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The Influence of Measurement Game Tools on Problem Solving Ability in Children Ages (3-4) Years

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ABSTRACT

This study aims to see the effect of measurement game tools on early childhood problem-solving abilities. The method used in this study is pre-experimental design with the design of the one-shot case study. This study was conducted on children aged (3-4) years at Rumah Belajar Ceria Palembang with a sample of 12 children. The sampling technique uses purposive sampling technique. Data collection techniques are carried out with observation techniques to see children's problem-solving abilities. The data analysis used in this study used inferential statistics. The normality test is performed using the Shapiro Wilk Test and the homogeneity test is performed using the Hartley Test. Hypothesis testing shows that the results of the One Sample T-test have a significant value of 0.357. According to the criterion if a significant value > 0.05 means that Ho is rejected and Ha is accepted. Thus, it can be concluded that the Measurement Game Tool can have an influence on the problem-solving ability of children aged (3-4) years at Rumah Belajar Ceria Palembang. This research can provide input to social institutions engaged in education to pay more attention to facilities that can help optimize the learning process, so that children do not experience delays in reaching the stage of developmental achievement according to their age.

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1. INTRODUCTION

Bruder (2019) said NAEYC (National Association for Education of Young Children) states that early childhood or "early childhood" is a child aged 0-8 years. This age is a process of growth and development of children in various aspects of life because children are in their golden age, so it is essential to stimulate all aspects of their development to the fullest. Suryani and Seto (2020) said that generally, children are aware of the existence of an object that must exist or typically exist as well as develop delayed imitation when he sees the behavior of others, such as when people respond to goods, circumstances, and events that were encountered in the past. To understand something, children need abilities that they must learn, namely cognitive abilities. As stated Dhiu (2021) is the ability to grasp the nature, meaning, or description of something and have a clear picture. Aspects of cognitive development have an essential role in children's learning success (Hyun et al., 2020).

Therefore, most activities in learning refer to thinking abilities, especially problem-solving abilities. Problem-solving abilities in early-aged children Oktaviany et al., (2021) involve thinking about effective problem-solving and solving them by determining evidence from their already existing information. In human life, the early age period plays a pivotal role in brain growth, intelligence, personality development, memory formation, and various other aspects. As highlighted by Mifroh (2020) this phase holds immense significance. Any hindrances or stunted growth experienced during this critical period can impede overall development. It underscores the importance of providing optimal support and nurturing during this stage to ensure the best possible outcomes for individuals' cognitive and holistic development.

However, based on initial observations made at the Rumah Belajar Ceria Palembang, there are problems with the problem-solving abilities of children aged (3-4) years. It could say it is a problem because, in general, children aged (3-4) years, according to the Regulation of the Minister of Education and Culture of Indonesia Number 137 of 2014 concerning National Standards for Early Childhood Education, especially in problem-solving abilities, can already mention the various uses of several objects and can already understand the difference between the two types of the same. This problem is characterized by children who are still trying to understand the difference between two things of the same type, such as differences between animals and animals, plants and plants that are around children and still need clarification about mentioning the various uses of objects.

To understand how cognitive development works, we need a supporting theory that can explain this cognitive development significantly. According to Agung (2019), cognitive ability refers to an individual's capacity to adapt to and interpret the objects and events that surround them. It encompasses various cognitive processes, such as how individuals group objects to identify their similarities and differences, comprehend the causes of changes in objects and events, and formulate predictions about them. Cognitive ability plays a crucial role in shaping our understanding of the world and enables us to make sense of complex information. It involves processes like perception, attention, memory, problem-solving, and reasoning. By studying cognitive abilities, researchers gain insights into how the human mind functions and how individuals acquire knowledge and make sense of their experiences. Understanding cognitive abilities contributes to fields such as psychology, education, and neuroscience, as it helps in designing effective learning strategies, diagnosing cognitive disorders, and improving overall cognitive performance. In addition, Suci (2018) pointed out that children's cognitive development is influenced by the environment around them, such as social and cultural; individuals are more active in constructing their knowledge through interaction with their local environment. Saputra and Suryandi (2021) pointed out that children construct their knowledge in a social context and actively optimize it independently by interacting with caregivers, family or community, and society. Internal cognitive development. Hoque (2016) is a stage of change that occurs in human growth to understand, process information, solve problems and know something. Bloom's taxonomy, Listiani and Rachmawati (2022) is a thought that forms concepts at a higher level, such as analyzing and evaluating processes, procedures, and principles, not just remembering facts/memorization.

In this study, children were asked to reach the thinking stage C2 of Bloom's Taxonomy, namely understanding. According to Magdalena et al., (2020) understanding is an attempt to build a separate meaning from various information such as communication, reading, etc. Examples of verbs used in understanding are distinguishing, mentioning, and explaining. Distinguishing things of the same type, then mentioning the various uses of the objects found in the measurement game tool and explaining again the understanding they have gained from today's playing activities.

In addition to cognitive development, an essential aspect of children's development, Playing is no less important because the child's world is playing. Cognitive development can be a stimulus with games Sukmono et al., (2022) stated that games are one of the principles in early childhood education; through games, children can develop aspects of their development, namely moral and religious, cognitive, language, physical motor, socialemotional and art. This aligns with the principles of playing in Susanto (2021) Children's growth can be stimulated by playing activities, starting from babies and toddlers up to kindergarten age. Playing can channel the excess energy that is in the child's body. According to Dwiredy and Qalbi (2021) Playing can simultaneously make children learn or practice in a cheerful atmosphere to improve their physical and psychological functions. One of the play activities that can be applied is to provide educational game tools.

Sato (2018) define APE as a tool designed to improve aspects of early childhood development. APE has several benefits in the cognitive field, as written by Muttaqin (2018) Namely, children can actively learn, develop imaginative abilities, and reconstruct the knowledge and experiences they find in their play activities, then explore as many ideas as possible, which are formed into systematic knowledge, and integrate them into their lives. Because in article 25, paragraph 2, Government Regulation of the Republic of Indonesia No. 57 of 2021 concerning National Education Standards, namely that it must support the implementation of active, creative, collaborative, fun, and effective learning. The forms of games children use are very diverse; one example is the type of APE measurement (Syafdaningsih et al., 2021).

According to Magdalena (2020) measurement is comparing something (quantity) with something else, which is used as a measurement benchmark. Measuring ability significantly influences everyday life because daily human life cannot be separated from measurement. According to Sa'ida et al., (2017) an essential measure of teaching children from an early age, early childhood should be able to recognize differences in size that are more than, less than, and most/ter, able to classify objects based on colour, shape and size, able to classify more objects in the same or similar group, and able to sort objects based on size smallest to largest or vice versa.

The learning process at Rumah Belajar Ceria Palembang still minimally uses APE to support the learning process. So, the researcher wants to test a measurement game tool in children's learning activities to see if there is an effect on problem-solving abilities in children aged (3-4) years; this is relevant to previous research conducted by Fitriyani et al., (2014) with the title "The Effect of Puzzle Use on Improving Problem Solving Skills of Children 5-6 years of age" The study's results stated that applying puzzles influences children's cognitive development.

The effect is intended that the more often children are given puzzle media, the more cognitive development of children will also increase, especially in problem-solving. So here, the researcher is interested in using a measurement game tool to compare previous researchers who used other APE, which have been proven to influence children's cognitive development. To find out whether the measurement game tool affects increasing children's cognitive development, especially in problem-solving abilities of children aged (3-4) years at the Rumah Belajar Ceria Palembang.

2. METHODS

This research is a pre-experimental study using The One-Shot Case Study design in the following the **Table 1** :

The One-Shot Case Study							
Subject	Treatment	Observasi					
1 group	Х	0					

Table 1. Group Tr	eatment Observation
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This research was conducted at the Rumah Belajar Ceria located on Jl. Sarkowi. RT 20 RW 05 Keramasan Ward, Kertapati District, Palembang city. The population in this study were all children in the PAUD group at the Rumah Belajar Ceria, a total of 28 people. The sample in this study was all children aged (3-4) years at the Rumah Belajar Ceria, 12 children. The sample selection technique uses a purposive sampling technique. The consideration is because these 12 children are participating in the non-formal learning activities of the Rumah Belajar Ceria. The variables examined in this study are the measurement game tool as the independent variable (X) and the child's problem-solving ability as the dependent variable (Y).

The data collection technique used in this study was an instrument in the form of an observation sheet. The observation sheet is used to see the problem-solving abilities of children aged (3-4) years. The indicators used to observe the problem-solving abilities of children aged (3-4) years are the use of game tools to measure weight-lightness, height-lowness, big-small, length-shortness and being able to understand the difference between weight and lightness, high-low, big-small, long-short. This study also used instrument validation techniques and observation sheets of children's problem-solving abilities. The instrument validation technique used is expert judgment.

The data analysis technique used is inferential statistical calculations. Inferential statistics are calculated to test the prerequisites for data analysis before testing the hypothesis, namely the normality test and data homogeneity test. The data normality test was carried out by the Shapiro-Wilk test. The Hartley test carried out the data homogeneity test with a significance level of α = 0.05. After doing the prerequisite analysis test, it continued with hypothesis testing using the t-test. The test was conducted with a significance level of α = 0.05 at a 95% confidence level.

3. RESULTS AND DISCUSSION

The normality test was carried out to determine whether the sample under study was normally distributed. In this study, the normality test used the one-sample Shapiro-Wilk test in the SPSS 21 application program with a significant level of 0.05. The provisions of the normality test are that if the significant value is > 0.05, then the data is normally distributed. Meanwhile, the data is not generally distributed if the significant value is <0.05. The normality test results can be seen in **Table 2**.

	Shapiro-Wilk					
-	Statistic	Df	Sig.			
Problem Solving Ability	.781	12	.006			

Table 2	Norma	lity Test	Data
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Based on **Table 2**. shows that the normality test results of the observed value of the problem-solving abilities of children aged (3-4) have a significant 0.06, so it can be concluded that the observed data are normally distributed. Furthermore, the homogeneity test was carried out with the Hartley test. The calculation results are presented in **Table 3**.

Table 3. Homogeneity Test Data

Problem Solving	F _{count}	F _{table}
Ability	2,6	5,05

For decision making is Fcount <Ftable, the data is homogeneous. Because Fcount is 2.6, it can be concluded that the problem-solving ability data of children aged (3-4) can be concluded as having the same or homogeneous variance. The next stage is hypothesis testing. Hypothesis testing was carried out to determine whether there was an influence on the problem-solving ability of children aged (3-4) years after the measurement game was implemented. To make a decision can be seen after analyzing the data, namely if significance > 0.05, then Ho is rejected, Ha is accepted; otherwise, if significance < 0.05, then Ho is accepted. **Table 4.** shows that the results of the One Sample T-test have a significant value of 0.357.

Table 4.	Hypothesis test
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т	Df	Sig.	Mean	95%		
			Difference	Confidence		
				Interva	l of the	
				Difference		
				Lower	Upper	
.962	11	.357	.75000		2.4661	

According to the criteria, if the significant value is > 0.05, Ho is rejected, and Ha is accepted; this means that implementing the measurement game tool influences the problem-solving

abilities of children aged (3-4) years. The results of the research were found to answer the problems of this study, namely that there was an influence of measurement games on the problem-solving abilities of children aged (3-4) years at the Rumah Belajar Ceria Palembang.

The measurement game tool being tested was an APE developed by Lederman et al., (2022) which was declared valid based on the results of an expert review which obtained an average value of 3.75% in an excellent category. This measurement game tool is declared practical; seen from the one-to-one evaluation stage, an average observation is obtained of 87% in the excellent category, while in the small group evaluation stage, the observation average is 92% in the excellent category, which means that the game tool can attract children's attention in learning measurement material. The essence of deep problem-solving abilities (Roman, 2014).

According to Putri and Taqiudin (2021) Indicators showing children's problem-solving abilities can be seen from observing, classifying, comparing, measuring, communicating, conducting experiments, connecting, drawing conclusions and associating information in everyday life. In line with what was written by Agung (2019) which states that early childhood learns the differences and functions of objects such as play tools. How do children classify these objects to find similarities and differences, then answer the causes of changes in these objects. These indicators are also in line with the things assessed for children at the Ceria Palembang Learning House, so the results of this study have answered the problem of this research, namely that there is an influence of game measurement tools on the problem-solving abilities of children aged (3-4) years at the Ceria Palembang Learning House.

Based on the results of observations at the time the research was conducted, children aged (3-4) years at the Ceria Palembang Learning House seemed very enthusiastic in participating in learning activities that used the Measurement Game Tool so that they could improve their problem solving abilities, this was shown by children aged (3-4) years Rumah Belajar Ceria is very enthusiastic and happy when they see a measurement game tool because previously not many APEs have been implemented by Rumah Belajar Ceria, children aged (3-4) years Rumah Belajar Ceria are already able to mention the use of game tools for measuring heavy-light, children aged (3-4) years of the Rumah Belajar Ceria are able to mention the use of game tools to measure height and low, children aged (3-4) years of the Rumah Belajar Ceria are able to mention the use of game tools to measure big and small, children aged (3-4) years of the Rumah Belajar Ceria are able to mention the use of a game tool to measure length and shortness, children aged (3-4) years of the Rumah Belajar Ceria are able to understand the difference between weight and lightness, children aged (3-4) years of the Rumah Belajar Ceria are able to understand the difference between height and low, children aged (3-4) years of the Rumah Belajar Ceria are able to understand the difference between big and small, children aged (3-4) year Rumah Belajar Ceria has been able to understand the difference between long and short, this is supported by research conducted Fitriyani et al., (2014) that the use of APE is very supportive and helps stimulate children's development because by using media, children do not just play and sit still. Through APE, children are actively involved in interactive play, promoting their physical, cognitive, and social development. By utilizing media tools, children can explore, experiment, and problem-solve, thereby enhancing their critical thinking and problem-solving skills. Additionally, APE facilitates multi-sensory experiences, enabling children to engage with various stimuli, fostering sensory development. The interactive nature of APE helps children build communication and social skills as they collaborate, negotiate, and interact with others during play. Thus, the use of APE proves to be an effective approach in promoting holistic development among children, as it encourages their active participation, exploration, and learning.

However, children will be seen actively using the APE. In more detail, the acquisition value of each child will be presented in the following **Table 5**:

No	Name		Indicator Score						Total Score	Average	Category	
		1	2	3	4	5	6	7	8			
1	Ln	3	3	3	3	3	3	3	3	24	75	BSB
2	Vr	3	3	3	3	4	3	3	3	25	78	BSB
3	As	3	3	3	3	3	3	4	3	25	78	BSB
4	Za	3	3	3	3	3	3	3	3	24	75	BSB
5	Cl	3	3	3	3	3	3	3	3	24	75	BSB
6	SI	3	3	3	3	3	3	3	3	24	75	BSB
7	Rs	3	3	3	3	3	4	4	3	26	81	BSB
8	Df	3	3	3	3	3	4	4	3	26	81	BSB
9	Clrs	3	3	3	3	4	3	4	3	26	81	BSB
10	Yg	3	3	3	3	3	3	3	3	24	75	BSB
11	Dy	3	3	3	3	3	4	3	4	26	81	BSB
12	Κv	3	3	3	3	3	4	3	3	25	78	BSB
											77,7	

Table 5. Overall average value of the problem-solving abilities

It can be seen from the table above that the overall average value of the problem-solving abilities of children aged (3-4) years at the Ceria Palembang Learning House is 77.7, with the Very Well Developed category. Therefore, children's problem-solving abilities are well stimulated with the help of the Measurement Game Tool; this is in line with research conducted by Romadhona et al., (2020) which states that the use of APE can increase children's cognitive development because it can be seen from the influence of APE learning media on children's development. In this study, it was proven that by implementing the Measurement Game Tool, the process of learning activities at the Rumah Belajar Ceria Palembang was more active in a learning atmosphere, different from the usual learning atmosphere because it did not use APE or concrete media in children's learning activities so that it can stimulate children's cognitive abilities, especially problem-solving abilities, such as children being able to distinguish other objects that are around the child beside the objects in the Measurement Game Tool.

Then the advantages of this study are that this research focuses on answering the formulation of the problem, namely related to "Can Game Measurement Tools affect the Problem Solving Ability of children aged (3-4) years at the Rumah Belajar Ceria Palembang?" so that the discussion does not widen to other discussions. Furthermore, some children also want to play with this measuring material game tool again. Thus, this is in line with the goals and functions of educational game tools put forward by Laili et al., (2017) that material measurement game tools can foster children's motivation and interest and also create a fun learning atmosphere so that the learning process obtains optimal results.

Then the shortcomings in this study were that researchers did not get enough information regarding the Measurement Game Tool used because of the lack of references, so the reference for researchers was only previous research using other APE which was associated with research that tested children's problem-solving abilities, especially in measurement material and because of the severity of this APE, children have limitations in opening this APE, so researchers must always accompany children when playing measurement material game tools.

4. CONCLUSION

The implementation of Game Measurement Tools at Rumah Belajar Ceria Palembang has shown a significant influence on the problem-solving abilities of children aged 3-4 years. These tools enable children to develop their cognitive skills and enhance their ability to differentiate between various attributes. For instance, the children become more adept at distinguishing between light and heavy objects, tall and low structures, big and small items, and long and short distances. Moreover, they can effectively identify the specific functions of objects within the Measurement Game Tool, such as using scales to weigh objects and utilizing flagpoles to measure height, length, and elevation.

The Measurement Game Tool also facilitates the development of spatial and geometric awareness in children. By engaging with different geometric shapes within the tool, they learn to discern between objects of varying sizes. This skill extends beyond the tool itself and becomes applicable to their daily lives, as children start to distinguish and recognize the sizes and proportions of objects in their surroundings.

Furthermore, the use of the Measurement Game Tool significantly stimulates the problemsolving abilities of children at Rumah Belajar Ceria Palembang. The interactive nature of the tool encourages critical thinking and analytical skills. As children engage in activities involving measurement and comparison, they learn to think logically, analyze information, and make informed decisions. This development of problem-solving skills becomes evident not only within the context of the tool but also in various real-life situations encountered by the children.

Overall, the incorporation of Game Measurement Tools at Rumah Belajar Ceria Palembang has proven to be highly beneficial for children aged 3-4 years. It not only enhances their ability to differentiate and name objects within the tool but also extends their cognitive abilities to everyday scenarios. By fostering problem-solving skills and spatial awareness, the Measurement Game Tool plays a crucial role in the holistic development of children in the learning environment.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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