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Number Board Media to Stimulate the Symbolic Thinking Ability of Children Aged 5-6 Years

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ABSTRACT

Children will experience a golden period that is very important and should not be missed until they are 3 years old. Because during these times, children's cognitive abilities are still growing and developing rapidly. In fact, about 80% of children's cognitive skills are optimized in the first 3 years of life, and up to 90% of their abilities will continue to develop until they reach the age of 5. Media is a tool that can be used as an intermediary in stimulating all aspects of development in early childhood both aspects of moral and religious values, physical motor aspects, language aspects, social emotional aspects and cognitive aspects. To stimulate all aspects of early childhood development cannot be separated from learning media because for early childhood learning is done through play using learning media both real media, audio media, visual media, environmental media and audio-visual media, so that learning activities in early childhood run effectively. This article will discuss how the influence of number board media in stimulating the symbolic thinking ability of children aged 5-6 years in Sumurugul Village.

Keywords: *Number Board, Symbolic Thinking, 5-6 Years Old*

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INTRODUCTION

According to Trianto, there are several aspects of development that must be developed in every learning process in early childhood education, one of which is the achievement of development in the cognitive field (Vial, 2019). Cognitive development can be stimulated with various innovative learning methods and media (He dkk., 2019). One of them is the number board media.

In accordance with the PAUD curriculum, one of the early childhood competencies to be formed is the ability to count (Song dkk., 2020). For early childhood, this ability is called the ability of beginning counting, which is the ability that every child has to develop their abilities, the characteristics of their development start from the environment closest to them, in line with the development of their abilities the child can increase to the stage of understanding the number, which is related to addition and subtraction (S. Wang dkk., 2019). So as to improve the learning objectives in the PAUD curriculum, play media is needed to help children improve and stimulate learning.

Cognitive development is the process by which individuals can improve their ability to use their knowledge. Meanwhile defines cognitive as a person's thinking ability in connecting and considering a knowledge of an event or event so that the person gains new knowledge (Penconek dkk., 2021). So, it can be concluded that cognitive is the ability to think a person in managing his mind to gain new knowledge that will be useful for his future life.

Aspects of cognitive development include problem solving, logical thinking, and symbolic thinking and counting. However, this scientific article focuses more on aspects of cognitive development to develop the potential of symbolic thinking and counting for children aged 5-6 years (Caniëls dkk., 2019). However, children whose age should have been able to recognize numbers but children have not been able to develop do not know the shape of the number symbol and there are many more cases or problems experienced by early childhood regarding the ability to recognize number symbols. Where the ability to recognize number symbols is one of the most important abilities for children to have and master (Pfattheicher dkk., 2022). Teachers in the learning process still have a position that determines the success of learning, because the main function of teachers is to design, manage, evaluate, and of course continuously develop learning.

Learning media in the teaching and learning process can arouse new desires and interests, arouse motivation and stimulation of learning activities, and even bring psychological influences on students (Peng dkk., 2020). Learning media that media if understood broadly, then the media is a human, material or event that builds a condition or makes students / students able to gain knowledge, skills or attitudes (Jiang dkk., 2019). All forms and channels used to convey messages or information, meaning that by using the media, it is hoped that information can be conveyed well, quickly, and precisely.

One of the media that can be used in children's learning, namely number boards, has the potential to stimulate children's cognitive development. According to (Salminen dkk., 2020), one way that can help the process is to adjust the way early childhood learns. Early childhood learns through things that are real. For example, with the use of media in early childhood learning.

In this case the researcher wants to develop children's potential in terms of counting children (Hu dkk., 2019). Number board media is an effective graphic media to present certain messages made from used cardboard and is also easy to find, how to

play it is easy so that it can be used many times (Van Doren dkk., 2019). In addition to pictures, in the early grades of elementary school and kindergarten, this number board made of cardboard is also used to paste letters and numbers. Because the presentation is instantaneous (F. Wang dkk., 2019), in addition to attracting students' attention, the use of this number board can make the presentation more efficient.

LITERATURE REVIEW

Symbolic Thinking

One of the six aspects of early childhood development that is no less important to achieve is cognitive development, where cognitive development is directly related to thinking activities and how thinking activities work. Cognitive role has an important role for children's learning success, because learning success is directly related to remembering and thinking (Low dkk., 2019). The tap in children's cognitive development that children must achieve is one of them is symbolic thinking (Ani Bodedarsyah, 2019).

According to Piaget, cognitive development is divided into 4 stages, namely sensory motoric (age birth-2 years), pre-operational (age 2-7 years), concrete operational (age 7-11 years), and formal operational (age 7-11 years). At the end of the motor sensor stage, children can already produce complex motor sensory patterns and use primitive symbols (Santrock, 2008. Page 245). Piaget in his theory states that in the pre-operational stage (ages 2-7 years), children have begun to present their world with words, images, and pictures. At this stage the child will develop the ability to draw an object that does not exist (Santrock, 2008. p.251).In the ministerial regulation no 137 of 2014 concerning the standard level of developmental achievement of cognitive aspects in symbolic thinking that must be achieved in children aged 4-5 years are: counting the number of objects 1-10, recognizing number symbols 1-10, recognizing number concepts and recognizing letter symbols.

Symbolic ability is one of the aspects included in cognitive development which is a very important aspect that must be achieved by children. According to Piaget, symbolic thinking ability is the ability to think about objects and events, even though these objects and events are not physically present in front of the child (Gao dkk., 2021). Children's symbolic thinking ability occurs in the age range of 2-7 years, this period is referred to as the pre-operational stage (Santrock, 2008.Page 252) (Chen dkk., 2019). Indicators of cognitive development in symbolic thinking of children aged 4-5 years based on the standard level of achievement of early childhood development are: counting the number of objects 1-10, recognizing number symbols 1-10, recognizing number concepts and recognizing letter symbols.

While the indicators of cognitive development in improving the ability to think symbolically of children aged 5-6 years taken in this study are (Bai dkk., 2021), counting the number of objects 1-10, recognizing the symbols of numbers 1-10, and recognizing the concept of numbers to improve the ability to think symbolically of early childhood which of course cannot be separated from the role of educators in stimulating

which of course with stimulation that is fun for children. therefore in every learning activity the role of media is very important to convey material to early childhood.

Learning media is a term used to indicate educational efforts carried out deliberately with goals set in advance before the process is carried out, and whose implementation is controlled (Bai dkk., 2021). Learning is a process of communication and interaction as a form of educational effort by conditioning the learning process in students. Learning media is anything that can be used to channel messages from sender to receiver, so that it can stimulate students' thoughts, feelings, attention, and interests, and thus the learning process occurs. Learning media is anything that is used to channel messages, and can stimulate the thoughts, feelings, attention, and willingness of the learner so that it can encourage a deliberate, purposeful, and controlled learning process.

Number Board Media

Number board media is a learning media compiling number cards or numbers (Huseien & Shah, 2020). The number board media is a game that is thrown with a dice and counts the number of points on the number block that is adjusted to the point of the dice (Hassan dkk., 2021). The dice game is one of the games favored by children, the media is a type of visual media that can only be seen and enjoyed by the sense of sight. According to Sucahyo, smart board media is a learning medium in the form of pieces of images that are arranged to form a complete picture (Yang dkk., 2019). Smart board media in this smart board game is formed by playing with upright pieces of blocks then arranged or arranged on a number smart board so that it forms a flat shape that is easy to understand and this stage is a cognitive stage.

Number board media is a learning media that can be made by the teacher in the form of a board made of cardboard equipped with a box containing pieces of number picture cards (Huseien & Shah, 2020), the contents of which are adjusted to the learning theme and the objectives to be achieved in learning.

Product framework

Number board media is a learning media that can be made by the teacher himself in the form of a board made of cardboard equipped with a box containing pieces of number picture cards (Cappa dkk., 2021), the contents of which are adjusted to the learning theme and the objectives to be achieved in learning.

Materials: cardboard, pieces of blocks, base board, paper.

Tools: scissors, cutters, glue, color paint, ruler, board maker markers.

Manufacturing steps:

1. Make a media base from cardboard with a size of ± 10x5 cm, then tidy it up.
2. Divide the cardboard media base into 2 equal parts, then paint with different red color pieces of blocks, color for writing and give numbers and dots like dice.
3. In the center of the teacher installs a box to place the box, and next to the edge is installed a barrier that is made in such a way that it can be used to put the number dice box
4. Make a picture box like a dice with numbers from 1-10 with a size of 10X5 cm as many as 20 pieces.

Steps to use:

Number board media can be played for 2 or 4 people and has a gradual level of difficulty, starting from the simplest to the more difficult or more complex level (Wu dkk., 2020). This aims to make it easier for children to practice recognizing numbers and colors. The steps for using it are as follows:

1. The child takes the card that has been prepared in the center box, and reads the word under the picture.
2. The child throws the dice at random
3. The child looks for the number card in the box available according to the number listed on the dice that is thrown randomly.
4. When the dice points to a certain number, the child sticks it to the place that is available in front of him, then the child is considered correct in answering or guessing the number on the dice.
5. The child writes the number on the card using the board maker provided.
6. Children who correctly answer or guess the score are given a star (aplause / reward).

RESEARCH METHODOLOGY

development). Sugiyono Sulistyo (2019) explains that research and development (R&D) is a research method used to produce certain product designs, test the effectiveness, validity of designs that have been made so that the product becomes tested and can be utilized by the public. Producing certain products is used for research that is needs analysis and effectiveness testing is carried out so that the product can be used by the community (Arora dkk., 2019). According to Sukmadinata, R&D are steps to develop and improve an existing product, and can be accounted for (Putra, 2018). This research uses the ADDIE model which only runs up to the Development stage. According to Supart and Susanti (2017), the ADDIE model is one of the standard stages in the media model development process starting with analysis, design, development until a prototype model is ready to be implemented to get feedback through the evaluation stage.

The stages in this research are:

1. Analysis stage
2. Design stage
3. Development
4. Implementation
5. Evaluation

The explanation of each stage above is as follows:

Analysis Stage (analyze)

At the analysis stage, researchers conducted observation activities on children aged 5-6 years or child A (Zhang & Jin, 2020). Researchers found problems that were happening, namely children having difficulty in understanding numbers 1-10.

Stage of Design

After analyzing the development of children, the next stage is to design the product. The product chosen by the researcher is the number board media. Researchers create a media design concept that is tailored to the design concept that children like children.

Development

Development here can be interpreted as the development of media design towards the media as a whole or product. After becoming a product, the product will be validated by material experts and media experts.

Implementation

Evaluation.

The population in the study were parents of children aged 5-6 years in sumurugul village. In this study, researchers used a sample of two children who took turns playing the game.

play the game.

RESULT AND DISCUSSION

Making number board media begins with providing materials and tools that are in accordance with product objectives. The purpose of this media making product is to stimulate the counting ability of children aged 5-6 years. The materials and tools used include:

1. Cardboard, can use used cardboard
2. Glue
3. Markers
4. Ruler
5. Solation
6. Scissors
7. Origami paper
8. Etc.

In its manufacture, the cardboard is first cut according to the predetermined size, then attached using glue and solation according to the picture below:

Actually, there are many kinds of learning media used at school, usually children only use magazines, packet books, and also APE that has been provided at school for children's learning activities, so that children are not bored, we as educators must be

smart to manage the class so that children are not bored with learning that is just that, for this board media is intended to support children's learning, once the teacher brings this number board media to the children, it turns out that this board is very liked by children because it can be used many times by children, this media is also very useful for developing counting skills in children, children can also count by adding up mentioning the concept of many and few.

Pre-test Results

This study conducted a product trial at the age of 5-6 years, using the number board media to see the effect of the product in stimulating interest in time recognition in children, on the first day 4 people in Sumurugul Village.

Table 1. Pretest Results

No	Name	Value
1.	R J	14
2.	Z K	10
3.	A l	12
4.	A N	16
	Total	52

From the pretest results above, the percentage can be calculated as follows:

Maximum score = 4 x 10 x 4 = 160

= 52 : 160 x 100 = 32,5

In table 1. For the average results of the pretest of children aged 5-6 years regarding symbolic thinking indicators is 32.5% with these results can show that these 4 children are still in the stage of starting to develop in symbolic thinking skills.

Post-test results

This study conducted a product trial at the age of 5-6 years, using the time passage media to see the effect of the product in stimulating interest in time recognition in children, on the second day 4 people at RA Ibnu Zain.

Thick 2. Posttest results

No	Name	Value
1	R J	22
2.	Z K	28
3.	A L	32
4.	A N	36
	Total	118

From the post-test results above, the percentage can be calculated as follows:

Maximum score: 4 x 10 x 4 = 160

= 118 : 160 x 100 = 73,75%

In table 2. For the average results of children aged 5-6 years after the second post-test trial regarding symbolic thinking indicators is 73.75% with these results can show that the 4th child has made a lot of progress very rapidly and shows the results of developing as expected in the ability to think symbolically.

CONCLUSION

Cognitive development is the process by which individuals can improve their ability to use their knowledge. Cognitive development can be stimulated with various innovative learning methods and media, one of which is the number board media.

Learning media in the teaching and learning process can arouse new desires and interests, arouse motivation and stimulation of learning activities, and even bring psychological influences on students. Media in learning is very necessary and has a significant role to support the success of learning. Apart from being an intermediary for conveying messages, the media also has many benefits in an effort to achieve learning goals.

The need for counting games in kindergarten includes; the level of mental development of children, the sensitive period of counting in children, Early development determines the development of further children.

In the implementation of the number board media in children aged 5-6 years in Sumurugul Village, 2 product trials were conducted with the first trial score of 32.5% with the following results the child has not developed, after the second trial with a score of 73.75% this shows that children develop as expected in learning, and it is proven that the number board media is effective in stimulating children's symbolic thinking process. By using the number board media, children can easily and quickly perform calculations.

REFERENCES

Albrecht, E., & Chin, K. J. (2020). Advances in regional anaesthesia and acute pain management: A narrative review. *Anaesthesia*, *75*(S1). https://doi.org/10.1111/anae.14868

Arora, S., Singh, H., Sharma, M., Sharma, S., & Anand, P. (2019). A New Hybrid Algorithm Based on Grey Wolf Optimization and Crow Search Algorithm for Unconstrained Function Optimization and Feature Selection. *IEEE Access*, *7*, 26343–26361. https://doi.org/10.1109/ACCESS.2019.2897325

Bai, B., Guo, Z., Zhou, C., Zhang, W., & Zhang, J. (2021). Application of adaptive reliability importance sampling-based extended domain PSO on single mode failure in reliability engineering. *Information Sciences*, *546*, 42–59. https://doi.org/10.1016/j.ins.2020.07.069

Caniëls, M. C. J., Chiocchio, F., & Van Loon, N. P. A. A. (2019). Collaboration in project teams: The role of mastery and performance climates. *International Journal of Project Management*, *37*(1), 1–13. https://doi.org/10.1016/j.ijproman.2018.09.006

Chen, Y., Zhong, H., Wang, J., Wan, X., Li, Y., Pan, W., Li, N., & Tang, B. (2019). Catalase-like metal–organic framework nanoparticles to enhance radiotherapy in hypoxic cancer and prevent cancer recurrence. *Chemical Science*, *10*(22), 5773–5778. https://doi.org/10.1039/C9SC00747D

Gao, Z., Dang, W., Wang, X., Hong, X., Hou, L., Ma, K., & Perc, M. (2021). Complex networks and deep learning for EEG signal analysis. *Cognitive Neurodynamics*, *15*(3), 369–388. https://doi.org/10.1007/s11571-020-09626-1

Golden, T. D., & Gajendran, R. S. (2019). Unpacking the Role of a Telecommuter's Job in Their Performance: Examining Job Complexity, Problem Solving,

Interdependence, and Social Support. *Journal of Business and Psychology*, *34*(1), 55–69. https://doi.org/10.1007/s10869-018-9530-4

Hassan, M. H., Houssein, E. H., Mahdy, M. A., & Kamel, S. (2021). An improved Manta ray foraging optimizer for cost-effective emission dispatch problems. *Engineering Applications of Artificial Intelligence*, *100*, 104155. https://doi.org/10.1016/j.engappai.2021.104155

He, J., Baxter, S. L., Xu, J., Xu, J., Zhou, X., & Zhang, K. (2019). The practical implementation of artificial intelligence technologies in medicine. *Nature Medicine*, *25*(1), 30–36. https://doi.org/10.1038/s41591-018-0307-0

Hu, L., He, S., Han, Z., Xiao, H., Su, S., Weng, M., & Cai, Z. (2019). Monitoring housing rental prices based on social media:An integrated approach of machine-learning algorithms and hedonic modeling to inform equitable housing policies. *Land Use Policy*, *82*, 657–673. https://doi.org/10.1016/j.landusepol.2018.12.030

Low, E. S., Ong, P., & Cheah, K. C. (2019). Solving the optimal path planning of a mobile robot using improved Q-learning. *Robotics and Autonomous Systems*, *115*, 143–161. https://doi.org/10.1016/j.robot.2019.02.013

Penconek, T., Tate, K., Bernardes, A., Lee, S., Micaroni, S. P. M., Balsanelli, A. P., De Moura, A. A., & Cummings, G. G. (2021). Determinants of nurse manager job satisfaction: A systematic review. *International Journal of Nursing Studies*, *118*, 103906. l

Peng, H., Wang, H., Du, B., Bhuiyan, M. Z. A., Ma, H., Liu, J., Wang, L., Yang, Z., Du, L., Wang, S., & Yu, P. S. (2020). Spatial temporal incidence dynamic graph neural networks for traffic flow forecasting. *Information Sciences*, *521*, 277–290. https://doi.org/10.1016/j.ins.2020.01.043

Pfattheicher, S., Nielsen, Y. A., & Thielmann, I. (2022). Prosocial behavior and altruism: A review of concepts and definitions. *Current Opinion in Psychology*, *44*, 124–129. https://doi.org/10.1016/j.copsyc.2021.08.021

Song, J., She, J., Chen, D., & Pan, F. (2020). Latest research advances on magnesium and magnesium alloys worldwide. *Journal of Magnesium and Alloys*, *8*(1), 1–41. https://doi.org/10.1016/j.jma.2020.02.003

Van Doren, J., Arns, M., Heinrich, H., Vollebregt, M. A., Strehl, U., & K. Loo, S. (2019). Sustained effects of neurofeedback in ADHD: A systematic review and meta-analysis. *European Child & Adolescent Psychiatry*, *28*(3), 293–305. https://doi.org/10.1007/s00787-018-1121-4

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, *28*(2), 118–144. https://doi.org/10.1016/j.jsis.2019.01.003

Wang, F., Wang, H., Wang, H., Li, G., & Situ, G. (2019). Learning from simulation: An end-to-end deep-learning approach for computational ghost imaging. *Optics Express*, *27*(18), 25560. https://doi.org/10.1364/OE.27.025560

Wang, S., Chen, X., & Szolnoki, A. (2019). Exploring optimal institutional incentives for public cooperation. *Communications in Nonlinear Science and Numerical Simulation*, *79*, 104914. https://doi.org/10.1016/j.cnsns.2019.104914

Yang, Z., Yu, W., Liang, P., Guo, H., Xia, L., Zhang, F., Ma, Y., & Ma, J. (2019). Deep transfer learning for military object recognition under small training set condition. *Neural Computing and Applications*, *31*(10), 6469–6478. https://doi.org/10.1007/s00521-018-3468-3

Zhang, Y., & Jin, Z. (2020). Group teaching optimization algorithm: A novel metaheuristic method for solving global optimization problems. *Expert Systems with Applications*, *148*, 113246. https://doi.org/10.1016/j.eswa.2020.113246