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The Influence of Ethnomathematics Through a Variety of Betawi Batik Motifs on the Numerization Literacy Ability of Grade IV Students of SDN Cipinang Besar Selatan 20 Pagi

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Abstract: This research aims to see the influence of ethnomathematics through various Pattern of Batik Betawi on the Numerization Literacy Ability of class IV students on flat shapes learning material. This research was conducted at SDN Cipinang Besar Selatan 20 Pagi with a sample of fourth grade students in the second semester of the 2023/2024 school year. Samples were taken using the Single-Stage Cluster Sampling technique. The method used is a quasi-experimental research method with a pretest-posttest control group design research design. The data was collected using an instrument in the form of descriptions that have been theoretically and empirically validated. The results of the research analysis showed that the average pre-test result for the experimental class was 6.73 and the post-test was 8.50 which its show a bigger increase of 1.77 points in the experimental class that applied an ethnomathematics approach rather than the control class that applied conventional learning. Therefore, the alternative hypothesis can be accepted and it can be concluded that the application of Ethnomathematics through various pattern of batik Betawi has a positive effect and able to improve students' numerization literacy skills.

Keyword: Ethnomathematics, Pattern of Batik Betawi, Numeracy Literacy

INTRODUCTION

Along with the times, literacy activities are not only about reading and writing activities but have a wider scope such as numerization literacy. Numerical literacy is the ability to acquire, interpret, use, and communicate various kinds of numbers and mathematical symbols in solving contextual problems in daily life (Mahmud & Pratiwi, 2019). Numerical literacy is based on reasoning in analyzing and understanding a statement, through various activities involving symbols and language in mathematics found in daily life, and revealing the statement through oral and written words (Ekowati et al., 2019). There are several main aspects that are indicators of the achievement of proficiency in numerical literacy skills in the form of arithmetic aspects, numeracy relations, and arithmetic operations (Perdana & Suswandari,

2021). In his description, counting is the ability to count an object verbally and the ability to identify the number of objects.

Understanding the importance of numeracy literacy in daily life, it is very unfortunate to know that Indonesia is at the bottom of the Survey Programme for International Students Assessment (PISA) in numerical literacy ability, this is shown through the absence of an increase in Indonesia's ranking in mathematical literacy from 2009 to 2015. Then in 2009 Indonesia held the position of 68 out of 74 countries, the 64th position out of 65 countries with a fairly low level of achievement in 2012, and there was a slight increase in the position in 2015, namely the 63rd position out of 72 countries. The results of three surveys indicate that the numerization literacy ability of students in Indonesia is still very low and quite concerning (Ayuningtyas & Sukriyah, 2020).

Based on the results of observations and interviews conducted by the author to the homeroom teacher of grade IV of SDN Cipinang Besar Selatan 20 Pagi. It was found that students' interest and numerization literacy ability were relatively low, as evidenced by the results of students' mid-semester summative scores on mathematics material that were not satisfactory, this was also due to the fact that there were several students who experienced difficulties in explaining, analyzing, and identifying various forms of flat buildings.

At the elementary school level, the development of elementary mathematics learning, refers to the concept of collaborative, thematic, and integrated learning which in its implementation as one of the efforts to improve students' literacy and numerization skills has been carried out through cross-curriculum and thematic learning which is the implementation of learning activities carried out by educators by creating learning activities that involve numeracy in several subjects that to be studied (Patriana et al., 2021). One learning theme is several subjects that are designed by themselves using methods, models, approaches, and provide media that can make it easier for students to understand numeracy material easily (Yustitia & Juniarso, 2020). The low level of numerization literacy is not spared from the influence of the low motivation of numerization literacy that students have, students think that learning mathematics will be difficult and numerization literacy activities will be boring.

Seeing these worrying conditions, it is necessary to innovate and provide real examples of the implementation of flat building geometry elements in various daily activities, objects, and cultures around students so that students gain a more concrete understanding. Incorporating aspects of ethnomathematics, culturally based mathematics, can help students develop a greater interest in mathematics (Agustin et al., 2019).

Ethnomathematics is known as an approach that integrates mathematics learning with cultural aspects which is certainly an innovation in the exploratory learning process about the culture around the environment where students live, namely DKI Jakarta such as the introduction of various forms of flat geometri buildings in Betawi batik motifs (Faqih et al., 2021).

Ethnic native to Jakarta, the Betawi ethnic group has a variety of local cultures and wisdom that can be used as a source of value in packaging learning plans, learning resources and learning media in Elementary Schools (Suryaningsih & Putriyani, 2022). As is known, Betawi culture is certainly thick with a variety of cultural objects ranging from Betawi traditional houses, music and songs, traditional food to typical Betawi clothing and batik that can be used as objects or media for the application of ethnomathematics.

One form of Betawi culture that can be used as an ethnomathematical object is typical Betawi batik, where this batik has a variety of beautiful motifs and patterns and contains elements of Betawi culture itself such as the ondel – ondel and tanjidor motifs (Nursyeli & Puspitasari, 2021). In addition, by using Betawi batik as a medium in improving literacy skills and numerization of students, teachers also indirectly educate students about Betawi batik culture.

METHOD

The method used is the Quasi Experimental Research Method. The Quasi Experimental Research method is an experiment that is carried out by placing the smallest unit of the experiment into the experimental and control groups (Hastjarjo, 2019).

The ethnomathematical approach through a variety of Betawi batik motifs will be applied to the experimental group to see if the application of the ethnomathematical approach through a variety of Betawi batik motifs has a positive influence on improving students' numerical literacy skills, while the conventional learning method is applied to the control group as a reference.

The research design used is pre-test & post-test control group design. The following is an illustrative table of the research design.

Table 1. Pre-Test and Post-Test Control Group Design Research Design

Group	Pre-test	Treatment	Post-test
R (Experiment)	01	X	02
R (Control)	03	C	04

Source: Priadana & Sunarsi (2021)

The group of grade IV students from SDN Cipinang Besar 20 Pagi was selected as a sample for the study, Based on the results of the draw, class IV-A was selected as the experimental group and class IV-B as the control group. Class IV-A consists of 30 students and class IV-B consists of 30 students, so there are 60 students in this study who are used as samples. The data analysis technique in this study uses the Normality Test, Homogeneity Test and hypothesis testing is carried out using the Paired sample T-Test or t-test.

RESULTS AND DISCUSSION

This research is quantitative in which the data produced is in the form of numbers obtained through the provision of pre-test and post-test description tests that have been validated to measure the numerization literacy ability of students in both groups, The acquisition of pre-test score data was obtained through the calculation of the results of students' work in working on description question instruments in grades IV-A and IV-B, before the application of the Ethnomathematics approach and conventional learning (Lecture).

The pre-test data obtained was then analyzed to see an initial picture of students' numerical literacy skills. The following is a table of data calculation results through SPSS 29 version.

Table 2. Pre-Test Acquisition Score

Table Head	Descriptive Data Pre-Test Experiment and Control			
	N	Minimum	Maximum	Mean
Pre-test Experiment	30	4	10	6,73
Pre-test Control	30	2	10	6,07

Source: Research data

Based on the results of the pre-test above, it can be seen that the calculation and data analysis was carried out using SPSS 29 Version, it was found that the results of the pre-test of the experimental class amounted to 30 students with an average score of 6.73, the lowest score of 4 and the highest score of 10, the pre-test of the control class amounted to 30 students with an average score of 6.07, the lowest score of 2 and the highest score of 10.

The acquisition of post-test score data was obtained through the calculation of the work results of grade IV – A students who have applied an ethnomathematical approach through a variety of Betawi batik motifs and IV – B who have applied a conventional approach (Lecture).

The post-test data obtained was then analyzed to see an initial picture of students' numerical literacy skills. The following is a table of data calculation results through SPSS 29 version.

Table 3. Post-Test Acquisition Score

Table Head	Descriptive Data Pre-Test Experiment and Control			
	N	Minimum	Maximum	Mean
Pre-test Experiment	30	6	10	8,50
Pre-test Control	30	4	9	7,30

Source: Research data

Based on the application of the ethnomathematical approach through a variety of Betawi batik motifs in the experimental class, it was found that the results of the post-test obtained with an average score of 8.50, the lowest score of 6 and the highest score of 10, the post-test class through conventional learning activities obtained an average score of 7.30, the lowest score of 4 and the highest score of 9.

The increase in the average grade score was higher as shown by the experimental class that applied the ethnomathematics approach by 1.77 points compared to the control class by 1.23 points so that it can be said that the numerization literacy ability of the experimental class students has increased more than the control class, this shows that there is a positive influence of the application of ethnomathematics through a variety of Betawi batik motifs on the numerization literacy ability of students.

The results of obtaining student score data were then analyzed through the Shapiro-Wilk normality test. The following is an analysis table of normality tests obtained for pre-test and post-test of experimental classes and control classes.

Table 4. Normality Test for Acquisition of Pre-Test and Post-Test for Mathematical Numerization Literacy Ability

	Pre-Test & Post Test Normality Test					
	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pre-Test Eksperimen	.136	30	.165	.953	30	.198
Pre-Test Kontrol	.215	30	.001	.951	30	.178
Post-Test Eksperimen	.074	30	.200*	.974	30	.653
Post-Test Kontrol	.160	30	.049	.931	30	.053

a. Lilliefors Significance Correction

Source: Research data

Based on the results of the analysis in the table, it is known that from 30 students in each class with a significance level value of 0.05, the results of the pre-test normality test of students in the experimental group were 0.198 and in the control group of 0.178. Then the results of the post-test normality test of students in the experimental group were 0.653 and in the control group were 0.053. With this, the pre-test results of the experimental group and the control group obtained a significance value greater than the significance level value, so that it can be stated that the obtained data is distributed normally.

Then the sustainability of the research data test was analyzed through the homogeneity test process, where the barlett test was chosen as the basis for homogeneity decision-making with the results of the research data test declared homogeneous. The results can be seen in the following table.

Table 5. Homogeneity Test: Bartlett's Literacy Ability Numerizes Mathematics

Homogeneity Test: Barlett	
Box's M	1.211
F	Approx. 1.191

df1	1
df2	10092.000
Sig.	.275
Tests null hypothesis of equal population covariance matrices.	

Source: Research data

Based on the results of the barlett test, it was found that the Nsig was 0.275, which on the basis of making decisions on the barlett test if the Nsig > 0.5, the data was declared homogeneous, but if the Nsig < 0.05, the research data was declared not homogeneous. Thus, the research data in the experimental and control groups is stated to be homogeneous.

The testing of the research data was continued by conducting a hypothesis test in which the hypothesis test of the T-test type was chosen to see how much impact the application of ethnomathematics through a variety of Betawi batik motifs on students' numerical literacy skills. The following is a table of the results of the t-test calculation through SPSS 29 Version.

Table 6. Hypothesis Test: T-Test

		Hypothesis Test: T-Test					Significance				
		Paired Differences									
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	One Sided p	Two Sided p	
					Lower	Upper					
Pair 1	Experiment Pre-test and Experiment Post-test	-	1.367	1.790	.327	-2.035	-.698	4.181	29	<.001	<.001

Source: Research data

Based on the results of the t-test, it was found that the Nsig < 0.05 was 0.001 which showed a significant difference between the initial variable and the final variable, which indicated that there was a significant influence on the difference in treatment given to each variable, strengthened by the results obtained post-test (8.50>7.30). It was stated that Ha was accepted H0 and rejected. Thus, it can be concluded that an alternative hypothesis is acceptable and it is proven that the application of ethnomathematics through a variety of Betawi batik motifs has a positive influence on the numerical literacy ability of grade IV students SDN Cipinang Besar Selatan 20 Pagi.

Indications of a positive influence on the application of ethnomathematics through a variety of batik motifs in the experimental class can be seen during the learning process which is carried out where students become more creative and independent during the learning process, considering that the steps to apply ethnomathematics consist of the Exploration stage, the Mapping stage, the Explanation stage, and the Reflection stage, with the use of Betawi batik motif media, learning activities are also more preferred Students are not monotonous, and bring living values in learning activities that can be found in daily life (Rohim, 2021).

Furthermore, student activities related to discussing and question-and-answer related to flat building materials are also more interactive considering that students can see directly the flat building shape on the Betawi batik motif image, this is certainly an added value for the application of ethnomathematics in learning activities because when juxtaposed with the control class which has a lower significance value because the learning activities are more teacher centered.

The results of the research data also showed that the increase in the average score of the class was higher than that of the experimental class that applied the ethnomathematics approach by 1.77 points compared to the control class of 1.23 points, in line with the research conducted

by Wafiyah (2023) which also found a higher increase in the value of numerical literacy skills in variables that applied ethnomathematics.

Based on the results of the t-test hypothesis test, the results of the analysis showed that there was a positive influence on the application of the ethnomathematical approach through a variety of Betawi batik motifs on the improvement of numerical literacy skills of experimental class students. This is shown by a greater increase in the results of the pre-test and post-test of the experimental class so that it can be said that the alternative hypothesis (H_a) is acceptable and it is proven that the application of ethnomathematics through a variety of Betawi batik motifs has a positive influence in improving the numerization literacy ability of grade IV students SDN Cipinang Besar Selatan 20 Pagi.

CONCLUSION

Based on the results of the research conducted related to the influence of ethnomathematics through a variety of Betawi batik motifs on the numerical literacy ability of grade IV students of SDN Cipinang Besar Selatan 20 Pagi which was analyzed using a normality test with the Liliefors Shapiro-Wilk test, a homogeneity test with the Bartlett test, and a Hypothesis test with a t-test. The average results of the pre-test of the experimental class were 6.73 and the post-test was 8.50 while the average results of the control class pre-test were 6.07 and the post-test was 7.30.

The increase in the average grade score was higher as shown by the experimental class that applied the ethnomathematics approach by 1.77 points compared to the control class by 1.23 points so that it can be said that the numerization literacy ability of the experimental class students has increased more than the control class, this shows that there is a positive influence of the application of ethnomathematics through a variety of Betawi batik motifs on the numerization literacy ability of students.

So this indicates that there is a significant influence on the difference in treatment given to each variable. Thus, it can be concluded that the alternative hypothesis (H_a) is acceptable and it is proven that the application of ethnomathematics through a variety of Betawi batik motifs has a positive influence on improving the numerical literacy ability of grade IV students SDN Cipinang Besar Selatan 20 Pagi.

REFERENCES

- Agustin, R. D., Ambarawati, M., & Era Dewi Kartika, E. D. (2019). Ethnomatematika: Budaya dalam Pembelajaran Matematika. *Laplace : Jurnal Pendidikan Matematika*, 2(1), 11–18. <https://doi.org/10.31537/laplace.v2i1.190>
- Ayuningtyas, N., & Sukriyah, D. (2020). Analisis pengetahuan numerasi mahasiswa matematika calon guru. *Delta-Pi 鉃: Jurnal Matematika Dan Pendidikan Matematika*, 9(2).
- Ekowati, D. W., Astuti, Y. P., Wahyu, I., Utami, P., Mukhlishina, I., Suwandayani, B. I., Universitas), & Malang, M. (2019). Literasi Numerasi di SD Muhammadiyah. *Else (Elementary School Education Journal)*, 3(1).
- Faqih, A., Nurdiawan, O., & Setiawan, A. (2021). Pengembangan Media pembelajaran Multimedia Interaktif Alat Masak Tradisional Berbasis Etnomatematika. *Mosharafa: Jurnal Pendidikan Matematika*, 10(2). <http://journal.institutpendidikan.ac.id/index.php/mosharafa>
- Hastjarjo, T. D. (2019). Rancangan Eksperimen-Kuasi. *Buletin Psikologi*, 27(2), 187. <https://doi.org/10.22146/buletinpsikologi.38619>
- Mahmud, M. R., & Pratiwi, I. M. (2019). Literasi Numerasi Siswa Dalam Pemecahan Masalah Tidak Terstruktur. *Jurnal Pendidikan Matematika*, 4(1), 69–88.

- Nursyeli, F., & Puspitasari, N. (2021). Studi Etnomatematika pada Candi Cangkuang Leles Garut Jawa Barat. *Plus Minus: Jurnal Pendidikan Matematika*, 1(2).
- Patriana, W. D., Utama, S., & Wulandari, M. D. (2021). Pembudayaan Literasi Numerasi untuk Asesmen Kompetensi Minimum dalam Kegiatan Kurikuler pada Sekolah Dasar Muhammadiyah. *Jurnal Basicedu*, 5(5), 3413–3430. <https://doi.org/10.31004/basicedu.v5i5.1302>
- Perdana, R., & Suswandari, M. (2021). LITERASI NUMERASI DALAM Pembelajaran Tematik Siswa Kelas Atas Sekolah Dasar. *Absis: Mathematics Education Journal*, 3(1),9. <https://doi.org/10.32585/absis.v3i1.1385>
- Rohim, D. C. (2021). Konsep Asesmen Kompetensi Minimum untuk Meningkatkan Kemampuan Literasi Numerasi Siswa Sekolah Dasar. *Jurnal VARIDIKA*, 33(1), 54-62. <https://doi.org/10.23917/varidika.v33i1.14993>
- Suryaningsih, T., & Putriyani, I. J. (2022). Pengembangan E-Modul Pembelajaran Matematika Berbasis Etnomatematika Betawi Pada Materi Bangun Datar Kelas Iv Mi/Sd. *JMIE (Journal of Madrasah Ibtidaiyah Education)*, 6(1), 103. <https://doi.org/10.32934/jmie.v6i1.366>
- Wafiyah, A. K. (2023). *Pengaruh Model Pembelajaran Realistik Berbasis Etnomatematika Terhadap Kemampuan Literasi Matematika Siswa*. Universitas Nahdlatul Ulama Sunan Giri.
- Yustitia, V., & Juniarso, T. (2020). LITERASI MATEMATIKA MAHASISWA DENGAN GAYA BELAJAR VISUAL. *Malih Peddas (Majalah Ilmiah Pendidikan Dasar)*, 9(2), 100–109. <https://doi.org/10.26877/malihpeddas.v9i2.5044>