

Effectiveness of Educational Game for the Intelligence of Early Childhood Naturalist

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Abstract—The purpose of this research is to test and know the effectiveness of educational game of animal and plant introduction to children's naturalist intelligence and to know the difference of children naturalist intelligence through educational game of animal and plant introduction or using deonstration method. This research method is quantitative research. Data were collected using an observation sheet. Quantitative data were analyzed using descriptive analysis and quantitative data were analyzed using t-test, independent sample t-test. The result of this study is that there is a significant difference in children creativity between collaborative drawing activities and individual drawing activities. This is shown by the result of SPSS 20 t test that is t count = 8,523 < t table = 2,603. Collaborative drawing activities have better drawing results and can enhance children's creativity.

Keywords—educational game, naturalist intelligence, early childhood

I. INTRODUCTION

Learning in early childhood education basically implements the essence of play. Sujiono in [1], states that play has the main goal of maintaining the development and optimal growth of early childhood through a creative play approach, interactive and integrated with the environment and the world of child play. Play pressing children on the development of creativity and talent and the potential of intelligence that is in him. Childhood is a period of rapid development of brain cells. Learning is not limited to space and time. Early Childhood period is a golden age (golden age) in individuals. At this time is the best time in stimulating children. Stimulation given will shape early childhood development. Developments developed in the form of physical ability, cognitive, language, social emotional, self-concept, discipline, kemandirian, art, moral, and religious values. Children always learn at any time wherever children are. The child will do whatever he sees.

Gardner *et al.*, in [2] classifies 9 human intelligences consisting of: (1) linguistic Intelligence; (2) Logical-Mathematical Intelligence; (3) Spatial Intelligence; (4) Kinesthetic Intelligence; (5) Interpersonal Intelligence; (6) Musical Intelligence; (7) Interpersonal Intelligence, (8) Naturalist Intelligence; and (9) Existential Intelligence. "This theory was coined by Howard Gardner, a Harvard psychologist who has discovered 9 human intelligence. MI assumptions arise because of the results of Gardner's research which gives an idea that individuals can achieve success not only rely on high IQ but also supported by the intelligence developed by a person. Multiple intelligence illustrates that each child has different characteristics. Each child's

intelligence has a different indicator so that in providing different stimulation. Gardner mentions that the intelligences can not be separated. Intelligence tend to complement each other so that in using the intelligence can be done simultaneously.

Parental awareness is now more concerned with children's cognitive intelligence, so that other intelligences are ignored. Parents are more demanding that children can master logical-mathematica and linguistic. This is because the lack of parental knowledge about multiple intelligence one of them is naturalist intelligence. Gardner's explanation through multiple intelligence is to provide knowledge to parents and teachers about plural intelligence. Gardner's explanation emphasizes that children's intelligence is not just a narrow test of intelligence or merely achievement. This plural intelligence can be managed and utilized in the learning process both inside and outside the classroom. Naturalist intelligence is an intelligence that can not be separated from the life around us. Natural intelligence is the ability to treat, identify, and classify plants, animals, and natural phenomena [3]. In addition, naturalist intelligence can be interpreted as deal with the classification abilities or flora and fauna of one's environments [4]. Children with natural intelligence love to play outside the outdoors. They really enjoy activities that are done outside the classroom such as raising animals, plants, reading books about nature, watching television about nature, or playing games about nature. This naturalist intelligence needs to be taught and instilled in children from an early age. Muhammad Yaumi reveals that naturalistic intelligence as a skill to recognize and categorize species, both flora and fauna, surrounding environment, and ability to process and utilize nature, and preserve nature [5]. The most influential people in child development are parents and teachers. Parents and teachers should have sufficient knowledge about child development. The educator's job is to make use of the early years of childhood with a high degree of concern rather than abandoning it [6]. Teachers and parents should play an active role in guiding and directing their children. Parents need to know about their interests. Parents function as child counselors while at home.

The natural environment is an environment that is very attached to the daily life of children. The contribution of nature around is very big in developing the ability of children. Parental and teacher guidance is needed in developing children's abilities. Please note that the most influential on the development of children starting from the environment around the child. The immediate environment closest to the child is

the natural environment. The natural environment teaches children to interact with the natural surroundings.

Environmental education is not only taught at home by parents. Schooled teachers also teach about Environmental Education. Through environmental learning the teacher can ask the child to participate in developing the child's abilities. Learning environment created should make children interested in malakukan activities. Development of naturalist intelligence can be done by inviting children to play outside (outdoor), field trips, project models, introduction of plants and animals through educational games games. The natural environment is the basis of human survival and physical development. The population explosion and lack of environmental awareness will surely increase environmental concerns [7]. The importance of naturalist intelligence is developed because the fact that there is now a lot of individuals who do not develop naturalist intelligence, this is evidenced by the many human beings who do indiscriminate logging, wild hunting and even forest burning, littering and also no matter the environment. that's why it teaches children about the care of the environment.

The number of parents who lack awareness of the environment so that children also lack awareness of the environment. Education environmentally sound environmentally conscious behavior by way of instilling a sense of love for the environment. Naturalist intelligence has a very big role to the surrounding environment therefore, ditanamkannya environmental awareness since early childhood. Many things can be done to instill awareness of the environment. The medium used is also diverse to instill awareness of the environment.

In the era of globalization as now technology has become more sophisticated. Many children are already familiar about gadgets. Parents can provide insight to children through gadgets. Educational game one of the visual media that has many advantages when compared with mediavisual yang lain set vidio ataupun Drawings [8]. Educational games may also invite app users to participate and take part in determining the final outcome of the educational game [9]. The use of educative game technology can help to achieve learning targets through a fun experience by involving several visual aspects, graphic appeal, competition challenges / systems, and excitement of interaction with the device [9]. Children are interacting with great excitement about digital technologies such as internet, video games, and computer games [10]. Educational games are designed to be specific in the case of education. The lessons learned in the children's schools are not easy to get bored. The game itself has a good impact when used properly and in parental control. Hasi research from Rahman et al., [8] in his research with the title of development of educational game of animal name recognition and habitat in 3 languages as multimedia-based learning media, educational game is one visual media that has many advantages when compared with other visual media such as vidio Picture.

Based on the above problems, the authors are encouraged to conduct experiments through educational games are effective in improving the naturalist intelligence of early childhood. Low intelligence naturalist child, then seen from the fact in the environment around the awareness of cleanliness is lacking. Throwing litter indiscriminately.

Number of illegal logging, hunting of protected animals. Researchers view that the necessity of learning activities held that can improve the child's naturalist intelligence.

The rest of this paper is organized as follow: Section II describes the literature review. Section III describes the materials and proposed methodology. Section IV presents the obtained results and following by discussion. Finally, Section V concludes this work and highlights the limitation.

II. LITERATURE REVIEW

Naturalist intelligence is part of the Multiple Intelligence theory developed by Howard Gardner. This naturalist intelligence relates to the ability to treat, identify, and classify plants, animals, and natural phenomena. Children who have natural intelligence love to be outside the home. Children really enjoy the activities that are being done outdoors. Developing naturalist intelligence also has a positive impact on thinking intelligence. Maintaining animals or plants can increase the child's naturalist intelligence. This naturalist intelligence is able to develop the child's self. The child will interact with humans, animals and plants.

Lunenburg & Lunenburg in [11], argue that "naturalist intelligence is the ability to understand, relate to, categorize, classify comprehend, and explain the things encountered in the world of nature." That is, naturalist intelligence is the ability to relate to, categorize, classify, understand and explain the things facing the natural world. This is in agreement with Santrock in [12] which explains that natural expertise is the ability to observe natural patterns and understand natural or man-made systems. This naturalist intelligence can be developed by inviting children to explore, play the project, tourism sesauai with the results of research from Yulita HeristiInquiri about improving naturalist intelligence throughmethod in children aged 5-6 years. The result of the research stated that the inquiry method gives big announcement to the learning about the type of plant so that it can improve the child naturalist's intelligence. The result of this research is Naturalist Intelligence can be developed through edu-tourism. The better the naturalist intelligence in the child, the greater the sense of awareness of the environment. Children will be more concerned with the environment. Teachers and parents are instrumental in this. Directing a child or teaching him to keep clean. Parents can take their children to play in the park, outdoors, outbound, field trips.

Based on some of the above definition that naturalist intelligence is essentially related to the content of nature, that is both the flora and fauna.Oleh therefore we can synthesize that naturalist intelligence is the ability to recognize, distinguish, reveal and create related categorization, with flora (plants) and fauna (animals) as well as natural objects that exist in the environment.

Learning process that develops multiple intelligence especially naturalism can be done by inviting children to work tour. Learning planning should be developed in detail in developing child naturalism. Teachers can do the learning process by making the classroom atmosphere beautiful. In the learning process is filled out about the classification of plants or animals. Children in the learning process are taught about environmental pollution. The child goes directly to nature so that the child can understand clearly with nature. Schools

provide learning aids that support early childhood naturalist intelligence. According to relevant research the school can develop a learning process that can arouse the child's environmental awareness. The learning process conducted in the classroom can not be separated from the learning media. Learning media can support learning process activities so that children are not easily bored. Learning media used should interest the child. Zaman and Eliyawati in [12], stating that the media in the learning process can enhance the learning process of students in learning and also expected to enhance student learning outcomes. Many researches are conducted on the use of learning media. Without learning media, the learning outcomes of children are less than optimal. Therefore, the use of instructional media is highly recommended to improve the quality of learning. Technology in Education is used as a medium of learning media. Technology is applied in Early Childhood Education to keep children out of date. However, at this time there are still many schools that have not applied technology in the learning process.

Quality and effective learning is intrinsically related to the achievement of learning outcomes that need to be mastered by the learners through learning process designed by the program developer Munir in [13] The research titled the development of educational game of animal name recognition and its habitat in 3 languages as a medium of learning based multimedia, educational games is one visual media that has many advantages when compared with other visual media such as video or picture. Educational games may also invite app users to participate and take part in determining the end result of the educational game. Mortara et al., [9], argue that the role of utilizing educational game technology can also help to achieve learning targets through a pleasant experience by involving several aspects of visual, graphic appeal, competition challenges / systems, and intrusive interaction with the device. In the selection of learning for children must be tailored to the characteristics of early childhood. Educational games are not only able to develop cognitive and child language. Educational games of animal recognition, animal care, plants, plant origin knowledge through educational games see the video.

The introduction of plants can improve children's naturalist intelligence by introducing the types and names of plants, parts of plants, and how to care for the plants. In the daily life of the child is very close to the environment, especially in plants that exist around the house. Observing the environment and plants that are around the house is also able to improve the child's naturalist intelligence with parental guidance. Explain to the children the types of plants that are around: (1) cassava plants, (2) flower plants, (3) grain crops, (4) vegetable crops, (5) fruit plants and others.

Researchers make initial observations seen children still throw garbage carelessly, and less love in plants so that children are still often pull and pick plants around them. Children are seen looking for small animals around to be killed and persecuted. If it continues it will become a habit that does not change until the child grows up, the child will be a person who has no love for the plants, the child does not care about the destruction of nature / forest, even children can easily become a person who destroys the natural environment own.

If the nature / forest has been destroyed by humans then over time will cause imbalance in the ecosystem. It is so that causes the threat of natural disasters that hit.

III. MATERIALS & METHODOLOGY

This section presents the data used and the proposed methodology.

A. Participants

Participants to be examined in this study are children aged 5-6 years. As for children aged 5-6 years totaling 184 children, the experimental class is 92 people, and the control class is 92 people. There are 2 groups of each selected randomly (R). The first group is treated (X) and the other group is not. The treated group is called an experiment and an untreated group is called a control. The problem studied is the extent of children's intelligence, in the experimental class that uses learning activities using educational games while in the control class using the center of natural materials liquid.

B. Method

research uses quantitative research type. In this study there is a group of experiments and control groups. This study involved different treatments between the experimental class and the control class. this study uses t test with the help of SPSS 22.

IV. RESULTS AND DISCUSSION

Based on the test of this research hypothesis is how effective the use of educational games for naturalist intelligence of early childhood. Based on the mean result, the experimental naturalist intelligence of the experimental group is the children doing the learning activity using educational game while the control group that is the children doing the learning activity using the demonstration revealed the difference of the result based on the mean value that is 67,76 > 60,40. Based on the analysis of t-test the experimental group has a higher mean value than the control group's average value. Based on the analysis of t-test obtained tcount of 8.523 while the value of t-table with degrees of freedom (df) 54 significance level $\alpha = 0.05$ is equal to 2.669. The significance level $\alpha = 0.05$ seen significant value 2 direction (t-tailed) 0,000 < real level of 0.05. Thus the value of t-count is 7,006 > t-table 2,603. Based on the descriptive value proved experimental group learning using educational games more effectively. Then H0 hypothesis is rejected and H1 accepted, so H1: $\mu_1 \neq \mu_2$ this indicates that there is significant effectivity between child naturalist intelligence doing learning activity using educational game and control group that is children doing project learning activity in Table I.

TABLE I. GROUP STATISTICS

group	N	Mean	Std. Deviation	Std. Error Mean
experim ental	92	67.76	5.307	values,553
control	92	60.40	6.358,	663

TABLE II. INDEPENDENT SAMPLES TEST

	Levene's Test for Equality of Variances	t-test for Equality of Means								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error	95% Confidence Interval of the Difference	
									Lower	Upper
Equal variances assumed	2.720	.101	8.523	182	.000	7.359	.863	5.655	9.062	
Equal variances not assumed			8.523	176.367	.000	7.359	.863	5.655	9.063	

From the Table II, results of the analysis of these studies menunjukkan that learning to use the game education is more effective than project learning. Learning activities using educational game media is more desirable by children. This is because children are more likely to play games. This educational game is more effective in improving the child's naturalist intelligence. As the development of today's technology interests more children to technology. New media used by teachers will stimulate children's interest to learn. This game introduces about a variety of plants and animals. How to care for plants and animals is also applied in this game. Interest in children will play very high games. Children are more interested in using new media while learning the process. Teachers must be good at making media for learning. In addition to playing about animals and plants, children can also play simulated natural disasters. The consequences of what will happen if we pollute the nature around us. Teaching children to preserve the natural surroundings through this game is one of the small things that parents and teachers can do in introducing nature to children. Developing the child's naturalist intelligence is not easy. All begins from adults who teach first. Has awareness of the importance of the mini-style. This educational game can also stimulate the naturalist intelligence of early childhood.

Based on the results of this study, it can also be seen that the less effective method of demonstration in developing the child's naturalist intelligence. Children tend to be less antusia listening to what the teacher says. A short concentration of children also affects the focus or not on what the teacher says. The media used in explaining to children is less interesting. Demonstration here the teacher only explain dipapan only without bringing a real media for children. At this age the child is very interested in real and interesting media. A good stimulus to the child is encouraged in the medium of interest used.

V. CONCLUSION

Based on the results of the research discussion it can be concluded that there is a significant difference between educational games with the demonstration. This difference is very significant. More efektif using educational games rather than monotonous demonstration methods. The media used is very influential on the learning process and the child's interest in learning media. This shows the result of SPSS 20 t test that is $t_{hit} = 8,523 < t_{tabel} = 2,603$ and result. Educational game

learning activities to improve the child's naturalist intelligence. Adults can motivate and introduce other media that can be used in developing early child naturalist intelligence.

C. Limitations

The limitations of this study on the number of schools that do not yet have computer laboratories. The implications of this study in improving the naturalist intelligence of children aged 5-6 years.

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