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The Effectiveness of Snakes and Ladders Assisted Discovery Learning Model in Kindergarten B Gugus Kardinah Kendal

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Abstract: Early childhood requires educational efforts to achieve all aspects of optimal development, both physical and psychological development, especially in terms of children's cognitive- psychomotor growth and abilities. Therefore, a learning system is needed that motivates children's learning interest in new inventions that are able to develop learning systems that involve children with a learning system while playing using learning media. This research is a Research and Development which is designed to find the right model product findings to be used practically in the field of education. The steps are: Define, Design, Develop and Disseminate. Data analysis techniques used descriptive statistics, N-Gain test and linear regression. Data validity techniques include quantitative data and qualitative data using concurrent triangulation at the same time. The two data are then compared to find out whether there is convergence, difference, or combination. The conclusion from the results of the study is that the learning model is appropriate for use in improving children's cognitive abilities in Kindergarten B Gugus Kardinah Kendal, this is based on the validity test of linguists, the validity of the learning model expert and the validity of the material expert which provides an assessment that the discovery learning model is aided by the traditional game of snakes and ladders suitable for use in the good category. An effective learning model can improve children's cognitive abilities in Kindergarten B Gugus Kardinah Kendal, this is based on the average value of children's cognitive abilities from the experimental class having children's cognitive abilities that are relatively better compared to the control class using conventional learning models.

Keywords: Discovery Learning, Traditional Games, Snakes and Ladders

1. Introduction

Early Childhood Education is essentially education that is organized with the aim of facilitating the growth and development of children as a whole or emphasizing the development of all aspects of the child's personality (Wahyuseptiana, 2021). Therefore, Early Childhood Education provides opportunities for children to develop their personality and potential to the fullest.

Various research results state that early childhood is a golden period for child development where 50% of intelligence development occurs at the age of 0-4 years, the next 30% until the age of8 years. This golden period is at the same time a critical period for children where the development obtained in this period greatly influences the development in the following period until adulthood (Imas Kurniasih, 2009). Based on the opinion above, it can be said that in the golden period,

children experience very rapid development. It is important to organize early childhood education from 0-8 years with various aspects of development ranging from physical, cognitive, language, moral and other developments because basically every development is needed by children from childhood to adulthood.

One of the developments that must be stimulated is cognitive ability (Veronica, 2018). Cognitive is a thought process, namely the individual's ability to connect, assess and consider an event (Setyaningrum et al., 2014). Cognitive theory according to Jean Piaget explained that children's knowledge can be built and developed through play activities. Playing for children is a reflection of the attitude of knowledge and can contribute to the development of children's cognition. Piaget explained that when playing, children do not learn anything new, but they learn to practice and consolidate the skills they have acquired. Children create their own knowledge about the world through interaction, information or experience (Davies et al., 2013). Piaget stated that every child has a cognitive structure called schemata, which is a conceptual system that exists in themind as a result of understanding objects in their environment (Marshall

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et al., 2020).

Jean Piaget's theory is known as cognitive development (cognitive abilities). According to Piaget, a person's cognitive ability is divided into 4 stages, namely: a). Sensorimotor stage (0-2) years. The characteristics seen at this stage are the beginning of the formation of the concept of object permanence and the gradual progress from reflective behavior to goal-angry behavior. Children's cognitive abilities are obtained through their senses, b). Preoperational stage (2-7) years. It can be observed from this period that children are already able to use symbols to represent world objects, c). Concrete operational stage (8-12) years. The characteristic of its development is that children have started to be able to show improvements in the ability to think logically, d). Formal operational stage (over 12 years). Traits that can be seen are that children have begun to understand or do pure abstract and symbolic thinking (Davies et al., 2013). Another opinion states that children's cognitive abilities are awakened when they experiment with their toys, make simple discoveries with their toys. By playing, children can find out the color, shape, size, and texture of an object (Iannuccilli et al., 2021).

Research on children's cognitive abilities, the authors focus on the cognitive abilities of children aged 5-6 years. At the age of 5-6 years, children are able to use symbols to represent world objects. In developing cognitive early childhood indicators of achievement are needed that are appropriate to the stages of child development (Setyaningrum et al., 2014). In carrying out cognitivedevelopment carried out by teachers at school, they must have a strategy for using appropriate methods. In carrying out cognitive development carried out by teachers at school, they must have a strategy for using methods that are appropriate to the child's age level. The selection of development methods is often not based on an analysis of the characteristics of students, learning objectives, and teaching materials, so that the level of aspects of children's cognitive abilities does not work optimally (Ramakrishnan & Chandrasekhar, 1999).

Early childhood is a child who is in need of educational efforts to achieve all aspects of optimal development, both physical and psychological development, such as cognitive, language, motor, social-emotional as well as moral and religion (Istikomah et al., 2013). Especially in termsof growth and cognitive psychomotor abilities of children. Children's cognitive abilities greatly influence growth and development in other aspects such as children's psychomotor development (Pransiska, 2018). Therefore, we must provide a learning system that motivates children's learning interest in new discoveries that he gets by using an interesting learning system but also developing aspects.

The development of a learning system that involves children, a learning system while playing using learning media is urgently needed. By experiencing directly, students are expected to be more enthusiastic about learning, not bored, fun and more active. The use of direct instructional media is expected to make children more enthusiastic and motivated to learn. Meanwhile, the use of the discovery learning method for early childhood aims so that children's cognitive abilities can develop optimally in learning carried out in class to obtain new discoveries for children which can facilitate optimizing children's cognitive abilities (Niswatuzzahro et al., 2018).

The discovery method can involve children in the activities provided so that children can explore and find themselves actively and creatively and can conclude their findings into a concept that will always be remembered, helping children understand and actively discovering the knowledge that they build through exploration activities. Putri et al., 2020). With strong cooperationand motivator by the teacher, this activity will be efficient and run well (Hendrizal et al., 2022). From the problems faced by Group B children at TK Kartini Sendangdawuhan, the researchers have a desire to improve students' cognitive and psychomotor abilities.

The problems described above also arise in the learning activities for starting arithmetic at the Kartini Sendangdawuhan Kindergarten. Based on the results of observations, it is known thatthe initial counting activities are faced with obstacles. This is due to several factors that hinder cognitive functioning, one of which is the lack of practice in starting arithmetic and the limitations of learning media as a source of learning, namely props such as playing videos, photos or pictures, recorded sound and there are media games such as congklak, number cards, and snakes and ladders which used in the learning process. Seeing the activities carried out by children, there are only a few games to develop cognitively, so it makes children less interested and bored with the media, causing the expected learning to not be created. In addition, the activities carried out in the kindergarten are still focused on activities that make children bored so that children are less interested in participating in class activities, especially in counting activities. In this case the child is stillconfused

Based on observations so far, early childhood in Kindergarten B Cluster of Kendal Cardinals experience quite important problems, one of which is the problem of children's cognitive and psychomorphic development. In the cognitive aspect, children's development is very weak, this is known in their daily lives, for example, children who are unable to understand the symbol numbers 1 to 10 are still many children who have not mastered it. Then cognitive abilities so far in terms of children's ability to think more complexly as well as to do reasoning and problem solving are still very weak, the development of these cognitive abilities will make it easier for children to master broader general knowledge, but these constraints become low children's cognitive development.

Then in the psychomotor aspects of children in TK B Cluster of Kendal Cardinal there are also many obstacles and problems, there are still many children who have not been able to develop their fine motor skills such as the development of movement which includes small muscles with eye-hand coordination. For example, such as drawing, writing, cutting, assembling puzzles, or inserting blocks according to the shape, such things are still not possible for children at TKB Gugus Kardinah Kendal.

Several strategies that can be used to optimize children's counting activities, by using good media so that children's cognitive can increase. Educational game learning media is one of the media that can develop cognitive in playing (Ramakrishnan & Chandrasekhar, 1999). One of them that can be applied in improving children's cognitive is the snake and ladder game media (Lalos et al., 2009; Niswatuzzahro et al., 2018; Rekysika & Haryanto, 2019).

According to (Shonkoff, 2010) games really support the growth and development of children, namely: 1). For cognitive abilities, 2). For social and emotional development, 3). For language development, 4). For physical (physical) development, 5). For the development of letter recognition. Bruner in Slamet said that playing is part of a child's cognitive ability. Furthermore, it is said that playing is a problem-solving process. When playing, children are faced with various situations, conditions, friends and objects, both real and imaginary, which allow them to use various thinking skills and solve problems (Hidayati, 2016). Piaget in Slamet states that playing with objects in their environment is a way for children to learn. By interacting with objects and people, using these objects for various purposes, children construct an understanding of objects, people and situations (Andriyani & Suniasih, 2021). According to Meylinda, student understanding is an important factor in the implementation of learning (Lo Presti, 2009).

Playing snakes and ladders is a traditional game that is widely known by the community, so it doesn't take long to introduce and explain the name of the game to children (Afifah & Hartatik, 2019). Snakes and ladders are an interesting learning medium, children will be happy, children will feel like they are playing even though in reality this game is learning while playing (Fransisca et al., 2020). When playing, the child rolls the dice and the dice have the numbers listed, then the child can count by running to the box according to the number obtained on the dice, without realizing it the child can count with direct playing experience. The learning material that will be delivered can be easily accepted by students because it builds their own understanding.

Visual-based learning media in the form of a snake and ladder game is an effective medium for increasing students' absorption and understanding of lessons, especially discussions that are difficult to accept without media intermediaries (Chabib et al., 2017). This proves that the game of snakes and ladders can help teachers in delivering learning material.

In line with this, snakes and ladders game media is used to assist and facilitate teachers in teaching and learning activities, as well as to make children more enthusiastic about participating in the learning process in starting arithmetic. So, the researcher developed a product that was used in the teaching and learning process with the aim of increasing the cognitive abilities or initial numeracy of all students in learning and making it easier for educators to convey material so as to obtain optimal learning results.

The method is the path traversed to achieve a goal. In this study using the discovery method which is interpreted as a method of discovery. The traditional snake and ladder assisted discovery method in this method will give children the opportunity to explore their surroundings with natural media that are already available in their school environment. In line with the opinion (Kurniawati, 2019) with discovery activities children's curiosity will be fulfilled and various process skills can be built properly. (Black et al., 2016) argues that discovery is a learning method using the discovery method. Therefore, researchers in this study will develop learning innovations with a discovery learning model based on a number card game to improve understanding of the concepts and symbols of numbers in early childhood.

2. Research Methods

This study uses a research and development model known as Research and Development (R&D) using a quantitative approach. The stages of developing learning tools in this study are the Define Stage, the Design Stage, the Develop Stage and the Disseminate Stage. Data collection techniques using the Observation Method, Interview Method, Documentation Method, Literature Study and Test Method. The data collection instrument used Test Instruments and Non-Test Instruments (Expert Validation Sheets, Interview Guidelines). Data validation techniques include Instrument Testing Analysis, Learning Device Validity, Validity of Trial Test Items, Reliability of Trial Items, Difficulty Level of Trial Items and Difference Power. Data analysis techniques in this study contained quantitative data (Cognitive and Psychomotor Ability Data Analysis, Linear Regression Analysis) and qualitative data (Observation Sheet Analysis, Response Questionnaire Data Analysis).

3. Research Result

To find out whether the discovery learning model assisted by the snakes and ladders game is effective, it can be used to improve children's cognitive abilities in this study using the T test (Paired Sample T Test). But before carrying out the test, the data obtained must be normally distributed and come from the same population, to find out the data is normally distributed and comes from the same population by using normality and homogeneity tests. The explanation is as follows:

1. Normality Test

The normality test is carried out to test whether all data is normally distributed or not. The normality test uses the Kolmogorov-Smirnov formula and the Shapiro-Wilk test. To find outwhether it is normal or not, if sig > 0.05 then it is normal and if sig < 0.05 it can be said to be abnormal. Statistical results using the SPSS for Windows 24 program for normality can be seen in the following table:

Table 1. Normality Test

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Class	Statistic	df	Sig.	Statistic	df	Sig.
Children's Cognitive Ability	Pretest Kartini Sendangdawuhan Kindergarten	0.233	15	0.057	0.886	15	0.058
	Posttest Kartini Sendangdawuhan Kindergarten	0.232	15	0.079	0.858	15	0.073
	Pretest Pertiwi Handayani Kindergarten	0.178	15	0.200	0.940	15	0.384
	Posttest Pertiwi Handayani Kindergarten	0.193	15	0.139	0.872	15	0.086
	Pretest Pertiwi Tambaksari Kindergarten	0.188	15	0.163	0.946	15	0.467
	Posttest Pertiwi Tambaksari Kindergarten	0.201	15	0.106	0.868	15	0.081
	Pretest Pertiwi Wijaya Kusuma	0.170	15	0.200	0.957	15	0.635
	Posttest Pertiwi Wijaya Kusuma	0.196	15	0.124	0.935	15	0.323

a. Lilliefors Significance Correction
Source: Output SPSS

The results of the data normality test in the table above show that the significance value is greater than 0.05 at the 5% significance level. Thus, it is concluded that the data in each class is normally distributed. This normality assumption is necessary because if normality is not met, the effectiveness test decision (t-test) obtained becomes invalid.

2. Homogeneity Test

The homogeneity test is used to measure whether the two classes come from a homogeneouspopulation, meaning that the abilities of all children are the same. The homogeneity test in thisstudy serves to see the homogeneity of the control class and the experimental class. Data from the results of the calculation of the homogeneity test of the two classes, both experimental and control, obtained the results as presented in the following table

Table 2. Homogeneity Test Results

		Levene Statistic	df1	df2	Sig.
Children's Cognitive Ability	Based on Mean	1.428	3	56	0.244
	Based on Median	1.157	3	56	0.334
	Based on Median and with adjusted df	1.157	3	54.001	0.335
	Based on trimmed mean	1.440	3	56	0.241

Source: Output SPSS

Based on the output results of SPSS version 24.0 it is known that the significance value (sig)based on mean is 0.244 > 0.05 at the 5% level so that it can be concluded that the abilities of the children in the experimental and control classes are the same or homogeneous. Thus, one of the requirements of the paired sample t test is fulfilled.

3. Paired Sampel T Test

Furthermore, an effectiveness test was carried out using the paired-samples t test to find out whether the development of discovery learning models assisted by traditional snakes and ladders games was effective in increasing cognitive abilities in Kindergarten B children of Gugus Kardinah Kendal. The results of the paired-samples t test analysis can be seen in the following table:

Table 3. Paired Samples Test Cognitive Ability in Children

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pretest - Posttest Kartini Sendangdawuhan Kindergarten	30.667	11.932	3.081	37.275	24.059	9.954	14	0.000
Pretest - Posttest Pertiwi HandayaniKindergarten	30.000	12.101	3.124	36.701	23.299	9.602	14	0.000
Pretest - Posttest Pertiwi Tambaksari Kindergarten	29.333	10.834	2.797	35.333	23.334	10.486	14	0.000
Pretest - Posttest Pertiwi Wijaya Kusuma Kindergarten	5.667	2.582	0.667	7.097	4.237	8.500	14	0.000

Source: Output SPSS

Kartini Kindergarten Sendangdawuhan (Experiment 1) obtained a Sig. (2-tailed) of 0.000 <0.05, or Tcount 9.954 > Ttable 2.14479, it can be interpreted that there is a difference in the average cognitive abilities of children before and after using the development of discovery learning models assisted by the traditional game of snakes and ladders. Thus, it can be concluded that the discovery learning model assisted by the traditional game of snakes and ladders is effective in improving the cognitive abilities of Group B children in Sendangdawuhan Kartini Kindergarten.

Pertiwi Handayani Kindergarten (Experiment 2) obtained a Sig. (2-tailed) obtained 0.000 <0.05 or Tcount 9.602 > Ttable 2.14479, it can be interpreted that there is a difference in theaverage cognitive abilities of children before and after using the development of discovery learning models assisted by the traditional game of snakes and ladders. Thus, it can be concluded that discovery learning assisted by the traditional game of snakes and ladders is effective in improving the cognitive abilities of Group B children in Pertiwi Handayani Kindergarten.

Pertiwi Tambaksari Kindergarten (Experiment 3) obtained a Sig. (2-tailed) obtained 0.000 <0.05 or Tcount 10.486 > Ttable 2.14479, it can be interpreted that there is a difference in the average cognitive abilities of children before and after using the discovery learning model assisted by the traditional game of snakes and ladders. Thus, it can be concluded that the discovery learning model assisted by the traditional game of snakes and ladders is effective in improving the cognitive abilities of Group B children in Pertiwi Tambaksari Kindergarten.

Based on the results of the mean (average) value in each class, both the experimental and control classes, it can be seen in the paired sample statistics table below:

Tabel 4
Paired Samples Statistics

	Mean	N	Std. Deviation	Std. ErrorMean
Pretest Kartini SendangdawuhanKindergarten	50.00	15	11.802	3.047
Posttest Kartini SendangdawuhanKindergarten	80.67	15	19.809	5.115
Pretest Pertiwi Handayani Kindergarten	50.33	15	12.022	3.104
Posttest Pertiwi Handayani Kindergarten	80.33	15	19.591	5.058
Pretest Pertiwi Tambaksari Kindergarten	50.67	15	12.659	3.268
Posttest Pertiwi Tambaksari Kindergarten	80.00	15	19.911	5.141

continued

Pretest Pertiwi Wijaya Kusuma Kindergarten	50.33	15	14.075	3.634
Posttest Pertiwi Wijaya Kusuma Kindergarten	56.00	15	13.390	3.457

Source: Output SPSS

Based on the results of the paired samples statistic, it is known that the cognitive abilities of the experimental class children are Kartini Sendangdawuhan Kindergarten; Pertiwi Handayani Kindergarten; Pertiwi Tambaksari Kindergarten; Pertiwi Wijaya Kusuma Kindergarten, namely learning using discovery learning assisted by the traditional game of snakes and ladders, in Sendangdawuhan Kartini Kindergarten obtained a posttest score of 80.67; the posttest score in Pertiwi Handayani was 80.3 and the posttest score in Pertiwi Tambaksari Kindergarten was 80.0. These results can be interpreted that the average value of the cognitive abilities of children from the experimental class who both use the discovery learning model assisted by the traditional game of snakes and ladders has relatively the same cognitive abilities of children.

When compared with the average value of children's cognitive abilities in the control classat Pertiwi Wijaya Kusuma, namely learning without using conventional learning modeldevelopment, it obtained a posttest score of 56.00. These results are lower than the experimental class. So that it can be said that children who are given learning using the development of discovery learning models assisted by traditional snakes and ladders games have better cognitive abilities compared to children who are not given conventional learning.

4. Discussion

Experimental class 1 The majority of N-Gain values are in the high category. These results can be concluded that the increase in the cognitive abilities of group B children in Kartini Kindergarten Sendangdawuhan after using the discovery learning model assisted by the traditional game of snakes and ladders experienced a high increase. In the experimental class 2, the majority ofthe N-Gain values are in the high category. These results can be concluded that the increase in the cognitive abilities of group B children in Pertiwi Handayani after using the development of the discovery learning model assisted by the traditional game of snakes and ladders experienced a high increase. In the experimental class 2, the majority of the N-Gain values are in the high category. These results can be concluded that the increase in the cognitive abilities of group B children in Pertiwi Tambaksari Kindergarten after using the development of discovery learning models assisted by traditional snakes and ladders games experienced a high increase. Experimental class 3 that the majority of N-Gain values are in the high category. These results can be concluded that the increase in the cognitive abilities of group B children in Pertiwi Tambaksari Kindergarten after using the development of discovery learning models assisted by traditional snakes and ladders games experienced a high increase. In the control class, the majority of N-Gain values are in the low category. These results can be concluded that the increase in the cognitive abilities of group B children in Pertiwi Wijaya Kusuma Kindergarten as a control class with learning without using the discovery learning model assisted by the traditional game of snakes and ladders experienced a low increase.

Then the sample t-test showed that the Sendangdawuhan Kartini Kindergarten (Experiment 1) obtained a Sig. (2-tailed) of 0.000 <0.05, or Tcount 9.954 > Ttable 2.14479, it can be interpreted that there is a difference in the average cognitive abilities of children before and after using the development of discovery learning models assisted by the traditional game of snakes and ladders. Thus, it can be concluded that the discovery learning model assisted by the traditional game of snakes and ladders is effective in improving the cognitive abilities of Group B children in Sendangdawuhan Kartini Kindergarten.

Pertiwi Handayani Kindergarten (Experiment 2) obtained a Sig. (2-tailed) obtained 0.000 <0.05 or Tcount 9.602 > Ttable 2.14479, it can be interpreted that there is a difference in the average cognitive abilities of children before and after using the development of discovery learning models assisted by the traditional game of snakes and ladders. Thus, it can be concluded that discovery learning assisted by the traditional game of snakes and ladders is effective in improving the cognitive abilities of Group B children in Pertiwi Handayani Kindergarten.

Pertiwi Tambaksari Kindergarten (Experiment 3) obtained a Sig. (2-tailed) obtained 0.000 <0.05 or Tcount 10.486 > Ttable 2.14479, it can be interpreted that there is a difference in the average cognitive abilities of children before and after using the discovery learning model assisted by the traditional game of snakes and ladders. Thus, it can be concluded that the discovery learning model assisted by the traditional game of snakes and ladders is effective in improving the cognitive abilities of Group B children in Pertiwi Tambaksari Kindergarten.

Discovery learning is a learning model that expects education to be more creative in producing situations that can make students learn to discover their own knowledge and be active (Sani, 2014). The purpose of the discovery learning model is to train students in their ability to find and solve problems so they can analyze and process existing information (Yusuf & Wulan, 2015).

This is also supported by research conducted by Putra, Wirawan & Pradanyana (2017) where the results of the research show that the existence of e-modules based on discovery learning can increase students' enthusiasm for

learning because it is equipped with videos and pictures that make learning not get bored quickly and become more interesting and can make students more independent and active in the learning process.

5. Conclusion

Based on the description of the background of the problem and the results of the research above, the following conclusions can be drawn: An effective learning model can improve the cognitive abilities of children in Kindergarten B Gugus Kardinah Kendal, this is based on the average value of the cognitive abilities of children from the experimental class having the cognitive abilities of children who relatively improved better than the control class that uses conventional learning models.

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