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Transformation of Snakes and Ladders through Index Card Match: Educational Media to Improve Early Childhood Cognition

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ABSTRACT

Early childhood cognitive development is a critical foundation for future learning. However, many existing learning methods remain monotonous and less engaging, leading to low participation and slow cognitive progress among children. To address this, interactive and enjoyable learning media is essential. This study aims to improve early childhood cognitive development through the transformation of the traditional snakes and ladders game integrated with the Index Card Match (ICM) method. The game was selected for its ability to stimulate recognition of basic symbols—numbers, letters, colors, shapes, and sizes—which are key elements in early cognition. The research was conducted at Ceria Eduloka Kindergarten, Seberida District, using a participatory Classroom Action Research (CAR) design consisting of planning, implementation, observation, and reflection in two cycles. The game was modified by adding ICM elements, where children match questions and answers during each move, promoting active thinking and engagement. Data were collected through observation, teacher interviews, and documentation. The results showed a significant increase in cognitive achievement, with average scores rising from 33% in the pre-cycle to 86% in the second cycle. This indicates that the modified game successfully fosters basic cognitive abilities such as recognition, understanding, and problem-solving. Theoretically, the study contributes to the application of constructivist learning and multimodal approaches in early childhood education. In the long term, this educational media has the potential to be replicated in various early childhood education settings as an inclusive, engaging, and culturally adaptive tool to support the development of cognitive and social-emotional competencies in young children.

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1. INTRODUCTION

The introduction should briefly place the study in a broad context and highlight why it is Early childhood is a development that starts from the age of 0 years to about 6 years old. According to the National Education System Law no. 20 of 2003 article 28 paragraph 1 children aged 0-6 years are included in the early childhood group and are included in the Early Childhood Education pathway (Debby Adelita Febrianti Purnamasari, 2024). In early childhood is a good initial phase to provide stimulus to children so that they develop properly and optimally, both physical, cognitive emotional, religious and other developments both in the family environment (home) and in the school environment carried out by teachers, as explained in research (Kent et al., 2020) that the first year of a child's life is very important to develop their cognition. In the example of application at school to improve children's cognitive development in English, through puzzle games, is more improved than playing puzzles using the Indonesian language of instruction (Mantasiah, 2019). This means that children's cognitive development carried out with interesting and appropriate media can develop well.

Early childhood is a golden phase in human development, characterized by high sensitivity to stimulation from the surrounding environment. It is a crucial period for the formation of children's cognitive foundations that will influence the learning process at the next level (Shonkoff & Phillips, 2000; Papalia et al., 2020; Bredekamp, 2017; Yusuf, 2019; Purnamasari, 2024). Therefore, Early Childhood Education (ECED) plays a strategic role in providing meaningful and enjoyable early learning experiences. This is also reinforced by the National Education System Law No. 20 of 2003 Article 28 Paragraph 1, which emphasizes that education for children aged 0-6 years is an important part of the national education system that requires a stimulative and holistic approach (Kemendikbud, 2003; Sari & Kurniawati, 2020; Ningsih Fadhilah, 2023; Mutmainnah, 2019).

One effective approach in supporting early childhood cognitive development is through educational games. Games not only bring together cognitive, social, and emotional elements, but also provide a natural and fun exploration space for children (Bodrova & Leong, 2007; Vygotsky, 1978; NAEYC, 2020; Siregar & Nara, 2021; Mulyani & Hartati, 2022). In this context, the transformation of the traditional game of snakes and ladders into an interactive and meaningful learning medium, such as through integration with the Index Card Match method, offers great potential in developing children's executive function and thinking power. This combination allows children to learn basic concepts in a fun way while practicing memory, problem-solving, and collaborative skills (Zhou et al., 2021; Maharani et al., 2020; Fitriyani, 2019; Ratnasari et al., 2021; Yulianti, 2023). Research conducted by Bodrova & Leong (2007) in the United States and by Zhou et al. (2021) in China has shown that the integration of structured play with cognitive tasks significantly improves children's attention, working memory, and executive function. These studies underline that the combination of play-based methods and symbolic matching strategies—similar to the integration of snakes and ladders with Index Card Match in this study—is effective across various educational contexts. This comparison situates the present research within a global discourse on cognitive development through game-based learning.

In addition, game-based learning has also been widely explored in European early childhood education systems. For instance, studies in Finland and the Netherlands emphasize the use of playful learning environments to enhance early cognitive competencies such as symbolic recognition and problem-solving (Whitebread et al., 2017; Broström, 2015). These international practices highlight the importance of integrating play with structured educational objectives—an approach aligned with the transformation of snakes and ladders through Index Card Match in this study. By contextualizing local cultural games with global pedagogical methods, this research contributes to the growing international body of evidence that supports the effectiveness of educational games in early childhood learning. Research shows that early childhood involved in educational games experience significant improvements in the ability to think logically, solve problems, and remember information (Piaget, 1964; Berk, 2018; Roopnarine et al., 2019; Nurhayati & Wahyuni, 2020; Kartika, 2022). In this case, the modification of the snakes and ladders game with the integration of the Index Card Match method is an innovative strategy that is not only fun, but also loaded with cognitive content. This game is able to

stimulate children's mental activity through gradual and systematic challenges, which encourage them to think critically and solve problems independently.

Learning activities through this game are in line with the principle of scaffolding in constructivism theory, where teachers or adults provide assistance gradually until children are able to complete the task on their own (Wood, Bruner & Ross, 1976; Lestari, 2019; Herawati, 2021; Dewi & Susanto, 2022). In other words, modified games become effective learning tools, especially to support the development of executive functions in early childhood. More than just a learning tool, the transformation of traditional games is also a form of local cultural preservation that is packaged in a format that is relevant to the times (Lancy, 2007; Gunawan, 2018; Harun, 2021; Novianti & Zulfa, 2020; Amelia et al., 2023). In the midst of digitalization and the dominance of online games that lack educational value, the presence of games such as modified snakes and ladders is a safe, educational, and character-building alternative for children. Values such as collaboration, sportsmanship, and love for local culture can grow naturally from an early age through structured and meaningful play activities (Widodo et al., 2020; Fitria, 2022; Wahyuni et al., 2021; Zakiyah, 2020).

Interesting and interactive learning media such as cognitive snakes and ladders games can strengthen children's attention and memory of the material presented (Mayer, 2009; Susanti & Pratiwi, 2021; Fitriani, 2022; Yunita et al., 2020; Fauziah, 2023). The multimodal approach that combines visual, verbal and tactile elements in this game allows children to understand basic concepts such as numbers, colors and patterns more easily. Furthermore, the modified snakes and ladders game can support learning differentiation, which is the customization of learning activities based on the developmental level and abilities of each child, thus supporting the principle of inclusivity in early childhood education (Tomlinson, 2014; Aisyah et al., 2021; Salsabila & Nugroho, 2022; Wulandari & Putri, 2021).

Based on the results of initial observations at Kindergarten Ceria Eduloka Simpang 4 Belillas, Seberida District in October 2023, it shows that out of 10 students in independent class two, there are 7 students who are not in accordance with the achievement of child development after 5-6 years contained in the Regulation of the Minister of Education and Culture of the Republic of Indonesia in 2004, that some children still look confused and have difficulty understanding the concept of numbers and number symbols, and 2 children have not been able to distinguish the symbols of the numbers 6 and 9 because when asked to show the number 6 it shows the number 9 and vice versa. Children tend to be silent and even answer for a long time when asked about a number of objects with the number symbol. In addition to individual aspects, social interactions formed during the play process also contribute to children's cognitive development. Discussions, negotiations, and decision-making that occur during the game encourage the formation of higher-order thinking skills (Palincsar & Brown, 1984; Decety & Jackson, 2004; Hurlock, 2006; Rahmawati & Sulastri, 2022; Hartini & Kurniasari, 2023). At Ceria Eduloka Kindergarten, the implementation of this game places students as active subjects in the learning process, where they participate in making questions and answering challenges in the snakes and ladders board. The activity directly contributes to the development of metacognitive skills, which is the child's ability to realize and manage his/her own thinking process (Suryani et al., 2023; Hasanah & Fitri, 2021; Zulkarnaen et al., 2022).

The transformation of the snakes and ladders game in Ceria Eduloka Kindergarten is carried out by inserting questions related to early literacy, mathematical logic, and introduction to basic science (Nugroho & Sunarti, 2021; Wahyuningsih, 2020; Indrawati, 2022; Farida & Prasetyo, 2023; Handayani & Safitri, 2021). Thus, games not only serve as a means of entertainment, but also a vehicle for critical and creative thinking. In this activity, the teacher acts as a facilitator who bridges the world of play with the world of learning, creating an educational atmosphere that remains fun (Widyaningsih, 2022; Iskandar & Fauziyah, 2023; Damayanti et al., 2020). Evaluation of the effectiveness of the game is done through observation of children's cognitive behavior, such as the ability to remember information, answer questions, and make simple hypotheses (Santrock, 2018; Zimmerman, 2002; Suminar et al., 2021; Hafidah & Ramadhani, 2023; Lestari & Muniroh, 2022). The results of the four-week implementation show an increase in cognitive scores in students, which reinforces the findings of previous studies that

traditional games that are repackaged educationally have a positive impact on the development of early childhood cognitive functions (Sari & Rachmawati, 2021; Rusdiana & Aisyah, 2023). The importance of innovation in traditional game-based learning media is also recognized in the Merdeka Curriculum, which emphasizes contextual, holistic, and child-oriented learning (Kemendikbudristek, 2022; Saputra et al., 2023; Arum & Wahyuni, 2022; Nurjanah, 2021; Irwansyah, 2023). The cognitive snakes and ladders game integrated with the Index Card Match method is a concrete example of educational media that can integrate children's social-emotional, cognitive, and motor aspects as a whole. Through this approach, teachers have a great opportunity to create a learning environment that is meaningful, fun, and still rooted in local cultural values. Based on this background, this study aims to analyze how the transformation of snakes and ladders through Index Card Match as an educational media to improve early childhood cognition at Ceria Eduloka Kindergarten.

This research also wants to evaluate the extent to which the media can improve students' critical thinking, problem solving and memory skills through fun and contextualized learning methods. In addition, this research is expected to be the basis for developing similar media in various Early Childhood Education (PAUD) institutions in Indonesia to strengthen culture-based learning and early childhood cognition.

2. METHODS

This research uses a participatory Classroom Action Research (PTK) approach that allows researchers to be directly involved in the entire learning process in the classroom. According to Mu'alimin & Hari (2014), this involvement creates a synergistic relationship between researchers, teachers, and students to produce relevant and in-depth data. The research was conducted at Ceria Eduloka Kindergarten, Seberida Subdistrict, with participants consisting of one teacher and ten class B students. Although the number of participants was relatively small (10 children), this is common in early childhood classroom action research settings, and the limited sample size is acknowledged as a constraint in generalizing the findings beyond this context. The Classroom Action Research (PTK) model used refers to the Kemmis and Taggart design which includes four main stages, namely:

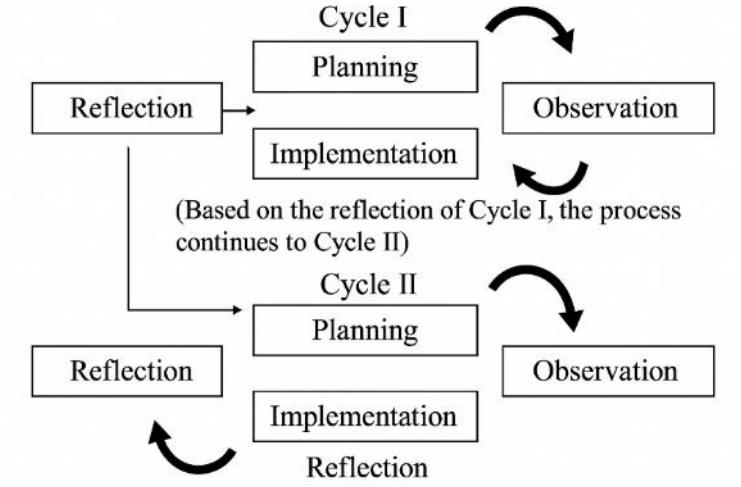

Figure 1. Kemmis & Mc Taggart Action Study Model.

(1) Planning, where the researcher develops an action plan based on students' needs and learning objectives, including preparing observation sheets and documentation; (2) Implementation, which is the implementation of learning strategies through an interactively modified snakes and ladders game to increase student engagement; (3) Observation, which is the activity of recording and observing students' interactions and responses during the learning process; and (4) Reflection, which is the evaluation stage to review the results of the action and design improvements in the next cycle. The research instruments—including observation sheets and interview guidelines—were developed based on existing literature and adapted to early childhood learning characteristics. Instrument validation

was conducted through expert judgment by two early childhood education lecturers to ensure content validity and relevance.

Data were collected through direct observation techniques, semi-structured interviews with teachers, and photo and video documentation as visual evidence of learning activities. Data analysis was conducted using a qualitative descriptive approach, through grouping information in thematic categories such as active engagement, student response, and effectiveness of teaching methods. Interview results were analyzed narratively to understand changes in student behavior more deeply, while observation data was used to describe the dynamics of social interaction in the classroom. This study did not employ inferential statistical analysis due to the small sample size and the qualitative nature of the data, which is recognized as a methodological limitation. However, the descriptive approach was considered suitable for capturing in-depth and context-specific learning dynamics in early childhood settings. With this method, the research is expected to make a real contribution to improving the quality of PAUD learning and become a reference for teachers in applying contextual and innovative Classroom Action Research (PTK) approaches.

3. FINDINGS AND DISCUSSION

3.1. Findings

This research aims to improve early childhood cognitive understanding through the transformation of snakes and ladders game media collaborated with the Index Card Match method at Ceria Eduloka Kindergarten, Seberida District. This transformation is realized through educational modifications that enrich the game board with visual elements (colors, shapes), symbols (numbers, letters), and motor activities combined with the active Index Card Match method. This approach is adapted to the characteristics of early childhood development to make it more fun, interactive, and meaningful in the learning process.

The results of the implementation in Cycle II, especially the second meeting, showed a very significant increase in the achievement of children's cognitive development indicators. Children are able to remember and understand basic concepts such as number symbols, letters, shapes, colors, and symbols displayed in the game better. The collaboration between the snakes and ladders game and the Index Card Match method creates an active and collaborative learning process, so that children are directly involved in thinking activities and solving simple problems. The achievement of indicators in this study contains four (4) scales, namely special signs can be in the form of ticks, letters, certain symbols, etc. But in the implementation of assessment, the check mark uses letters, there are four scales as stated as follows (Suminah et al., 2018) as follows: a) Not Yet Developed (BB): if the child does it, it must be with guidance or exemplified by the teacher, with a score of 1. b) Start to Develop (MB): if the child does it, he still has to be reminded or helped by the teacher, with a score of 2. c) Develop According to Expectations (BSB): if the child can do it independently and consistently without having to be reminded or exemplified by the teacher, with a score of 3. d) Very Good Development (BSB): if the child can do it independently and can help his friends who have not, with a score of 4.

This progress is evident through the comparison of pre-action conditions (Pre Cycle), Cycle I, to Cycle II, as shown in Diagram 1 and Table 1.

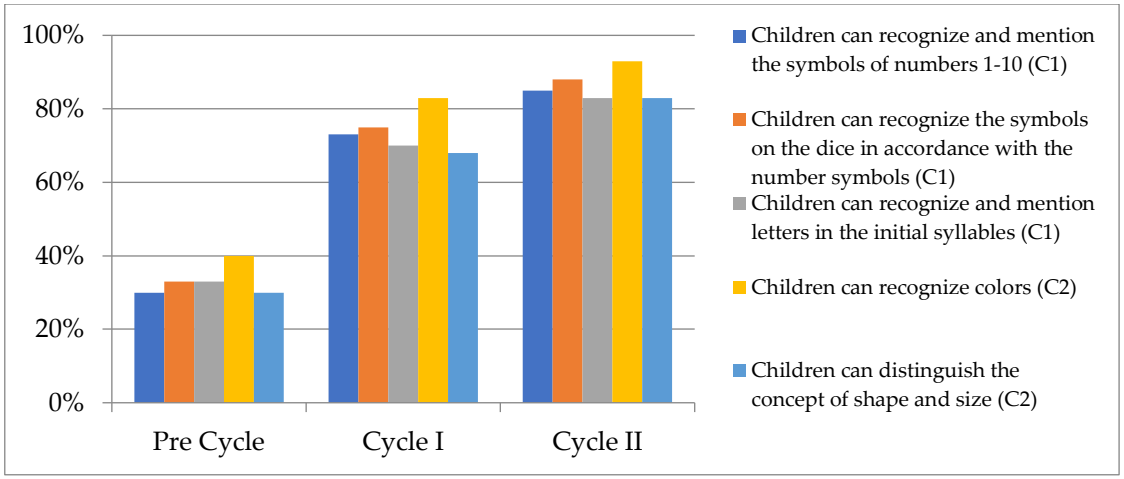

Figure 2. Achievement level of early childhood cognitive understanding.

Table 1. Recapitulation of Achievement Results of Early Childhood Cognitive Understanding

Indicator	Criteria	Pre Cycle		Cycle I		Cycle II	
		Score	%	Score	%	Score	%
Children can recognize and mention the symbols of numbers 1-10 (C1)	Undeveloped	8	20	1	3	0	0
	Beginning to Develop	4	10	4	10	18	45
	Developing as Expected	0	0	12	30	12	30
	Developing Very Well	0	0	12	30	0	0
	Total Score	12	30	29	73	34	85
Children can recognize the symbols on the dice in accordance with the number symbols (C1)	Undeveloped	8	20	0	0	0	0
	Beginning to Develop	2	5	2	5	0	0
	Developing as Expected	3	8	24	60	15	38
	Developing Very Well	0	0	4	10	20	50
	Total Score	13	33	30	75	35	88
Children can recognize and mention letters in the initial syllables (C1)	Undeveloped	7	18	1	3	0	0
	Beginning to Develop	6	15	4	10	2	5
	Developing as Expected	0	0	15	38	16	40
	Developing Very Well	0	0	8	20	8	20
	Total Score	13	33	28	70	33	83
Children can recognize colors (C2)	Undeveloped	5	13	0	0	0	0
	Beginning to Develop	10	25	0	0	0	0
	Developing as Expected	3	8	21	53	9	23
	Developing Very Well	0	0	12	30	28	70
	Total Score	16	40	33	83	37	93
Children can distinguish the concept of shape and size (C2)	Undeveloped	8	20	0	0	0	0
	Beginning to Develop	4	10	6	15	2	5
	Developing as Expected	0	0	21	53	15	38
	Developing Very Well	0	0	0	0	12	30
	Total Score	12	30	27	68	33	83
Total Score Percentage		33%		74%		86%	

Quantitatively, this development can be seen from the increase in the total average achievement of children's cognitive indicators from 33% in the Pre-Cycle (Beginning to Develop category), to 74% in Cycle I (Developing as Expected category), and reached 86% in Cycle II (Developing Very Well category). Each indicator showed a consistent upward trend. For example, in the indicator of the ability to recognize and mention the symbols of numbers 1-10 (C1), the average achievement increased from 30% in Pre-Cycle, to 73% in Cycle I, and finally reached 85% in Cycle II.

The indicator of recognizing symbols on the dice according to the number symbols (C1) also showed a progressive surge, from 33% (Pre Cycle) to 75% (Cycle I), and 88% (Cycle II). Children are increasingly quick to associate the dot symbol on the dice with the corresponding number symbol, indicating a strengthening of the relationship between visual symbols and numerical concepts. This increase in understanding was also seen in the ability to recognize initial syllable letters (C1), with the average achievement increasing from 33% to 70%, and finally 83% in the final cycle. In visual-cognitive aspects, such as recognizing colors (C2), children's achievement rose dramatically from 40% at the beginning, to 83% in Cycle I, and 93% in Cycle II. Children were able to distinguish basic colors more precisely, and even began to mention secondary colors and give examples of objects according to these colors. The same thing also happened in the indicator of distinguishing the concept of shape and size (C2), which increased from 30% to 68% and finally 83%. The children were able to classify objects based on size big-small, high-low, and distinguish shapes such as circle, triangle, and square.

Qualitatively, observations showed that students were more enthusiastic in participating in learning activities. They were actively involved in small discussions when determining answers, showed high curiosity, as well as a confident attitude when taking their turn to play. Teachers also noted positive changes, where children who were previously passive became more courageous, responsive and cooperative. Interactions between students developed to be more supportive and strengthened social-emotional values, such as cooperation, empathy, and a sense of responsibility within the group. This increase in achievement proves that the transformation of snakes and ladders through Index Card Match is effective as a stimulative medium in developing children's cognitive functions. Children's cognitive development is closely related to visual abilities, observation, perception, and attention to the surrounding environment. Early childhood involved in the experience of playing while learning shows an increase in the ability in the aspects of remembering (C1) and understanding (C2) in Bloom's cognitive taxonomy.

(a) (b)

Figure 3. (**a**) Form of Snakes and Ladders Game; (**b**) Process of Snakes and Ladders Game.

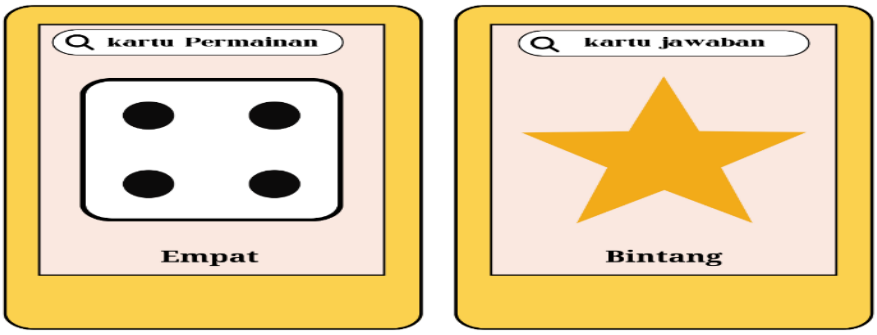

Figure 4. Index Card Match.

In general, the results of this study underscore that educationally modified traditional games, such as snakes and ladders, have great potential in cognitive learning at the early childhood education level. The game design that presents mild cognitive challenges and attractive visual symbols makes learning activities feel natural and fun. The game not only serves as entertainment, but also as an effective educational tool in helping children build the basics of logical, symbolic and conceptual thinking gradually and thoroughly.

3.2. Discussion

In this study, the transformation of snakes and ladders game through Index Card Match approach proved to be effective as an educational media to improve cognitive abilities of early childhood at Ceria Eduloka Kindergarten. The results of observations and quantitative data show that this game is able to strengthen the understanding of basic concepts such as numbers, letters, colors, shapes, and sizes which are important foundations in children's cognitive development. As explained by Suherman et al. (2016), game media has a strategic role in improving children's basic skills, especially in the development of number concepts and symbol recognition. Furthermore, Hadiyanto (2020) asserts that game-based learning can significantly increase early childhood learning engagement and motivation. Through the integration of Index Card Match elements in the snakes and ladders game, children are not only involved in fun play activities, but also gain meaningful learning experiences through symbolic visualization and card matching activities. This activity touches on various cognitive aspects of children, ranging from classification, pattern recognition, to simple decision making. This approach is in line with Piaget's (1970) theory of constructivism, which states that children construct knowledge through concrete experiences and active interaction with their environment. Thus, the transformation of the snakes and ladders game through Index Card Match becomes a holistic and fun educational tool in supporting early childhood cognitive development.

The improvement seen in children's ability to recognize and mention number symbols 1-10 (C1) reflects the associative process that occurs between concrete symbols and number concepts. The transformation of the snakes and ladders game through the Index Card Match approach makes this game not only an entertainment medium, but also an effective educational tool in strengthening basic mathematical concepts that are very important for early childhood cognitive development. According to Rizki & Triyono (2018), games can be a vehicle for strengthening basic cognitive abilities, including counting and number recognition skills in early childhood. Support also comes from Mantasiah (2019), who states that games that contain elements of repetition and symbolic association can improve children's ability to remember and understand concepts more deeply. In line with Piaget's cognitive development theory, direct experience through educational games such as snakes and ladders modified with Index Card Match provides concrete opportunities for children to learn actively. Thus, this game is not only fun, but also pedagogically meaningful in stimulating the understanding of number concepts and their symbols. In addition, the successful transformation of the snakes and ladders game through Index Card Match in improving children's understanding of the symbols on the dice and number symbols shows that the visual and motor stimulation in this game is very supportive of a fun

and meaningful learning process. Interactive activities that involve physical movement and manipulation of concrete objects, such as game boards and dice, help children connect numbers with dot symbols on dice which are important foundations in basic math learning. Research by Agustin et al. (2020) shows that games that combine visual and physical aspects can significantly improve children's understanding of basic math concepts. In line with this, Nurhadi (2019) revealed that number and symbol-based learning media such as dice have an important role in accelerating children's cognitive understanding of mathematical concepts. Furthermore, the snakes and ladders game modified with the Index Card Match approach also provides space for children to practice fine motor skills and hand and eye coordination. This is as stated by Mustafa (2019), that games that involve light physical activity can strengthen children's overall motor development. Thus, this media not only supports cognitive aspects, but also integrates motor aspects as part of holistic learning.

The significant increase in the indicator of recognizing letters in initial syllables (C1), as well as the ability to distinguish colors, shapes, and sizes, shows that the transformation of the snakes and ladders game through Index Card Match is not only effective in mathematical aspects, but also contributes to children's cognitive development in the realm of language and visual skills. This game provides comprehensive stimulation and also combines the recognition of letters, syllables, colors, shapes, and sizes in one fun and educational activity. Research by Kent et al. (2020) confirms that interactive games have great potential in supporting children's language development, as it allows them to learn through hands-on experiences involving communication, symbol recognition and social interaction.

Similar findings were revealed by Muntasir & Nurhayati (2017), which showed that letter and syllable-based game media can effectively improve early reading skills in early childhood. In addition, the experience of playing the Index Card Match version of snakes and ladders allows children to recognize letters and words more naturally through the activity of matching cards and answering simple questions related to letter or syllable symbols. In this context, children not only memorize, but also actively construct the meaning of symbols. The introduction of color, shape and size in this game also plays an important role in strengthening children's visual and cognitive skills. This is in line with the findings of Prihatin (2019), which states that stimulation of colors and shapes in early childhood can stimulate overall cognitive development. Thus, the transformation of snakes and ladders through the Index Card Match approach is a medium that is not only fun, but also very strategic in supporting children's cognitive development in an integrative manner.

The significant increase in achievement in cycle I and II reflects that the transformation of the snakes and ladders game through the Index Card Match approach is an effective tool in facilitating active, participatory and fun learning. The game method allows children to develop not only cognitive aspects, but also social skills, as they learn to interact, share roles and work together in a collaborative atmosphere. This is in line with Vygotsky's social development theory which emphasizes the importance of social interaction in shaping children's learning process. In this context, games are not only a teaching aid, but also an important medium of social learning. Research by Sari et al. (2019), also confirms that group play activities can strengthen children's social and emotional abilities, such as empathy, cooperation and communication.

From a pedagogical perspective, the implementation of Classroom Action Research (PTK) in this study contributed positively to improving the quality of interaction between teachers and students. The approach that involves direct observation, interviews, and structured documentation allows teachers to understand the dynamics of learning more deeply. This is in accordance with the findings of Hadi & Wahyudi (2021), who state that PTK encourages teachers to be more reflective and adaptive in designing learning strategies that suit the individual needs of students. Furthermore, as stated by Muliani (2019), PTK provides space for teachers to innovate and evaluate the effectiveness of teaching methods on an ongoing basis. In the context of this study, teachers at Ceria Eduloka Kindergarten were able to assess the effectiveness of the snakes and ladders game based on Index Card Match and adjust the teaching approach in a more targeted manner, according to the characteristics and development of each child. In the long term, the integration of symbolic, visual, and interactive components in this

game-based learning media has the potential to foster sustainable cognitive habits, such as logical reasoning, memory retention, and problem-solving skills. These foundational skills are essential for future academic success, particularly in literacy and numeracy development at the elementary level. By cultivating these habits through structured play from an early age, children are more likely to develop into independent and reflective learners. In addition, the role of parents and the home environment plays a critical part in reinforcing the learning outcomes achieved in school. Parental involvement in follow-up activities—such as asking children to repeat game-based questions at home or practicing recognition of numbers and letters using household items—can significantly enhance memory consolidation. Encouraging parents to adopt a playful yet educational approach at home, aligned with the learning media used in school, builds consistency and strengthens cognitive reinforcement. Therefore, future implementations of this media are recommended to include parental guidance modules or take-home versions of the game to bridge school and home learning environments.

4. CONCLUSION

This study shows that the snakes and ladders game modified with the Index Card Match approach can significantly improve early childhood cognitive abilities. This game not only serves as an entertainment medium, but also as an effective learning tool in introducing basic concepts such as numbers, letters, colors, shapes, and sizes. By involving visual, physical and symbolic elements, children can learn actively through fun and meaningful hands-on experiences. This approach is in accordance with the theory of constructivism, where children build understanding through exploration and direct interaction with learning media. The improvement of children's cognitive abilities can be seen from the results of the cycle which shows progress from the category of Beginning to Develop to Developing Very Well. In addition to improving cognitive aspects, this game also contributes to children's social and emotional development, because it is done interactively in a collaborative atmosphere. Therefore, the use of game media such as snakes and ladders with the Index Card Match approach can be used as an alternative to creative and fun learning strategies in early childhood education, and can be adapted by other teachers in improving the quality of learning in the classroom.

This research contributes to the scientific development of local culture-based learning innovations by transforming traditional games into effective cognitive learning media. It also bridges theoretical frameworks of cognitive development (such as constructivism, scaffolding, and multimodal learning) with contextual and practical classroom applications. Instrument validity was ensured through expert judgment from two early childhood education lecturers, while reliability was maintained by consistent observation procedures and structured interview protocols. However, the limited number of participants (10 children) presents a challenge in generalizing the findings to a broader population. This study acknowledges this as a limitation, and recommends further research with larger and more diverse samples. In practice, challenges such as limited time allocation, varying levels of teacher readiness, and the need for media preparation may affect implementation. Therefore, effective planning, teacher training, and potential parental engagement are essential to optimize the impact of this learning media.

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