Belia 6 (1) (2017)

Early Childhood Education Papers (Belia)

http://journal.unnes.ac.id/sju/index.php/belia

Application of Building Playing in the Center of Beams to Improve the Visual-Spatial Intelligence of Children at the Age 5-6 Years Old in Mutiara Insan Kindergarten, Sukoharjo Regency

Sri Ngadinah Amrih Utami✉, **Wulan Adiarti**

Department of Early Childhood Teacher Education, Faculty of Science of Education, Semarang State University, Indonesia

Article Info

Received April 2017
Accepted May 2017
Published June 2017

Keywords:
visual-spatial intelligence; building playing; center beam; early childhood

Abstract

Visual-spatial intelligence is the ability to understand picture and shape including the ability to interpret the invisible space dimension. Visual-spatial intelligence have the characteristics they are the sensitivity toward line, color, shape, space, balance, the ability of imagine, interpreting the idea visually and spatially, so it is rests on the sharpness of seeing and the accuracy of observing. Optimized of visual-spatial intelligence in children at the early childhood development can be done through building games by using beam as the media which have been available in the center of beams. The existence of building play is the media to practice the ability that is needed by the children and also to stimulate the ability of children to create the thoughts, ideas, and concepts. The objective of this study is to know the increase in visual-spatial intelligence which is reached by the children at the age 5-6 years old through the activity playing of building in the center of beams. Experimental research is used in this quantitative research with the design One Group Pretest-Posttest. The populations of this study are all of the students of Mutiara Insan Kindergarten, Sukoharjo Regency with the sample of 30 students consisting of children at the age of 5-6 years old (grade B kindergarten). The sampling technique used was Purposive sampling. Whereas data collection methods of this study using children visual-spatial intelligence scale which have been tested both the validity and the reliability for about 0,901. The data distribution obtained indicates normal data and homogenous. The statistical analysis method with Paired Sample t-Test technique is the result of pretest and posttest. The result obtained t calculate= -102,524 with sig= 0.000, so that the average score pretest and posttest of the children visual-spatial abilities at the age of 5-6 years old experience significant improvement after conducted optimization of beam as a media for application the building games in the center of the beam.

ISSN 2252-6382

✉Corresponding author:
Gedung A3 Lantai 1 FIP Unnes
Kampus Sekaran, Gunungpati, Semarang, 50229
E-mail: Diena.Utami@yahoo.co.id

INTRODUCTION

Visual-spatial intelligence is the ability to understand pictures and shapes, three-dimensional shapes, including the ability to interpret the invisible space dimensions. Rettig (Yaumi, 2012:16) also explains there are three things in visual-spatial intelligence they are perception which capture and understand something with the five senses, is related with the eyes ability especially of color and space, also compare something which is captured by the eyes in another shape, such as sketches or painting.

The level of children visual-spatial ability that is still low can be found in several kindergarten institutions. One of them is in Mutiara Insan kindergarten, Sukoharjo Regency. The results of beginning observations in Mutiara Insan kindergarten, Sukoharjo Regency shows that the basic needs of kindergarten children is very large in playing, the beam as a media considered to be less attractive to the child interest in playing, compared to the media using technology as the basic such as gadgets. Those things can be seen when the researchers tried to distract the children attention from the play activities using a beam with the use of a game in mobile. Children quickly move their attention by approaching the researcher and stopping their activity in playing the beam.

In addition, there are still found in Mutiara Insan kindergarten several problems of children that directed the children ability related to the children visual-spatial intelligence. It is indicated of all the children which are observed, only a small number of children who seen to have a good ability of visual-spatial intelligence. Due to the low of child visual-spatial intelligence is indicated on the ability of children to pour their imagination out in the form of picture, lack of sharpness in seeing and accuracy of observing. This condition is seen with an indication of less appropriateness of playing in the center of beam, on the activities of playing in arranging the beam, only a little of children who can arrange with the building shape that almost suitable to the description of the children.

It has been observed from several students of kindergarten at group of 5-6 years old student still cannot able to decide the right-left direction, recognize a color, difficulty in remembering, and classifying geometric shape. Children at age 5-6 years old belong to pre-operational stage, children have a mental image and able to pretend, a short step to use a symbol. The characteristic of children in this stage is to foster the ability to learn through the symbols, language and the mental representations of mind, extension of the using of symbolic thoughts, or the representational ability appear in the late stages of sensorimotor (Rohmah, 2014:141).

Gardner (Morrison, 2012: 86) said that children who have more dominant visual-spatial intelligence, will be best learn visually and arrange everything visually. Children with high visual-spatial intelligence tend to think with imagination. Being able to form an image about space arrangement or room in their mind, children with rich imagination make them imaginative and creative. Children with high visual-spatial intelligence think with pictures. Usually, children like do activity such as playing puzzle, drawing, playing beams, playing maze, building a shape, also imagination to form buildings through games.

Several stages playing the beam experienced by the children during structured building games, there are nineteen detailed stages consisting of one stage using the beam without making the building, the two stages relating to make a straight line building, the two stages connected with the areas of two-dimensional building, five stages associated with the three-dimensional building, and nine stages connected with representation of the game (Depdiknas, 2004:3). Generally there are four stages in playing in beams game by Dodge et al (Masnipal, 2013:296), they are: selecting and finding the beams, installing the beam pole and creating the road, connecting the beams to create a structure and making a more detail construction. Playing beams activities can be introduce to children on the grouping of objects based on 2D, 3D and its' size also the color, arranging the beams into a series, recognizing the patterns, showing awareness of position and space, making the image then interpreted it. Hurlock (2013: 330) explains that constructive play is a form of play where the children using materials to make something which is not for the other useful purposes and more intended for the excitement.

Visual imagination and spatial ability can only increase with focused practice on the relationship with geometric shape, direction, orientation, different perspective in space, relation between shape and size of object, and the relation between the changes in shape with the changes of size (Wardhani dan Warjiyono, 2014: 52). Application of building games activity inside the center of the beam become one of the efforts in increasing the children visual-spatial intelligence which is adapted with the tendency of children intelligence, so that children can optimize the potential they have.

RESEARCH METHODS

The research methodology used is experimental research. With the design of research Pre-experimental design that used One Group Pretest-Posttest Design (Azwar, 2015: 110-111). The variables in this research are the application of building games in the center of the beam as the independent variable and the children of 5-6 years old visual-spatial intelligence as the dependent variable. The population of this study is all of the students of kindergarten in Bendosari district, Sukoharjo regency in the academic year of 2016/2017. The sampling technique used purposive sampling with sample of 30 children form TK B group in Mutiara Insan kindergarten, Sukoharjo. The research instrument used to measure the variable of children visual-spatial intelligence are using the likert scale and Visual-Spatial Intelligence Scale as means of collecting the data in this study.

Data analysis in this study consisted of normality test, homogeneity test, and paired sample t-Test to test the hypothesis that assisted with the statistic program SPSS 20.0 for windows. Certainty of the result of hypothesis test that if H_o is rejected and H_a is accepted if $t_{calculate}$ is bigger or equal with t_{table} or if H_o is accepted and H_a is rejected if $t_{calculate}$ is smaller than t_{table}. The hypothesis in this study is H_o is "equal with zero", mean that there is no increase of children visual-spatial intelligence through the implementation of building games in the center of the beams and H_a is "not equal with zero" mean that there is an increasing of children visual-spatial intelligence through the implementation of building games in the center of the beam.

RESULTS AND DISCUSSION

Research data before and after being treated are as follows:

Table 1. Descriptive data analysis of children visual-spatial ability

Data	N	Mean	Minimum	Maximum
Pretest	30	84,10	79	88
Posttest	30	121,00	115	128

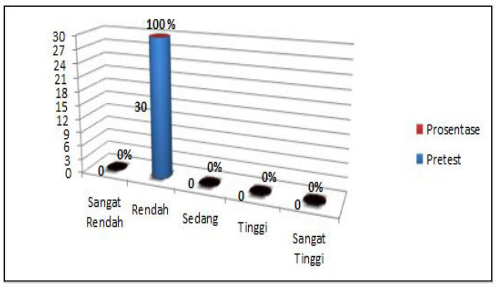
Based on the table above shows the result data of descriptive analysis of the respondent of children visual-spatial intelligence show that the number of respondent (N) as much 30 students with an average (mean) score for pretest is 84,10 and the average score of posttest is 121,00. The smallest score of pretest is 79, while the posttest is 115. The highest score of pretest is 88 and posttest is 128.

Table 2. The data result of pretest and posttest from experimental group

Class interval	The sum of children		Percentage		Criteria
	Pretest	Posttest	Pretest	Posttest	
147 – 172	0	0	0	0	Very high
121 – 146	0	18	0	60%	High
95 – 120	0	12	0	40%	Medium
69 – 94	30	0	100%	0	Low
43 – 68	0	0	0	0	Very Low
Sum	30	30	100%	100%	

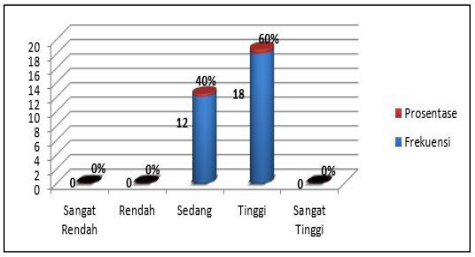
Based on the table above shows that the percentage of children visual-spatial ability is increased can be seen from the criteria before and after getting a treatment. The following is the picture of diagram shows of data and facilitate the reading of data distribution of pretest and posttest:

Figure 1. Data distribution of pretest score from experiment group



Based on the pretest diagram above shows that children who have low category of visual-spatial intelligence level as much as 30 children or equal 100% with the average score 84,10.

Figure 2. Data distribution of posttest score from experiment group



Based on the posttest diagram above shows that children who have the medium category of visual-spatial intelligence level as much as 12 children or 40% and the high category as much as 18 children or 60% with the average score 121,000.

The result of the normality test, homoge-

neity test, and paired sample t-Test to test the hypothesis that assisted with the statistic program SPSS 20.0 for windows is as follows:

Table 3. The result of Normality test of pretest and posttest score from experiment group

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		30
Normal Parameters[a,b]	Mean	0E-7
	Std. Deviation	1,95792712
Most Extreme Differences	Absolute	,093
	Positive	,084
	Negative	-,093
Kolmogorov-Smirnov Z		,507
Asymp. Sig. (2-tailed)		,959

a. Test distribution is Normal.

b. Calculated from data.

According to the table above shows that the sig. score on experiment group at pretest and posttest is 0,959 which is shows a bigger score from score α (0,05), because sig. > α then show the data result of experiment group at pretest and posttest come from normally distributed population.

Table 4. The result of Homogeneity test of pretest and posttest from experimental group

Test of Homogeneity of Variances

Posttest

Levene Statistic	df1	df2	Sig.
2,401	7	20	,059

According to the table above, the significant level is 0,0059 which means bigger (>) than 0,05, so it can be concluded that the data of experiment group at pretest and posttest is homogenous or have the same variant.

The calculation result of the second difference test using Paired Sample t-Test presented in the following table:

Table 5. The result of mean of hypothesis test of experiment group

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	84,10	30	3,199	,584
	Posttest	121,00	30	3,948	,721

Based on the table above we can see that the average score on the result of posttest is higher than the result of pretest. The average score of posttest result as much as 121,00 and the average score of pretest as much as 84,10 with the difference -36.900. Paired Sample t-test result on the experiment group is significant because it has the $t_{calculate}$ score as much -102,524 with sig.(2 tailed) < 0,005 that is 0,00. This means that there is a significant difference between the pretest and posttest of the ability of children visual-spatial intelligence at the age 5-6 years old.

The conclusion obtained that Ho is rejected and Ha is accepted means that there is an increase of ability in the children visual-spatial intelligence at age 5-6 years old with the application of building game application optimally with beam as the media inside the center of beams, due to the average score of posttest is higher than the average score of pretest.

According to Sonowat and Gogri (Yaumi, 2012: 16) visual-spatial thinking ability is the ability to think in the form of visualization, image and three- dimensional shapes. Prasetyoningrom (2014: 2) also revealed that the Visual-Spatial intelligence related to the skill to capture a color, direction, and space accurately. The children visual-spatial intelligence mentioned can be seen from the development of cognitive skill in building games activity with the beam as the media that become one type of game to improve the children visual spatial intelligence. The purpose of building games is to stimulate the children ability to create thoughts, ideas and their concepts into a real work.

The beam as the media was chosen due to building games can be the media structurally,

Table 6. The result of mean of hypothesis test of experiment group

Paired Samples Test

Mean		Paired Differences					T	df	Sig. (2-tailed)
		Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1	pretest - posttest	-36,900	1,971	,360	-37,636	-36,164	-102,524	29	,000

whereas the place of game activity can be done in center of beams which of course have been provided with many kinds of beam in various shape, size and texture.

Optimization learning activity in the center of beam on Mutiara Insan, Sukoharjo regency at the time of allocation of research with time of 1 hour and 30 minutes early details are used 30 minutes for the opening ,45 minutes of play activities in the center, and 15 minutes late for closure. The period of rest is done after the completion of activity in the center. The average of pretest on the experiment group with 30 children as respondents, the children ability to play the beam reach on category which is related with the three-dimensional building on the stage when children placed two parallel beams within and connected between two beams by a beam on it, formed a curve or a bridge, children make a shape such as an open box of four beams or more. While, the children average posttest, the children ability to play beam until the category which is related with representation games that children construct one building and gave the name of the beam on one-on-one as an 'object', even though the building or the beam shape was not as 'thing' in reality, but it still represent the children thought, children give the name to all the beam buildings as an 'object'. One building represents one object, the children gave a name 'shapes' to beam in one building representing 'objects'. More than one beam are used to form objects, children build also the separate object, then give the name of each object.

Children with high visual-spatial intelligence tend to think with imagination. Being able to form a picture about space arrangement in their mind, children with rich imagination are inclined to be imaginative and creative. Visual imagination and spatial ability can be improved with focused practice on the relation with geometric shape, direction, orientation and difference perspective in space, the relation between shape and size of object, and the relation between shape changes with the size changes. The application of building games activity inside the center of beam, become one of the efforts to improve children visual-spatial intelligence fitted with the children preference, so that the children can optimize their potential.

CONCLUSION

Based on the explanation above, it can be concluded that there is an improvement on children at the age of 5-6 years old ability of visual-spatial intelligence with the application of building game optimally with the beams as the media in the center of beam. The application of building games with optimize beam as the media inside the center of beam gave a considerable role in improving the children visual-spatial intelligence. This can be shown by the result of average score which is increased between pretest and posttest had done by the child after obtaining a treatment. The increasing of posttest score proved that the role of building games application optimally with the beam as media inside the center of beam can improve the children ability related with their visual-spatial intelligence.

REFERENCES

Depdiknas. (2004). *Bahan Pelatihan; lebih jauh tentang Sentra dan saat Lingkungan; main pembangunan*. Jakarta: Proyek Pengembangan Anak Usia Dini Pusat.

Hurlock, B Elizabeth. (2013). *Perkembangan Anak: Jilid 1*. Jakarta: PT Erlangga.

Masnipal. (2013). *Siap Menjadi Guru dan Pengelola PAUD Profesional*. Jakarta: PT Elex Media Komputindo Kelompok Gramedia.

Morrison, George S. (2012). *Dasar-Dasar pendidikan Anak Usia Dini*. Jakarta: PT Index.

Prasetyoningrom, W., dkk. (2014). MENINGKATKAN KECERDASAN VISUAL-SPATIAL PADA TEMA PEKERJAAN MELALUI MEDIA PUZZLE GAMBAR (PENELITIAN TINDAKAN KELOMPOK ANAK KELOMPOK B2 TK PERTIWI 02 JENENGAN, BOYOLALI TAHUN PELAJARAN 2013/2014). *Jurnal Kumara Cendekia, 2(2),* 1-7.

Rohmah, N. (2014). ARITHMETIC DICE MEDIA AS COUNTING CONCEPT INTRODUCTION FOR EARLY CHILDHOOD. *Indonesian Journal of Early Childhood Education Studies, 3(2),* 140-147. doi:10.15294/ijeces.v3i2.9486

Wardhani, Galih W., Warjiyono. (2014). PERENCANGAN ANIMASI INTERAKTIF BERBENTUK PUZZLE GUNA MELATIH KECERDASAN VISUL A SPATIAL ANAK. *Jurnal Evolusi, 2(1),* 52-59.

Yaumi, M. (2012). *Pembelajaran Berbasis Multiple Intelligences*. Jakarta: Dian Rakyat.