

The Effectiveness of Visual Media on the Understanding of the Concept of the Number of Children Aged 5-6 Years in PAUD Delima

Eneng Hasanah^{a,1,*}, Solihin^{a,2}

^a Universitas PTIQ Jakarta, Jl. Lebak Bulus No.2, Kota Jakarta Selatan 12440, Indonesia

¹enenghasanah_22@mhs.ptiq.ac.id, ²solihin@ptiq.ac.id,

*Corresponding author

INFORMASI ARTIKEL	ABSTRAK
Article History: Received: 06 Mei 2026 Revised: 18 Mei 2026 Accepted: 20 Mei 2026 Published: 29 July 2026 Kata Kunci: Media Visual konsep bilangan numerasi awal anak usia dini penelitian tindakan kelas	Penelitian ini dilatarbelakangi oleh rendahnya pemahaman konsep bilangan pada anak usia 5–6 tahun di PAUD Delima. Anak masih mengalami kesulitan dalam mengenal lambang bilangan, mengurutkan angka, menghubungkan jumlah benda dengan simbol bilangan, serta mencocokkan lambang bilangan dengan benda konkret. Penelitian ini bertujuan untuk meningkatkan pemahaman konsep bilangan anak melalui penggunaan media visual. Penelitian ini menggunakan metode Penelitian Tindakan Kelas (PTK) yang dilaksanakan dalam dua siklus, dengan tahapan perencanaan, pelaksanaan, observasi, dan refleksi. Subjek penelitian adalah anak usia 5–6 tahun di PAUD Delima. Teknik pengumpulan data dilakukan melalui observasi, dokumentasi, dan penilaian perkembangan anak. Data dianalisis secara deskriptif kuantitatif dan kualitatif. Hasil penelitian menunjukkan bahwa penggunaan media visual dapat meningkatkan pemahaman konsep bilangan anak. Pada tahap pra-siklus, tingkat pencapaian anak berada pada angka 40%, kemudian meningkat menjadi 60% pada siklus I, dan kembali meningkat menjadi 80% pada siklus II. Peningkatan ini menunjukkan bahwa media visual efektif digunakan dalam pembelajaran numerasi awal karena mampu membantu anak memahami konsep bilangan secara lebih konkret, menarik, dan sesuai dengan karakteristik belajar anak usia dini. Dengan demikian, penggunaan media visual dapat menjadi salah satu alternatif strategi pembelajaran untuk meningkatkan pemahaman konsep bilangan pada anak usia dini.
Keywords: Visual Media; Number Concepts; Early Numeracy; Early Childhood; Classroom Action Research	ABSTRACT This study was motivated by the low understanding of number concepts among children aged 5–6 years at PAUD Delima. The children still experienced difficulties in recognizing number symbols, arranging numbers in sequence, connecting the quantity of objects with number symbols, and matching number symbols with concrete objects. This study aimed to improve children's understanding of number concepts through the use of visual media. The study employed a Classroom Action Research (CAR) method conducted in two cycles, consisting of planning, implementation, observation, and reflection stages. The research subjects were children aged 5–6 years at PAUD Delima. Data were collected through observation, documentation, and child development assessments. The data were analyzed using descriptive quantitative and qualitative techniques. The results showed that the use of visual media was able to improve children's understanding of number concepts. In the pre-cycle stage, the level of children's achievement was 40%, then increased to 60% in Cycle I, and further increased to 80% in Cycle II. This improvement indicates that visual media is effective in early numeracy learning because it helps children understand number concepts in a more concrete, engaging, and developmentally appropriate way. Therefore, the use of visual media can serve as an alternative learning strategy to improve young children's understanding of number concepts. This is an open access article under the CC-BY-SA license. 

1. Introduction

Early childhood education plays a crucial role in optimizing children's cognitive development during a period of rapid growth. One cognitive aspect that needs to be stimulated from an early age is understanding the concept of numbers. This ability is an important basis for children to recognize number symbols, understand quantities, and prepare themselves for learning mathematics at the next level of education. Understanding number concepts is also closely related to the development of early numeracy, which serves as a foundation for logical thinking, classification, reasoning, and problem-solving skills at the next stage of learning (Rini Novianti Yusuf et al., 2023; Mustofa & Suarjana, 2024; Graven et al., 2024). Therefore, the introduction of number concepts in early childhood is important not only for academic learning but also for supporting the child's overall cognitive development.

The urgency of strengthening numeracy skills from an early age is also supported by various assessment results and educational reports indicating that Indonesian children's numeracy skills still require serious attention. The results of the Programme for International Student Assessment (PISA) show that Indonesian students' mathematical ability remains below the OECD average, underscoring the importance of strengthening the foundation of numeracy from the early education level (Suhayyatman, 2026). In addition, various early childhood learning reports show that many children still have difficulty recognizing number symbols, matching the number of objects to number symbols, and understanding the concept of quantity correctly (Nainggolan et al., 2025; Sholihat, 2025). This condition indicates that early numeracy skills need to be more effectively stimulated through learning strategies aligned with the characteristics of early childhood development. Therefore, the introduction of number concepts in early childhood is important not only for academic learning but also for supporting the child's overall cognitive development.

Indeed, children aged 5-6 years are generally in the preoperational stage of cognitive development, when they begin to use symbols but remain highly dependent on concrete experience to understand abstract concepts. At this stage of development, learning activities should be designed through direct experience, real objects, visual representations, and meaningful play. Number concepts should not be introduced solely through memorization or written exercises, but rather through concrete, visual learning experiences that enable children to associate number symbols with real quantities (Maryam et al., 2025; Bjorklund & Barendregt, 2021; Stiawan & Mustaqimah, 2021). In the context of early childhood education, learning through play is considered highly appropriate because it allows children to actively explore, observe, and build their understanding at their developmental stage (Sofyan Susanto, 2023).

A number of previous studies have shown that the use of learning media aligned with children's developmental characteristics can improve early numeracy skills. Visual media is one of the most widely used media because it helps children understand abstract concepts through a more concrete, interesting, and easy-to-observe form. Several studies have shown that media such as number cards, pictures, and other visual aids can support children in recognizing number symbols, sorting numbers, and associating number symbols with the appropriate number of objects (Mustofa & Suarjana, 2024; Katimah et al., 2022; Juandara et al., 2025).

However, previous studies have generally focused on the partial use of a single type of visual media and have placed greater emphasis on overall number-recognition performance. In addition, some studies have not specifically examined the effectiveness of integrating various forms of visual media for learning number concepts among children aged 5–6 years in real classroom settings. Previous research is also still limited in describing how visual media is used directly to help children connect number symbols to the quantity of objects, in line with the characteristics of the child's preoperational stage. Therefore, there is still a need for research that examines the use of visual media in a more contextual and applicative manner in early childhood learning.

Based on these conditions, this study is novel in its use of various forms of visual media integrated into the learning process of number concepts within the context of real learning at PAUD Delima for children aged 5–6 years. This research not only emphasizes the recognition of number symbols but also the understanding of the relationship between numbers and the quantity of objects through visual and play activities that align with the characteristics of early childhood cognitive development.

Furthermore, based on the results of initial observations conducted at PAUD Delima, Menteng, Central Jakarta, 10 children in Group B were found to still have difficulty recognizing and understanding the concept of numbers. In particular, some children have not been able to match the number symbol with the appropriate number of objects. During the learning process, some children seem hesitant, lack concentration, and still rely heavily on the teacher's directions before responding. This condition indicates that children's understanding of number concepts still needs improvement, especially in connecting number symbols to meaningful quantity representations. These findings also indicate that the ongoing learning process has not fully provided a concrete, interesting, and appropriate learning experience for children's development.

From the initial findings, it is also suspected that the problem is influenced by learning methods that are still not varied and by the limited use of learning media that are both interesting and appropriate to the child's developmental stage. Monotonous learning practices can easily bore children, reduce concentration, and limit their active involvement in classroom learning activities. As a result, children tend to only memorize the sequence of numbers without really understanding the relationship between the number symbol and the actual number of objects. This condition can hinder the development of children's early numeracy skills, particularly in recognizing, sorting, and meaningfully matching numbers (Yuliasti & Vitaloka, 2025; Desniwati et al., 2025). Thus, more contextual learning efforts are needed and in accordance with the characteristics of early childhood learning.

The use of visual media is considered a relevant and promising alternative for improving children's understanding of number concepts in early childhood education. Visual media can help children directly connect number symbols with quantity through number cards, pictures, and concrete objects. In addition to facilitating the understanding of concepts, visual media can also increase children's attention, motivation, and active participation during the learning process (Raudilah, 2021; Katimah et al., 2022; Juandara et al., 2025). For children aged 5–6 years who are still in the concrete stage of thinking, learning experiences that involve seeing, touching, and manipulating real and visual objects are highly beneficial. Therefore, the use of visual media is expected to help children observe, count, and more precisely match number symbols to the number of objects, while supporting the development of children's cognitive engagement and independent thinking skills in learning activities.

Based on this description, this research has an important position in strengthening the practice of early numeracy learning in early childhood education, especially through the use of visual media in classroom learning activities. This research focuses on efforts to improve children's understanding of number concepts among 5–6-year-olds through visual media in the learning context at PAUD Delima. Thus, the purpose of this study is to examine the effectiveness of visual media in improving the number-concept understanding of children aged 5–6 years at PAUD Delima. The results of this study are expected to make a practical contribution to early childhood educators by helping them design learning activities that are more interactive, concrete, and better aligned with children's developmental stages, especially in supporting early numeracy skills.

2. Research Methods

This study uses the Classroom Action Research (PTK) design, based on the Kemmis and McTaggart models, and is carried out in two cycles to improve children's understanding of number concepts through visual media. Classroom Action Research was chosen because it is well-suited to identifying learning problems in the classroom and implementing improvements in a reflective, systematic, and sustainable manner. This PTK model is widely used to improve the quality of learning through a cyclical process that includes planning, action, observation, and reflection (Prihantoro & Hidayat, 2019).

Each cycle in this study lasted two weeks, with two meetings per cycle, for a total of four learning action meetings. Each meeting lasts ± 60 minutes, adjusted to the early childhood learning schedule at PAUD Delima. The learning material in Cycle I focuses on recognizing the symbols for numbers 1–10, matching numbers to the number of objects, and sorting simple numbers using visual media such as illustrated number cards, number posters, and pictures of concrete objects. Learning activities are carried out through play, matching pictures to numbers, counting objects on visual media, and grouping objects according to number symbols.

In Cycle II, learning actions focus on improving children's ability to understand the concept of quantity, compare the number of objects, and recognize the concepts of more and less using more-and-less visual media. The media used include visual number boards, counting picture games, simple animated videos, and groups of object cards. Learning activities are carried out through group games, counting and comparing the numbers of visual objects, compiling sequences of numbers, and visual media-based question-and-answer activities. Observation and reflection are conducted at the end of each cycle to evaluate the development of children's understanding of the concept of numbers and to determine improvements in actions for the next cycle.

Data collection in this study was carried out through observation, documentation, and assessment of child development. Observation is the primary technique for monitoring the learning process and children's engagement with visual media. Observation is considered relevant in early childhood research because the achievement of child development is more accurately observed through direct and continuous observation in the classroom (Farrell et al., 2015).

The research instrument was an observation sheet used to assess understanding of the concept of numbers, compiled from indicators of early numeracy development in children aged 5–6 years. The use of structured observational instruments is important in early childhood education research because it helps systematically document children's developmental learning and enables more consistent data interpretation (Farrell et al., 2015).

The grid of research instruments is compiled based on several indicators of understanding the concept of numbers, namely: (1) the ability to recognize the symbols of numbers 1–10, (2) the ability to name the sequence of numbers, (3) the ability to match the number symbol with the number of objects, (4) the ability to calculate the number of simple objects, and (5) the ability to compare quantities such as more and less. Each indicator is observed during the learning process using visual media in each action cycle.

The child development assessment uses an early childhood development assessment scale with the categories: Not Developed, Starting to Develop, Developing According to Expectations, and Developing Very Well. The scale is used to describe the level of achievement in children's number concept abilities, gradually, according to the characteristics of assessment in early childhood education.

Before being used in the study, the instrument is validated to ensure the suitability of its content, the clarity of its indicators, and its relevance to the research objectives. The instrument was validated

through expert judgement by two validators: early childhood education lecturers on campus and early childhood teachers experienced in early childhood numeracy learning. The validation results showed that the instrument was feasible to use, with some improvements to the indicator's editorial aspects and the clarity of the assessment description.

Data analysis in this study was carried out using qualitative and quantitative descriptive approaches. Quantitative data were analyzed to determine the percentage increase in children's understanding of number concepts in each cycle, while qualitative data were used to describe the learning process, children's involvement, and changes in learning behavior during the use of visual media. Qualitative data analysis was carried out through the stages of data reduction, data presentation, and conclusion drawing, enabling the systematic identification of children's ability development in each research cycle.

Quantitative analysis was carried out by calculating the percentage of child developmental achievement using the formula:

$$P = \frac{f}{N} \times 100\%$$

Description:

P = percentage of child developmental achievement;

f = number of children who achieve developmental indicators; and

N = the total number of research subjects.

The percentage results were then categorized according to early childhood development criteria: Not Yet Developed, Starting to Develop, Developing As Expected, and Developing Very Well. The Not Yet Developed category is given if the child is not able to show the indicators assessed, Beginning to Develop if the child starts to show ability but is not consistent, Developing as Expected if the child has been able to achieve the indicators consistently enough, and Very Well Developed if the child is able to show the indicators independently and consistently without the help of the teacher.

The criteria for the success of the action in this study are met if at least 75% of the children reach the categories of Developing As Expected and Developing Very Well on the indicators of observed understanding of the concept of numbers. The criteria are determined by the early childhood development standards used in learning assessment at PAUD Delima.

To ensure the validity of the data, this study employed triangulation by comparing data from observations, interviews, and documentation. Triangulation is widely used in educational and qualitative research to strengthen the credibility of findings by combining multiple methods and data sources (Carter et al., 2014).

3. Results and Discussion

The results of the study showed an increase in children's understanding of number concepts aged 5–6 years after the implementation of learning activities using visual media. This class action research involved 10 children in Group B at PAUD Delima and was carried out in three stages: pre-cycle, Cycle I, and Cycle II. Observations in this study are focused on four indicators of understanding the concept of numbers, namely: (1) mentioning the number symbols 1–20, (2) sorting the number symbols 1–20, (3) connecting the number of objects with the number symbols, and (4) matching the number symbols with concrete objects.

The use of visual media in this study includes number cards, picture media, and concrete objects, which serve as learning tools to support children's ability to recognize, observe, count, and

understand number symbols more meaningfully. These media are expected to help children learn through visual and concrete experiences that are appropriate to their developmental stage.

Table 1. Indicators of Understanding Number Concepts

No	Assessment Indicators	Description of Understanding
1	Mention the symbols of numbers 1–20	Children can visually recognize and pronounce the numbers 1–20 through number cards, number posters, or pictures of objects labeled with numbers.
2	Sorting the symbols of numbers 1–20	Children can arrange numbers in order from small to large or vice versa with the help of visual media.
3	Relating the sum of objects to the symbol of numbers	Children can count the number of objects and associate them with the corresponding number symbols, for example matching the number 5 with five objects on visual media.
4	Matching number symbols to concrete objects	Children are able to match number symbols with appropriate groups of concrete objects and distinguish the number of objects such as more, fewer, or the same amount through visual observation.

Based on Table 1, the four indicators serve as the main reference for assessing the development of children's understanding of the concept of numbers during the implementation of classroom action research. These indicators are compiled to measure children's abilities over time, from recognizing number symbols and understanding number sequences to connecting numbers to concrete representations of quantities. Thus, the assessment instrument not only assesses the ability to memorize numbers but also the child's understanding of the meaning of numbers through visual and concrete learning experiences appropriate to the stage of early childhood cognitive development. The development of children's achievements at each stage of the research is presented in Table 2 below.

Table 2. Improved Understanding of the Concept of Number of Children (10 Children)

No	Assessment Indicators	Pre-Cycle	Category	Cycle I	Category	Cycle II	Category
1	Mention the symbols of numbers 1–20	4 children (40%)	BD	6 children (60%)	DE	8 children (80%)	VWD
2	Sorting the symbols of numbers 1–20	4 children (40%)	BD	6 children (60%)	DE	8 children (80%)	VWD
3	Relating the sum of objects to the symbol of numbers	4 children (40%)	NYD	6 anak (60%)	BD	8 anak (80%)	DE
4	Matching number symbols to concrete objects	4 children (40%)	NYD	6 children (60%)	BD	8 children (80%)	DE

Description:

NYD (Not Yet Developed): Children have not shown an understanding of the indicators of number concepts.

BD (Beginning to Develop): The child begins to show understanding, but is not consistent.

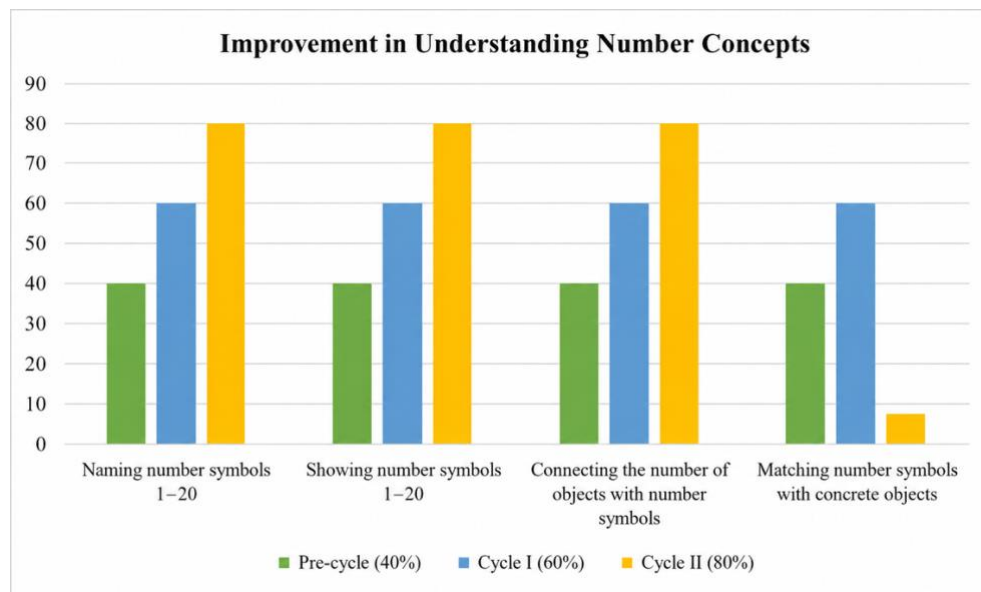
DE (Developing as Expected): Children demonstrate a sufficient, relatively consistent understanding.

VWD (Very Well Developed): The child shows excellent understanding and independence.

Based on Table 2, there is an increase in understanding of the concept of children's numbers across the stages of the research. In the pre-cycle stage, the average achievement of children remains at 40%, with the NYD and BD categories dominating. After the implementation of visual media in Cycle I, the achievement increased to 60% with the BD and DE categories. Furthermore, in Cycle II there was a more significant increase to reach 80% with the dominance of the DE and VWD categories.

The most notable improvement was seen in the indicator of naming and sorting number symbols, where most children began to recognize the order of numbers independently after using more varied and interactive visual media. Meanwhile, the indicator of linking the number of objects to the number symbol and matching the number symbol to concrete objects also increased gradually after the child gained more concrete learning experience through number cards, pictures, and real objects during learning activities.

Graph 1. Improving Understanding of Children's Number Concepts in the Pre-Cycle, Cycle I, and Cycle II Stages



Based on Graph 1, there is a gradual increase in children's understanding of number concepts from the pre-cycle stage through Cycle I and Cycle II. In the pre-cycle stage, the average achievement of children is 40%, then increases to 60% in Cycle I and to 80% in Cycle II. The diagram shows that the use of visual media positively contributes to improving children's understanding of the concept of numbers.

Pre-Cycle

In the initial condition, only 4 out of 10 children (40%) showed early achievement on the observed indicators, and most children were still in the BB and MB categories. At this stage, children still have difficulty correctly recognizing and understanding number symbols. Children are also unable to consistently associate the number symbol with the corresponding number. Some children seem hesitant and still rely on the teacher's help during learning activities. These findings show that

children's initial understanding of number concepts is still relatively low and needs to be improved through more appropriate learning strategies.

Cycle I

After the use of visual media in Cycle I, such as number cards, pictures, and concrete objects, children's understanding of number concepts improved. The number of children who demonstrated achievement on the observed indicators increased to 6 (60%). This increase shows that the use of visual media is starting to help children recognize and understand number symbols more effectively. However, some children still need help, especially in relating the number of objects to the appropriate number symbols and in maintaining consistent responses during learning activities.

Cycle II

In Cycle II, improvements were made based on the results of reflection in Cycle I by presenting learning activities using visual media that were more interesting, varied, and actively involved children. The learning process was made more interactive through the use of colored pictures, number cards, and concrete objects that allow children to directly count, observe, and match objects with number symbols. The results of the study showed a greater increase than in Cycle I. The number of children who understood the concept of numbers increased to 8 (80%), and most had reached the DE and VWD categories. These results show that using more varied and meaningful visual media positively contributes to children's understanding of number concepts.

Discussion

The results of this study show that the use of visual media is effective in improving the understanding of the concept of numbers of children aged 5-6 years in PAUD Delima. This increase can be seen from the gradual increase in children's achievements, namely from pre-cycle (40%), increasing to 60% in Cycle I, and reaching 80% in Cycle II. These findings show that visual media not only function as a learning tool but also as a means of bridging abstract number concepts to more concrete, easier-to-understand concepts for early childhood. For children in the preoperational stage, number symbols are still difficult to understand if presented verbally or through memorization alone. Therefore, the use of visual media such as number cards, pictures, and concrete objects helps children build relationships between number symbols and quantity representations in a more real and meaningful way.

Theoretically, the findings of this study reinforce the constructivist view that places children as active subjects in building their knowledge through direct experience. In the learning process using visual media, children not only receive information from the teacher but also engage in observing, calculating, matching, comparing, and directly manipulating objects. These activities help children build an understanding of number concepts gradually through interaction with their learning environment. These findings are also relevant to Bruner's theory of representation, which explains that children learn through enactive, iconic, and symbolic stages. The use of concrete objects and image media in this study helps children move from concrete experiences to a more systematic understanding of number symbols. Thus, visual media serves as an iconic representation that facilitates the child's transition from concrete thinking to symbolic understanding of numbers.

The contribution of this research to the development of early numeracy learning lies in highlighting the importance of using varied, interactive visual media for learning number concepts in early childhood. This study shows that the success of early numeracy learning is determined not only by the learning material but also by how the concept is presented in line with the characteristics of the child's cognitive development. The practical implications of this study for early childhood education include the need for teachers to design numeracy activities that involve visual experiences, play, and the manipulation of concrete objects, so that children are more active and can more easily

understand early mathematics concepts. Thus, numeracy learning in early childhood education should not only focus on memorizing numbers or completing worksheets, but also be directed toward learning experiences that are contextual, exploratory, and fun for children (Bjorklund & Barendregt, 2021; Stiawan & Mustaqimah, 2021).

At the pre-cycle stage, the understanding of the concept of the number of children is still relatively low. Most children have difficulty naming, recognizing, and matching number symbols to the appropriate number of objects. This condition shows that children have not fully understood the relationship between number symbols and the meaning of quantity. Therefore, early numeracy learning in early childhood is not enough if it focuses only on memorizing numbers; it needs to be directed toward concrete experiences that help children gradually build the meaning of numbers (Bjorklund & Barendregt, 2021; Mustofa & Suarjana, 2024).

Low achievement in the early stages is also related to learning conditions that remain less varied and tend to be teacher-centered. In situations like this, children tend to just follow instructions, memorize a sequence of numbers, or imitate without really understanding the relationship between the numerical symbols and the actual number of objects. These findings show that the monotonous learning process can inhibit children's active involvement, reduce focus, and limit children's opportunities to explore number concepts independently. Thus, children's difficulties in understanding the concept of numbers are not only caused by individual ability but are also influenced by the learning strategies used in the classroom (Sofyan Susanto, 2023; Dewi Indayani, 2021).

The increase in Cycle I was due to children receiving clearer visual stimuli through number cards, number posters, and pictures of concrete objects. At this stage, children seem more interested in participating in learning because the media used provides more interesting visual stimulation than the previous learning method. Children's interaction with media begins to be evident when they match number cards to pictures of objects, count objects, and arrange numbers in sequence with their friends. However, the results of the teacher's reflection in Cycle I showed that some children still had difficulty maintaining concentration and still needed help when associating the number symbol with the appropriate number. Teachers then realized that the use of visual media needed to be more interactive and to involve children more actively, so that the learning process is not only visual but also includes manipulative and exploratory activities. (Katimah et al., 2022; Dewi Indayani, 2021).

Based on the results of these reflections, learning improvements were implemented in Cycle II by presenting more varied visual media, including color images, counting games, concrete objects, and group activities that involved children's active participation. The specific factor that led to the increase in Cycle II was the increase in children's involvement in the learning process through direct counting activities, matching objects, comparing the number of objects, and independently compiling a sequence of numbers using visual media. At this stage, the child appears more confident, actively asks questions, cooperates with friends, and begins to respond more quickly when asked to recognize or match numbers. These changes in learning behavior indicate that interactive visual media can increase children's attention, motivation, and cognitive engagement during learning. (Stiawan & Mustaqimah, 2021; Mustofa & Suarjana, 2024).

The increase observed in Cycle II also shows that the effectiveness of visual media lies not only in its form but also in how it is used in meaningful learning activities and in accordance with the child's developmental stage. When children are given the opportunity to see, touch, manipulate, and explore objects directly, their cognitive processes become more active in building an understanding of the concept of numbers. Repetitive, concrete learning experiences help children develop mental representation skills for the relationship between number symbols and the quantity of objects more profoundly. These findings reinforce the view that early numeracy learning in early childhood will be more effective if it is done through concrete experiences, play activities, and the use of media that

are able to present abstract concepts in a more real and easy-to-understand form for children (Bjorklund & Barendregt, 2021; Mustofa & Suarjana, 2024).

The findings of this study strengthen the view that understanding of number concepts in early childhood does not develop instantly or solely through memorization, but through gradual, consistent, and appropriate learning experiences aligned with the child's developmental stage. Children need the opportunity to observe, calculate, match, compare, and manipulate objects directly in order to build a meaningful understanding of numerical relationships. In this study, visual media serves as an effective bridge between abstract number symbols and children's concrete experiences, making the learning process easier to understand and more interesting for children (Bjorklund & Barendregt, 2021; Stiawan & Mustaqimah, 2021).

In addition, the results of this study confirm the importance of teachers' role in designing and implementing creative and interactive learning activities. The effectiveness of visual media is determined not solely by the media itself but also by how teachers manage the learning environment, guide children, and create opportunities for children to participate actively. Therefore, the success of the improvement observed in this study is also closely related to teachers' role in adjusting learning strategies in each cycle based on the results of previous learning reflections (Dewi Indayani, 2021; Sofyan Susanto, 2023).

Overall, the results of this study show that the use of visual media such as number cards, pictures, and concrete objects can effectively improve the understanding of number concepts in children aged 5–6 years in Group B of the Pomegranate Early Childhood Education. The increase observed in each cycle shows that this strategy is appropriate for supporting early childhood cognitive development and for creating a more interactive, meaningful, and fun learning environment for children. Thus, the use of visual media can be considered one of the relevant learning strategies for strengthening children's early numeracy skills in early childhood education (Katimah et al., 2022; Mustofa & Suarjana, 2024).

4. Conclusion

Based on the results of the classroom action research conducted, it can be concluded that the use of visual media is effective in improving children's understanding of number concepts aged 5–6 years at PAUD Delima. The improvement in children's abilities was observed gradually from the pre-cycle stage, increasing to 40% by Cycle I and reaching 80% by Cycle II. These results show that the use of visual media helps children understand the concept of numbers more concretely and in accordance with the characteristics of early childhood cognitive development.

The indicator that experienced the most significant improvement was the ability to name and sort symbols of the numbers 1–20. Children find it easier to recognize number symbols and arrange a sequence of numbers after learning using visual media such as figurative number cards, number posters, and pictures of concrete objects. In addition, the ability to connect the number of objects with number symbols has also increased because children gain direct learning experience through counting, matching, and observing visual objects during the learning process.

The most dominant form of visual media effectiveness is its ability to attract children's attention, increase active involvement during learning, and help children connect abstract number symbols with real-world quantities. The use of number cards, colored pictures, and concrete objects makes the learning process more interactive and fun, and makes it easier for children to understand number concepts through visual and concrete experiences. Thus, visual media can be a relevant learning strategy for supporting the development of early childhood numeracy, especially in learning number concepts.

Bibliography

- Bjorklund, C., & Barendregt, W. (2021). *Powerful teaching in preschool mathematics: How to support children's learning of numbers and counting*. Early Child Development and Care, 191(4), 543–556.
- Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). *The use of triangulation in qualitative research*. Oncology Nursing Forum, 41(5), 545–547. <https://doi.org/10.1188/14.ONF.545-547>
- Clements, D. H., & Sarama, J. (2016). *Math, science, and technology in the early grades*. The Future of Children, 26(2), 75–94. <https://doi.org/10.1353/foc.2016.0017>
- Dewi Indayani, S. (2021). *Media pembelajaran interaktif pada pendidikan anak usia dini*. Jurnal Pendidikan Tambusai, 5(3), 8821–8828.
- Duncan, G. J., Magnuson, K., & Votruba-Drzal, E. (2017). *Moving beyond correlations in assessing the consequences of poverty*. Annual Review of Psychology, 68, 413–434. <https://doi.org/10.1146/annurev-psych-010416-044224>
- Farrell, A., Kagan, S. L., & Tisdall, E. K. M. (Eds.). (2015). *The SAGE handbook of early childhood research*. SAGE Publications. <https://doi.org/10.4135/9781473920859>
- Gasteiger, H., & Benz, C. (2018). *Enhancing and analyzing kindergarteners' understanding of numbers and operations*. ZDM Mathematics Education, 50, 623–636. <https://doi.org/10.1007/s11858-018-0941-y>
- Katimah, S., Fauziah, N., & Lestari, D. (2022). *Penggunaan media kartu angka untuk meningkatkan kemampuan mengenal bilangan anak usia dini*. Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 6(4), 2981–2991.
- Knaus, M. (2017). *Supporting early mathematical thinking through play-based learning*. Australasian Journal of Early Childhood, 42(3), 95–104. <https://doi.org/10.23965/AJEC.42.3.11>
- McAteer, M. (2013). *Action research in education*. SAGE Publications. <https://doi.org/10.4135/9781473913967>
- Mononen, R., Aunio, P., Koponen, T., & Aro, M. (2014). *A review of early numeracy interventions for children at risk in mathematics*. International Journal of Early Childhood Special Education, 6(1), 25–54.
- Moomaw, S. (2017). *Teaching STEM in the early years: Activities for integrating science, technology, engineering, and mathematics*. Redleaf Press.
- Mustofa, M., & Suarjana, I. M. (2024). *Pengembangan kemampuan numerasi awal melalui pembelajaran bermakna pada anak usia dini*. Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 8(1), 145–157.
- Nainggolan, J. A., Sundari, N., & Mashudi, E. A. (2025). *Penerapan Media Digital Wordwall dalam Mengembangkan Kemampuan Numerasi Anak Usia Dini*. Aulad: Journal on Early Childhood, 8(3), 1645-1660. <https://doi.org/10.31004/aulad.v8i3.1463>
- Pyle, A., DeLuca, C., & Danniels, E. (2017). *A scoping review of research on play-based pedagogies in kindergarten education*. Review of Education, 5(3), 311–351. <https://doi.org/10.1002/rev3.3097>
- Purpura, D. J., & Lonigan, C. J. (2015). *Early numeracy assessment: The development of the preschool early numeracy scales*. Early Education and Development, 26(2), 286–313. <https://doi.org/10.1080/10409289.2015.991084>
- Prihantoro, A., & Hidayat, F. (2019). *Melakukan penelitian tindakan kelas*. Ulumuddin: Jurnal Ilmu-ilmu Keislaman, 9(1), 49–60. <https://doi.org/10.47200/ulumuddin.v9i1.283>
- Sarama, J., & Clements, D. H. (2016). *Physical and virtual manipulatives: What is “concrete”?* Current Directions in Psychological Science, 25(1), 9–13. <https://doi.org/10.1177/0963721415611448>
- Sholihat, N. Z., Sabani, F., Hutami, E. P., & Hasis, P. K. (2025). *Analisis Kesulitan Anak Dalam*

- Mengidentifikasi Simbol Angka Dan Memilih Warna. *Generasi Emas: Jurnal Pendidikan Islam Anak Usia Dini*, 8(1), 54-64. [https://doi.org/10.25299/ge.2025.vol8\(1\).21403](https://doi.org/10.25299/ge.2025.vol8(1).21403)
- Sofyan Susanto, A. (2023). *Bermain sebagai pendekatan pembelajaran bermakna pada pendidikan anak usia dini*. *Jurnal Pendidikan Anak dan Karakter*, 5(1), 15–26.
- Stiawan, D., & Mustaqimah, U. (2021). *Pembelajaran konkret dan simbolik pada pengenalan konsep matematika awal anak usia dini*. *Jurnal Tunas Cendekia*, 4(2), 67–79.
- Suhayyatman, S. (2026). Pengaruh Implementasi Kurikulum PAUD Berorientasi PISA terhadap Minat Belajar Anak Usia Dini. *AS-SABIQUN*, 8(2), 179-188. <https://doi.org/10.36088/assabiqun.v8i2.6071>
- van den Heuvel-Panhuizen, M., & Elia, I. (2015). *The role of picture books in young children's mathematics learning*. *ZDM Mathematics Education*, 47, 251–265. <https://doi.org/10.1007/s11858-015-0673-2>