



ANALYSIS OF COGNITIVE ASPECTS IN EARLY CHILDHOOD LEARNING: A STUDY ON THE IMPLEMENTATION OF THE MERDEKA CURRICULUM

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Abstract:

The aim of this writing is to analyze the cognitive aspects of early childhood learning using the Merdeka curriculum. The research method employed is the qualitative descriptive method. Data collection techniques were conducted through observation, interviews, documentation, and data analysis techniques. Descriptive data analysis was carried out to explain or present information contained in the data so that it could be better understood. The research results indicate that the application of cognitive theory in early childhood learning at Integrated Early Childhood Education Citra Bakti implements child development in accordance with the preparation of teaching aids where there are indicators related to cognitive aspects. In learning achievements, there are three stimulation elements, each containing six aspects. These three stimulation elements elaborate on the aspects of religious and moral values development, physical motor skills, cognitive, socio-emotional, language, Pancasila values, and other areas to optimize children's growth and development according to educational needs. In the Merdeka curriculum, learning achievements are outlined as learning objectives. In these learning achievements, the three achievements consist of: (1) achievement of religious and moral values learning, (2) achievement of self-identity learning, and (3) achievement of literacy basics, mathematics, science, technology, engineering, and arts learning.

Keywords: cognitive analysis, early childhood, Merdeka curriculum

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1. Introduction

Early childhood education can be seen as the cornerstone for further educational development. In the realm of education, Early Childhood Education (ECE) stands out as particularly crucial as a child's future development is greatly influenced by meaningful stimuli provided during their early years. Properly preparing early childhood education ensures that during the golden period of a child's development and growth, they receive comprehensive stimulation to unlock their full potential. This notion is supported by research; Suyadi (2017) states that ECE fundamentally aims to facilitate the holistic growth and development of children, while Tatik (2016) suggests that early childhood represents a golden period throughout the human developmental span, characterized by heightened sensitivity to environmental stimuli. The concept and direction of education are inherently tied to the curriculum, serving as the standard for organizing learning activities across all educational levels. In ECE, the curriculum is designed to foster children's potential through enjoyable activities, aiming for the achievement of developmental aspects through continuous and sustainable education in preparation for higher levels (Ndeot, 2019). In 2021, the Ministry of Education and Culture launched a prototype curriculum, refined into the Merdeka curriculum, which advocates for learning freedom in its implementation (Mu'arif *et al.*, 2021).

The concept of "Merdeka Belajar" (Freedom to Learn) in Early Childhood Education (ECE) is interpreted as freedom to play. This concept aligns with the principle of learning through play in early childhood education, encapsulated in the motto "Learning through Play and Playing while Learning." This notion is supported by research conducted by Prameswari (2020), which suggests that in ECE, learning is essentially freedom to play for children. Dewi's study (2022) further supports this idea, indicating that the Merdeka curriculum emphasizes learner-centered teaching methods, fosters student autonomy, and promotes meaningful and enjoyable learning experiences. The concept of "Merdeka Belajar" aims to sharpen children's problem-solving skills, encourage critical thinking, broaden their understanding, and facilitate holistic development across various domains, not just cognitive development (Fadillah & Hibana, 2022). In ECE, emphasis is placed on instilling positive character traits, physical abilities, cognitive skills, verbal communication, artistic expression, social skills, emotional intelligence, spiritual values, self-discipline, self-concept, independence, and optimal sensory perception. Research by Liu Ali *et al.* (2021) highlights the curriculum's role in setting the standard for learning activities at all educational levels, including ECE, emphasizing its importance in shaping children's personalities and development. This aligns with Rahma *et al.*'s assertion (2022) that early childhood experiences and upbringing significantly influence how children respond to life's challenges.

The learning outcomes of the Merdeka curriculum in ECE encompass religious and moral values, self-identity, and foundational knowledge in literacy, mathematics, science, technology, engineering, and the arts. Additionally, developmental aspects include religious and moral values, physical motor skills, cognitive development, social

and emotional skills, language proficiency, and Pancasila values, all aligned with children's growth and development. Educational institutions can utilize these learning outcomes to establish learning objectives and measure learning achievements while considering the ECE institution's vision, mission, children's characteristics, local cultural characteristics, and school environment (Efrina Rizkiya Wahono, Indriz, 2021).

Learning in early childhood education plays a crucial role in stimulating cognitive development in children. This is supported by Fitriana Septi's research (2018), which suggests that effective stimulation from educators fosters optimal development, including cognitive development. Children construct their knowledge through play, and cognitive abilities involve the individual's capacity to evaluate and consider various factors. At the Integrated Early Childhood Education Center (PAUD Terpadu) Citra Bakti, various activities are conducted to develop cognitive abilities, such as recognizing numbers and letters, solving puzzles, and more, indirectly facilitating cognitive development. Cognitive development encompasses learning abilities, thinking skills, and intelligence, including the capacity to learn new skills and concepts, understand the environment, utilize memory, and solve simple problems (Khadijah, 2016). Cognitive skills also involve remembering, understanding, and problem-solving (Mussardo, 2019), while Ibda (in Naufal, 2021) suggests that cognition involves human thought processes occurring within the central nervous system, focusing on changes in language and thinking abilities. Within the context of "Merdeka Belajar" (Freedom to Learn) in ECE, children are given the freedom to choose learning activities and fulfill their right to play according to their interests and talents. In the context of ECE, "Merdeka Belajar" translates to freedom to play, comprising both active and passive play. Through play activities, children learn problem-solving, cause-and-effect relationships, various concepts of shapes, colors, sizes, and quantities, all of which stimulate cognitive development.

The implementation of cognitive aspects in early childhood learning at the Integrated Early Childhood Education Center (PAUD) Citra Bakti provides a concept of enjoyable learning for children, thereby effectively stimulating their cognitive development. This aligns with the research conducted by Kartini and Waridah (2019), which emphasizes understanding the implementation of integrated learning in early childhood education and its influence on children's cognitive development. In early childhood education, cognitive aspects are applied through the provision of learning media at school. The provision of learning media in the ECE setting can develop children's cognitive aspects, such as providing letter cards, number cards, and other learning materials that sharpen children's critical and logical thinking in problem-solving.

This is supported by Nafsia and Nenu's research (2023), which underscores the importance of these activities in enhancing the cognitive abilities of young children, allowing them to continuously develop their knowledge in recognizing colors and letters. Similarly, Destrianda, Bahrin, and Fauzia (2019) suggest that the development of children's cognitive abilities involves problem-solving skills in creating artworks, with picture-number cards being one medium that enhances children's cognitive abilities. In

this regard, teachers play a crucial role in facilitating children's learning to achieve planned goals (Nuraeni, 2014). Through such learning media, children's abilities to generate ideas, solve problems independently, and recognize colors and numbers are enhanced. This resonates with research on children's freedom to learn, suggesting that if this concept is applied from an early age, children will be able to independently engage in learning according to their preferences, resulting in a joyful learning experience (Handayani & Rohman, 2020).

2. Literature Review

Cognitive development in early childhood is a critical area of study in educational psychology, particularly concerning the design and implementation of curricula aimed at fostering optimal learning outcomes. This literature review explores key theoretical frameworks and empirical studies relevant to the analysis of cognitive aspects in early childhood learning, with a specific focus on the implementation of the Merdeka curriculum.

This literature review provides a comprehensive overview of key theoretical frameworks and empirical research relevant to the analysis of cognitive aspects in early childhood learning, with a specific focus on the implementation of the Merdeka curriculum. Drawing from Piaget's Theory of Cognitive Development, Vygotsky's Socio-Cultural Theory, Information Processing Theory, research on Executive Functioning, and Neuroscience perspectives, the review highlights the importance of hands-on, experiential learning activities, collaborative learning environments, scaffolding techniques, and interventions targeting executive functioning skills in promoting cognitive development and academic achievement in young children. This synthesis of literature informs the analysis of cognitive aspects within the Merdeka curriculum, elucidating both theoretical foundations and practical implications for enhancing early childhood learning outcomes (Campbell *et al.*, 2001; Kemdikbud, 2022).

The Merdeka curriculum initiative in Indonesia represents a significant shift in the country's education landscape. Introduced as part of educational reform efforts, it aims to provide schools with greater autonomy in crafting their own curricula, with a focus on student-centered learning, character development, and the strengthening of literacy and critical thinking skills. Key elements of the Merdeka curriculum include competency-based learning, flexibility, and autonomy for schools, integration of cultural values and character education, and a focus on literacy and skill development. Schools are empowered to design their curricula to cater to the specific needs and characteristics of their students, fostering diversity and innovation in educational approaches. Moreover, the curriculum emphasizes the importance of character development and instilling Indonesian cultural values such as cooperation, diversity, and the spirit of independence. Additionally, it underscores the need to strengthen literacy across various domains and enhance critical thinking and analytical skills. The involvement of parents and the community is also recognized as crucial, with their active participation encouraged in the

teaching and curriculum development processes. As implementation and development of the Merdeka curriculum continue, it undergoes ongoing evaluation and adjustment to ensure its effectiveness and relevance to the evolving educational landscape in Indonesia (Kemdikbud, 2022).

3. Material and Methods

The method employed in this research is qualitative. Qualitative research focuses on analyzing cognitive aspects in early childhood, specifically studying the implementation of the Merdeka curriculum. This descriptive qualitative approach aims to obtain comprehensive information about the analysis of Cognitive Aspects in Early Childhood: a study on the implementation of the Merdeka curriculum. Data collection techniques used in this research include observation, interviews, and documentation.

- 1) Observation: aspects observed at the Integrated Early Childhood Education Center Citra Bakti include cognitive aspects and the implementation of the Merdeka curriculum in early childhood, as well as learning media related to cognitive aspects.
- 2) Interviews: interviews involve meetings between two individuals to share information or ideas through questions and answers, embedding meaning into specific topics. Interviews also serve as a data collection technique when researchers seek to conduct preliminary research to identify issues requiring investigation, or to gain detailed insights from respondents.
- 3) Documentation: documentation at the Integrated Early Childhood Education Center Citra Bakti serves as evidence that the researcher has conducted the study. The purpose of documentation is to obtain data and information in the form of documents and images that provide supporting evidence for the research.

Data are analyzed descriptively. Descriptive analysis is performed to explain or present information contained within the data, facilitating a better understanding of the findings.

4. Results and Discussion

4.1 Result

In the research conducted at the Integrated Early Childhood Education Center Citra Bakti, the application of cognitive theory in relation to the Merdeka curriculum differs from the K13 curriculum. In the Merdeka curriculum, teachers adapt their teaching methods or learning media based on individual students' understanding levels, as opposed to the K13 curriculum where teachers focus on delivering the material comprehensively to ensure students grasp the essence of the content. This adaptation in the Merdeka curriculum aims to ensure that all students, regardless of their pace in understanding the material, can achieve learning goals, referred to as "achievement of the child" in the Merdeka curriculum documentation. The analysis of cognitive aspects

in this research includes components contained within the learning achievement elements. Within the learning achievement, there are three stimulation elements, each comprising six aspects.

These stimulation elements elaborate on various developmental aspects including religious and moral values, physical motor skills, cognitive development, socio-emotional skills, language, Pancasila values, and other areas to optimize children's growth and development according to educational needs. In the Merdeka curriculum, learning objectives are outlined as learning achievements. Within these learning achievements, there are three accomplishments: (1) achievement of religious and moral values, (2) achievement of self-identity, and (3) achievement of basic literacy, Mathematics, Science, Technology, Engineering, and Arts (STEAM). The cognitive aspect is embedded within the third learning achievement, which encompasses basic literacy and STEAM (Lestari, Ibrahim, and Iriani, 2023). It describes how children recognize and understand various information, communicate feelings and thoughts orally, in writing, or through media, and engage in pre-reading and pre-writing activities. Children identify and use pre-mathematical concepts to solve everyday problems, demonstrate basic critical, creative, and collaborative thinking skills, show curiosity through observation, exploration, and experimentation using their environment and media as learning resources, explore various art processes, experience them, and appreciate artistic creations.

The components of cognitive aspects are also reflected in children's learning reports, commonly known as "student report." Within these reports, children's cognitive aspects are outlined in the components of basic literacy and STEAM assessment. Teachers assess children's cognitive aspects within these reports, aligning with Rosyidi's research (2020), which states that methods and tools are techniques used to achieve goals, while assessment is an effort or action to determine the extent to which goals have been achieved, serving as a tool to assess the success of the learning process and outcomes. In the learning process at the Integrated Early Childhood Education Center Citra Bakti, there are supportive tools that can develop children's cognitive aspects, such as providing learning media. The learning media provided at Citra Bakti includes materials that can enhance children's critical thinking skills, such as letter cards, number cards, puzzles, colored balls, and abacuses.

During the interview process at Citra Bakti on the implementation of the teaching and learning process at school, the application of cognitive theory is evident in teachers' preparation of teaching materials, which include indicators related to cognitive aspects. Within these cognitive aspects, various components are included, such as problem-solving, symbolic thinking, and logical thinking. These components are incorporated into suitable teaching methods. For instance, in the problem-solving component, teachers provide learning media, such as "tracking." In this process, teachers give children worksheets to solve problems encountered during the tracking activity. The second component is symbolic thinking, where teachers provide children with lessons involving numbers and letters to help them recognize symbols within the learning content.

The third component is logical thinking, where teachers provide experiential learning through simple experiments. An example of an experiment conducted at the Integrated Early Childhood Education Center Citra Bakti involves the teacher conducting a simultaneous experiment with rocks and paper in water. From this experiment, children observe that the rock sinks while the paper floats. Through this experiment, children logically deduce that heavier objects sink while lighter ones float.

4.2 Discussion

The findings reveal that cognitive aspects are presented in the Merdeka curriculum document at the Integrated Early Childhood Education Center Citra Bakti. In the Merdeka curriculum, learning objectives are outlined as learning achievements. Within these achievements, components of cognitive aspects are presented in children's learning outcomes. This is supported by Shalehah's research (2023), which states that assessment and learning outcomes in the Merdeka curriculum refer to the National Education Standards as the reference standard, which is then referred to as learning achievements. These achievements encompass religious and character values, self-identity or self, as well as the basics of literacy and STEAM (science, technology, engineering, arts, and mathematics). These benchmark learning achievements have been integrated with references to the National Standards for Early Childhood Education, content standards, and assessment standards, making it expected that teachers will find it easier, more practical, and more directed to design early childhood learning.

In the research conducted at Citra Bakti, the implementation of the Merdeka curriculum allows teachers to grant freedom to children to explore and experiment with their surroundings. As a result, children demonstrate basic critical, creative, and collaborative thinking skills. This is supported by Darmayani & Amelia's research (2023), which states that the implementation of the Merdeka curriculum requires educators to master the evolving technology and consider the needs of learners in learning, resulting in more interactive learning patterns, critical and creative thinking, and independence in classroom learning activities. In this context, the freedom implied by "merdeka" (freedom) refers to children's freedom to think, move, innovate, and be creative (Cahayanti *et al.*, 2022). It is capable of stimulating all aspects of children's intelligence through various directed learning activities, creating a learning environment that encourages children to be active, creative, and think critically through their own experiences (Kartini, 2022).

From the above research findings, children demonstrate curiosity through observation, exploration, and experimentation using their surroundings and media as learning sources to gain ideas about natural and social phenomena. This is supported by Ali, Fauzih, & Latif (2023), stating that children are guided and facilitated to explore the environment by observing and reflecting on things that exist and happen, engaging in question-and-answer sessions between teachers and children, and asking children to share their experiences after visiting. Teachers also explain about environmental learning resources. This aligns with Suryana's research (2017), which suggests that children

acquire knowledge through processes of observation, questioning, trying, reasoning, and communicating. Therefore, in designing engaging learning activities, teachers need creativity and innovation to develop learning activities that introduce scientific concepts. Furthermore, from the above research, it is evident that early childhood education has a structured activity format with three components to achieve learning outcomes. These three components include: 1) religious and moral values, 2) self-identity, and 3) basic knowledge of literacy, mathematics, science, technology, engineering, and arts. Learning outcomes indicate that children are beginning to recognize and practice the fundamental teachings of their religion and beliefs with elements of religious values and ethics, protecting themselves, behaving well, respecting differences of opinion, and having noble manners, which fall under the component or element of religious and moral values. The second component is self-identity. Learning outcomes in this component are equally important for the development of positive self-identity in early childhood because they have consequences, including: 1) instilling a sense of worth and confidence in children; 2) shaping children into positive, cheerful, and high-achieving individuals in school; 3) instilling a sense of pride in children in being part of a particular social group; 4) fostering children to become individuals who can appreciate and accept all differences that are part of daily life to cultivate children's tolerance for diversity. The phases of forming a child's personality occur through interaction. First, children can understand that they are unique individuals who cannot be compared to others (Rao *et al.*, 2017).

It is essential to understand various aspects of a child, such as their physical characteristics, preferences, and potential. Secondly, children start paying attention to and investigating their surroundings. Thirdly, they become aware that they are part of specific groups or social environments. Fourthly, active support from family, teachers, peers, and the community is crucial for children. Fifthly, children need to feel valued and confident. Sixthly, developing a positive identity is vital. Learning the elements of identity can help children develop positive attitudes, self-care, understanding, managing, and building healthy relationships with their environment, as well as showing pride in their family, culture, and Indonesian identity based on Pancasila citizenship (Retnaningsih and Khairiyah, 2022).

The third component comprises the basics of literacy, mathematics, science, technology, engineering, and art. In early childhood education, literacy goes beyond reading and writing skills. Children need to understand speaking, counting, and problem-solving abilities in their daily lives. Therefore, teachers can use observational and experimental learning approaches, science, to give children an understanding of natural processes. The STEAM (Science, Technology, Engineering, Art, and Mathematics) learning approach helps address educational questions. Technology is created to meet human needs, so children should be introduced to technology and its utilization in life as much as possible. Another goal is to enable children to compete and balance technological advancements in their time. Engineering is the process through which children learn that they must solve problems, design, create, and enhance their scientific and mathematical knowledge to create new technology. In this engineering concept,

teachers' task is to allow children to explore more widely and find solutions to the challenges they face. Art helps them develop their imagination and creativity (Carson *et al.*, 2026).

The study of mathematical concepts through observation and experimentation is known as mathematics. From the research conducted at Citra Bakti, the learning outcomes in the independent curriculum have the same status when compared to previous curricula (e.g., the 2013 curriculum). They encompass core competencies and basic competencies that integrate attitude, knowledge, and holistic skills in children. The learning outcomes in early childhood education within the independent curriculum cover religious and moral values, identity, and fundamental knowledge in literacy, mathematics, science, technology, engineering, and art, as explained earlier. Meanwhile, the developmental aspects include religious and moral values, physical motor skills, cognition, socio-emotional skills, language, and Pancasila values, in line with children's growth and development. These elements are the result of curriculum development from the previous curriculum. Educational institutions can use these learning outcomes to set learning objectives, and measure learning achievements, while still considering the vision and mission of early childhood education institutions, the characteristics of children, and the characteristics of the local cultural environment (Shalehah, 2023).

From the research findings at Citra Bakti, in the cognitive aspect, various components exist, including problem-solving learning, symbolic thinking, and logical thinking. This is consistent with research by Ismawaty (2023), stating that cognitive abilities are essential for children to learn various things. The developmental achievements of children in cognitive skills have developed very well, including learning and problem-solving skills, logical thinking, and symbolic thinking.

5. Recommendations

Based on the abstract provided, here are some recommendations for further research:

- 1) Investigate the effectiveness of implementing the Merdeka curriculum in early childhood education institutions other than Citra Bakti. This comparative study can provide insights into the adaptability and efficacy of the curriculum across different settings and contexts.
- 2) Explore the perceptions and experiences of educators, parents, and stakeholders regarding the implementation of the Merdeka curriculum. Understanding their perspectives can offer valuable feedback for curriculum improvement and development.
- 3) Conduct longitudinal studies to assess the long-term impact of the Merdeka curriculum on children's cognitive development. Tracking children's progress over time can provide comprehensive insights into the effectiveness and sustainability of the curriculum in promoting cognitive skills.
- 4) Investigate the role of technology in enhancing cognitive learning outcomes within the Merdeka curriculum. Exploring how digital tools and resources can be

integrated into early childhood education can inform strategies for incorporating technology effectively into the curriculum.

- 5) Examine the relationship between cognitive development and other domains of learning, such as socio-emotional development and language acquisition, within the context of the Merdeka curriculum. Understanding the interconnectedness of these domains can facilitate holistic approaches to early childhood education.

6. Conclusion

From the research conducted at the Integrated Early Childhood Education Center Citra Bakti, it can be concluded that the analysis of cognitive aspects in early childhood within the Merdeka curriculum is present in the third achievement, which includes the basic literacy and Steam learning outcomes. It is hoped that this research will provide readers with a broader understanding of cognitive aspects of early childhood learning within the context of the Merdeka curriculum.

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Conflict of Interest Statement

The authors declare no conflicts of interest.

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