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The Development of Number Fishing Media to Enhance the Ability to Recognize Number Concepts in Children Aged 5–6 Years

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ABSTRACT

This study was motivated by the low ability of children aged 5–6 years to recognize the concept of numbers 1–10, as well as the limited use of engaging learning media appropriate to children's developmental stages at TK RA Kartini Lamongan. The purpose of this research was to examine the feasibility and effectiveness of the Number Fishing media in improving the ability to recognize number concepts in children. The study employed the Research and Development (R&D) method with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The product developed was Number Fishing media made of flannel fabric, consisting of a fish pond, fish numbered 1–10, magnetic fishing rods, colored dice, and fish containers. Validation was conducted by two material experts and two media experts using a Likert-scale assessment sheet. The validation results indicated that the media was highly feasible, with average scores of 95.83% from material experts and 96.88% from media experts. Effectiveness testing was carried out using

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pretest and posttest analyzed with the Wilcoxon test, yielding an Asymp. Sig. (2-tailed) value of 0.002 < 0.05. These findings demonstrate that the Number Fishing media is feasible, effective, interactive, and aligned with the developmental characteristics of early childhood.

Introduction

Early childhood is an individual in the phase of rapid growth and development. At this stage, children begin to explore the world more widely, starting from their family environment and surroundings (Ulum, 2014; Nisa', 2020; Ratnasari, 2020). In the perspective of education in developed countries, children aged 0–6 years are referred to as early childhood and often called the *Golden Age* (Indrawati, 2017). At this age, children enter the initial stage of intelligence formation, in which cognitive development takes place eight times faster. According to Piaget (Sofyan, 2015), the preoperational stage is a period when children's activities are not only based on external stimuli but also driven by internal motivation, enabling them to imitate the behavior of those around them. At this stage, children are ready to be involved in various activities to understand and master their environment (Iftitah & Dorlina, 2014). Therefore, during the Golden Age, children need more attention from parents and their surroundings in order to receive proper direction and examples in both informal and formal education.

In the educational context, parents play an important role in providing care that must be supported by their families. Parents who

understand child development will strive to monitor their children's growth and ensure that it occurs optimally. To help optimize children's potential, appropriate institutions and professional educators are needed (Ayuni et al., 2022). Educational services for early childhood are diverse and available in various forms suited to children's needs. One of these is Early Childhood Education (PAUD), which is a part of the national education goals regulated in Law No. 2 of 1989 concerning the national education system. PAUD serves as a forum for children to develop intelligence, discipline, habits, and various abilities (Iriyanti & Widayanti, 2023).

In PAUD, there are six basic aspects of development that become the main focus: religious and moral values, cognitive, language, social-emotional, physical-motor, and arts (Gemilang & Ningrum, 2023). Of these aspects, cognitive development is considered most important. Cognitive development is closely related to other aspects of child growth, such as motor skills, language development, social interaction, and independence (Hanisah & Simatupang, 2016). Through cognition, children can think logically and understand various forms of numbers actively to build their own knowledge. Children with good logical thinking skills tend to be more enthusiastic when playing with numbers, enjoy counting activities, and are able to solve mathematical problems that require logical reasoning (Ayuni et al., 2022).

According to Piaget (Aprilianti & Widayati, 2021), during the preoperational stage (ages 2–7), children begin to use symbols to

represent surrounding objects. Cognitive development in children is essential because it influences other developmental aspects. Cognitive development encompasses many areas, including mathematics. In basic mathematics, the ability to recognize number symbols needs to be introduced and stimulated from an early age. Early introduction to number symbols is a key factor in children's success in learning mathematical concepts at later educational levels (Anwar, 2021). There are various ways to introduce numbers to children, such as through counting activities, grouping, matching, and classifying by using fingers, cards, or other media (Iriyanti & Widayanti, 2023). Teachers introduce number concepts according to the child's age level so that when they advance to higher levels of education, they can understand the material that has been taught.

Teachers play a crucial role in introducing number concepts to children by providing appropriate stimulation for their growth and development. Teachers can utilize interesting learning media, which enables children to learn individually, in groups, or classically (Sofiati & Komalasari, 2016). Media functions to convey messages in learning, such as material, with the expectation that children's interest, attention, and participation will increase (Hasiana, 2021). The use of instructional media is highly recommended to improve the quality of learning (Purwanti & Simatupang, 2017). Thus, learning media is essential in supporting the effectiveness of teaching, as learning is essentially a communicative interaction between teachers and children.

Based on observations and preliminary interviews conducted at TK RA Kartini, Meluke Hamlet, Sidomulyo Village, Lamongan Regency, it was found that children's ability to recognize numbers 1–10 was still relatively low. This was shown by the fact that some children could only mention number symbols without truly understanding them. Of the 12 students observed, 8 children were unable to arrange numbers from 1–10 correctly. This condition reflects a common phenomenon in rural schools, where teachers often lack a systematic understanding of the stages of number concept development in children. This finding is consistent with Agustina & Widayati (2015), who noted that teachers often have limited comprehension of number concepts.

To understand number concepts 1–10, children need a solid foundation, including the ability to group or classify objects based on certain characteristics, arrange items from smallest to largest (or vice versa), recognize the concepts of many and few, and count sequentially. Early childhood learning should be adjusted to children's developmental stages to make the learning process more meaningful and enjoyable (Suryantika et al., 2024). Meanwhile, the learning model used at TK RA Kartini is group learning, but in practice tends to rely more on classical learning. This often makes children bored during lessons and passive because the model is teacher-centered. Moreover, the school did not yet have innovative media to improve number recognition. Teachers tended to use practical games with existing educational tools. Based on these issues and the results of initial

observations, the researcher developed Number Fishing media to facilitate learning number concepts. According to Lathifah (2016), number fishing is a creative idea to attract children's interest in counting activities.

This study was therefore conducted to develop Number Fishing media aimed at introducing number concepts to children. Another objective was to provide a reference for educators to use interactive and engaging media in teaching children. The application of this media involves concrete objects, allowing children to learn in a fun way.

Methods

This type of research is Research and Development (R&D). Research and Development (R&D) is a method used to produce specific product designs, test the effectiveness and validity of the designs that have been developed, so that the products become tested and can be utilized by the public (Widayati et al., 2021). The development design in this study employed the ADDIE model (Analyze, Design, Development, Implementation, Evaluation). The research design applied was a Pre-Experimental Design (non-designs) because external variables could influence the process, in the form of a One-Group Pretest–Posttest Design. The reason the researcher chose the One-Group Pretest–Posttest Design was due to limitations in determining the sample and time constraints, which made it impossible to use control variables or conduct random sampling from the population.

The product tested in this research was the Number Fishing media

made of flannel fabric. This media consisted of a fish pond, fish numbered 1–10, magnetic fishing rods, colored dice, and fish containers. All components were designed by considering aspects of safety, appropriateness to the developmental stage of early childhood, and visual appeal so that they could be used in interactive and enjoyable learning. The research sample consisted of 12 children aged 5–6 years at TK RA Kartini Lamongan, who became the subjects of the field trials through pretest and posttest activities. In addition, 7 children from class B1 were involved in the validity and reliability testing of the instrument, which was different from the main experimental group.

Result and Discussions

The development of the Number Fishing media aimed at improving the ability of children aged 5–6 years to recognize number symbols 1–10 was carried out by following the stages in the ADDIE development model (Analyze, Design, Development, Implementation, Evaluation). The following is an explanation of the media development process based on this model:

Analyze

At the analysis stage, the researcher analyzed the basic needs of children and the problems experienced during learning. The problems found were that children's understanding of number concepts 1–10 was still low. Children tended to only memorize number symbols, had difficulty distinguishing between numbers 6 and 9, and were unable to arrange numbers correctly. Interviews with teachers revealed that

limited learning media was one of the main causes. Based on these problems, the researcher was encouraged to develop media that could support the ability to recognize the number concept 1–10 in children aged 5–6 years according to their needs.

Planning (Design)

After the analysis was carried out, the researcher proceeded to the product design stage in the form of Number Fishing media. The media design was adjusted to children's needs, followed by material preparation. The following is the design result of each part of the Number Fishing media:

Fish Pond

Made of blue flannel fabric measuring 50x50 cm. The top was equipped with a drawstring that allowed the pond to be closed and also functioned as a bag. Inside the pond, decorative elements such as grass and small stones made of flannel fabric were added as ornaments.

Figure 1. Fish Pond

Fish

Made of flannel fabric sewn into the shape of a fish and filled with

dacron as stuffing. On each fish, numbers 1 to 10 made of flannel were attached. In addition, a small magnet was placed in the mouth of each fish to serve as a hook when being fished.

Figure 2. Fish

Fishing Rod

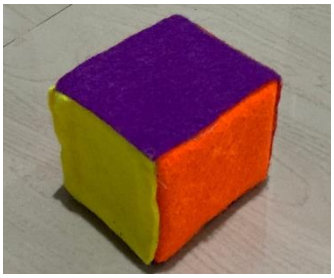
The rod was made of a 30 cm rattan stick wrapped in flannel fabric to ensure safety when used by children. At the end of the rod, a string was tied with a small magnet at the bottom to hook the fish during the fishing activity.

Figure 3. Fishing Rod

Dice

Made of cardboard in the shape of a cube and covered with flannel fabric. Each side of the dice was given a color corresponding to the colors of the fish. The dice served to determine the color of the fish that children should catch.

Figure 4. Dice



Fish Container

Made of rectangular cardboard covered with colored paper. The color of the paper corresponded to the color of the fish, namely red, yellow, orange, and purple.

Figure 5. Fish Container

Development

Development referred to the process of refining the media design into a complete product. The developed product was then validated by material experts and media experts to obtain input regarding its feasibility.

The validation results from material and media experts indicated

that the Number Fishing media had content that was appropriate and beneficial for children aged 5–6 years, thus declared feasible for production without revision. The percentage of assessment from two material experts reached 93.75%, while from two media experts it was 96.88%, both of which stated that the media was suitable for use. In this study, the researcher used a sample of 12 children aged 5–6 years at TK RA Kartini Lamongan.

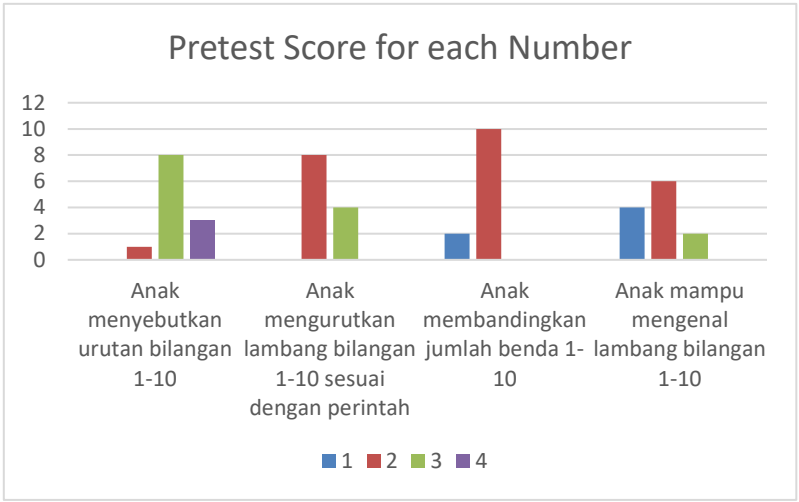
Implementation

The implementation of validity and reliability testing was carried out at TK RA Kartini Lamongan in group B1, which was a different class from the one used during the pretest and posttest activities, with a total of 7 students. Validity testing was calculated using SPSS 29. The results showed that out of 4 items, all obtained r-count > r-table. This indicates that the 4 instrument items were valid and all questions were suitable for use as research measurement tools. Meanwhile, the reliability test results showed that the instrument had a reliability coefficient of 0.844. This value indicates that the instrument is considered reliable and consistent because it is ≥ 0.6. Thus, this instrument could be used for field testing.

Pretest Activity

The pretest results regarding the understanding of number concepts 1–10 at TK RA Kartini Lamongan are shown. The percentage of each indicator is presented in the bar chart below:

Diagram 1. Pretest Scores



Notes:

1 = Not Yet Developed (BB)

2 = Beginning to Develop (MB)

3 = Developing as Expected (BSH)

4 = Developing Very Well (BSB)

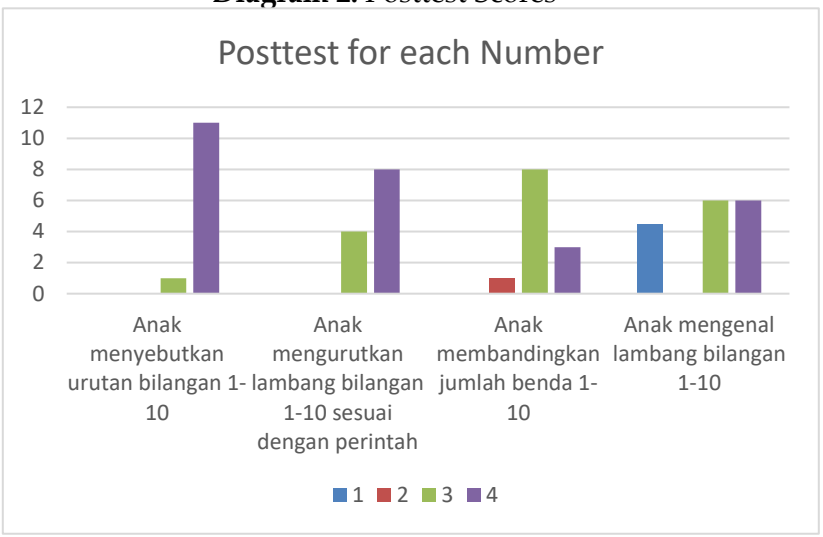
Treatment Activity

The treatment was carried out over 3 days, on May 19, 20, and 21, 2025. Children were very enthusiastic when playing with the Number Fishing media. Even when they first arrived in class, they asked the teacher to immediately play with the media. Children participated in the treatment activities well and followed the teacher's instructions, although some were impatient while waiting for their turn. In addition, the teacher also designed accompanying activities so that children waiting for their turn would remain engaged in positive activities and not disturb the main activity.

Posttest Activity

The posttest results regarding children's ability to recognize number concepts at TK RA Kartini Lamongan are shown. The percentage of achievement for each indicator is presented in the bar chart below:

Diagram 2. Posttest Scores



Notes:

1 = Not Yet Developed (BB)

2 = Beginning to Develop (MB)

3 = Developing as Expected (BSH)

4 = Developing Very Well (BSB)

All pretest and posttest results were then processed using SPSS 29 with the Wilcoxon test. This test aimed to determine the difference in mean values of two paired samples. The statistical analysis results are presented in the following table:

Table 1. Wilcoxon Test Ranks

N	Mean Rank	Sum of Ranks

Negative Ranks	.00	.00
Positive Ranks	6.50	78.00
Ties	–	–
Total	12	–

Table 2. Wilcoxon Test Results

Posttest–Pretest	**Z**	**Asymp. Sig. (2-tailed)**
–	–	0.002

Based on the results of the Wilcoxon test analyzed using SPSS 29, the asymp. sig. (2-tailed) value obtained was 0.002. Because this significance value was smaller than 0.05, H_0 was rejected and H_a was accepted. This indicates that there was a significant difference between the pretest and posttest results, with an increase in scores in the posttest. Thus, it can be concluded that the use of Number Fishing media is effective in improving the ability of children aged 5–6 years to recognize number concepts.

Evaluation

Data collection at each stage of the research was carried out through formative evaluation, while summative evaluation was used to assess the final results.

Discussion

The research results showed that the Number Fishing media was effective in improving the ability of children aged 5–6 years to recognize number concepts 1–10. This was evidenced by the Wilcoxon test results with an Asymp. Sig. (2-tailed) value of 0.002 < 0.05, indicating a

significant difference between the pretest and posttest scores. Thus, the use of Number Fishing media had a positive impact on children's understanding of number concepts.

This finding is consistent with Piaget's theory of cognitive development, which states that children in the preoperational stage (ages 2–7 years) learn through symbols and concrete experiences. The Number Fishing media provided direct experience through play-based learning activities, enabling children to connect number symbols with tangible objects. This supports the view of Iriyanti & Widayanti (2023), who emphasize that number recognition in early childhood is more effective when conducted through concrete and enjoyable approaches.

In addition, the validation by material experts and media experts showed that this media was highly feasible, both in terms of content, visual design, and suitability with the developmental stage of children. These results strengthen the findings of Hasiana (2021) and Purwanti & Simatupang (2017), who argue that innovative learning media can enhance children's interest, attention, and participation in learning activities.

Practically, the Number Fishing media offers an alternative for interactive and enjoyable learning tailored to the characteristics of early childhood development. Children not only learn to recognize number symbols but also practice sequencing, comparing, and understanding quantity relationships concretely. This demonstrates that creative, play-based media can be a solution to the limitations of conventional learning

media, which often make children bored quickly.

Thus, this research emphasizes that the Number Fishing media is not only statistically effective but also theoretically and practically relevant in supporting early childhood cognitive development, particularly in mastering basic number concepts.

Conclusion

The Number Fishing learning media developed in this study was declared feasible based on the validation results from material experts and media experts. This media met the aspects of content suitability with early childhood development, safety of use, visual attractiveness, and alignment with the characteristics of children aged 5–6 years. The design of the media, in the form of fish with numbers and fishing rods equipped with magnets, successfully created a concrete, enjoyable, and meaningful learning experience for children.

The Number Fishing media proved to be effective in enhancing the ability to recognize number concepts in children aged 5–6 years. This was evidenced by the results of the pretest and posttest, which showed improvements in children's ability to mention, arrange, and compare numbers 1–10. Statistical tests using the Wilcoxon test indicated a significant difference between before and after treatment. Thus, this media is capable of optimally stimulating children's cognitive development through enjoyable and meaningful learning.

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