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Ability to Recognize Pattern Concepts through Loose Parts Media for 4-5 Year Old Children

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Abstract

This study explores the effect of loose parts media on improving pattern recognition in 4-5-year-olds at Nusa Indah Kindergarten, motivated by the need to find innovative approaches to enhance early childhood education. Early recognition of patterns is a fundamental cognitive skill that supports later academic learning, particularly in mathematics and literacy. Therefore, the objective of this research is to determine the effectiveness of loose parts media in fostering the development of pattern recognition skills among young children. The study employs a descriptive qualitative approach, gathering data through interviews with teachers and documentation of classroom activities. The results indicate that the use of loose parts media, which involves natural or everyday objects that children can manipulate, significantly enhances their ability to recognize and create patterns. The children engaged more deeply with the learning material, demonstrated improved focus, and exhibited a higher level of creativity in their responses. The study concludes that incorporating loose parts media into early childhood education provides a more interactive and effective method for addressing challenges related to pattern recognition. It also suggests that such media can make learning more enjoyable and meaningful, thereby fostering a positive attitude towards learning in young children. This research offers valuable insights for educators, emphasizing the importance of adopting innovative and child-centered teaching strategies to enhance cognitive development in early learners.

Keywords: early childhood; learning media; loose parts; pattern concepts.

INTRODUCTION

The early childhood period only occurs once in life, therefore the early childhood period is also called the golden age, which means the golden period. In early childhood, all aspects of child development develop very rapidly, therefore meaningful stimulation is needed to develop all aspects of early childhood development (Richter et al., 2017). Providing stimulation can be done through education programs for early childhood (ECED). There are six aspects of child development that must be optimally stimulated, one of which is cognitive development (Carson et al., 2016). Early childhood cognitive development is essentially a mental process to identify, remember, connect (correlation and association), count, explain, classify, analyze, synthesize, and apply something (Zeng et al., 2017). One aspect of children's cognitive development that needs to be developed is the introduction and understanding of mathematical concepts with material content about the concept of patterns.

The concept of pattern is one of the mathematical concepts taught in ECED (Nisa et al., 2019). According (Rittle-Johnson et al., 2017) suggest that patterns are finding predictable sequences, and the first patterns that children interact with are repeating patterns (i.e., linear patterns with core units, such as the color blue-red, that repeat, such as blue-red-blue-red). Understanding the concept of pattern is very important to be taught in early childhood because understanding the concept of pattern is the basis of mathematical knowledge at the next level

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of education (Kholiyah et al., 2023). Based on the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 137 of 2014 concerning National Standards for Early Childhood Education, it explains that one of the levels of developmental achievement of children aged 4-5 years in the scope of cognitive development of logical thinking is the ability to recognize patterns (for example, AB-AB and ABC-ABC) and the ability to repeat them. The above statement shows that the concept of patterns is important to be taught in early childhood.

Based on observations in several ECED institutions, the introduction of pattern concepts is not given optimally. The problems found include children not being able to mention advanced simple patterns based on shapes or objects, children not being able to repeat patterns, children not being able to imitate simple patterns, and children not being able to make their own patterns. This is due to the lack of innovation and variety in the learning media used to introduce the concept of patterns for early childhood. The learning media used tends to use LKA (Children's Worksheet). The problem must clearly be addressed, namely by changing the learning media used to introduce the concept of patterns to children.

In the age range of 2-7 years, it means that including the age range of 4-5 years, children are in the pre-operational phase where children's development will increase and children will build their knowledge by observation or seeing directly and being directly involved (Vandenbroucke et al., 2018). So that learning must be done concretely, namely through concrete media as well. Media as a learning tool is part of the planning process in ECED learning management (Yusuf, 2022). The use of learning media in ECED must interest children so that children are interested in carrying out learning activities so that children are not easily bored.

Learning media to introduce the concept of patterns in early childhood must use media that is interesting, can be seen, and can be touched. The media is by using loose parts media. Loose parts are materials that are open, separate, can be put back together, can be carried, can be combined, can be aligned, can be moved, and can be used alone or combined with other materials (Gull et al., 2019). Loose parts media are media that do not have binding rules, so they can continue to be explored by children (Cankaya et al., 2023). In addition, loose parts can also be easily found in the environment around children (Houser et al., 2016). Based on that, it is clear that loose parts learning media can be a learning media to recognize the concept of patterns in children.

Research conducted by (Sipahutar & P, 2023) stated that loose parts is a learning media that can be used as a tool to explore various aspects of problem solving, creativity, concentration, fine and gross motor, science, language, art, and math. Based on this research, it is stated that loose parts can be a medium for learning math. This opinion is in line with research conducted by (Setiani & Elvira, 2023) which suggests that loose parts media can successfully support children's math learning activities, including material about patterns. Children can recognize and form patterns with media using loose parts media. Furthermore, research conducted by (Kholiyah et al., 2023) found that loose parts media has a significant effect on the ability to recognize the concept of patterns in children aged 4-5 years. The novelty in this analysis is that it allows the finding that if there are still children aged 4-5 years and have not been able to mention or continue simple patterns and have not been able to make patterns, then it can be stimulated by using loose parts learning media. The main contribution of this research is to provide an overview and idea about the application of loose parts media on the ability to recognize children's pattern concepts. Therefore, this study aims to analyze the role of loose parts media in improving the ability to recognize the concept of patterns in children aged 4-5 years.

METHOD

The research method used in this study is descriptive qualitative. This research focuses on describing the improvement of the ability to recognize pattern concepts through loose parts media in children aged 4-5 years. Researchers collected data using interview techniques and documentation. The interview technique in this research is a structured interview technique, by preparing a list of questions that will be asked to the resource person. The criteria for selecting sources used for this research are teachers in ECED or kindergarten who have implemented learning about pattern concept material with loose parts media for children aged 4-5 years. Interviews were conducted with teachers at Nusa Indah Kindergarten with questions about the use of loose parts media in kindergarten and learning patterns with loose parts media. In addition, other equipment in the form of a recorder was also used to help record the results of the interview to be more detailed and accurate. The interview was conducted with a duration of 15 minutes. Meanwhile, documentation was used to collect data that was not summarized in the list of questions in the interview. The flow of qualitative descriptive research in this study is determining the topic, conducting interviews, reading the entire text, classification, analyzing descriptions, and drawing conclusions.

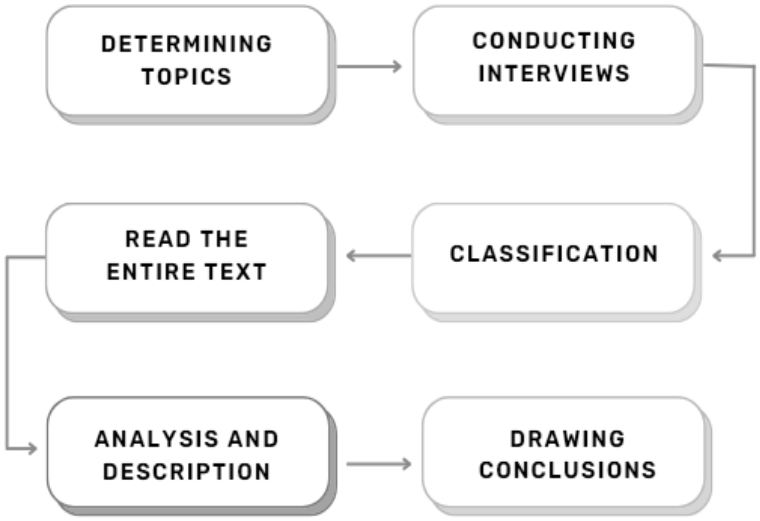

Figure 1. Qualitative Data Analysis Process

The collected data was analyzed using the thematic analysis method, which involves identifying, analyzing, and reporting patterns or themes that emerge within the data (Bogdan & Biklen, 2007). The analysis process followed several key stages. First, researchers familiarized themselves with the data by thoroughly reading and reviewing all collected materials, including interview transcripts, observation notes, and documentation of children's activities, to gain a comprehensive understanding of the content (AM & Purnama, 2024). Next, a coding process was undertaken, where the researchers assigned labels or codes to segments of the data that were relevant to the research focus, such as aspects related to children's engagement, challenges in pattern recognition, and the effectiveness of loose parts media. These codes were then grouped into broader and more significant themes, reflecting the general patterns that emerged from the data, such as the enhancement of pattern recognition abilities, increased creativity, and improved focus among 4-5-year-old children. Following this, the researchers refined these themes by revisiting the data to ensure that the developed themes accurately reflected the content and aligned with the research objectives.

Finally, the results of the thematic analysis were reported descriptively, connecting the findings with relevant theories and literature on early childhood education, particularly within the context of using loose parts media to improve pattern recognition in young children. This analysis provided valuable insights into how loose parts media can be effectively utilized in educational settings to foster cognitive development in early learners.

RESULTS AND DISCUSSION

❖ Loose Parts as Learning Media

Loose parts is a term for a type of game that was first introduced in 1971 by an architect named Simon Nicolshon (Cankaya et al., 2023). Initially, loose parts aimed to provide opportunities for children to express their creativity through the use of material components that are easy to obtain, manipulate, modify, and assemble themselves (Gibson et al., 2017). Essentially, loose parts are media that can be disassembled, reassembled, and can also be combined with other media.

❖ Application of Loose Parts in Nusa Indah Kindergarten

Based on the results of an interview with one of the class teachers at Nusa Indah Kindergarten, information was obtained that the teachers at Nusa Indah Kindergarten already knew about loose parts media. They said that loose parts are materials that are around. Nusa Indah Kindergarten has used loose parts media in learning with various types or components of loose parts. The types of loose parts found in Nusa Indah Kindergarten consist of seven types, namely: 1) Natural materials, such as leaves and twigs; 2) Metal materials, such as buttons and coins; 3) Ceramic or glass materials; 4) Wood materials, such as wood, rattan or bamboo, twigs, and blocks; 5) Plastic materials; 6) Cloth, thread, and rope; and 7) Used packaging materials. Almost all types of loose parts in Nusa Indah Kindergarten are used and applied as learning media in daily teaching and learning activities. Loose parts media can be used according to any theme (Cankaya et al., 2023). The availability of loose parts made of ceramics or glass in Nusa Indah Kindergarten is not much, because it is feared that they will be misused by children and therefore dangerous for them.

❖ Benefits of Loose Parts in Early Childhood Development

Loose parts as a medium used for learning and playing in PAUD have many benefits for stimulating the development of early childhood. According to (Wahyuningsih et al., 2020), loose parts media can be used to improve problem-solving skills, creativity, concentration, fine and gross motor skills, science, language development (literacy), art, mathematical logic, engineering, and technology. Based on this explanation, it can be concluded that loose parts media can be a means to improve children's mathematical abilities.

❖ Teaching Mathematical Concepts for Early Childhood

Mathematics must be given and taught to children from an early age. Mathematics as part of academic competence is important to be taught and mastered by early childhood (Byrd et al., 2015). This is because mathematics is one of the sciences needed by humans in living life (Feigenson et al., 2013). Mathematical activities that can be learned by early childhood can be in the form of number concepts, number operations, comparisons, groupings, patterns, and geometry (Björklund et al., 2020). Based on this statement, it is stated that one of the important mathematical materials taught to early childhood, including children aged 4-5 years, is material about the concept of patterns.

❖ **Implementation of Pattern Concept Learning in Nusa Indah Kindergarten**

The concept of a pattern is something that consists of objects or objects that are arranged repeatedly. According to (Burgoyne et al., 2017), the concept of a pattern is defined as a series of objects, words, sounds, or colors that are formed repeatedly. Based on the results of the interview, Nusa Indah Kindergarten has implemented learning about mathematical patterns using loose parts media. This learning activity often uses loose parts components from natural materials, namely leaves. In its implementation, each meeting carries out different learning activities according to the learning objectives. The types of loose parts used also vary. It can be concluded that the development of loose parts media to improve the ability to recognize pattern concepts in Nusa Indah Kindergarten is adjusted to learning objectives.

❖ **Children's Achievement Standards in Recognizing Pattern Concepts**

Children's achievement standards in recognizing pattern concepts are regulated in the Child Development Achievement Level Standards (STPPA). Based on the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 137 of 2014 concerning National Standards for Early Childhood Education, in the scope of cognitive development of logical thinking in children aged 4-5 years, one of them is the ability to recognize patterns (for example, AB-AB and ABC-ABC) and the ability to repeat them. In Nusa Indah Kindergarten, group A with an age range of 4-5 years has been introduced to the concept of patterns with indicators AB-AB and ABC-ABC. Learning about the concept of patterns uses interesting learning media, one of which is loose parts media. An example of a learning activity to recognize the concept of patterns with loose parts media in Nusa Indah Kindergarten is making an Indonesian flag with a red-white-red-white (AB-AB) pattern sequence using loose parts components from used packaging, namely cardboard/paper. Not only by using loose parts components from used packaging, learning to make pattern sequences is also done using loose parts components from natural materials, namely leaves. Another example of an activity is making a pattern with the colors blue-red-yellow-blue-red-yellow (ABC-ABC) using loose parts components from plastic, namely bottle caps.

❖ **Steps for Using Loose Parts Media in Learning the Concept of Patterns**

The steps for using loose parts media to introduce the concept of patterns to children aged 4-5 years at Nusa Indah Kindergarten are first, the children look for materials or types of loose parts that will be used, for example bottle caps. Children look for bottle caps around the school and in clean and accessible places. After finding the type of loose parts bottle cap, children can bring it into the classroom and then sit in their respective places. If there are children who do not find a bottle cap, the teacher will give it to them. Then, the children carry out the instructions given by the teacher, for example arranging patterns according to the color of the bottle cap red-white-red-white. Children can arrange patterns on their respective desks based on the instructions given by the teacher.

❖ **Results and Impact of Learning the Concept of Patterns with Loose Parts Media**

Learning about the concept of patterns for children aged 4-5 years using loose parts media makes children happy and enthusiastic in participating in learning. Around 75% of children aged 4-5 years at Nusa Indah Kindergarten have understood what was ordered. Children have also understood the tasks given related to the concept of patterns. Basically, all children develop very well and the results are in accordance with expectations and learning objectives. Children are able to compose patterns with indicators that children are able to

mention simple patterns that have been formed based on shapes or objects, repeat patterns, imitate simple patterns, and form patterns or create their own patterns.

❖ **Learning the Concept of Patterns in Children's Cognitive Development**

Learning about the concept of patterns is included in the aspect of cognitive development. Cognitive theory was developed by a child cognitive development psychologist named Jean Piaget. Piaget explained that there are 4 (four) stages of cognitive development, namely: 1) Sensorimotor Stage (0-2 years); 2) Pre-Operational Stage (2-7 years); 3) Concrete Operational Stage (7-11 Years); and 4) Formal Operational Stage (11-15 years). Based on the stages of cognitive development according to Piaget, it can be concluded that children in the age range of 4-5 years are in the pre-operational stage (Babakr et al., 2019). At the pre-operational stage, learning must be carried out concretely (Kholiyah et al., 2023). This is to make it easier for children to understand the material (Flevares & Schiff, 2014). The media used for learning must be visible and touchable by children so that children can be directly involved with the learning media and meaningful learning is created. Including in introducing the concept of patterns to children, concrete media must be used, one of which is by using loose parts learning media.

❖ **The Influence of Loose Parts Media on Children's Ability to Recognize Pattern Concepts**

The ability to recognize pattern concepts in children aged 4-5 years at Nusa Indah Kindergarten can be improved by using loose parts media in their learning. In line with that, research conducted by (Holiyah et al., 2023) proved that the use of loose parts media has an effect on the ability to recognize pattern concepts in children aged 4-5 years in Bojong District, Pandeglang Regency-Banten. Likewise, research conducted by (Christiany, 2021) found that there was an increase in arranging ABC patterns using loose parts media so that it had an effect on the cognitive development of group A children at PL Bernardus Kindergarten. Based on the results of interviews at Nusa Indah Kindergarten, the researcher concluded that loose parts media can improve the ability to recognize pattern concepts in children aged 4-5 years. By using loose parts media in learning about pattern concepts, the child's achievement standards that have been set in the child's development achievement level standards can be achieved. Children are able to name simple patterns that have been formed based on shapes or objects, repeat patterns, imitate simple patterns, and form patterns or create their own patterns.

CONCLUSION

The results showed that Nusa Indah Kindergarten has used loose parts media in teaching and learning activities every day. The use of loose parts media can improve the ability to recognize the concept of patterns for children aged 4-5 years at Nusa Indah Kindergarten. The diversity of components in loose parts media can provide learning with different learning objectives using different types of loose parts. In addition, loose parts media are also easy to find in the surrounding environment and are favored by children. The loose parts media found in Nusa Indah Kindergarten include natural materials (leaves and twigs), metal materials (buttons and coins), ceramic or glass materials, wood materials (wood, rattan or bamboo, twigs, and blocks), plastic materials, fabrics, yarn, ropes, and packaging. The limitation of this study is the limited source of data that makes the research only conducted in one kindergarten because it did not find any kindergarten that had implemented learning about the concept of patterns using loose parts media. Recommendations that can be given are that researchers

can add data sources, namely kindergartens that have implemented learning about the concept of patterns using loose parts media.

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