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The Effect of Ethnomathematics Approach on Numbers 1-20 Counting Skills for Children 4-6 Years Old

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ABSTRACT

Children aged 0-6 years are at an age where cognitive development is very rapid. Counting ability is one of the things that cannot be ignored in this case. The Ethnomathematics approach is an approach that prioritises cultures that contain mathematical values This study aims to determine the ethnomathematics approach to counting skills 1- 20 students aged 4-6 years. This research is a quasi-experimental research with posttest only control design, with a sample of 22 children out of 44 students at RA Al-Qur'an Dina Padang Matinggi. The results showed a significant effect of initial counting ability on the final counting ability of experimental class students using the ethnomathematics approach.experimental class students who used the ethnomathematics approach. Statistical results show the value of F = 18,861 with a significance of 0.000 (p < 0.05). The Ethnomathematics approach can be used in the learning process at the early childhood education level. So that counting skills can develop through this approach. And of course it is necessary to pay attention to the understanding of the culture possessed by students after the learning process is carried out.

INTRODUCTION

Cognitive development shows the child's ability to think critically and solve problems. Preschool children are considered part of the pre-operational stage of development (2-7 years), according to cognitive development Hikmawati et al., (2022). Given the importance of number concepts in everyday life, children must be taught and guided about numbers as early as possible with guidance that is in accordance with early childhood cognitive development. Early childhood development consists of six aspects of development. These development aspects are physical-motor, language, cognitive, religious and moral values, social-emotional, and artistic development (Khaironi, 2018 ; Hikmawati et al., 2022). All aspects of development need to be stimulated appropriately so that children can grow and develop optimally. One aspect of development that needs special stimulus and attention is the aspect of cognitive development.

The cognitive process is closely related to the level of intellectual intelligence that refers to thinking, knowledge, and reasoning, where this cognitive process concerns the development of children's thinking Kurinci et al., (2022). Aspects of cognitive development, especially the ability to recognize number symbols 1-20 (Wondal et al., 2020). Recognizing numbers is one of the important aspects that will be developed in Early Childhood Education. Knowing numbers 1-20 is intended so that children have the basis they need to be able to think critically when they continue to the next level of education, developing the ability to recognize number symbols 1-20 can i improving their thinking

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skills (Winarsih & Windi Wahyuni, 2019). Mathematics is an excellent subject to develop students' intellectual competence (Lubis et al., 2021). Early childhood numeracy skills are important to stimulate to develop children's knowledge and skills not only to interpret numbers and number operation skills but related to problem solving skills and the application of mathematics in everyday life (Sulistiyaningsih, 2023)

Early childhood is a child whose age ranges from 0 to 6 years. This age is the age from birth until the child will continue basic education. In line with that, Mulyani, (2020) says that the age of children under 6 years is a golden age and also a critical period in the stages of life, which will determine the development of children in the future. At this age, children's development is faster. Therefore, early childhood is considered so important that it is referred to as the golden age. The golden age in question is based on the results of research conducted by Keith Osborn, Burton L, White, and Benyamin, S. Bloom in Mutiah, (2010) stated that children's intellectual development occurs very rapidly in the early years of a child's life. About 50% of adult intelligence variability occurs when the child is four years old, the next 30% increase occurs at the age of 8 years, and the remaining 20% in the middle or end of the second decade (Nasional, 2008). Every human life begins at an early age and develops and grows with age. However, early childhood is a phase in human development, so the existence of early childhood cannot be ignored.

Early childhood is the most appropriate time to stimulate individual development Khaironi, (2018). Creativity is defined as the ability to see things from different perspectives and the ability to find solutions and make choices (Ata-Akturk & Sevimli-Celik, 2023). At this time it can provide various knowledge efforts regarding the development that occurs in early childhood. These stages include the sensorimotor stage (0-2 years), pre-operational (2-7 years), concrete operational (7-11 years), and formal operational (11-15 years) (Hanfstingl et al., 2019). Furthermore Khaironi, (2018) says that knowledge of early childhood development will be the basis for parents and educators in preparing various stimulations, approaches, strategies, methods, plans, media, or educational game tools, which are needed to be able to develop each aspect of development in accordance with the needs of children at each age stage. Innovations can make learning more meaningful (Sefriyanti & Ibrahim, 2022). In line with research from (Peyre et al., 2016) children's cognitive ability is influenced by school, peers, cognitive stimulation, parental education, birth weight, and breastfeeding duration.

Based on preliminary studies, it is known that in group A children at RA Al-Qur'an Dina Padang Matinggi, it is known that there are 15 out of 22 children who do not recognize the concepts and symbols of numbers well. This is indicated by children being able to mention the numbers one, two, three, to the number twenty, but not yet able to identify the number 11 with the word eleven, the number 12 with the word twelve, to the number 20 with the word twenty and the child's understanding is still limited to memorization. It can be seen that children are only able to mention the sequence of numbers or numbers, but have not been able to show the numbers they say correctly. Children are also only able to imitate number symbols but have difficulty remembering and repeating the number symbols they imitate. These results prove that children's knowledge and ability to recognize numbers have not developed well.

The learning methods applied by teachers at RA Al-Qur'an Dina Padang Matinggi still use the lecture and storytelling methods. Teachers also still use the singing method at the opening of the lesson. Like saying numbers 1-20 with songs that seem the same as the next day, where there is no creation that can increase children's interest in learning. So that these efforts are still considered less than optimal. The impact of this is not only on children's cognitive abilities but also on other aspects of children. As stated by (Siregar, 2023), children's concern for friends and the environment is also still low, such as sharing food or toys and helping friends who are in trouble. The lack of children's concern for the surrounding environment triggers low responsibility in children. From this it can be concluded that the learning methods used are still monotonous. One of the tools that can help teachers stimulate aspects of child development in learning activities is media. Learning media becomes a bridge of communication between teachers and children in learning activities (Siregar, 2021).

Educators can develop all materials that help develop children's potential both in terms of children's reasoning and how children think in learning (Mamonto et al., 2022). It is necessary to have the right methods and strategies to introduce the concept of number to children. Learning that is in accordance with the characteristics of early childhood. As stated by (Hayati et al., 2021), currently the learning method for early childhood uses the method of "learning while playing, playing while learning"

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in accordance with the characteristics of early childhood, namely play. Of course, a learning approach that is attached to the daily life of children and their environment is needed. The term ethno describes all the things that make up a group's cultural identity, namely language, codes, values, jargon, beliefs, food and clothing, habits, and physical traits. One of the things that can bridge between culture and education, especially mathematics, is ethnomathematics. Ethnomathematics is a form of culture-based learning in the context of mathematics. (d'Ambrósio, 2006) states that ethnomathematics can be analogized as a lens to see and understand mathematics as a cultural product or cultural product.

Learning innovation is needed so that learning mathematics can be more fun (Lubis & Widada Wahyu, 2020). Teachers as facilitators play an important role in this. Providing a comfortable school environment and varied and interesting methods will accommodate children to more easily adjust to the environment (Siregar & Nabila, 2022). Things that are real and related to students' daily experiences can be used as interesting learning resources. (Lubis et al., 2021) (Widada et al., 2018)said that students solve mathematical problems through an ethnomathematics-based mathematical process, and students realize that ethnomathematics is the starting point of horizontal mathematical activities. So that innovation in learning is needed so that learning mathematics can be more fun and learning objectives can be achieved. In line with the above findings, (Widada et al., 2018) stated that students who were given ethnomathematics-oriented materials and mathematics understanding were higher than students who used a realistic mathematics learning approach after controlling for students' initial abilities.

Ethnomathematics is a representation of a daily mathematics practice or a culture of a particular group in a socio-cultural environment(D'Ambrosio, 1985)(D'Ambrosio, 1998). by The application of ethnomathematics, in the form of local culture, in mathematics learning can reduce the perception of the society concerning the lack of connection between mathematics and daily life(Widada et al., 2018). By applying the surrounding culture as the starting point of mathematics learning, ethnomathematics can be the integrated component of mathematics education (Widada et al., 2018). Therefore, ethnomathematics can be integrated into the mathematics curriculum intensively (Rosa & Orey, 2011). This is rational as ethnomathematics is a subfield of mathematics history and mathematics education with a natural connection to anthropology and science (D'Ambrosio, 1985). Ethnomathematics can build mathematical reasoning and mathematics as a cultural construct (Widada et al., 2018). Based on the above problems, it can be concluded that children aged 4-6 years (group A) should be able to understand the concept of numbers 1-20 well. This is in accordance with the Regulation of the Minister of Education and Culture of the Republic of Indonesia number 137 of 2014 concerning national standards for early childhood education. Where, the level of achievement of child development in the scope of symbolic thinking at the age of 4-6 years is being able to count many objects one to ten, recognize the concept of numbers, recognize number symbols, and recognize letter symbols. In response to the above problems, one alternative that can be used to overcome these problems is to use realistic learning about life around us as a way to introduce numbers to children. This learning can be introduced to early childhood because it has many benefits, including helping children recognize numbers. One of the learning approaches that can be applied is the ethnomathematics approach. In connection with the above problems, the researcher was encouraged to raise the title " The Effect of Ethnomathematics Approach on Numbers 1-20 Counting Skills for Children 4-6 Years Old".

METHODS

The research used is a quasi experiment, namely nonequivalent control group design. This type of research is quasi experimental research, namely nonequivalent control group design. The population in this study were all children in RA Al-Qur'an Dina Padang Matinggi consisting of two classes (one class in group A and one class in group B) with a total of 44 students. The sample in this study were 22 children in RA Al-Qur'an Dina Padang Matinggi. The class used consisted of one experimental class and one control class.

Class	Treatment	Posttest
Experiment	Ethnomathematics Approach	O_1
Control	-	O_2

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The data used in this study are 1-20 counting ability test data. The test given to the ethnomathematics approach experimental class was ethnomathematics-oriented learning in the form of LKS with the same questions totalling 5 questions. Indicators of children who have the ability to count are being able to count the number of objects, knowing the numbers 1 to 20, counting numbers, the readiness of the child himself to recognize numbers, add and subtract numbers, classify numbers, understand the number of objects that are many or few, the same or not the same, large or small, and children communicate with friends or others using these numbers. and communicate with friends or other people using the number. The data analysis used is Anacova. Initial numeracy refers to the entire set of basic competencies consisting of oral counting, enumeration, number relationships, collection comparisons, arithmetic calculation strategies, and number decomposition. Grids or indicators of numeracy skills on the entire set of basic competencies consisting of oral counting, enumeration, number relationships, collection comparisons, arithmetic calculation strategies, and number decomposition.

RESULTS AND DISCUSSION

In the research conducted in class X RA Al-Qur'an Dina Padang Matinggi, researchers used the ethnomathematics approach with number counting material. The number of face-to-face meetings conducted by researchers was six times, with details of two meetings as pretest and posttest, and four meetings as a learning process in class. The ethnomathematics approach was used in the experimental class and the conventional model was used in the control class. With the number of students in the experimental class and control class being 22 students each. Pretest and posttest were conducted to see students' initial and final abilities in the form of a number counting ability test sheet. Based on the results obtained from the test, the highest score for the experimental class was 92 and the control class was 83. This can be seen in Table 1 below.

Table 1. Pretest and Posttest Data of Number Counting Ability

Statistics	Experimental Class		Control Class	
	Pretest	*Posttest*	*Pretest*	*Posttest*
Maximum Value	57	92	59	83
Minimum Value	24	68	20	62
Average	37.00	78.86	32.91	71.23
Variant	63.45	49.48	86.90	31.90
Standard Deviation	7.97	7.03	9.32	5.65

Furthermore, it continued with the requirements test, namely testing the prerequisites that must be met in testing using the Anacova test, namely normally distributed data and homogeneous variance. The power normality test is used to determine whether the population data for the two variables is normally distributed or not. The results of the normality test can be seen in Table 2 below.

Table 2. Normality Test

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Experiment	*Pretest Ethnomathematics*	.094	22	.200*	.969	22	.679
	Posttest Ethnomathematics	.114	22	.200*	.954	22	.380
control	*Pretest Kontrol*	.146	22	.200*	.929	22	.117
	Posttes Kontrol	.174	22	.081	.939	22	.191

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Table 2 shows that the tests carried out with Kolmogorov-Smirnov and Shapiro-Wilk. (2-tailed) for pretest-posttest scores, pretest and posttest scores for the ethnomathematics approach in experimental and control classes are more than 0.05, so it can be concluded that the initial ability and final ability of students are normally distributed, the next step is to conduct a homogeneity test. The results of the homogeneity test can be seen in Table 3 below

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Table 3. Numeracy Ability Scores For The Experimental Class And Control Class

	Levene Statistic	df1	df2	Sig.
Counting Numbers	2.828	1	42	.100

This homogeneity test uses Levene's test of equality of error variance. The data to be tested is the ability to count in the experimental class and control class to see if the two groups are homogeneous or inhomogeneous. Homogeneous if the sig value> 0.05. Then the table shows a sig value of 0.100 (sig> 0.05), so the two classes are homogeneous. The prerequisite test has been fulfilled, where the data is normally distributed and the variance is homogeneous. Next, proceed with hypothesis testing bellow.

H0: There is no linear effect of the covariate of initial counting ability on the average final counting ability of 1-20 children aged 4-6 years who learn with an ethnomathematics approach with control class students who learn with a conventional learning model.

Ha: There is a linear effect of the covariate of initial counting ability on the average final 1-20 counting ability of 4-6 year old children who learn with an ethnomathematics approach with control class students who learn with a conventional learning model.

With testing criteria, accept Ho if the sig value > α, and reject Ho if the sig value < α. The results of the hypothesis testing carried out show that there is a significant linear effect of the covariate of initial counting ability on the average final counting ability of 1-20 children aged 4-6 years who learn with an ethnomathematics approach with control class students who learn with a conventional learning model. The test results can be seen in Table 4 below

Table 4. Tests of Between-Subjects Effects

Dependent Variable: Numeracy Ability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1220.833[a]	2	610.417	12.513	.000	.379
Intercept	10080.244	1	10080.244	206.630	.000	.834
Pretest1	189.720	1	189.720	3.889	.055	.087
Class	822.567	1	822.567	16.861	.000	.291
Error	2000.144	41	48.784			
Total	244313.000	44				
Corrected Total	3220.977	43				

a. R Squared = .379 (Adjusted R Squared = .349)

Based on the results of the analysis, it can be seen that the statistical value of F = 16,861 with a significant probability figure of 0.000 (p < 0.05). with a significant figure of 0.000 which means Ho is rejected and Ha is accepted. Assuming that there is a significant linear effect of the covariate of initial numeracy ability on the average final numeracy ability of RA Al-Qur'an Dina Padang Matinggi experimental class students who learn with an ethnomathematics approach with control class students who learn with a conventional learning model.

Before the sample class is given treatment by applying an Ethnomathematics-based learning model, a pretest is first given as an initial description of the child's condition. After the researcher gets the initial results of the child on the subject of counting numbers 1-20, the next action is for the researcher to provide treatment, namely by using an Ethnomathematics-based learning model. After the sample class is given treatment, the children are given a final activity sheet (posttest). The learning process in the sample class begins by conveying learning objectives and providing an explanation of the Ethnomathematics-based learning model that will be used in the learning process, then the children are given motivation in the form of clapping and singing together in accordance with the learning theme.

A fun learning process makes children concentrate and not feel bored when following the learning process in class. Based on the observation results, there are changes in children, where at the beginning of the activity there were several children who did other activities and were indifferent during the learning process. This can be seen in the first meeting, there were as many as 12 children who did not pay attention to learning. Meanwhile, at the second meeting only 5 children did other activities and did

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not pay attention to learning. The application of the Ethnomathematics-based learning model can also make children better understand the concept of numbers. Children are much more understanding about numbers 1-20 during Ethnomathematics-based learning.

Learning is carried out using an Ethnomathematics-based learning model so that it is obtained that the increase in children's learning outcomes regarding the ability to count numbers 1-20 is better than using the lecture and singing method in group A (aged 4-6 years) RA Al-Qur'an Dina Padang Matinggi, in other words, it can be concluded that there is a significant effect of using an Ethnomathematics-based Learning Model on the ability to count numbers 1-20 about recognising the concept of numbers, counting numbers 1-20, sorting and matching numbers. In the ability to count 1-20 children still cannot fully improve. This is because the learning approach is still very rarely used with children. But children have literacy and have a sense of excitement about culture in the learning process of counting 1-20.

The cognitive development achieved such as the ability to recognize simple concepts in everyday life, the ability to recognize and classify objects based on the shape, color, size and function of an object, counting 1-10, connecting numbers with numbers and the ability to recognize letters (Herentina & Yusiana, 2012). These stages include the sensorimotor stage (0-2 years), pre-operational (2-7 years), concrete operational (7-11 years), and formal operational (11-15 years) (Hanfstingl et al., 2019). Initial numeracy refers to the entire set of basic competencies consisting of oral counting, enumeration, number relationships, collection comparisons, arithmetic calculation strategies, and number decomposition (Sulistiyaningsih, 2023). This is in line with the opinion (Wahyu, 2022) that traditional games are a means of natural educational learning that has grown and developed for a long time which is synergistically connected with nature. (Naafi' & Irawan, 2022) stated that modifying traditional games that are packaged in such a way, will make a very interesting game choice. Traditional games are a place for educators to create games that can stimulate all aspects of child development. Traditional games are hereditary or inherited from the ancestors (Siregar & Nabila, 2022).

There are 15 (fifteen) traditional games that develop aspects of cognitive development. These games consist of belajur, gade, jiret, sit, bekel, tolang bajek, sut jalan, geplek, span, terompah, bale-balean, rubber, manuq-manuqan, play stone, selae. The development of cognitive aspects seen from the child's ability to solve problems, have ideas to solve problems, count, and strategise (Nilawati Astini et al., 2022). In line with this, ethnomathematics-based teaching aids used in the learning process can stimulate cognitive development, attract children's interest in learning while playing, and help them to optimise their potential.(Stefanus Taneo et al., 2024). Numeracy skills are important predictors of academic achievement, which is why a focus on improving numeracy skills is recommended from early education (de Chambrier et al., 2021).

The results of this relevant research tend to be the same so that it is used as relevant research by researchers. One of the factors that determine the success of learning mathematics is the learning media used (Sulistiyaningsih, 2023). The interconnected steps of Ethnomathematics-based learning and indicators of the ability to count numbers 1-20 show that the Ethnomathematics-based learning model can improve children's ability to count numbers 1-20. This is in accordance with the theory that says that the Ethnomathematics-based learning model is a model based on local or cultural wisdom, where children must have references to the culture around them so that they can be linked to a lesson concept in a fun atmosphere. Numeracy skills are essential for early childhood (Sulistiyaningsih, 2023)

Thus the Ethnomathematics-based learning model can affect children's counting ability with an increase in the scores obtained by children. Children who are taught using an Ethnomathematics-based learning model have better results in achieving indicators of the ability to count numbers 1-20. Learning through traditional games is intended so that educators can present a learning atmosphere that is not boring, so that students are able to focus their attention on learning activities to improve the quality of learning. Through these traditional games, children inadvertently develop various aspects of their development. Traditional games can be an alternative media that can improve various aspects of development to be more optimal. Traditional games are similar to sports because they have rules and can provide fun, relaxation, excitement, and challenge.(Wahyu, 2022). The provision of developmental stimulation must be through concrete things or objects and the need for teacher creativity in providing a variety of learning activities (Sefriyanti & Ibrahim, 2022). Numeracy skills also mediate the relationship between executive function and math achievement in early childhood (Chan & Scalise, 2022).

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CONCLUSIONS

From the results of the discussion, it can be concluded that there is a significant linear effect of the pretest covariate of the ability to count numbers 1-20 on the final average of the ability to count numbers 1-20 in early childhood aged 4-6 years taught using the ethnomathematics approach better than the conventional learning model. with a statistical value of F = 18.861 with a significant probability of 0.000 ($p < 0.05$). So that the ethnomathematics approach can be applied as an innovation in early childhood learning and can be used to preserve culture from generation to generation starting from an early age. The Ethnomathematics approach can be used in the learning process at the early childhood education level. So that counting skills can develop through this approach. And of course it is necessary to pay attention to the understanding of the culture possessed by students after the learning process is carried out.

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