Kontinu: Jurnal Penelitian Didaktik Matematika
E-ISSN: 2656-5544
P-ISSN: 2715-7326
Vol. 6, No. 2: November 2022
Hal. 94-101

Effectiveness of Learning Using Ethnomathematics Approach Assisted by Adobe Animate to Improve Understanding of Mathematical Concepts for Junior High School Students

Achmad Buchori[1)*], Jaka Wisnu Wardana[2)], FX Didik Purwosetiyono[3)]
Universitas PGRI Semarang[1),2),3)]
*Corresponding email : achmadbuchori@upgris.ac.id

Abstarct. This study aims to determine the effectiveness of learning with an ethnomathematical approach assisted by Adobe Animate to improve understanding of mathematics concepts for junior high school students. The ethnomathematical object used in this study is the Arjuna temple in Banjarnegara. This research is quasi-experimental (quasi-experimental). The population in this study was class IX students of SMP Negeri 1 Wanadadi in the academic year 2022/2023, with the research sample being taken at random by two classes, namely class IX A as the experimental class and class IX C as the control class. The data was obtained through tests after being processed and tested with a one-sided test, a learning completeness test, and a simple linear regression test. The results of data analysis show that: (1) there are differences in concept understanding between students who use the ethnomathematical approach assisted by Adobe Animate and conventional learning; (2) the ability to understand concepts of students who use the ethnomathematical approach assisted by Adobe Animate achieves mastery learning; (3) there is an effect of activeness on the ability to understand mathematical concepts of students who use learning with an ethnomathematical approach assisted by Adobe Animate.
Keywords: Ethnomathematics, Math Concepts understanding, Adobe Animate.

Abstrak. *Penelitian ini bertujuan untuk mengetahui keefektifan pembelajaran dengan pendekatan etnomatematika berbantuan Adobe Animate untuk meningkatkan pemahaman konsep matematika siswa SMP. Objek etnomatematika yang digunakan dalam penelitian ini adalah candi Arjuna di Banjarnegara. Penelitian ini merupakan penelitian eksperimen semu (quasi eksperimen). Populasi dalam penelitian ini adalah siswa kelas IX SMP Negeri 1 Wanadadi tahun pelajaran 2022/2023, dengan sampel penelitian diambil secara acak dua kelas yaitu kelas IXA sebagai kelas eksperimen dan kelas IX C sebagai kelas kontrol. Data diperoleh melalui tes setelah diolah dan diuji dengan uji satu sisi, uji ketuntasan belajar, dan uji regresi linier sederhana. Hasil analisis data menunjukkan bahwa: (1) terdapat perbedaan pemahaman konsep antara siswa yang menggunakan pendekatan etnomatematika berbantuan Adobe Animate dan pembelajaran konvensional; (2) kemampuan pemahaman konsep siswa yang menggunakan pendekatan etnomatematika berbantuan Adobe Animate mencapai ketuntasan belajar; (3) terdapat pengaruh keaktifan terhadap kemampuan pemahaman konsep matematika siswa yang menggunakan pembelajaran dengan pendekatan etnomatematika berbantuan Adobe Animate.*
Kata kunci: *Etnomatematika; Pemahaman Konsep Matematika; Adobe Animate*

INTRODUCTION

The government is making efforts to improve the quality of education by improving the curriculum. There are three curriculum options that can be used by educational units for learning recovery in the post-Covid-19 pandemic, one of which is the 2013 Curriculum. Through the 2013 Curriculum, educational institutions have the opportunity to develop culture-based learning (Permendikbud Number 68 2013).

Ethnomathematics is a part of mathematics which is a link between formal concepts and practice in culture, so that students' understanding of material is easier because the material is directly related to culture which is their daily activity. The aim of ethnomathematics is to recognize that there are other and different ways of expressing and doing mathematics which so far have only been confined to formal education in schools by adopting various societal cultures (Putra & Prasetyo, 2022). With the objective of the ethnomathematics approach, students are expected to be able to construct an understanding of mathematical concepts through their previous experience.

One aspect of the goals of learning mathematics is understanding the concept. Conceptual understanding is an ability related to understanding comprehensive and functional mathematical ideas (Fahrudin et al., 2018). Understanding of concepts is an important component of ability, because mathematical concepts are hierarchical in nature (Juniantari et al., 2018). With mathematical concepts that have a hierarchical nature, students who have a strong understanding of concepts are the main milestones in helping students to solve problems related to mathematics.

The results of the 2015 Trends in International Mathematics and Science Study (TIMSS) study, the average achievement of Indonesian students' mathematical ability is at a low level, namely at a score of 397 on an international scale which represents a low level of 400. With the TIMSS 2015 research results, it indicates that the level understanding of students' mathematical concepts in Indonesia is still relatively low.

NCTM (2000) states that technology is needed in learning mathematics as an effort to support students in learning mathematical concepts, one of which is the use of technology-based learning media. However, the use of learning media in schools is still minimal, this is due to the need for the teacher's ability to make learning media interesting for students. Learning media is one of the factors that can determine the success of the learning process (Wahid et al., 2020). One program that can be used to create learning media is Adobe Animate. Adobe Animate is an updated version of the Adobe Flash program which is used to display audio and visual multimedia in the form of an application.

Based on the background that has been described, the researcher has a solution to overcome this problem in the form of using learning with an Ethnomatematics approach assisted by Adobe Animate learning media, so that researchers are interested in taking the title " Effectiveness of Learning Using Ethnomathematics Approach Assisted by Adobe Animate to Improve Understanding of Mathematical Concepts for Junior High School Students".

METHOD

This study uses a type of quantitative research. Quantitative research is research that is structured and quantifies data to be generalized (Kurniawan & Puspitaningtyas 2016:18). The research design that will be used is Quasi Experimental. This design has a control group, but cannot fully function to control external variables that affect the implementation of the experiment (Sugiyono 2013:77). In this study there are four stages, namely (1) Preparation. (2) Execution. (3) Data Analysis and (4) Conclusion Drawing. The population in this study were students in class IX at Wanadadi Public Middle School 1 in the academic year 2022/2023 which involved a sample of 58 students consisting of 29 students in class IX A as an experimental class and 29 students in class IX C as a control class using a random sampling technique. random. Data collection techniques in this study used documentation and tests in the form of descriptions. Data obtained from student test results were analyzed quantitatively using one-sided t test, learning completeness test and linear regression test with a significance level of 5%. The purpose of this

study was to determine the effectiveness of learning with an ethnomathematics approach assisted by Adobe Animate to increase junior high school students' understanding of mathematical concepts.

RESULT AND DISCUSSION

Prior to testing the hypothesis, the research data obtained will first be tested for prerequisites including the normality test, homogeneity test and two-party t-test. Based on the prerequisite test, it was found that the mathematical concept ability data was normally distributed, the variance of the data was homogeneous and the samples were at the same ability, so the hypothesis testing could be continued. To find out the difference in the ability to understand concepts between students who use learning with an ethnomathematics approach assisted by Adobe Animate and conventional learning using the right-sided t test. The results of the right side t test analysis can be seen in the following table:

Class	n	t_{count}	t_{table}	Conclusion
Experiment	29	3,328	1,673	The average learning outcomes of the experimental class are better than the control class
Control	29			

Table 1. Right-Tailed Test

Table 1 shows that for n_1=29 and n_2=29 with a significant level of 5%, t_{count} is 3.328 and t_{table} is 1.673. This shows that $t_{count} > t_{table}$ so H_0 rejected. Based on these calculations, it can be concluded that the average learning outcomes of the experimental class are better than the control class. This is in line with research conducted by Febriani et al. (2019) stated that there were differences in the ability to understand mathematical concepts between students who were given ethnomathematics-based learning materials and those who were not ethnomathematics-based after controlling for students' initial abilities. Nugroho et al. (2019) stated that there were differences in the ability to understand concepts

between students who were taught by learning with the YouTube-assisted ethnomathematics approach using Corel Videostudio X10 and conventional learning. The results of previous studies have similar results with research conducted by researchers, where in the learning process experimental class students more easily understand mathematical concepts than control class students, this is because experimental class students understand concepts from students' initial understanding coupled with the use of learning media Adobe Animate is used to visualize students' initial understanding regarding the ethnomathematics approach. The learning process resulted in changes in learning outcomes in giving questions or tests, where experimental class students found it easier to work on these questions than control class students.

To find out the ability to understand mathematical concepts of students who were taught with an ethnomathematics approach assisted by Adobe Animate to achieve learning mastery using the learning mastery test. The results of the learning mastery test analysis can be seen in the following table:

Class	n	t_{count}	t_{table}	Conclusion
Experiment	29	3,976	1,701	The proportion of completeness of student learning outcomes is achieved
Control	29	-0,936	1,701	The proportion of completeness of student learning outcomes is not achieved

Table 2. Learning Completeness Test

In table 2, for the experimental class with n = 29 and a significant level of 5% obtained $t_{hitung} = 3{,}976$ while the test calculation in the control class obtained $t_{count} = -0{,}936$ where $t_{table} = 1{,}701$. Because in the experimental class $t_{count} > t_{table}$ so H_0 accepted, while in the control class $t_{count} < t_{table}$ so H_0 rejected. Based on these calculations, it can be concluded that the average learning outcomes of the experimental class are better than the control class. This is in line with the research of Nida et al. (2017) stated that the average class learning outcomes using the ethnomathematics approach with comic math were better than the average

conventional class learning outcomes. May et al. (2021) stated that after implementing ethnomathematics-based learning there was a significant increase in the ability to understand concepts. Opinions from previous studies have the same results as research conducted by researchers, where the results of students' mastery learning in the classical control class are 55% and the results of mastery learning in the classical experimental class are 83%. This indicates that the acquisition of the average class learning outcomes using the ethnomathematics approach assisted by Adobe Animate is better than the average conventional class learning outcomes.

To find out the effect of student activity on students' conceptual understanding skills using ethnomathematics learning assisted by Adobe Animate using a simple linear regression test. From the results of the experimental class regression $\hat{Y} = 5{,}251 + 0{,}899X$ hen for the coefficient of determination in the experimental class obtained r = 0,744 dan $r^2 = 0{,}553$. Based on r^2 the contribution of students' activeness to students' understanding of mathematical concepts has an effect of 55,3% and 44,7% is influenced by other factors. For the significance test obtained t_{count} of 5,794 and t_{table} of 1,703 because $t_{count} > t_{table}$ then H_0 is rejected and it can be concluded that there is a positive influence between student activity and student learning outcomes. This is in line with the research by Rasiman et al. (2018) which states that there is an effect of student activity on the ability to understand students' mathematical concepts. there is an influence of student activity on the ability to understand students' mathematical concepts. Mubaid et al. (2019). The results of previous research have similarities with the results of research conducted by researchers, it is clear from r^2 that the contribution of student activity to students' understanding of mathematical concepts has an effect of 55.3% and 44.7% is influenced by other factors.

CONCLUSION

In this study it can be concluded that there are differences in the ability to understand concepts between students taught by the ethnomathematics approach assisted by Adobe Animate and conventional learning, then the students' conceptual understanding abilities taught by the ethnomathematics approach assisted by Adobe

Animate achieve learning mastery, strengthened by a significant influence related to activeness students' understanding of students' mathematical concepts in learning with an ethnomathematics approach assisted by Adobe Animate. It is necessary to further apply the ethnomathematics approach to mathematics learning in junior high schools in various regions of Central Java assisted by Adobe Animate, this is because by combining ethnomathematics assisted by Adobe Animate media it is able to improve student learning outcomes for the better.

REFERENCES

Fahrudin, A. G., Zuliana, E., & Bintoro, H. S. (2018). Peningkatan Pemahaman Konsep Matematika melalui Realistic Mathematic Education Berbantu Alat Peraga Bongpas. *ANARGYA: Jurnal Ilmiah Pendidikan Matematika*, *1*(1), 14-20.

Febriani, P., Widada, W., & Herawaty, D. (2019). Pengaruh pembelajaran matematika realistik berbasis etnomatematika terhadap kemampuan pemahaman konsep matematika siswa SMA Kota Bengkulu. *Jurnal Pendidikan Matematika Raflesia*, *4*(2), 120-135.

International Association for the Evaluation of Educational Achievement. (2015). TIMSS 2015 Assessment Framework.

Juniantari, M., Pujawan, I. G. N., & Widhiasih, I. D. A. G. (2019). Pengaruh Pendekatan Lipped Classroom Terhadap Pemahaman Konsep Matematika Siswa SMA. *Journal of Education Technology*, *2*(4), 197-204.

Kurniawan, A. W., & Puspitaningtyas, Z. (2016). *Metode Penelitian Kuantitatif*. Yogyakarta: Pandiva Buku.

Mei, M. F., Seto, S. B., & Tupen, S. N. (2021). Efektivitas Model Pembelajaran Konstekstual Berbasis Etnomatematika Ditinjau Dari Kemampuan Pemahaman Konsep Matematika Dan Sikap Disiplin. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*, *10*(4), 2490-2496.

Mubaid, A., Sutrisno, S., & Endahwuri, D. (2019, Augustus). Efektifitas Model Pembelajaran Problem Based Learning dan Model Pembelajaran Learning Cycle 5E Berbantuan Geogebra Terhadap Kemampuan Pemahaman

Konsep Matematis Siswa Kelas XI Smk Antonius Semarang. In *Prosiding Seminar Nasional Matematika dan Pendidikan Matematika* (Vol. 4, pp. 400-407).

NCTM. (2000). Principles and Standards for School Mathematics. United States of America: The National Council of Teachers of Mathematics, Inc.

Nida, Izza K., Buchori, A., & Murtianto, Y. H. (2017). Pengembangan Comic Math Dengan Pendekatan Etnomatematika Pada Meteri Kubus Dan Balok di SMP. AKSIOMA: Jurnal Matematika Dan Pendidikan Matematika, 8(1), 31–40.

Nugroho, K. U. Z., Widada, W., Zamzaili, Z., & Herawaty, D. (2019). Pemahaman Konsep Matematika melalui Media Youtube dengan Pendekatan Etnomatematika. *Jurnal Pendidikan Matematika Raflesia*, *4*(1), 96-106.

Permendikbud Nomor 68 Tahun 2013 tentang Kerangka Dasar dan Struktur Kurikulum Sekolah Menengah Pertama/Madrasah Tsanawiyah.

Putra, A. P & Prasetyo, D. (2022). Peran Etnomatematika Dalam Konsep Dasar Pembelajaran Matematika. *Intersections*, *7*(2), 1-9.

Rasiman, R., Rozana, E., & Sugiyanti, S. (2018). Efektivitas Model Pembelajaran Concept Attainment Dan Model Pembelajaran Guided Discovery Berbantuan Lectora Terhadap Kemampuan Pemahaman Konsep Matematika, *JIPMat*, *3*(2).

Sugiyono. (2013). Metode Penelitian Kuantitatif, Kualitatif dan R & D. Bandung: Alfabeta.

Wahid, A., Handayanto, A., & Purwosetiyono, F. D. (2020). Pengembangan Media Pembelajaran Berbasis Etnomatematika Menara Kudus Menggunakan Adobe Flash Professional CS 6 pada Siswa Kelas VIII. *Imajiner: Jurnal Matematika Dan Pendidikan Matematika*, *2*(1), 58-70.