers mechanically, the program enables them to construct numerical understanding through systematic finger representations. Although the method can represent larger numbers, its implementation for children aged five to six years is intentionally limited to numbers one through twenty in accordance with national indicators of early numeracy development.

The program was also developed to strengthen children's readiness for elementary education. Teachers recognized the importance of early numeracy competence and therefore designed an instructional strategy that improves mathematical understanding while preserving the playful nature of early childhood learning. Consequently, the program integrates cognitive, visual, and motor experiences within a structured instructional framework.

Observations showed that children displayed high enthusiasm throughout the implementation of the program. They actively participated in learning activities, confidently solved mathematical tasks, and demonstrated better understanding of numerical concepts through finger representations. These findings indicate that engaging and developmentally appropriate instruction can strengthen both participation and conceptual understanding.

These observations are consistent with previous studies demonstrating that finger-based learning significantly improves early numeracy competence because it combines

mathematical instruction with enjoyable motor activities (Marifuddin et al., 2024). Similar findings also indicate that finger-based instructional methods facilitate children's understanding of basic arithmetic operations, although consistent parental support remains important for reinforcing learning beyond the classroom (Almudzalifah et al., 2025).

Overall, previous studies confirm that fingers function as effective concrete learning media for developing early numeracy competence. However, existing literature has mainly focused on established approaches such as Jarimatika and Jari Aljabar, while investigations of newly developed finger-counting innovations remain limited. This condition highlights the need for further research exploring alternative instructional models that are specifically designed to address the developmental characteristics and educational needs of young children.

Although numerous studies have confirmed the effectiveness of finger-based learning in improving young children's mathematical abilities, the existing body of literature remains limited in several important aspects. Previous investigations have predominantly examined the implementation of Jarimatika as an instructional strategy for enhancing children's arithmetic competence or have focused on the application of Jari Aljabar as an alternative medium for introducing basic mathematical concepts (Marifuddin et al., 2024). Other studies have explored finger-counting methods from the perspective of classroom action research by emphasizing improvements in learning outcomes following repeated instructional cycles rather than providing an in-depth description of the instructional process itself (Munawaroh et al., 2026). Consequently, current evidence primarily explains whether finger-based learning is effective, while relatively little attention has been devoted to understanding how an innovative finger-counting program is systematically designed, implemented, evaluated, and sustained within an early childhood education institution.

Similarly, research examining extracurricular activities as a medium for developing children's early numeracy competence remains relatively scarce. Existing studies concerning extracurricular numeracy programs generally discuss the effectiveness of Jarimatika activities in fostering children's arithmetic abilities but provide limited explanation regarding the integration of instructional planning, learning implementation, evaluation procedures, and contextual institutional support that collectively determine program quality (Fitriati & Mustakimah, 2024). As a result, previous literature has not yet presented a comprehensive understanding of how a structured extracurricular program may function as a holistic learning

environment for stimulating early numeracy development among children aged five to six years.

Studies investigating the use of fingers as concrete learning media have also emphasized different educational perspectives. Several researchers have demonstrated that finger-based instruction effectively improves children's understanding of addition and subtraction because concrete representations simplify abstract numerical concepts (Hasanah et al., 2022). Other researchers have highlighted that parental involvement is an essential factor supporting children's mastery of finger-based mathematical techniques beyond the classroom environment (Almudzalifah et al., 2025). Despite these valuable contributions, previous studies have not examined an instructional innovation that combines finger-based mathematics, extracurricular learning, structured instructional modules, and institutional best practices within a single educational framework.

Based on the review of previous studies, a significant research gap can be identified. Existing studies have primarily concentrated on conventional finger-counting approaches such as Jarimatika and Jari Aljabar, whereas no comprehensive investigation has specifically explored the implementation of the Magic Fingers Extracurricular Program as an integrated educational innovation. Furthermore, previous research has largely emphasized learning outcomes rather than examining the complete implementation process, including instructional planning, classroom practices, evaluation mechanisms, and the supporting as well as inhibiting factors influencing program sustainability. Consequently, empirical evidence explaining how an institution develops and implements a unique extracurricular numeracy program remains limited.

This gap is particularly important because effective educational innovations cannot be evaluated solely through children's academic achievement. A comprehensive understanding of planning strategies, instructional procedures, evaluation systems, teacher roles, children's participation, and contextual institutional factors is equally essential for determining whether an instructional innovation can be adapted and implemented in other educational settings. Therefore, examining the implementation process of the Magic Fingers Extracurricular Program contributes not only to practical educational improvement but also to the broader development of knowledge regarding developmentally appropriate numeracy instruction in early childhood education.

The present study responds to this gap by investigating the implementation of the Magic Fingers Extracurricular Program as a best-practice model for stimulating early numeracy competence among children aged five to six years. Rather than merely measuring children's arithmetic achievement, this study seeks to provide a comprehensive description of how the program is systematically planned, implemented, evaluated, and supported within the institutional context of TK Negeri Pembina Kepanjen. Through this approach, the study offers a broader perspective on educational innovation by emphasizing instructional processes alongside learning outcomes.

The novelty of this study lies in its investigation of the Magic Fingers method, an original finger-based instructional innovation that, to the best of the researcher's knowledge, has not previously been examined in academic literature. Unlike Jarimatika or Jari Aljabar, the Magic Fingers method is specifically designed as an extracurricular program developed exclusively at TK Negeri Pembina Kepanjen. The innovation extends beyond the use of fingers as concrete instructional media by integrating systematic learning modules, structured instructional stages, and comprehensive evaluation procedures tailored to the developmental characteristics of children aged five to six years.

Another distinctive contribution of this study is its emphasis on implementation rather than effectiveness alone. Previous studies generally focused on determining whether finger-based learning improves children's numeracy competence. In contrast, this study investigates how an innovative educational program is conceptualized, organized, implemented, and evaluated within an institutional setting. Such a perspective provides richer pedagogical insights that may guide educators and policymakers in designing similar numeracy programs appropriate for early childhood education institutions.

The theoretical framework of this study is grounded in three complementary perspectives on children's learning and cognitive development. The first is Jean Piaget's theory of cognitive development, which explains that children aged five to six years are in the preoperational stage, where learning is most effective when abstract concepts are represented through concrete experiences. This theoretical perspective supports the use of fingers as manipulable learning media because children can directly observe, manipulate, and internalize numerical concepts through meaningful physical interaction.

The second theoretical foundation derives from Lev Vygotsky's sociocultural theory, particularly the concept of the Zone of Proximal Development and instructional scaffolding.

Vygotsky argues that children's cognitive development occurs through guided interaction with more knowledgeable individuals who provide temporary assistance during learning activities. Within the Magic Fingers Extracurricular Program, teachers serve as facilitators who gradually guide children in understanding finger formations, numerical representations, and arithmetic operations until children are able to perform these activities independently. Consequently, learning becomes an interactive process rather than an individual memorization exercise.

The third theoretical perspective is Jerome Bruner's theory of representation, which proposes that knowledge develops through three sequential modes: enactive, iconic, and symbolic representation. These three stages are highly relevant to the instructional characteristics of the Magic Fingers method. During the enactive stage, children manipulate their fingers directly while performing arithmetic operations. During the iconic stage, children recognize systematic finger formations as visual representations of numerical quantities. Finally, during the symbolic stage, children establish connections between finger configurations and conventional numerical symbols. The integration of these three representational modes enables children to gradually transform concrete experiences into abstract mathematical understanding.

The combination of these theoretical perspectives provides a comprehensive conceptual foundation for understanding how concrete instructional media facilitate children's cognitive development. Piaget emphasizes children's developmental readiness for concrete learning experiences, Vygotsky highlights the importance of guided social interaction, and Bruner explains the representational process through which children construct mathematical concepts. Together, these theories justify the implementation of the Magic Fingers method as a developmentally appropriate approach to early numeracy instruction.

Based on these conceptual and empirical considerations, the present study focuses on two primary aspects. First, it investigates the implementation of the Magic Fingers Extracurricular Program as a strategy for stimulating early numeracy competence among children aged five to six years at TK Negeri Pembina Kepanjen. This investigation encompasses the entire instructional process, including planning, classroom implementation, and evaluation. Second, the study explores the supporting and inhibiting factors influencing the implementation of the program within its institutional context.

Accordingly, this study aims to analyze the implementation of the Magic Fingers Extracurricular Program from the stages of instructional planning, learning implementation, and evaluation as an approach to stimulating early numeracy competence among children aged five to six years. In addition, the study seeks to identify the supporting and constraining factors affecting the implementation of the program in order to provide a comprehensive understanding of the conditions that facilitate or hinder educational innovation within early childhood education settings.

The findings of this study are expected to contribute both theoretically and practically. From a theoretical perspective, the study enriches the literature concerning developmentally appropriate numeracy instruction by introducing an innovative finger-based learning model implemented through extracurricular education. From a practical perspective, the findings may provide valuable guidance for early childhood educators, school administrators, and educational practitioners seeking to design engaging, contextual, and developmentally appropriate numeracy programs. Furthermore, the comprehensive description of the Magic Fingers Extracurricular Program may serve as an alternative reference for other early childhood education institutions intending to strengthen children's early mathematical competence through concrete learning experiences that are enjoyable, systematic, and consistent with children's cognitive development.

METHODS

This study employed a qualitative descriptive approach to obtain an in-depth understanding of the implementation of the Magic Fingers Extracurricular Program as a strategy for stimulating early numeracy competence among children aged 5–6 years at TK Negeri Pembina Kepanjen. A qualitative approach was selected because the research was conducted in a natural setting, allowing the researcher to explore the phenomenon comprehensively from the perspectives of the participants without manipulating the research context (Sugiyono, 2023). The study focused on describing the implementation process of the program, including the stages of planning, implementation, and evaluation, as well as identifying the supporting and inhibiting factors that influenced its implementation.

The research adopted a descriptive research design that emphasized the systematic description of an educational innovation within an early childhood education setting. The research indicators were developed based on the main focus of the study, consisting of three

implementation dimensions, planning, implementation, and evaluation and two contextual dimensions, namely supporting factors and inhibiting factors. These indicators were used to examine how the Magic Fingers Extracurricular Program was designed, organized, implemented, evaluated, and sustained as an instructional innovation for fostering early numeracy competence among children aged five to six years.

The participants consisted of three key informants, namely the school principal, a Group B classroom teacher, and the coordinator of the Magic Fingers Extracurricular Program at TK Negeri Pembina Kepanjen. Participants were selected using purposive sampling because they were directly involved in the planning, implementation, and management of the program and therefore possessed relevant knowledge and experience related to the research objectives. The study was conducted at TK Negeri Pembina Kepanjen, Malang Regency, East Java, Indonesia. Preliminary data were collected during the researcher's Teaching Assistance Program from August to December 2025, while the primary data collection was conducted between April and May 2026. Overall, the research process was carried out over approximately seven months.

Data were collected through in-depth interviews, passive participant observation, and documentation, enabling methodological triangulation to enhance data credibility (Sugiyono, 2022). Observation refers to the process of systematically examining phenomena or events related to the research objectives (Malahati et al., 2023). Unstructured interviews were employed to provide flexibility for exploring participants' experiences and perceptions while remaining aligned with the research focus. This type of interview does not rely on a fixed list of questions; instead, the questions may vary across participants according to the context of the interview while remaining focused on the research objectives (Asiyah et al., 2025). Passive participant observation was conducted by directly observing the implementation of the extracurricular activities without actively participating in the learning process. Documentation, including photographs, program documents, and school archives, was used to complement and verify the findings obtained through interviews and observations. In qualitative research, the researcher served as the primary research instrument, while interview guidelines and observation sheets functioned as supporting instruments to ensure that data collection remained systematic and focused.

Data were analyzed using the Miles and Huberman interactive analysis model, which consists of data reduction, data display, and conclusion drawing. During the data reduction

stage, relevant information was selected, categorized, coded, and organized according to the research focus. The reduced data were subsequently presented in the form of descriptive narratives to facilitate the identification of patterns related to the implementation of the Magic Fingers Extracurricular Program. Conclusions were drawn continuously throughout the analytical process until consistent and credible findings were obtained. To ensure the trustworthiness of the findings, data credibility was established through method triangulation by comparing evidence from interviews, observations, and documentation, as well as source triangulation by cross-checking information obtained from the principal, the Group B teacher, and the extracurricular program coordinator. These procedures enhanced the credibility and dependability of the research findings.

RESULTS

Implementation of the Magic Fingers Extracurricular Program as a Stimulation for Early Numeracy Competence among Children Aged 5–6 Years at TK Negeri Pembina Kepanjen

The findings from observations, interviews, and document analysis indicate that the Magic Fingers Extracurricular Program at TK Negeri Pembina Kepanjen was designed to stimulate early numeracy competence among children aged 5–6 years as preparation for primary school. The program applies the Magic Fingers method, which uses children's ten fingers as concrete learning media to help them understand number concepts through active and enjoyable learning experiences.

During the 2025/2026 academic year, the program involved 34 children from Groups B1–B5 and was conducted every Saturday for approximately 60 minutes. The program was systematically implemented through three stages: planning, implementation, and evaluation. Besides developing number recognition and basic arithmetic skills, the program also aimed to improve children's concentration, learning focus, self-confidence, and active participation.

The instructional process consisted of opening, core, and closing activities. The opening session included prayers, greetings, apperception, attendance, and a review of previously learned finger formations. During the core session, the instructor demonstrated finger formations, followed by guided and individual practice before the children completed exercises in the Magic Fingers learning module. Throughout the lesson, the instructor

provided individual guidance and immediate feedback. The closing session consisted of a short reflection, question-and-answer activities, and a closing prayer.

Before learning arithmetic operations, children were introduced to finger formations representing single-digit and tens numbers. Using fingers as concrete learning media helped children connect number symbols with visual representations and understand numerical concepts more easily.



Figure 1. Introduction to Finger Formations for Single-Digit Numbers

Figure 1. Introduction to Finger Formations for Single-Digit Numbers shows that the initial stage of the Magic Fingers method focused on mastering right-hand finger formations representing the numbers 0–9. This stage served as the foundation before children learned addition and subtraction using both hands.

Table 1. Implementation of Early Numeracy Competence through the Magic Fingers Extracurricular Program

Early Numeracy Indicator	Implementation
Number recognition	Finger formations and learning module activities
Matching quantities with numbers	Counting objects and matching them with number symbols
Addition and subtraction	Demonstration, guided practice, and gradual exercises
Number sequencing	Ordering numbers through module activities

source: Compiled by the researcher (2026)

Table 1. Implementation of Early Numeracy Competence through the Magic Fingers Extracurricular Program shows that all early numeracy indicators were stimulated through

progressive learning activities, beginning with number recognition and continuing to basic arithmetic operations using fingers as concrete instructional media.

Observations further revealed that most children were able to follow the instructor's demonstrations, perform finger formations correctly, and complete learning activities independently. However, several children still required individual assistance when learning carrying and borrowing techniques in two-digit arithmetic. Teachers also reported improvements in children's concentration, confidence, and classroom participation.

Supporting and Inhibiting Factors in the Implementation of the Magic Fingers Extracurricular Program

The findings indicate that several factors supported the successful implementation of the Magic Fingers Extracurricular Program. School support through learning facilities, effective coordination among the principal, classroom teachers, and the extracurricular instructor, as well as gradual instructional strategies and individualized assistance, contributed significantly to the success of the program.

On the other hand, several challenges were identified. Differences in children's characteristics, learning motivation, concentration, and readiness resulted in varying learning progress. In addition, the limited variety of instructional media occasionally reduced children's engagement, indicating the need for more interactive learning activities.

Table 2. Supporting and Inhibiting Factors in the Implementation of the Magic Fingers Extracurricular Program

Aspect	Research Findings
Supporting Factors	School support, educator collaboration, gradual instructional strategies, individualized assistance
Inhibiting Factors	Differences in children's characteristics and motivation, varying concentration levels, limited instructional media

source: Compiled by the researcher (2026)

Table 2. Supporting and Inhibiting Factors in the Implementation of the Magic Fingers Extracurricular Program shows that the successful implementation of the Magic Fingers Extracurricular Program was influenced by the synergy between institutional support, collaboration among educators, and developmentally appropriate instructional strategies. Conversely, differences in children's learning characteristics and the limited variety

of learning media remain challenges that should be addressed to optimize children's early numeracy development.

DISCUSSION

This study aimed to analyze the implementation of the Magic Fingers Extracurricular Program as an approach to stimulating early numeracy skills among children aged five to six years at TK Negeri Pembina Kepanjen and to identify the factors supporting and constraining its implementation. The findings demonstrate that the program extends beyond improving children's arithmetic skills by establishing a systematic instructional process consisting of planning, implementation, and evaluation stages. These findings indicate that the success of an educational innovation is determined not only by the instructional method employed but also by the quality of program management throughout its implementation.

The planning stage revealed that the Magic Fingers Extracurricular Program was developed in response to a practical educational issue, namely the increasing demand for children's readiness to transition from early childhood education to elementary school. Rather than accelerating academic instruction within regular classroom hours, the school positioned the program as an extracurricular activity that provides additional numeracy stimulation without imposing excessive academic pressure on children. Furthermore, planning involved collaboration among the principal, extracurricular instructor, and parents through program socialization meetings and the joint development of instructional modules specifically designed according to the developmental characteristics of children aged five to six years. These findings indicate that the implementation of the program reflects a collaborative partnership between schools and families, which is considered an essential principle in early childhood education.

The instructional content was primarily focused on helping children master numbers from one to twenty, while larger numbers were introduced only as enrichment material. Such sequencing demonstrates that instructional objectives were established based on children's cognitive readiness rather than academic expectations. Consequently, learning activities emphasized conceptual understanding of numbers through meaningful and concrete experiences instead of encouraging children to memorize arithmetic procedures mechanically. This instructional approach is consistent with Piaget's theory of cognitive

development, which explains that children in the preoperational stage require concrete learning experiences to understand abstract mathematical concepts.

The implementation stage further demonstrated that fingers functioned as effective concrete learning media connecting children's physical experiences with mathematical symbols. Instead of merely memorizing numbers, children learned to associate finger formations with numerical symbols and quantities through structured activities. This instructional sequence illustrates how concrete representations facilitate conceptual understanding before children progress toward symbolic mathematical thinking. These findings support Bruner's theory of representation, which proposes that learning develops sequentially through enactive, iconic, and symbolic modes of representation (Safira et al., 2025).

The structured sequence of learning activities also contributed to children's gradual development of numeracy competence. Instruction began with understanding units represented by the right hand, followed by tens represented by the left hand, the combination of both hands to represent two-digit numbers, and finally the introduction of addition and subtraction operations. This progression enabled children to master one concept before advancing to more complex mathematical operations. Consequently, the instructional process emphasized conceptual mastery rather than rapid completion of learning materials.

The findings also indicate that the Magic Fingers Extracurricular Program successfully stimulated three essential indicators of early numeracy development: recognizing and using numerical symbols, matching quantities with corresponding numerical symbols, and performing basic addition and subtraction operations. These competencies were developed through the integration of finger formations, structured learning modules, teacher demonstrations, and repeated practice activities. Therefore, the effectiveness of the program cannot be attributed solely to the use of fingers as instructional media but also to the systematic integration of multiple learning components that collectively support children's conceptual understanding of mathematics.

Beyond improving early numeracy competence, the study revealed additional educational benefits. Teachers consistently reported that children participating in the extracurricular program demonstrated better concentration, stronger attention spans, and greater confidence during regular classroom instruction. These findings suggest that finger-based mathematical activities contribute not only to cognitive development but also to

children's self-regulation and learning readiness. Accordingly, the educational value of the program extends beyond mathematical achievement by supporting broader aspects of children's learning behavior.

The instructional strategies employed by the extracurricular instructor represent another important factor explaining the program's effectiveness. Demonstration constituted the primary teaching strategy, whereby the instructor first modeled finger formations before asking children to imitate them collectively. Such practice reflects Bandura's Social Learning Theory, which emphasizes that children acquire knowledge through observation and imitation of appropriate models (Warini et al., 2023). Repeated demonstrations also minimized children's errors while strengthening their understanding of finger formations used in arithmetic activities.

Individual assistance was equally important during the instructional process. Children experiencing difficulties received personalized guidance until they were capable of performing finger formations independently. This instructional practice illustrates the application of Vygotsky's concept of scaffolding, in which temporary assistance is gradually withdrawn as learners become increasingly competent (Wardani et al., 2023). Consequently, learning within the Magic Fingers Program was not merely teacher-centered instruction but a responsive educational process accommodating individual differences in children's developmental progress.

Positive reinforcement also played a significant role in maintaining children's motivation. The instructor acknowledged children who successfully answered mathematical questions by writing their names on the classroom board and allowing them to leave the classroom first. Although relatively simple, these rewards enhanced children's confidence and encouraged active participation throughout learning activities. Such findings are consistent with Skinner's Operant Conditioning Theory, which explains that positive reinforcement strengthens desirable learning behaviors and increases learners' motivation (Dhini, 2025).

Compared with previous studies, the present findings expand existing knowledge regarding finger-based mathematics instruction. Earlier investigations primarily examined the effectiveness of Jarimatika and Jari Aljabar methods in improving children's arithmetic competence (Marifuddin et al., 2024). In contrast, this study demonstrates that successful implementation depends not only on the instructional method itself but also on

comprehensive program management involving systematic planning, instructional implementation, evaluation procedures, and collaboration among school administrators, teachers, instructors, and parents. Therefore, this research contributes a broader perspective by emphasizing the importance of educational implementation alongside instructional effectiveness.

The findings also support previous research demonstrating that concrete instructional media facilitate children's understanding of addition and subtraction because tangible representations simplify abstract mathematical concepts (Hasanah et al., 2022). However, the present study extends this conclusion by showing that concrete media become considerably more effective when integrated with structured instructional modules, sequential learning strategies, and continuous evaluation procedures.

Evaluation within the Magic Fingers Extracurricular Program consisted of both process evaluation and outcome evaluation. Process evaluation focused on observing children's concentration, participation, and ability to perform finger formations during classroom activities, whereas outcome evaluation assessed children's performance through structured learning modules. The integration of these two evaluation approaches enabled teachers to obtain a comprehensive understanding of children's learning progress rather than relying exclusively on academic achievement. Such findings emphasize that assessment in early childhood education should evaluate both learning processes and learning outcomes.

Several supporting factors were identified as contributing to the successful implementation of the program, including institutional support, effective coordination between classroom teachers and the extracurricular instructor, and the application of gradual instructional strategies. School support was reflected in administrative supervision, provision of learning facilities, and collaborative development of instructional modules. Regular communication between classroom teachers and the instructor ensured continuity between extracurricular activities and regular classroom instruction, allowing children's progress to be monitored consistently. These findings indicate that educational innovation requires collaboration among all stakeholders involved in children's learning.

Nevertheless, several constraints were also identified. Differences in children's motivation, learning readiness, and individual characteristics required additional instructional time for some participants. Furthermore, limited variation in instructional media, introductory activities, and ice-breaking sessions occasionally reduced children's attention

and enthusiasm during learning. These findings suggest that although the Magic Fingers method has proven effective as a concrete instructional approach, further innovation in learning media and classroom activities is necessary to sustain children's engagement and accommodate diverse learning styles in early childhood education.

From a theoretical perspective, this study reinforces the relevance of Piaget's, Bruner's, Vygotsky's, Bandura's, and Skinner's theories in explaining concrete mathematics instruction for young children. The findings demonstrate that fingers function not merely as counting tools but as instructional media enabling children to construct mathematical concepts through direct experience, social interaction, observation, and positive reinforcement. Practically, the study provides valuable guidance for early childhood education institutions seeking to develop engaging, developmentally appropriate, and contextually relevant numeracy programs through collaboration among schools, teachers, extracurricular instructors, and parents.

Despite these contributions, several limitations should be acknowledged. The study was conducted in only one early childhood education institution with a limited number of participants; therefore, its findings cannot be generalized to all educational settings. Moreover, the qualitative research design prioritized in-depth understanding of program implementation rather than measuring instructional effectiveness quantitatively. Future studies are therefore recommended to involve multiple institutions or adopt mixed-methods approaches to provide more comprehensive evidence regarding the implementation and effectiveness of the Magic Fingers Extracurricular Program in enhancing early numeracy competence among young children.

CONCLUSION

This study aimed to analyze the implementation of the Magic Fingers Extracurricular Program as an approach to stimulating early numeracy competence among children aged five to six years at TK Negeri Pembina Kepanjen. The findings indicate that the program has been implemented systematically through three interconnected stages: planning, implementation, and evaluation. The planning stage involved a needs analysis based on the increasing demand for children's readiness to transition into primary school, collaborative preparation of instructional modules, and communication with parents regarding the objectives and procedures of the program. During implementation, learning activities were

organized through structured opening, core, and closing sessions using the Magic Fingers method as a concrete instructional medium that enabled children to understand numerical concepts progressively according to their cognitive developmental characteristics. Program evaluation was conducted continuously by observing both the learning process and children's performance on instructional modules, allowing teachers to monitor children's numeracy development comprehensively.

The findings further demonstrate that the Magic Fingers Extracurricular Program effectively stimulates several indicators of early numeracy competence, including the ability to recognize and use numerical symbols, match quantities with corresponding number symbols, and perform basic addition and subtraction operations. Beyond improving children's early mathematical competence, the program also contributed to increased concentration, learning engagement, self-confidence, and active participation during instructional activities. These findings indicate that the research objectives were successfully achieved by providing a comprehensive understanding of both the implementation process and the factors influencing the effectiveness of the program.

This study contributes theoretically by enriching the body of knowledge on developmentally appropriate early numeracy instruction through the implementation of the Magic Fingers method as an innovative finger-based learning approach integrated into an extracurricular program. Unlike previous studies that primarily emphasized the effectiveness of finger-counting methods in improving mathematical achievement, this study provides a broader understanding of how such an educational innovation is systematically planned, implemented, evaluated, and sustained within an institutional context. From a practical perspective, the findings offer valuable insights for early childhood education institutions seeking to design engaging, contextual, and child-centered numeracy programs that are consistent with children's developmental characteristics.

The successful implementation of the program was supported by strong institutional commitment, effective collaboration among the principal, classroom teachers, and the extracurricular instructor, as well as the application of gradual instructional strategies adapted to children's learning needs. Nevertheless, several challenges were identified, including differences in children's motivation, learning readiness, attention span, and individual learning characteristics, together with the limited variety of instructional media used during learning activities. These findings suggest that the effectiveness of early numeracy programs

depends not only on the instructional method itself but also on the quality of educational support and learning environments surrounding children.

Accordingly, early childhood education institutions are encouraged to enrich instructional media, incorporate more interactive learning activities, and strengthen collaboration with parents to ensure continuity between school and home learning experiences. Future studies are recommended to investigate the implementation of the Magic Fingers method in different educational contexts or employ alternative research approaches to obtain broader evidence regarding its applicability and potential contribution to the development of early numeracy competence among young children.

REFERENCES

Almudzalifah, S., Aurellia, R., Salsabillah, S., Suryani, Y. D., & Andika, W. D. (2025). Kemampuan Berhitung Permulaan melalui Jari Aljabar Usia 5–6 Tahun di RA Miftahul Jannah. *Bunayya: Jurnal Pendidikan Anak, 11*(2), 250–264. https://doi.org/10.22373/22ap2p90

Anwar, A. (2025). Penerapan Strategi Bermain Stick Angka dalam Mengembangkan Kemampuan Berhitung Permulaan Anak di Taman Kanak-Kanak. *AT-TAKLIM: Jurnal Pendidikan Multidisiplin, 2*(7), 484–500. https://doi.org/10.71282/at-taklim.v2i7.724

Asiyah, N., Kustiawan, U., & Pratiwi, A. P. (2025). Implementasi Drum Band Tematik dalam Menstimulasi Kecerdasan Kinestetik dan Musikal Anak di TK PKK X. *Integrative Perspectives of Social and Science Journal, 2*(3), 5975–5984. https://ipssj.com/index.php/ojs/article/view/759

Astuti, A. W., Syafrudin, U., & Oktaria, R. (2023). Pengaruh Penggunaan Media Kartu Angka terhadap Kemampuan Berhitung Permulaan Anak Usia 5–6 Tahun. *Generasi Emas: Jurnal Pendidikan Islam Anak Usia Dini, 6*(1), 39–48. https://doi.org/10.25299/ge.2023.vol6(1).10854

Dhini, Z. A. (2025). Strategi Guru dalam Pengkondisian Kelas Anak Usia Dini: Perspektif Behavioristik Skinner. *PELANGI: Jurnal Pemikiran dan Penelitian Islam Anak Usia Dini, 7*(1), 37–53. https://doi.org/10.52266/pelangi.v7i1.4013

Fitri, A. S., Rusdiyani, I., & Sayekti, T. (2025). Pengembangan Media Animasi Mobile Learning untuk Meningkatkan Kemampuan Berhitung Permulaan Anak Usia 5–6 Tahun. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 9*(4), 961–971. https://doi.org/10.31004/obsesi.v9i4.6949

Fitriati, A., & Mustakimah, M. (2024). Implementasi Ekstrakurikuler Jarimatika dalam Menumbuhkan Kemampuan Berhitung pada Kelompok A di TK Bunga Harapan Bringin. *As-Sibyan: Jurnal Pendidikan Anak Usia Dini, 9*(1), 155–164. https://doi.org/10.32678/assibyan.v9i1.10154

Hasanah, L., Sabrina, M. T., Nazmi, S. A., Anwar, F. A., & Izzati, N. (2022). Pengembangan Konsep Penjumlahan dan Pengurangan melalui Metode Jarimatika pada Anak Usia Dini. *Incrementapedia: Jurnal Pendidikan Anak Usia Dini, 4*(2), 85–89. https://doi.org/10.36456/incrementapedia.vol4.no2.a6641

Karunia, K., Sopia, S., & Wulandari, R. (2022). Pengelolaan Ekstrakurikuler Kelompok Bermain. *Jurnal Multidisipliner Kapalamada, 1*(3), 289–297. https://doi.org/10.62668/kapalamada.v1i03.239

Karuniah, M., Lian, B., & Novianti, R. (2023). Pengaruh Permainan Congklak terhadap Kemampuan Berhitung Permulaan Anak di TK Lematang Lestari Muara Enim. *ANTHOR: Education and Learning Journal, 2*(6), 827–833. https://doi.org/10.31004/anthor.v2i6.254

Malahati, F., B, A. U., Jannati, P., Qathrunnada, Q., & Shaleh, S. (2023). Kualitatif: Memahami Karakteristik Penelitian sebagai Metodologi. *Jurnal Pendidikan Dasar, 11*(2), 341–348. https://doi.org/10.46368/jpd.v11i2.902

Marifuddin, P. S., Afdal, U., Ilyas, S. N., Rusmayadi, R., & Herlina. (2024). Penerapan Metode Jarimatika dalam Meningkatkan Kemampuan Berhitung Anak Usia Dini 5–6 Tahun di TK Kemala Bhayangkari Polewali Mandar. *Edu Sociata: Jurnal Pendidikan Sosiologi, 7*(1), 490–495. https://doi.org/10.33627/es.v7i1.2054

Munawaroh, A., Wikanengsih, & Westhisi, S. M. (2026). Peningkatan Kemampuan Berhitung melalui Metode Jarimatika pada Anak Usia Dini. *CERIA (Cerdas Energik Responsif Inovatif Adaptif), 9*(1), 113–124. https://doi.org/10.22460/ceria.v9i1.30758

Nopiana, & Misgiyati. (2025). Menstimulasi Perkembangan Matematika Anak Usia Dini melalui Pembelajaran Berbasis Bermain. *Journal of Humanities, Social Sciences, and Education, 1*(10), 131–143. https://doi.org/10.64690/jhuse.v1i10.570

Puspita, S. M. (2025). Implementasi Pengembangan Early Math Skills di Pendidikan Anak Usia Dini. *Research in Early Childhood Education and Parenting, 6*(2), 45–53. https://doi.org/10.17509/recep.v6i2.93399

Rahayu, P., Sutama, I. W., & Astuti, W. (2026). Modul Pembelajaran Berbasis Deep Learning untuk Pengenalan Matematika di Masa Transisi PAUD ke SD. *Jurnal Ilmiah Pendidikan Dasar (JIPDAS), 6*(1), 937–949. https://doi.org/10.37081/jipdas.v6i1.4018

Safira, S. A., Anisa, S., Habibah, N., Desky, T., & Misrina, M. (2025). Implementasi Tahap Enaktif-Ikonik-Simbolik (EIS) Bruner untuk Meningkatkan Pemahaman Konsep Operasi Perkalian pada Siswa Sekolah Dasar: Studi Literatur Tingkat Dasar. *Numerical: Jurnal Matematika dan Pendidikan Matematika, 9*(2), 369–380. https://doi.org/10.25217/numerical.v9i2.6887

Sugiyono. (2022). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Sugiyono. (2023). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Utami, Y. S., Garum, & Izzah, A. A. (2025). Penggunaan Media Apront Story Based Meningkatkan Kemampuan Berhitung Anak Usia 5–6 Tahun di Taman Kanak-Kanak Islam Terpadu Adzkiyyah Smart School Palembang. *UNISAN JURNAL: Jurnal Manajemen dan Pendidikan, 4*(9), 689–698. https://www.journal.an-nur.ac.id/index.php/unisanjournal/article/view/4973

Wardani, I. R. W., Putri Zuani, M. I., & Kholis, N. (2023). Teori Belajar Perkembangan Kognitiv Lev Vygotsky dan Implikasinya dalam Pembelajaran. *DIMAR: Jurnal Pendidikan Islam, 4*(2), 332–346. https://doi.org/10.58577/dimar.v4i2.92

Warini, S., Hidayat, Y. N., & Ilmi, D. (2023). Teori Belajar Sosial dalam Pembelajaran. *ANTHOR: Education and Learning Journal, 2*(4), 566–576. https://doi.org/10.31004/anthor.v2i4.181