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A STUDY ON THE USE OF LOOSE PART MEDIA TO INTRODUCE NUMERATION ABILITIES TO EARLY CHILDHOOD GROUP A IN AL-KAUTSAR PAUD CILEGON BANTEN

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Abstract

Early childhood education plays an important role as an initial gate in building a foundation of numeracy that will benefit children throughout their life journey. The low numeracy ability in Indonesia shows the need to introduce numeracy from an early age through concrete, meaningful, and appropriate learning experiences in accordance with children's characteristics. This study aims to describe the planning, implementation, evaluation and challenges in the use of loose part media to introduce the numeracy of early childhood group A at PAUD Al-Kautsar Cilegon. The research uses descriptive qualitative research by collecting data through observation, interviews, documentation and field notes. The research subjects consisted of 10 children of group A and 1 teacher of class of group A. The results of the study showed that the use of loose part media to introduce numeracy skills was integrated into play activities. The numeracy concepts introduced include numbers, patterns, geometry, measurement, and data analysis. Challenges that arise, such as differences in children's abilities and interests, can be overcome through a variety of play activities involving gestures, questions and answers, and providing assistance according to children's needs. Through the use of loose part media, it can provide opportunities for children to understand the concept of numeracy through direct experience with concrete objects in the environment around children. Loose part media can be an effective alternative learning media in introducing numeracy skills in early childhood in a meaningful, contextual and fun way.

Keywords: loose part, numeracy, early childhood

INTRODUCTION

Early Childhood Education plays an important role as an initial foundation in equipping children with various basic skills that will be needed throughout life, including numeracy skills. In simple terms, numeracy can be interpreted as a person's ability to apply an understanding of numbers and mathematical calculations to deal with various situations in daily life (Lobo Sebastianus et al., 2021). Furthermore, numeracy includes the capacity, confidence, and tendency to use mathematics to meet the demands of learning, school, home, work, community, and civic life (Fatimah et al., 2024). Numeracy is not just the ability to recognize numbers or count, numeracy involves understanding mathematical concepts such as the recognition of geometric shapes, measurements, pattern identification, comparison, and the ability to recognize mathematical numbers and symbols.

Introducing numeracy in learning in early childhood education is a strategic step to build children's readiness to learn from an early age optimally, considering the urgency of children's numeracy skills in Indonesia is still an important concern. Results Programme for International Student Assessment (PISA) organized by Organisation for Economic Co-operation and Development (OECD) announced on December 5, 2023, shows that children's mathematical abilities in Indonesia are still relatively low. Of the 81 participating countries, consisting of 37 OECD member countries and 44 partner countries, Indonesia ranked 68th with a score of 366, which is still far from the average OECD score of 500 (Azhar et al., 2023). The limitation of a comprehensive national evaluation for early childhood is one of the factors that children's numeracy ability has not improved and low achievement can affect overall math ability (Fatimah et al., 2024). Seeing this reality, early childhood education plays a vital role as an initial gate in building a foundation of numeracy that will benefit children throughout their life journey.

Given the characteristics of early childhood who are active and enjoy exploration, it is necessary to have a learning approach that meets the needs of children by using learning media that are concrete

and manipulative. One of the media that can be used to introduce numeracy skills in early childhood is loose part. Loose part It is called detachable media with open material properties so that it can be used and changed freely by children in their play activities. Loose part first coined by Simon Nicholson through an article titled "The Theory of Loose parts: How Not to Cheat Children" in 1971. Nicholson views the availability of diverse loose part In a learning environment, it opens up a wide space for children to explore, create, and develop various ideas without being limited by rigid rules (Triyawati et al., 2025). Media loose part It has 7 components, including natural materials (stones, twigs, grains, leaves, pieces of wood, shells, sand), plastics, metals, wood and bamboo, yarn and fabric, glass and ceramics, and packaging containers.

In early childhood education, loose part It is closely related to Jean Piaget's theory of cognitive development which emphasizes the importance of direct experience. Piaget argues that children build their thinking skills through exploration and direct interaction with the environment around them (Triyawati et al., 2025). In addition, Lev Vygotsky's theory of the zone of proximal development (ZPD) also supports this concept, where loose part can serve as a tool that allows the child to develop new skills with the guidance of an adult or peer (Yuliani et al., 2024). Research by (Adawiyah & Priyanti, 2023) found that the use of media loose part contribute to improving children's numeracy skills. Children experience improvements in recognizing numbers, calculating, and understanding basic math concepts. In addition, research by (Maulida et al., 2025) shows the use of media loose part Help children understand the concept of numbers through exploratory experiences. Children are easier to recognize letters and numbers through the activities of arranging, grouping, and counting concrete objects such as buttons, stones, and grains.

Based on the results of initial observations made by researchers at PAUD Al Kautsar located in Purwakarta District, Cilegon City, it was found that PAUD Al Kautsar is one of the loose parts-based PAUD institutions . Media loose part have become part of learning practices in daily learning activities, including introducing numeracy skills. Numeracy learning at PAUD Al Kautsar is carried out on Tuesdays, Wednesdays and Thursdays on a scheduled basis, with numeracy activities that have been carried out in the form of naming numbers, installing objects according to number symbols, sorting simple patterns, recognizing geometric shapes, measuring the weight of an object, grouping objects based on color and size. From the results of the initial observations, the researcher felt the need to conduct a more in-depth study on the use of loose parts media to introduce numeracy skills, especially in group A children at PAUD Al Kautsar Cilegon.

RESEARCH METHODS

The type of research used is qualitative research. This study uses a descriptive qualitative approach. According to Sugiyono (Nurrisa et al., 2025), qualitative research is a research approach used to study phenomena in natural conditions. The descriptive qualitative approach was chosen because descriptive qualitative research is able to explain and answer a problem in detail and as it is according to the facts in the field. This study aims to describe the use of loose part media to introduce numeracy skills to early childhood group A at PAUD Al Kautsar Cilegon Banten, with research subjects of 10 children in group A and class teachers of Group A PAUD Al-Kautsar Cilegon. Data collection techniques used by the author in this study include observation, interviews, documentation, and field notes. Through observation, researchers have the opportunity to understand in depth the social interactions, behaviors, and contexts related to the phenomenon being studied. Interviews are used to gain an in-depth understanding of the experiences, views, and perspectives of individuals related to the phenomenon being studied. The documentation used by the researcher is in the form of photos, videos, and reports of children's activities as well as several recordings directly related to the use of loose parts to introduce numeracy to children in group A. Field notes in this study do not require in-depth knowledge of the literature because field notes are only small notes made by the researcher to support the success of the study. The data obtained were analyzed descriptively to understand the process of using loose part media in introducing numeracy skills to early childhood children in Group A. The results of the analysis were then presented in the form of a narrative that systematically describes the research findings. The data were analyzed using qualitative descriptive analysis techniques with reference to the theory of Miles and Huberman carried out interactively through data reduction, data presentation, and verification (Sugiyono, 2023).

RESULTS AND FINDINGS

Planning the Use of Loose part Media to Introduce Numeracy Skills for Group A Students at Al-Kautsar Cilegon Preschool

Based on research data, the planning for the use of loose-part media at Al-Kautsar Cilegon Banten Preschool is included in the Education Operational Unit Curriculum (KOSP) as part of the institution's long-term goals. During the planning stage, Group A teachers developed Daily Lesson Plans (RPPH) that included numeracy activities by identifying learning outcomes for children aged 4-5 years. Based on these learning outcomes, teachers then designed play activities and used concrete media to facilitate numeracy concepts.

The numeracy activities were designed by integrating various numeracy concepts into the learning topic, namely "Means of Transportation" with the subtopic "Various Types of Transportation." The numeracy activities were systematically structured into a series of lessons, starting with opening activities, core activities, and closing activities. The RPPH, which included numeracy learning using loose-part media, was designed for every Tuesday, Wednesday, and Thursday.

Various types of loose-part media were selected as learning media and adapted to the predetermined numeracy learning objectives. When selecting loose-part media, teachers considered safety, cleanliness, and appeal to children. Loose part media were placed in open containers, such as woven baskets and small bowls, and placed on tables in a display format, with the back larger than the front.

Picture 1. Loose part media event layout

Implementation of the use of loose part media to introduce numeracy skills to Group A at Al-Kautsar Cilegon Early Childhood Education School

The use of loose part media to introduce numeracy skills to Group A was carried out on a scheduled basis, namely on Tuesdays, Wednesdays, and Thursdays. In the initial stages of numeracy learning, teachers routinely provided stimulation by introducing various types of loose part media that would be used during the activities, while also introducing numeracy concepts to be learned, tailored to the learning topic. Teachers introduced various numeracy skills such as numbers and simple addition, patterns, geometric shapes, measurement, and data analysis. Initial stimulation was provided during morning circle through object observation, question-and-answer activities, songs, and short games such as guessing games and linking numeracy concepts to objects and situations familiar to the children's daily lives.

On the first day, numeracy skills in the form of numbers were demonstrated through counting activities using number cards and loose-part media. The media used today consisted of number cards 1-10, a wooden plate, and various types of loose parts such as coral stones, dried pine, mojokeling seeds, and bottle caps placed on a platform. This activity began with the child being asked to choose a number card freely. Next, the child said the number printed on the card, and then the child took the loose part of the media according to the number printed on the card. In this activity, the ability to recognize number symbols and count was seen when the child freely chose one number card from 1-10 and was able to say the number printed on the card correctly. The ability to say the sequence of numbers was seen when the child took the loose parts media one by one and counted sequentially to the required number. Meanwhile, the ability of one to one correspondence was seen when the child matched each object counted sequentially until the number of loose parts taken matched the number symbol on the selected card. During the activity, the child could choose loose parts media according to their wishes.

Picture 2. Children play counting using number cards and loose part media

On the second day, numeracy skills in the form of numbers were also seen when the children did a loose parts hunt activity when the song stopped. The media used was still the same as the first day. In this activity, children were invited to move around the table and listen to the song being played. When the song stopped, the teacher showed a number card and instructed the children to pick up the available loose parts according to the number listed on the number card. In this activity, the first number ability that was seen was one-to-one correspondence, which was seen when the children matched the number of loose parts taken with the number shown by the teacher. The ability to count and state the sequence of numbers was seen when the children were able to count the objects taken and state the number of objects according to the number card. Then the teacher connected the activity to the learning topic, namely transportation, with a trigger question in the form of various types of transportation that have wheels according to the number card. Through this activity, the children were happy and enthusiastic in picking up the loose parts according to the number on the number card.

Picture 3. Children play hunting for loose parts when the song stops

On the third day, numeracy skills in the form of measuring large and small objects and data analysis were seen when children carried out activities grouping large and small objects. The media used were still the same as the previous day, only with the addition of large and small loose parts. In this activity, children observed and compared the size of each loose part, then determined the appropriate size before placing them into large or small groups. Once children could determine the appropriate size, they could group the objects into groups according to their size. After children were able to group objects based on their size correctly, the teacher connected the concept of large and small objects to the theme of transportation. Through the given trigger questions, children were invited to identify various types of vehicles based on their size. Children were able to name examples of large transportation, such as airplanes, and smaller transportation, such as bicycles. Through this activity, children were able to directly recognize large and small objects using concrete media.

Picture 4. Children's grouping large and small objects

On the same day, numeracy skills in geometry were demonstrated during an activity to assemble geometric shapes, which focused on recognizing simple geometric shapes: circles, triangles, squares, and rectangles. This activity was conducted during the core activity, using a wider variety of loose part media, such as bottle caps, wooden twigs, small bamboo, peanut shells, wooden blocks, pine cones, stones, snake fruit seeds, and cardamom seeds. The activity began with the children choosing the geometric shapes they wanted to assemble, then freely arranging them using various loose-part media. After completing the assembly, the children were asked to name the geometric shapes they had created.

In this activity, the ability to recognize geometric shapes was demonstrated when the children observed the pictures provided by the teacher and chose the shapes to be assembled. Meanwhile, the ability to name geometric shapes was demonstrated when the children were able to identify and name the shapes they had successfully assembled. Once the children understood the geometric shapes, the teacher asked prompting questions, linking the geometric shapes to various types of transportation, their parts, and objects in their environment.

Picture 5. Children arranging geometric shapes

On the fourth day, numeracy skills in the form of numbers were seen to be more diverse during the bicycle counting activity. The loose parts used were different from the previous day. On this day, various types of loose parts were available, such as small pine cones, walnuts, rocks, small wooden twigs, and shells. This activity began with children being asked to say two numbers freely. Next, children took loose parts according to the number of each item. After that, children were able to calculate the result of the addition, then determine which number had the greater sum. Through this activity, the ability to recognize number symbols was seen when children chose and said two numbers freely, which were then written by the teacher on both bicycle wheels. The ability to count and say the sequence of numbers was seen when children counted loose parts one by one according to the numbers that had been chosen by saying the numbers in sequence. The ability of one to one correspondence was seen when children matched each object counted with a number until the number of loose parts taken matched the number symbol on each bicycle wheel. Meanwhile, the ability of cardinality was seen when children were able to say the final number of objects that had been counted and showed the result using their fingers. Children also demonstrate simple addition skills by counting the total number of objects in both groups. The ability to compare quantities is also demonstrated when children are asked to observe the two groups of loose parts that have been arranged and then asked to determine which number is greater or less.

Picture 6. Children playing counting on a number bicycle

On the fifth day, numeracy skills in the form of measuring weight and lightness were seen when children participated in loose-part experiments in water. The loose part media used were different, namely stones, shells, peanut shells, leaves, and 3 plastic cups filled with water as experimental media. In this activity, children could freely take loose-part media and identify the objects that had been selected as floating or sinking objects based on the results of observations that had been made. Children were also able to state the results of their observations and provide reasons why objects floated or sank by stating that objects that sink do so because they are heavy, while objects that float do so because they are light. The teacher linked the results of the experiment to the topic of transportation, with children being invited to identify vehicles that have a larger size and load as well as smaller and lighter vehicles based on the children's knowledge. Through loose part experiments in water, children gained direct experience in understanding simple measurement concepts, especially the difference between heavy and light, while also developing the ability to observe and express the results of their observations independently.

Picture 7. Children playing with loose part experiments in water

On the sixth day, numeracy skills in the form of measurement were seen in the activity of selecting long and short objects. This activity was carried out in gross motor activities, with the media used being a cone and 3 plastic rings, as well as loose parts media in the form of long pieces of wood, short wooden twigs, long pinecones, short pinecones, short bamboo, and long bamboo. In this activity, two children were paired, and each was given 3 plastic rings to put into the cone. After that, the teacher instructed the children to pick objects according to the size mentioned. In this activity, children were able to distinguish the size of objects correctly, determine their choices based on the characteristics of length and shortness observed, and pick objects according to the instructions given. The teacher linked the concept of length and shortness to the topic of transportation; children were invited to identify various types of transportation based on their size and were able to name examples of long and short vehicles according to their understanding. This activity was carried out alternately with different variations of instructions so that each child had the opportunity to identify both size concepts.

Picture 8. Children playing selecting long and short objects

Still on the same day, numeracy skills in the form of data analysis were seen when children participated in a scavenger hunt activity grouping loose parts according to color. The media used in this activity were 3 containers, blue, green, and orange origami pieces that had been attached in front of each container on a table, as well as loose part media in the form of blue, green, and orange bottle caps and orange pieces of wood that had been scattered around the class A environment. In this activity, children scattered to look for loose part media by identifying the color of objects, distinguishing one color from another, and grouping objects into appropriate color groups. Through this activity, most children were able to match and group objects based on color correctly and quickly.

Picture 9. Children hunt to group loose parts according to color

On the seventh day, the ability to quantify patterns and measure large and small was demonstrated during the vehicle pattern making activity. In this vehicle pattern making activity, the media used were various types of transportation that formed repeating patterns with AB-AB-AB and AAB-AAB-AAB patterns, as well as various types of loose parts such as dried pine cones, large and small coral stones, mojokeling seeds, gallon bottle caps, and drink bottle caps. The activity began with the teacher distributing different vehicle pattern images to each child, and then the children were introduced to repeating patterns using images of various large and small transportation that could form AB-AB-AB and AAB-AAB-AAB patterns. In this activity, the ability to quantify patterns and measure (large and small) was demonstrated when the children observed and named the order of vehicles according to the available pattern arrangement through large and small measurements. After that, the children quantified patterns using large and small loose parts by adjusting them to the observed vehicle patterns. During

the activity, the children were able to determine the size of large and small loose parts and then were able to quantify repeating patterns properly and correctly.

Picture 10. Children playing by arranging vehicle patterns

On the eighth day, numeracy skills in the form of numbers were again seen when the children were involved in an activity to match the number of objects according to the number. The media used was a sheet of paper containing ten circles, with one circle in the center containing loose parts in the form of red saga seeds, while the other nine circles contained the numbers 2 to 10 and chopsticks that had been attached to red origami pieces to help the children pick and move the red sago seeds to the chosen circles. The activity began with the children choosing a number and taking the loose part according to the chosen number, and then the children were able to name the number inside which had the loose part. In this activity, the ability to name the number symbol was seen when the children were able to correctly name the number according to the chosen number. In addition, one-to-one correspondence skills were seen when the children moved the red saga seeds one by one and matched the number to the chosen number symbol. After the children successfully matched the number of objects with the number symbol and could name the number correctly, the teacher related the number to the children's daily experiences. The children were invited to connect the chosen number with the number of passengers on various means of transportation.

Picture 11. Children play by matching objects according to numbers

On the ninth day, numeracy skills were demonstrated through a different activity, namely counting and comparing objects. This activity was conducted during gross motor skills, with the media used that day being number cards, three hula hoops, and various loose parts such as bottle caps, pieces of wood, wooden blocks, wooden twigs, shells, peanut shells, and pieces of bark. The activity began with the teacher instructing the children to jump over three hula hoops one by one. Next, the children were asked to name the numbers on two number cards, then freely take loose parts according to the number listed on each number card. After that, the children were able to count the number of loose parts that had been taken and determine which number had the greater number. In this activity, the ability to recognise number symbols and count was demonstrated when the children named the numbers on the number cards provided. The ability to state the order of numbers was demonstrated when the children took loose parts while counting objects one by one according to the chosen number. In addition, one-to-one correspondence skills were also demonstrated when the children matched each object counted with the number symbol on the number card. Meanwhile, the ability to compare the number of objects is seen when children observe two groups of objects that have been made, then determine which group has more or less. During the activity, children in group A showed good ability in comparing the number of objects, such as the number 2 is more than the number 1, the number 5 is more than the number 4, the number 8 is more than the number 1, and the number 6 is more than the number 3.

Picture 12. Children play counting and compare the number of objects

During the numeracy activities, from the first to the ninth day, the teacher also provided support to children in Group A. This support was provided when the children were unable to focus on the numeracy activities, meaning they were unable to learn independently and needed teacher assistance. The teacher provided support during counting activities using number cards and loose parts, grouping large and small, counting on a number bike, and scavenger hunts grouping loose parts by color. The support included scaffolding in the form of prompting questions, gradual assistance with simple questions, verbal guidance in the form of directions and instructions during the numeracy activities using loose parts, and motivation to maintain focus and confidence during the activities.

At each closing activity, the teacher conducted a recall session to help the children recall the learning experiences they had during the numeracy play activities using loose parts. The teacher invited the children to discuss the day's activities. This provided an opportunity for the children to recount the process and results of their activities. Most children were able to recount their activities. Even though there are still some children who need direction from the teacher, the children still try to answer questions and participate in discussion activities. Apart from that, teachers also provide reinforcement of the numeracy concepts that have been learned as well as appreciation for children's participation and efforts during learning activities.

Evaluation of the Use of Loose part Media to Introduce Numeracy Skills in Group A at Al-Kautsar Early Childhood Education (PAUD) Cilegon

During the evaluation, teachers conducted assessments by observing and noting the development of each child's numeracy skills throughout the activities, from the initial stimulus to the closing activities. All observations were recorded in a daily assessment log. Following the daily assessment, teachers conducted a learning reflection by reviewing the assessment notes to determine whether the numeracy learning objectives were achieved. This allowed teachers to evaluate whether the activities were aligned with the learning objectives. Furthermore, teachers ensured that the media used captured children's interest and that the instructions were appropriate for their level of understanding. Through this reflection, teachers could note aspects that went well and those that needed improvement, which they could consider when planning subsequent activities.

Follow-up activities were planned based on the children's numeracy skills by reviewing indicators that had been achieved and those that had not. Children who had achieved the learning objectives were given a variety of more challenging activities. Meanwhile, children who still did not understand numeracy concepts were given similar, simplified activities. Through this evaluation, children were able to continue participating in activities according to their abilities and had the opportunity to gradually understand numeracy concepts. The next activities can be adjusted to the needs and development of the children so that all children can continue to participate in learning well and optimally.

Challenges faced in utilizing loose parts media to introduce numeracy skills to group A at Al-Kautsar Cilegon Preschool

Regarding the challenges during the loose parts introduction activities, the group A class teacher employed various strategies to actively engage children in numeracy activities. These included packaging numeracy activities into fun games that were relevant to their daily lives, combining numeracy activities with physical activities, and using a variety of engaging loose parts that were relevant to the children's lives. Furthermore, children were given the opportunity to choose their own loose parts media, which increased their interest and active engagement during the learning process. During the numeracy activities, the teacher used songs and question-and-answer sessions to maintain children's attention throughout. Numeracy activities were also kept brief, tailored to the focus level of

children aged 4-5, and maintained their meaning by interspersing songs, movement, and simple games to prevent boredom. The teacher also prepared the necessary media the day before the numeracy activities began, ensuring minimal learning time.

In addressing the differences in children's interests, it was discovered that some children were reluctant to engage in numeracy activities, particularly during the number bike counting activity. Children preferred free play rather than participating in planned activities. This indicates a variation in children's learning interests. In response, teachers provided individual guidance by providing examples, guidance, and positive support so that children were encouraged to try to participate and complete activities according to their abilities without feeling forced and still gaining learning experiences. The guidance provided included asking children to focus and count the objects they had picked up. The teacher stimulated the children by starting with counting, then asking the children to continue counting and asking the sequence of numbers afterward. The children were able to participate quite well in the activity.

RESULTS AND DISCUSSION

Planning the Use of Loose-Part Media to Introduce Numeracy Skills in Group A at Al-Kautsar Cilegon Early Childhood Education (PAUD)

Based on the results of the research that has been carried out, it is found that PAUD Al-Kautsar Cilegon Banten has carried out a plan for the use of media loose part to introduce numeracy skills in group A by preparing everything, one of which is compiling RPPH. In the preparation of the RPPH, teachers have determined learning objectives and various activities that contain numeracy activities for every Tuesday, Wednesday and us before the implementation of numeracy learning takes place. Teachers can arrange various activities that are packaged in the form of play and in accordance with the learning objectives that have been set. Through planning, numeracy learning activities can take place effectively and provide a meaningful learning experience for group A children. The Learning Implementation Plan not only serves as a guide for learning implementation, but also assists teachers in identifying and anticipating various problems that may occur during learning activities (Rauter & Nazlia, 2023).

Numeracy concepts have been integrated into ongoing learning topics, so that children's learning experiences are not focused on mastering numeracy separately, but are obtained through various play activities that are in accordance with the learning topic. Teachers have designed a variety of numeracy activities that cover various aspects, such as the concept of numbers, patterns, geometry, measurement, and data analysis by considering the developmental stages of children aged 4-5 years, which can be systematically arranged into a whole series of activities, starting from the opening, core, to closing, so that the learning process takes place continuously and in accordance with the needs of children's development. The findings show that teachers need to understand the aspects and stages of early childhood development, understand the principles of learning for early childhood, understand learning strategies, plan learning activities, and choose learning media (Sudarti, 2022). Teachers' understanding of learning planning will support the child's overall learning process.

Media loose part can be planned in play activities that are close to children. The selection of learning media is an important aspect that needs to be considered so that the activities designed are able to attract children's interest and involvement. This reinforces that learning media needs to be a concern in learning planning. Interesting activities will also be less effective if it is through media that does not support children's needs and characteristics, so that children's enthusiasm in participating in learning is reduced (Reza et al., 2022).

How to implement the use of loose part media to introduce group A numeracy skills at PAUD Al-Kautsar Cilegon

Based on the results of the research that has been carried out, it was found that the implementation of the use of loose part media to introduce Group A numeracy skills at PAUD Al Kautsar, Cilegon City, Banten, has gone well and has been adjusted to the development of children aged 4-5 years. In its implementation at PAUD Al Kautsar, Cilegon City, it was seen that group A children already knew the concept of numeracy according to their age stage, which was 4-5 years old.

During the implementation of media utilization loose part to introduce the numeracy skills of group A, various numeracy concepts were found that were seen through play activities. The concepts include

numbers, patterns, geometry, measurement, and data analysis. In the numerical aspect in the form of counting precisely, mentioning the order precisely, one-to-one correspondence through pairing objects according to the name of the number, cardinality through showing the results of calculations with fingers, comparison of more than and less than, counting operations including addition. Other numeracy aspects that can be seen are the pattern aspect, the geometric aspect in the form of simple geometric shapes, the measurement aspect in the form of long-short, large small, heavy and light, to data analysis in the form of grouping colors and sizes. The findings are in line with the scope of numeracy for children aged 4-5 years in the numeracy development pocket book which includes understanding numbers, patterns, geometry, measurement, and data analysis (Hasbi, 2021).

Although not all concepts are introduced, such as the numerical aspect in the form of sorting objects from the least to the most, the geometry aspect in the form of the concept of space (top-bottom, front-back, right-left, outside-inside), and data analysis in the form of comparing equations and differences between groups of objects, but most of the numeracy concepts have been introduced to the sub-group A through the medium loose part as a concrete object, so that the child can be directly involved in exploratory activities, where the child can observe, try, manipulate through direct experience. This is in line with Jean Piaget's theory of cognitive development regarding the importance of direct experience, where children build their thinking skills through active interaction with the environment around them to build their understanding of the world through trial and error (Triyawati et al., 2025). Through exploration and direct interaction with loose part As an open medium that can be composed, moved, and modified, it allows children to actively build their own knowledge, so that children have the opportunity to try, observe, and improve their understanding of the process trial and error.

In the aspect of numbers, it has been seen in the activity of playing counting with number cards and media loose part, playing hunting loose part When the song stops, count the number bikes, place objects according to the number, count activities and compare the number of objects. The activity is in line with the numeracy skills of children aged 4-5 years who focus on understanding number symbols, connecting the concept of numbers with their symbols, and pairing number symbols with a number of objects without requiring children to write them down (Cahyani, 2020). In line with that, Hasbi (2021) mentioned that the ability of simple calculation operations, such as summing, develops gradually according to the child's developmental stage. This can be seen in the number bike counting activity. Through these activities, children not only get to know the relationship between the symbol of numbers and the number of objects, but also begin to build an initial understanding of the concept of addition through concrete experiences obtained directly.

In the aspect of numeracy in the form of patterns, children are introduced through the activity of compiling vehicle patterns using images of various transportation that can form AB-AB-AB and AAB-AAB-AAB patterns. This activity is in line with the concept of pattern recognition in children aged 4-5 years can be done through repeated patterns, such as AB-AB-AB, AAB-AAB-AAB, and ABC-ABC-ABC (Ulfah & Felicia, 2019). Meanwhile, in the geometry aspect, the activities carried out are to arrange geometric shapes using various kinds of loose part such as circle, triangle, square and rectangle. These activities are in line with the development of geometry concepts, which can be started by introducing concrete shapes through play activities and environmental exploration (Sukadariyah et al., 2020).

In the measurement aspect, children learn to understand the concepts of long-short, large-small, and light-weight through the use of real objects available in play activities, namely choosing long and short objects, grouping large and small, and floating sinking experiments loose part in the water. Activities that involve direct experience with children support the development of measurement understanding through meaningful activities and involve the manipulation of various objects (Warmansyah et al., 2023). As for the data analysis aspect, children are trained to group objects based on color, shape, and size, then compare the results of the grouping to find similarities and differences. This activity helps children develop logical thinking skills and becomes the basis for understanding the concept of data analysis at the next stage of development.

According to the theory of multiple intelligences (multiple intelligences) put forward by Howard Gardner, in particular on logical-mathematical intelligence, where Gardner views logical-mathematical intelligence not only manifested in computational activities, but also reflected in the ability to analyze situations, make predictions, and make rational decisions based on available information (Anggraini et

al., 2025). Based on the numeracy activities that have been carried out by group A children, the ability to analyze situations, make predictions, and make simple decisions has begun to appear in some activities, although still at a very simple level according to the child's developmental stage. The activities that can show this ability are during experimental activities loose part In water, the activity of comparing more and fewer objects, the activity of choosing long and short objects, and the activity of compiling vehicle patterns.

During the numeracy activity, the teacher provides assistance to group A children. The form of assistance assistance scaffolding in the form of lighter questions, the provision of gradual assistance with simple questions, the provision of verbal guidance in the form of directions and verbal instructions during numeracy activities using loose part, as well as providing motivation so that children stay focused and confident during activities. This is in accordance with the theory zone of proximal development (ZPD), put forward by Lev Vygotsky, in which the child can achieve higher cognitive abilities when receiving support (scaffolding) of adults in this case teachers (Yuliani et al., 2024). This shows that loose part it not only supports independent learning, but also social learning that involves interaction and cooperation. Through adult assistance, namely teachers, children can try abilities that have not been fully mastered independently, so that the learning process takes place gradually.

How to evaluate the use of loose part media to introduce group A numeracy skills at PAUD Al-Kautsar Cilegon

Based on the results of the research that has been carried out, it was found that the evaluation of the use of loose part media to introduce Group A numeracy skills at PAUD Al Kautsar, Cilegon City, Banten, has gone well. Teachers conduct evaluations through observation activities by observing children's involvement and children's ability to complete various numeracy activities using loose part media. The results of these observations are then recorded in the daily assessment book as a basis for determining the development of each child's numeracy ability.

The assessment carried out includes several aspects of numeracy that arise during learning activities in the form of numbers aspects, namely counting precisely, mentioning the order precisely, one-to-one correspondence, cardinality, comparison of more than and less than, counting operations including addition. In addition, in the pattern aspect, the geometric aspect is in the form of simple geometric shapes, the measurement aspect is in the form of long-short, large small, heavy and light, to data analysis in the form of grouping colors and sizes. Based on the results of the evaluation obtained, the teacher reflects on the learning process that has been carried out. Reflection is carried out by reviewing the daily assessment book. The results of this reflection then become the basis for teachers to plan follow-up activities that are tailored to the needs and development of each child.

The results of the study showed that teachers used the data from daily assessments to reflect on the learning process and plan follow-up in accordance with the child's development. This shows that evaluation plays an important role in supporting decision-making related to the improvement and development of the learning process. Evaluation not only serves to determine children's learning outcomes, but also serves as a reference for teachers in determining the follow-up of children's learning (Winnuly et al., 2024).

What are the challenges faced in the use of loose part media to introduce group A numeracy skills at PAUD Al-Kautsar Cilegon

Based on the results of the research that has been carried out, it is found that the challenges faced in the use of loose part media to introduce numeracy of group A children at PAUD Al Kautsar, Cilegon City, can be well anticipated by teachers through learning activities that are tailored to the characteristics of children. Teachers apply strategies to maintain children's involvement during numeracy activities by packaging numeracy activities in the form of playing, singing, activities involving gestures, guessing, and simple questions and answers that are close to the child's daily experience. This strategy makes children more actively participate during activities and helps maintain children's focus on the given numeracy learning.

Teachers realize that each child has different interests, abilities, and levels of involvement in participating in numeracy activities. Teachers provide opportunities for children to choose the type of loose part they want to use so that children feel more interested and comfortable in participating in learning activities and anticipate differences in children's numeracy skills through providing assistance that is tailored to the needs of each child. Mentoring is carried out through simple directions, giving

examples, triggering questions, and individual assistance when children have difficulties in completing numeracy activities.

Teachers can manage the timing of numeracy activities to keep them effective and fun by adjusting the numeracy development of children 4-5 years old through various activities. This is because early childhood has a relatively short attention span, so activities need to be designed flexibly, actively, and funly, so that children remain involved without feeling depressed or bored (Sudirman, 2021). The numeracy activities that have been carried out have been packaged in play activities. The concept of learning while playing emphasizes that the learning process is inseparable from play activities, considering that the child's world is a world of play (Hasanah, 2018). This explains that playing is a natural way for children to learn, because through play activities, children not only get a fun experience, but also actively explore the environment around them (Maulani et al., 2024). Not only that, through play, the learning atmosphere becomes fun, so that it can stimulate the connection between nerve cells in the child's brain and support the development of knowledge (Suryana, 2021). This shows that learning that is designed in a fun way will be easier for children to accept and remember, so an interactive and fun learning environment is needed for the learning process to take place optimally. The duration of the activity is not too long according to the level of focus of children aged 4-5 years.

CONCLUSION AND SUGGESTIONS

Conclusions

Based on the research results, it can be concluded that the use of loose part media to introduce numeracy skills to a group A child at PAUD Al-Kautsar, Cilegon, Banten, has been carried out through the planning, implementation, and evaluation stages so that it can anticipate the challenges faced well. The introduction of numeracy for group A child has been adjusted to the learning plan and adapted to the developmental characteristics of children aged 4-5 years. Through various meaningful play activities, children gain direct experience in recognising the concept of numeracy, which includes aspects of numbers, patterns, geometry, measurement and data analysis. Through the use of loose part media as a concrete medium close to the child's environment, it helps children understand the concept of numeracy more easily, enjoyably, and in accordance with the principles of learning through play. In addition, evaluations carried out through daily observations and assessments help teachers monitor children's numeracy development and design follow-up actions that are appropriate to each child's needs. Existing challenges can be anticipated by teachers through child-centred learning strategies, in the form of varied play activities, providing freedom to choose media, mentoring according to individual needs, and time management that is adjusted to the child's developmental stage so that numeracy learning takes place effectively and enjoyably. The use of loose-part media can be used by early childhood education schools as an alternative learning medium that is meaningful, flexible, easy to obtain, and environmentally friendly.

Suggestions

The results of this study suggest that early childhood education institutions and teachers can utilize loose part media in designing learning activities. In addition, follow-up research can also examine its application in different age groups and learning contexts so that a deeper understanding of the use of loose part media in early childhood education can be obtained

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