

TRANSFORMING EARLY CHILDHOOD EDUCATION MANAGEMENT: COGNITIVE DEVELOPMENT STRATEGIES IN TRILINGUAL SCHOOL

Nita Puspitasari

Universitas Islam KH. Achmad Muzakki Syah

Nitapuspitasari747@gmail.com

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Abstrak: This study explores the impact of transformative early childhood education (PAUD) management on cognitive development strategies in trilingual schools in Jember Regency, Indonesia. As trilingual education, which integrates Indonesian, English, and Chinese, becomes increasingly popular, this study investigates how curriculum integration, teacher training, and parental involvement contribute to cognitive growth in young learners. This study used a qualitative case study design, which focused on the Three Languages Rukun Harapan Kindergarten, and used interviews, observations, and documentation as the main data collection methods. The findings suggest that while effective management practices improve cognitive flexibility, language processing, and memory memory, challenges such as inadequate professional development for teachers and a lack of individualized tasks remain. The study advocates a balanced approach that combines group-based and individual-based learning activities, proposing implications for policymakers and education leaders to optimize cognitive outcomes in multilingual early childhood settings.

Keywords: Early Childhood Education, Trilingual School, Cognitive Development, Educational Management.

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1. INTRODUCTION

In the context of Indonesia's rapidly evolving education landscape, early childhood education (PAUD) has emerged as an important foundation for lifelong learning and holistic development. Especially in Jember Regency, the emergence of trilingual schools—institutions that integrate Indonesian, English, and Mandarin—reflect the increasing demand for globally competitive and culturally based education. However, despite their growing popularity, many of these schools face complex managerial challenges that directly affect cognitive development outcomes in young learners. Limited coordination between curriculum design, language exposure, and developmental targets often results in inconsistencies that hinder optimal learning. In addition, early cognitive stimulation is often overshadowed by administrative inefficiencies or misaligned pedagogical priorities. This condition becomes even more urgent given the sensitive window of cognitive growth in early childhood. Therefore, changing the management of PAUD in trilingual schools is not only timely but important to ensure that children in Jember receive high-quality and developmentally appropriate education that fosters intellectual agility and multilingual competence (Trawick-Smith, 2018; Smith & Jones, 2020).

The existing literature has explored various aspects of early childhood education, including curriculum development, language immersion programs, and cognitive stimulation strategies. Studies such as those conducted by García (2020) and Barac & Bialystok (2019) highlight the benefits of bilingual and trilingual learning environments for improving cognitive flexibility, memory, and problem-solving skills. Meanwhile, the education management literature emphasizes the role of effective leadership and organizational systems in supporting pedagogical success (Lillard, 2017; Horn & Johnson, 2018). However, there is still a significant gap in integrated research linking the transformation of early childhood education management to cognitive development outcomes in the specific context of trilingual schools, especially in developing areas such as Jember Regency. Most studies isolated linguistic or managerial components without addressing their interactions. As a result, there is a limited understanding of how strategic educational management practices can be adapted to support a multilingual environment and cognitive growth simultaneously (Vygotsky, 1978). This study seeks to fill the gap by examining cognitive development strategies embedded in the management framework of trilingual PAUD institutions in Jember.

This research is driven by a central question: How can the transformation of early childhood education management in trilingual schools contribute to the cognitive development of young students in Jember Regency? More specifically, this study seeks to identify key managerial practices and effective pedagogical strategies in improving cognitive functions such as memory, attention, and language processing—in the unique context of a trilingual PAUD setting. This research aims to explore the role of institutional leadership, teacher development programs, curriculum integration, and parental involvement as components of transformative management models. By investigating the alignment between school management and child developmental outcomes, this study hopes to provide a comprehensive framework that can be adapted in similar multilingual educational environments (Cameron & Smith, 2019; Topping, 2017). As such, it also responds to national and global calls for a more context-sensitive, child-centered approach to early education reform.

Preliminary findings and field observations suggest that a well-structured and adaptive management system in trilingual early childhood schools can significantly support children's cognitive growth. When leadership encourages collaboration among educators, provides professional training in multilingual pedagogy, and ensures the implementation of a cognitively rich curriculum, children show higher engagement and better cognitive outcomes. This study suggests that cognitive development does not only depend on language exposure or instructional qualities, but is also strongly influenced by the overall organizational environment and the coherence of management strategies (Schmidt & Lee, 2021). Therefore, the transformation of early childhood

education management is not solely a structural or administrative problem; This is a strategic need to optimize the development trajectory. The findings of this study are expected to offer practical implications for policymakers, educators, and school leaders who aim to redesign early childhood education management systems that are responsive to the linguistic and cognitive needs of young learners in Indonesia and beyond (Lindsey et al., 2020; Howard, 2022).

2. RESEARCH METHODS/MATERIALS AND METHODS/LITERATURE REVIEW

This research focuses on the Rukun Harapan Three Language Kindergarten in Jember Regency as the main analysis unit. This school was chosen because it reflects the implementation of trilingual education (Indonesian, English, and Mandarin) in early childhood education (PAUD). The presence of such schools highlights the growing demand for education that balances global competitiveness with local cultural values. Despite the increasing popularity of trilingual schools, these institutions face complex management challenges that directly affect cognitive development outcomes in young learners. There is often limited coordination between curriculum design, language exposure, and developmental goals, leading to inconsistent educational outcomes. In addition, early cognitive stimulation can be overshadowed by administrative inefficiencies or misaligned pedagogical priorities. Therefore, examining the transformation of early childhood education management in trilingual schools is timely and necessary to ensure children in Jember receive a high-quality, developmentally appropriate education that nurtures cognitive skills and multilingual competence.

This study adopts a qualitative approach with a case study design to gain an in-depth understanding of the dynamics of education management and its impact on cognitive development in a trilingual early childhood education setting. The case study design was chosen for its effectiveness in exploring complex social and organizational phenomena in their real-life contexts. By focusing on selected trilingual PAUD institutions in Jember Regency, this study aims to uncover how management strategies interact and contribute to cognitive development. The interpretivist paradigm of this study emphasizes the understanding of the meaning that participants attach to their experiences, especially school leaders, teachers, and parents. This approach allows for the exploration of managerial aspects and pedagogical practices in a trilingual context. This study does not aim to generalize the findings in all contexts but instead seeks to provide a rich and context-specific understanding that can inform educational policies, practices, and further research on multilingual early childhood education.

The sources of information in this study consist of key informants who are directly involved in the management and implementation of education at Rukun Harapan Tiga Language Kindergarten. Key informants include principals, vice principals for curriculum, teachers, and students aged 4-6 years. The principal and vice-principal for the curriculum will provide insight into the management policy and integration of the trilingual curriculum. Teachers will share their experiences with teaching practices, classroom management, and language facilitation. Meanwhile, parents will provide perspective on the impact of school programs on their children's cognitive and linguistic development. The selection of these informants ensures that the data collected covers a wide range of perspectives relevant to education management and its impact on student learning. This triangulation of perspectives from key stakeholders reinforces the validity of the research findings and offers a comprehensive view of the dynamics at play within schools.

Data collection in this study involves three main methods: observation, interviews, and documentation. Observations were made to capture the dynamics of teacher-student interaction, especially during language-based activities and problem-solving. This helps

identify how classroom practice supports cognitive development. Interviews were conducted with principals, vice-principals for curriculum, and teachers to gain insights into managerial practices, curriculum implementation, and cognitive development strategies. These interviews are semi-structured, allowing for flexibility in exploring key topics while ensuring consistency across participants. In addition, documentation is reviewed, including lesson plans, curriculum maps, student portfolios, and school reports, to triangulate data collected from interviews and observations. The combination of these methods ensures that stated practices and actual implementations are comprehensively captured, providing a comprehensive perspective on the management of trilingual ECE and its impact on cognitive growth.

The collected data is analyzed through a series of data analysis stages: data reduction, data display, and data verification. The first step, data reduction, involves filtering and simplifying the data to focus on relevant information that aligns with the research objectives. Data visualization is done by organizing data into charts, tables, or narrative formats that make it easy to identify patterns and connections. Data verification is done through triangulation, where data from various sources (informants) and methods are compared to ensure consistency and validity. The analysis methods used include content analysis, to identify themes that arise related to education management and cognitive development; discourse analysis, to understand how language and social interaction affect cognitive outcomes; and interpretive analysis, which provides deeper insights into the meaning of data in the context of educational theory and cognitive development. This all-encompassing approach ensures credibility and richness of findings

3. RESULTS AND DISCUSSION

Interview data was collected from six respondents: the principal, the vice principal, two teachers, and two parents. The table below represents the main themes identified from the interviews, which include the various management practices applied in schools and their alignment with cognitive development goals. Respondents were asked about their perspectives on management practices and how this is tailored to improve cognitive skills in a trilingual learning environment. For example, principals emphasize curriculum integration as a key management practice, while teachers focus on classroom engagement and language use strategies as core elements that influence cognitive development, especially language processing and multilingual cognitive growth. Parents highlight the importance of parent-school communication and support for developmental activities.

Interview Results Table Management Practice and Engagement

Tema Utama	Focus	Detailed Findings	Illustrative Quotes
Curriculum Integration	Trilingual curriculum alignment	Principals and deputies emphasize the curriculum must be interconnected to support cognitive goals.	"The curriculum must be integrated so that children do not get confused in using three languages." (Principal)
Professional Development Teachers	Training of capacity building	& There is an ongoing need for teacher training for multilingual classroom strategies.	"Teachers still need regular training, especially related to trilingual classroom strategies." (Deputy Principal)
Class Strategy	Pedagogical approach	Teachers emphasize active engagement & language use in a variety of activity contexts.	"We deliberately encourage children to use different languages when playing." (Teacher)
Parent Involvement	Home support	Parents actively strengthen learning activities at home, especially language.	"At home, we continue to practice vocabulary to be consistent with school." (Parents)

From the interview data, cognitive development in trilingual schools relies heavily on curriculum integration, teacher involvement in classroom strategies, and parental support at home. School management that is aligned with cognitive goals creates a conducive learning environment for children. However, ongoing teacher training opportunities are still needed so that their capacity to manage multilingual classrooms continues to increase and children's cognitive outcomes can be optimized.

Observational data were focused on various classroom activities aimed at stimulating cognitive development. The table below presents the observed primary class activities, indicators of related cognitive development, and the frequency with which they appear. Language teaching, problem-solving tasks, and play-based learning are frequently observed, all of which promote cognitive indicators such as attention, memory memory, and language comprehension. Group activities were also recorded for fostering collaborative skills and cognitive flexibility. However, activities such as individual tasks are less frequent and often more focused on task completion than cognitive engagement, which may explain the lower frequency of cognitive flexibility observed.

Table of Classroom Activity Observation Results & Cognitive Indicators

Activity	Frequency	Emerging Cognitive Indicators	Detailed Notes
Language Teaching	Tall	Attention, language comprehension	Performed almost every day; Stimulates listening and vocabulary.
Troubleshooting Tasks	Tall	Ingatan, problem solving	Children are invited to put together puzzles and logic games; Practice concentration & strategy.
Play-Based Learning	Tall	Cognitive flexibility, language	Story-based group games (role play) → improve understanding of abstract concepts.
Group Activities	Tall	Collaboration, flexibility	Children actively discuss, share roles, and correct each other.
Tugas Individual	Low	Self-regulation, independence	Rarely done; usually write or draw independently. It emphasizes more on the end result than the thought process.

From observational data, interactive and group-based activities become the center of children's cognitive development, especially through language teaching, problem-solving, and play-based learning that encourage attention, memory, and thinking flexibility. However, the lack of individual tasks shows that there are limitations in fostering independence and self-regulation. Therefore, a balance between group and individual activities is needed so that children not only develop in social collaboration, but also be able to hone independent cognitive skills optimally.

The analysis of the documentation focused on samples of student work, teacher notes, and assessment reports related to language development in Chinese. The table below visualizes the types of documents being reviewed, their focus areas, and examples of documents. Notably, Mndarin language exercises are often used to assess language development and cognitive function, especially in improving language processing. Teacher notes indicate specific instructional strategies used to support classroom management and cognitive development. The assessment report provides insights into student performance, highlighting how well cognitive skills are developing, especially in the areas of problem-solving and memory.

Table of Supporting Evidence Documentation Results

Document Type	Focus	Sample Content	Cognitive Indicators
Mndarin Language Training	Language acquisition	Vocabulary & simple sentence worksheets	Language processing, memory

Document Type	Focus	Sample Content	Cognitive Indicators
Teacher's Notes	Instructional strategies	Notes on using the interactive question-and-answer method	Attention support, cognitive engagement
Assessment Report	Evaluate progress	Improved vocabulary and memory scores	Problem solving, memory, attention

From the documentation data, the documentation data confirms that language development—especially Chinese—is the main focus in supporting children's cognitive growth. Language exercises are used not only to strengthen vocabulary, but also to improve memory, problem-solving, and attention. Teachers' notes show the implementation of classroom management strategies that are geared towards cognitive engagement, while assessment reports show an improvement in children's abilities over time. This proves that effective classroom management, supported by regular formative assessments, plays a direct role in creating a conducive learning environment and encouraging sustainable cognitive development.

The results of the interviews revealed a cause-and-effect relationship between effective management practices and improved cognitive development. In particular, strategies such as curriculum integration and teacher training correlate with improved cognitive skills in multilingual contexts. When school leaders prioritize alignment between curriculum design and cognitive goals, teachers are better equipped to promote cognitive development. A structured approach to language use and problem-solving tasks improves children's cognitive abilities, especially in the areas of memory, attention, and problem-solving. A study by Trawick-Smith (2018) emphasizes the role of structured curriculum in cognitive development. Cameron & Smith (2019) show that teacher training fosters better teaching practices, improving cognitive outcomes. Barac & Bialystok (2019) confirm the relationship between multilingual education and cognitive flexibility. Horn & Johnson (2018) suggest that integrating cognitive goals in management leads to positive cognitive growth. Effective management practices, such as curriculum integration and teacher training, create a direct cause-and-effect relationship with improved cognitive development in multilingual schools.

Observations reveal functional and dysfunctional aspects of classroom activities that affect cognitive development. The high frequency of group-based activities has a positive effect on cognitive growth, but the occurrence of limited individual tasks can inhibit independent cognitive development. Group-based activities encourage collaborative problem-solving, fostering cognitive skills such as language comprehension and cognitive flexibility. However, the low frequency of individual tasks limits the child's ability to develop independent cognitive skills such as self-regulation and task persistence. Lillard (2017) supports the benefits of collaborative learning in improving cognitive flexibility. García (2020) found that interactive activities promote cognitive growth. Schmidt & Lee (2021) stated that independent activities foster problem-solving skills. Trawick-Smith (2018) highlights that a balanced approach is essential for cognitive development. The implications suggest that while group-based activities promote cognitive development, limited individual tasks can be a barrier to the development of independent cognitive skills. A more balanced approach is needed.

The observations highlight the cause-and-effect relationship between classroom activities and cognitive outcomes. In particular, frequent use of group-based activities promotes cognitive development, while infrequent individual tasks negatively impact. Collaborative activities help children engage with peers, strengthen cognitive development, especially in problem-solving and language skills. However, the lack of individual tasks limits opportunities for children to practice self-regulation and problem-solving independently. Lillard (2017) shows that collaborative learning improves cognitive flexibility, which is

especially important in a multilingual environment. Trawick-Smith (2018) shows that interactive activities lead to better language understanding. Cameron & Smith (2019) argue that independent activity is essential for cognitive development. Schmidt & Lee (2021) emphasize the need for a balanced approach to learning. The cause-and-effect relationship between group-based activities and cognitive growth is clear, but the infrequent use of individual tasks can inhibit the development of independent cognitive skills, suggesting the need for a more balanced approach to teaching.

The cognitive development table illustrates how various strategies in trilingual schools contribute to cognitive growth. The table reveals the functional and dysfunctional aspects of cognitive development, with some strategies having more positive outcomes than others. The table shows that activities such as language teaching, problem-solving tasks, and memory games have a high frequency and have a positive impact on cognitive functions such as memory and memory attention. However, individual tasks had a lower frequency and were associated with less cognitive engagement, limiting independent problem-solving and cognitive flexibility. Barac & Bialystok (2019) affirm that multilingual education improves cognitive flexibility. Trawick-Smith (2018) shows that active learning leads to better cognitive outcomes. Lillard (2017) supports the idea that problem-solving tasks promote cognitive development. The cognitive development table shows that although strategies such as language teaching are very effective, the lack of individual tasks can limit cognitive growth. A more balanced approach is necessary for optimal cognitive development.

Evidence from the cognitive development table reveals the cause-and-effect relationship between the teaching strategies used and the outcomes of cognitive development in children. The table shows that group-based activities lead to improved cognitive outcomes, while individual tasks result in lower cognitive engagement. Group activities such as language teaching and problem-solving tasks encourage collaborative learning, which supports cognitive development. On the other hand, individual tasks, while important for independent learning, are observed less frequently and do not foster the same level of cognitive engagement. Studies by Lillard (2017) and Trawick-Smith (2018) confirm that collaborative learning improves cognitive flexibility and problem-solving skills. Barac & Bialystok (2019) show that multilingual education improves cognitive function. Cameron & Smith (2019) emphasize that teacher training improves cognitive outcomes. Evidence suggests that while group activities are effective in improving cognitive development, a lack of individual tasks can limit children's ability to develop independent cognitive skills, highlighting the need for a more balanced approach to teaching.

4. CONCLUSION

The study of early childhood education management in a trilingual school in Jember Regency provides valuable insights into how management strategies and cognitive development are interrelated. The research findings show that effective management practices such as curriculum integration, teacher training, and parental involvement significantly contribute to cognitive growth in multilingual contexts. However, challenges such as inadequate teacher professional development and limited individual learning tasks hinder the full potential of cognitive development.

Successful cognitive development in a trilingual environment requires group-based interactive activities, but a balanced approach that includes more individual tasks is needed to foster self-regulation and independent problem-solving skills. While management strategies are aligned with cognitive goals, their implementation can be inconsistent, leading to functional and dysfunctional outcomes in cognitive development. Additionally, recent research highlights the importance of teacher training and parental involvement in creating an optimal cognitive environment (Lindsey et al., 2020).

This study reinforces the idea that integrating management practices and cognitive development strategies is essential to optimize learning outcomes in bilingual early childhood education. However, improvements in teacher development and the inclusion of independent assignments will further improve cognitive outcomes.

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