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Number Rinner Games to Improve 5-6 Year-Old Counting Ability

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ABSTRACT

The purpose of this research is to develop educational game tools for improve children's cognitive. The application of APE (Educative Game Tool) was carried out on village children to be exact at Harapan Pertiwi 2 Kindergarten. The researcher used the R&D research method (Research & Development) which aims to determine the application of game tools educative windmill counting in developing the development of cognitive aspects of children. This study used a child subject, namely 4 children between the ages of 4-5 years. Technique data collection using observation, interviews, trials, expert validation, and documentation. Based on the results of the research on the application of the Counting Rabbit Educative Game Tool it is proven feasible to use and able to improve children's cognitive abilities. Children are very enthusiastic in trying the game. The results of the data obtained from the Material Expert found that the total rating score obtained was 63 out of the expected 80, after being converted in the presentation the result was 143.2% in the 'Very Good' category. In the assessment rubric it is known that there is a significant difference in the ability to recognize the concept of numbers in children aged 5-6 years in playing the Counting Rabbit Windmill. In the pre-test activity, an average score of 30 out of 80 was obtained. Meanwhile, in the post-test activity using developed media, an average score of 50 was obtained from the score of 85. The pre-test and post-test activities experienced an increase in the average score of 125.1. So that with the Counting Rabbit Wheel media it can improve children's cognitive abilities.

Keywords: *Cognitive Development, Early Age, Games*

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INTRODUCTION

At this time the stimulation of all aspects of development has an important role for further developmental tasks. Aspects of these developments include moral values, social emotional and cognitive independence, language and physical motoric (Adelantado-Renau, 2019; Afifi, 2020; Childers dkk., 2023). Counting is one part of the aspect of children's numeracy skills, with the reason that children can recognize letters, numbers, or in the form of sentences. In addition, reading can train children's concentration and hone children's language skills (He dkk., 2019). Reading should be introduced to children from an early age in order to help children know the difference between uppercase and lowercase letters (Song dkk., 2020). Does not make children illiterate and also children are more familiar with the various forms of letters that form words or sentences in their surroundings (Vial, 2019). The teacher is an educator who can help develop aspects of a child's language, one of which is the child's reading ability. It is appropriate to provide the right stimulants at every stage of child development and in accordance with the characteristics of early childhood, namely playing while learning and learning while playing.

A learning process can be said to be successful if there is encouragement and motivation given by the teacher to his students (S. Wang dkk., 2019). In addition, professional teachers are teachers who can create an effective and fun learning atmosphere for children. Research conducted by Rita Gusmalasari (2013) examined 'Improving Children's Reading Ability Through Magic Box Games in Aisyiyah Paingan Kindergarten, Padang Pariaman Regency" (Penconek dkk., 2021). This type of research is classroom action research (Caniëls dkk., 2019). The results of the study show that playing the magic box can improve children's reading skills. Subsequent research conducted by Safitri (2014) entitled 'Effectiveness of Crossword Puzzle Games in Improving Children's Reading Ability at Harapan Pertiwi Kindergarten

The similarities that the researchers did with previous researchers were that they both researched children's counting abilities, with the same type of research, namely Quasy Experiment research. Meanwhile, the difference that the researcher did with the previous researcher was different in terms of the media (Pfattheicher dkk., 2022). The previous researcher examined the effectiveness of the crossword puzzle game while the researcher will examine the number wheel media. Based on the initial observations of researchers in the field, children's interest in reading activities is still not visible, such as reading pictures (Peng dkk., 2020). Children find it difficult to read words in pictures, children are less able to connect pictures with words, and children are less able to name the vocabulary in pictures. The lack of teacher creativity in using media in improving children's reading skills so that children are easily bored and feel bored with the activities provided by the teacher (Jiang dkk., 2019). In addition, teachers experience difficulties in teaching/introducing numbers to children. Based on this phenomenon, researchers can describe a problem that has been found in the field (Salminen dkk., 2020). This can be seen from the fact that it is difficult for children to read the numbers in pictures and children are less able to connect pictures with numbers (Hu dkk., 2019).

In addition, the teacher's lack of creativity in using media in improving children's reading skills (Van Doren dkk., 2019). Therefore, the authors are interested in researching children's reading skills through the 'Effectiveness of Number Wheel Media on Children's Reading Ability at Harapan Pertiwi Kindergarten. In this study, children can also think symbolically in differentiating the dissolution between sweet tea and coffee.

LITERATURE REVIEW

Media Wheel Numbers

The APE Number Mill Media Counting Rabbit Wheel was developed based on existing needs in the field, namely regarding media that can help children to be able to improve cognitive abilities in the form of counting or counting. Media is one that cannot be left behind in early childhood learning (F. Wang dkk., 2019). This APE is made from materials that are easy to obtain and can be used easily. The position of the importance of media is in line with research results which state that APE can also be made from used materials.

The steps for making a counting windmill game include;

1. Prepare tools and materials in advance.
2. Cut a rectangular cardboard box.
3. Cut the cardboard into a circle.
4. Then, cut the used cardboard into a circle. And origami paper scissors according to the size of the circle.
5. Paint from the rectangular piece of bord cardboard.
6. After the origami paper is in the shape of a circle, then write a number from 1-10.
7. prepare 10 ice cream sticks for the windmill rods..
8. After all the ingredients have been prepared, the next step is to assemble everything that has been prepared and cut.
9. Frame the cardboard bord with wood glue according to the picture.
10. After assembling it, then assemble it onto the ice cream sticks that are in the small shape.
11. After that, the bamboo that has been assembled with ice cream sticks is placed on top of the styrofoam and flannel cloth, using glue so that it doesn't fall off easily.
12. Then the APE game is ready to be played.

Calculating Ability

According to Piaget in Desimita, cognitive ability can be understood as a child's ability to think more complexly as well as the ability to reason and solve problems. In the development of cognitive abilities, it will make it easier for children to master broader general knowledge, so that children are able to continue their functions naturally in their interactions with society and the environment (Low dkk., 2019). According to Khadijah (Aslan, 2018; Kabashi dkk., 2022), cognitive development is an

ability to learn and think with intelligence that is able to learn new skills and concepts (Khadijah, 2020). Skilled at understanding what is going on around him and skilled at using memory and solving simple problems (Y. Chen dkk., 2019). Meanwhile, according to Naisser in Narussakinah Daulay, cognitive comes from the word cognition which means knowing which means knowing, another meaning of cognition is acquisition, arrangement and knowledge.

Johnson and Rising (1972) in the Integrated Mathematics Learning Book for Early Childhood states that mathematics is a pattern of thinking, a pattern of organizing logical evidence, language that uses carefully defined, clear and accurate terms, representation with symbols and solid, more in the form of symbolic language about ideas or ideas than about sound, knowledge of structure organized properties/theories are made deductively based on defined or undefined elements, axioms, properties/theories that have been proven true, an art whose beauty lies in its order and harmony (Gao dkk., 2021). Meanwhile Ruseffendi (1992) states that mathematics is a deductive science which does not accept generalizations based on observation or observation (inductive) but these generalizations must be based on deductive proofs; mathematics as a language, art and the queen of science, the science of well-organized structures, the science of patterns and relationships.

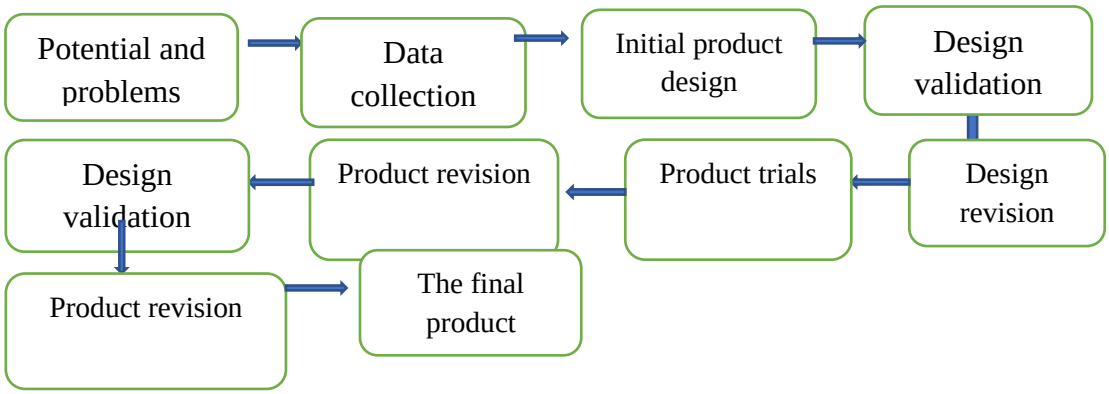
Troubleshooting

Problem solving ability is an action to solve problems or a process that uses the power and benefits of mathematics in solving problems, which is also a method of finding solutions through problem solving stages. It can also be said that problem solving is an attempt to find a way out of a difficulty (Yang dkk., 2019). Problem solving is a very important part of the mathematics curriculum because in the process of learning and solving, it is possible for students to gain experience using the knowledge and skills they already have to apply to problem solving (Hassan dkk., 2021). (Mulyono abdurrahman 2003) Based on this study the concept of numbers is very important to teach to early childhood, for example by playing the number wheel, children are able to recognize numbers 1 to 10 and solidly recognize the various colors in APE (Bai dkk., 2021), not only that children are able to add results that are stated in the game, with that, the level of knowing numbers in early childhood will be easy.

RESEARCH METHODOLOGY

This type of research is research that produces a particular product which refines existing products and there is effectiveness of the product the. (Saputro, Bidiyono; 2011) The main objective of the R&D research method is not only to formulate or test a theory, but to develop effective results that will be utilized in institutions education or something (Zhang & Jin, 2020). In R&D research There are several stages that must be passed to produce a product. After conduct analysis of field problems (Alduhaim dkk., 2020), researchers design products, products validation is carried out by media and material experts, then the product is applied in field. At the time of implementation (Wu dkk., 2020), an analysis of the development of cognitive abilities was carried out child.

Figure 1. Borg & Gall research stages



Potential and Problems

This research and development is motivated by the potential and problems, the potential in research and development is the very rapid development of children's media for early childhood learning, especially the number wheel media. These developments can be implemented in the world of education, so that it becomes its own potential. Based on the results of the interview, one of the teachers at Harapan Pertiwi 2 Kindergarten regarding the learning media used in learning numeracy and how to add calculations (Brand, 2019; I. H. Chen, 2021; Cliff, 2018), must rotate towards which part is intended, so that children feel bored in these learning activities (Hale, 2018; Lacey, 2022). The author also sees that there are still deficiencies in interesting learning media for children so that children's development is not optimal.

Data Collection

In this process, stages are carried out in the form of associating research objectives from the known problem formulation by finding relevant reference sources that will strengthen the research findings carried out. Besides that, the researcher made observations and learning carried out in the intended kindergarten (Jaddoe, 2020; Wen dkk., 2022). This information is very useful for researchers to develop needs and also the right design in overcoming the problem. Especially the concepts that will be prepared by exploring this information so that the media developed is truly beneficial for use in the institution.

Initial Product Design

After collecting data, then planning the initial product of learning media, namely the time tunnel. The steps in the initial media product design are:

1. Planning materials for the development of the Number Wheel
2. Development of designs on time passage media related to shape, structure, color, size.
3. Make the steps in making the Number Wheel
4. Pasting ice cream sticks into the media, and pasting the count numbers into the picture.
5. Make steps in playing Number Wheel

Design validation

At this stage, after the initial product is completed, validation is then given to a team of experts consisting of material experts and media experts as follows:

1. Material experts examine aspects of material studies in the form of material feasibility.
2. Media experts examine the elements of suitability and ease of use of the media

Design Revision

This step is an improvement to the Numerical Wheel media design based on inputs provided by material experts and media experts. This improvement is very possible to do more than one time so that a main number wheel can be obtained which is ready to be tested more widely.

In the field of education, product designs can be directly tested, after validation and revision. Testing is carried out with the aim of obtaining information whether the product is effective and suitable for use. The 10 steps carried out in the Numerical Wheel product trial are: 1). Directing how to play the number wheel to children aged 5-6 years using the number wheel media 2). Children listen, 3). The researcher did a recall to the children about how to turn the number wheel.

The Final Product

This step is a refinement of the Number Wheel media that is being developed. Improvement of the Number Wheel media is very necessary for the accuracy of the media developed based on input or the results of due diligence on a small scale. At this stage a Number Wheel media has been obtained whose level of effectiveness can be justified. The results of the refinement of the final Numerical Wheel media have a reliable generalization value. The research location for the development of the Number Wheel media was carried out in Purwakarta (Adhia, 2019; Allen, 2019), this kindergarten is located in the surrounding environment and can be used as learning media such as boxes, paper, ice cream sticks, which can be created as learning media. The subjects of this study were students with a focus on cognitive development. For data acquisition, researchers only chose one source, namely human data sources consisting of students aged 5-6 years.

The research techniques used are interviews, observation and documentation. The research time is 3 months from May to July 2023.

RESULT AND DISCUSSION

APE Numeracy Rabbit Mill was developed based on existing needs In the field, namely about media that can help children to be able to Improve cognitive abilities in the form of counting or counting. The media becomes One that cannot be left behind in early childhood learning. This APE Made from materials that are easily obtained and can be used easily.The important position of this media is in line with the results of research that states APE can also be made from scrap materials (Jazariyah et al., 2021).

Before the implementation of APE, the products developed were overgrown In the past, validation was carried out by material experts and media experts. ResultExpert

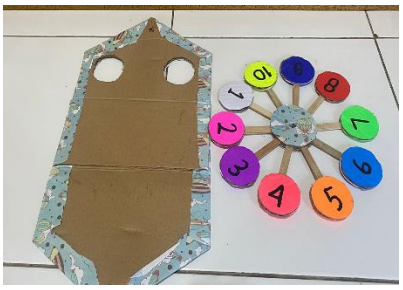
validation of the material shows a percentage of 143.2% which means "excellent". To The results of media expert validation show a percentage of 268.2% which also means "very Ok".

In the application of the APE game Rabbit Mill Counting as in the picture1, APE can improve social, emissional, cognitive and language aspects in children. In the activity when playing APE Kinwheel, the children counted very enthusiastically. In addition to developing these aspects, children can also recognize colors and get to know the numbers in APE. And through this game, the child earns more information so that his knowledge and understanding are richer and more Deep. And also train children to focus or concentrate. Focus and Concentration on helping children in the future. (Sundari, 2021) When this new information It turned out to be different from what he had known so far, so it means that the child gets new knowledge. With play, the cognitive structure of the child becomes more deeper, richer and more perfect. Child Development Achievement Level is the growth and development of children that can be achieved in the range of a certain age. Achievement of optimal child growth and development requires parental and adult involvement and access to ECCE services quality. Children are enthusiastic to do this game, because children rarely Looking at previous games, and the design is made as attractive as possible and the colors as bright and calm as so as to make children interested in play and learn. This game is expected to help children to learn to count, Recognize numbers, recognize colors. Before children apply the game In this case, researchers introduced the puzzle game first. After that the child is asked to practice the game APE Rabbit Mill Counting. Purpose of the researcher Introduce and ask children to play puzzles so that children do not get bored first before starting the core game APE Counting Rabbit Mill while the APE and temapt preparation researchers will be used. After children finish playing puzzles children dimimta to rearrange puzzle games and restore the original stickiness that aims to train the physical motor aspects in children

First, the existing cardboard is made in such a way as to follow a predetermined design pattern. The design pattern is as shown below:

Table 1 Steps for Making Number Mill Products

No	Number Mill Media	Description
1. 2		Media Performances Figures Description

.		Tools and materials provided
3.		Then design a pair of sticks for the number wheel.

Result Pre-test

This study conducted product trials at the age of 5-6 years, using time passage media to see the effect of the product in stimulating interest in time recognition in children, on the first day of 4 people in TK Harapan Pertiwi 2.

Tabel 1. Result Pretest

No	Name	Score
1.	rifandi	16
2.	syafira	13
3.	dhika	16
4.	Siti ana	18
	Jumlah	63

From the pretest results above, it can be calculated with the following percentage:

Maximum score: 4 x 10 x 4 = 44

= 63 : 44 x 100 = 143.2

In table 1. For the average results of the pretest of children aged 5-6 years on indicators of problem solving and symbolic thinking is 143.2% with these results can show that these 4 children are still in the stage of starting to develop in problem-solving and symbolic thinking skills.

Result post -test

This study conducted product trials at the age of 5-6 years, using time passage media to see the effect of products in stimulating interest in time recognition in children, on the second day 4 people at TK Harapan Pertiwi 2.

Tabel 2. Result posttest

No	Name	Score
1	Rifandi	23
2.	syafira	27

3.	dhika	30
4.	Siti ana	38
	Jumlah	118

From the post-test results above, it can be calculated with the following percentage:

Maximum score: 4 x 10 x 4 = 44

= 118 : 44 x 100 = 268,2

In table 2. For the average results of children aged 5-6 years after the second post-test on indicators of problem solving and symbolic thinking was 268.2% with these results can show that the 4 children made a lot of progress very rapidly and showed results developed as expected in problem solving skills and symbolic thinking.

CONCLUSION

Based on the results of the development and assistance of APE implementation The counting rabbit wheel that has been carried out by researchers in one cycle, it can It was concluded that through the Application of Rabbit Mill Educational Game Tools Numeracy in Improving Aspects of Cognitive Development in Children. Some The advantage of this APE is that it can train concentration but still exists The drawback is the lack of robustness of APE which is designed so that it can be an input for the next researcher.

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