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INTEGRATION OF LOCAL SITES 3D FIGURE TO IMPROVE STUDENT'S VISUAL SPATIAL ABILITIES

Cindy Kusumawati[1], Budi Priyo Prawoto[2], Mokhamad Kusen[3]
[1]Mathematics Education, Pre-Service Teacher Professional Education, State University of Surabaya, [2]Faculty of Mathematics and Natural Sciences, State University of Surabaya, [3]Junior High School 1 Diwek, Jombang
[1]cindykusumawati@mhs.unesa.ac.id, [2]budiprawoto@unesa.ac.id,
[3]mokhamadkusen31@guru.smp.belajar.id

ABSTRACT

This research is based on the lack of students' ability to visualize 3D figure such as cylinder and cone. This is shown from the data results of IX-E students score at Junior High School 1 Diwek, Jombang at previous year which stated that 80,65 % of them doesn't pass the minimum criteria score. Furthermore, the visual spatial abilities needed to learn 3D figure. The purpose of this study is to describe the process and results of the integration of local sites 3D figure to improve student's visual spatial abilities. This classroom action research used Kemmis and Taggart Model that consists of 2 cycles, each cycle consisting of 4 stages, namely: (1) planning; (2) implementation of actions, (3) observation, and (4) reflection. The research instrument used was an observation sheet of learning implementation, an assessment sheet, and a student questionnaire response sheet. This learning tools was tested to 31 students of IX-E class at Junior High School 1 Diwek, Jombang. The results of the implementation of learning in the excellent category with an average of 3.71 from 4.00, effective (classical succeed is reached, Learning Outcome in Cycle 2 is higher than Learning Outcome in Cycle 1, and student response is positive). So, the integration of local sites 3D figure to improve student's visual spatial abilities.

Keywords: integration, 3D figure, visual spatial abilities

A. Introduction

The definition of education based on Law Number 20 of 2003 is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble morals, and the skills needed by themselves, society, nation and state. Based on that statement so the teacher must develop their student's intelligence and skills. One way to develop their student's intelligence and skills is by using mathematics learning. Susanto (2016:186-187) states that mathematics learning is a teaching and learning process built by teachers to develop students' creative thinking and can improve the ability to construct new knowledge as an effort

to improve good mastery of mathematical concept. Mathematics studying about number, algebra, measurement, geometry, data analysing, probability, and calculus. The problems faced by junior high school students is geometry. Geometry is a type of math that deals with points, lines, shapes, and surfaces. According to the National Council of Teachers of Mathematics (NTCM) (in Siregih Sehatta, 2020: 9) states that in general geometric abilities that students must have: 1) Able to analyse the character and properties of geometric shapes both 2D and 3D; and able to build mathematical arguments about geometric relationships with others; 2) Able to determine the position of a point with more specific and description of spatial relationships with other systems; 3) Application of transformations and using them symmetrically to analyze situations mathematics; 4) Using visualization, spatial reasoning, and geometric models to solve problems. So, visual spatial abilities are needed to solve geometry problems. But, in fact the mathematical visual spatial abilities of IX-E students at Junior High School 1 Diwek, Jombang is still low, it is in accordance with the test results which show an average students' visual spatial abilities in solving problems are still very low. Based on result test in previous year, from all the 31 students in IX-E class of Junior High School 1 Diwek, Jombang only 6 students (19.35%) achieved completion and 25 students (80.65%) did not complete, so students' spatial abilities are still very low than the minimum criteria score of 75.

Currently, now in globalization area is making the world appear more transparent and social life becomes very broad, borders between countries seem to become blurry. This is proven with the ease of seeing, hearing and reading the series of human lives from various parts world. Therefore, with this kind of situation it is possible for a country's original culture to emerge forgotten. Moreover, today's young people seem prouder if they are able to master foreign cultures compared to native Indonesian culture. In fact, what is more worrying is the existence of a value phenomenon.

The nation's basic ideology seems to be slowly being eroded (Astriani dan Samsuri, 2018). Permendikbudristek Number 262 of 2022 states that the relevant learning

is the learning that designed according to the context, environment and culture of the participants education, as well as involving parents and the community as partner. This is also supported by Ki Hadjar Dewantara that states national education must be in line with culture and national life. Teaching the students based on culture and nationalism make them more confidence and love their country. National culture in education based on shared needs and aimed at improving the status of the nation and people. It's the same with Martini idea, knowledge citizenship is necessary to help students to learn to use skills, their knowledge, and attitudes to prepare them to become responsible citizens (Martini, 2019). Therefore, the aim of education in general is to prepare generations to become good citizens based on national character to organize a better future. Based on the explanation above, this research is done to know and describe the process and results of "Integration of Local Sites 3D Figure to Improve Student's Visual Spatial Abilities".

B. Methodology

This type of research is Classroom Action Research (CAR) using quantitative approaches. Research subject of this classroom action research (CAR) is all of students in IX-E class at Junior High School 1 Diwek, Jombang. This research was conducted for three weeks. It starts from 19th March 2024 - 19th April 2024. There are 31 students of IX-E class consists of 15 boys and 16 girls. This classroom action research used Kemmis and Taggart Model that consists of 2 cycles, each cycle consisting of 4 stages, namely: (1) planning; (2) implementation of actions, (3) observation, and (4) reflection. The research implementation scheme can be seen in the chart as follows:

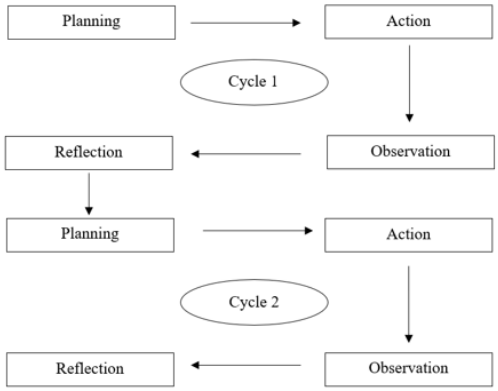

Chart 1, Stages of Kemmis and Taggart Model

The research instrument used was an observation sheet of learning implementation, an assessment sheet, and a student questionnaire response sheet. Data collection

techniques in this study using a questionnaire, observation, and tests. The questionnaire was given to students of class IX-E. In this study the researcher as a teacher while the observator is the class teacher namely Mokhamad Kusen, S.Pd to observe the implementation of learning. Data that is filled out by class teachers then analyzed to determine the practicality of the learning equipment. Then, the test given twice to students of class IX-E to determine the learning outcome after Cycle 1 and Cycle 2.

Data analysis is carried out after data collection activities are completed. Data analysis was carried out in two steps like following.

First step is data analysis of student activity. The analysis used for student activity is using quantitative data analysis. The steps taken are as follows:

1. Give a score to each aspect observed using Likert Scale with a scale of 1 to 4. (4 = always, 3 = often, 2 = sometimes, 1 = never).
2. Add up the scores for each aspect observed.
3. Calculate the percentage score for each aspect observed using a formula as follows:

$$\%activities = \frac{The\ number\ of\ students\ who\ carry\ out\ activities}{the\ number\ of\ students\ who\ attend} \times 100\%$$

Second step is data analysis of learning outcomes. This analysis uses quantitative data analysis by determining the average test score. The average test score is obtained from the sum of the scores obtained by students, then divided by the number of students in the IX-E class. Test scoring is based on the number of correct answers during the evaluation. The score numbers used are from a scale of 0 to a maximum scale of 100. According to Sudjana (2013: 109) to calculate the average test results the following formula can be used:

$$\bar{x} = \frac{\sum x}{n}$$

Explanation:
$\bar{x}$ = Average
$\sum x$ = The sum of all students' scores
n = Number of students

C.Research Result and Discussion

The results of the observation sheet of learning implementation as follows.

Table 1, Table of Observation Sheet in Learning Implementation

No.	Learning Stage	K_y		Average
		Cycle I	Cycle II	
1	Introduction	3.50	3.80	3.65
2	Main	3.84	3.90	3.87
3	Closing	3.40	3.76	3.58
KM				**3.70**

The performance total average of learning is 3.70. Based on the

criteria, the implementation of learning in the very practical category.

Based on results of the research, integration of Local Site 3D Figure with Discovery Learning Model and Culturally Responsive Teaching approach at Junior High School 1 Diwek, Jombang obtained data that increased visual and spatial abilities. The results of students score through Cycle 1 to Cycle II. More clearly can be seen in the table below.

Table 2, Table of Increasing Student Learning Outcomes

No.	Learning Outcomes	Pre-Cycle	Test Score	
			Cycle 1	Cycle 2
1.	Highest score	90	100	100
2.	Lowest score	30	56	46
3.	Average	65.58	81.58	87.16
4.	Pass the minimum score	19.35%	77.41%	90.32%
5.	Doesn't pass the minimum score	80.65%	22.59%	9.68%

From the table we know that, there was an increase in mathematics learning outcomes using integration of Local Sites 3D Figure from Cycle I to Cycle II. The average value of learning results for Cycle 1 was 81.58 with classical learning completeness of 77.41%. For Cycle II the average score was 87.16 with classical learning completeness of 90.32%.

According to the data above, there was an increase in learning outcomes and an increase in classical learning completeness from cycle to cycle from 77.41% to 90.32%, there was an increase in learning completeness by 12.91%. It is because in the learning stage the teacher carries out improvement activities in a planned and systematic manner. Therefore, the integration of local sites 3D Figure can improve student's visual spatial abilities.

Based on results of the student questionnaire response sheet, integration of Local Site 3D Figure with Discovery Learning Model and Culturally Responsive Teaching approach at Junior High School 1 Diwek, Jombang obtained data that the students more active and interesting with learning. The results of student questionnaire response sheet shown that students responses is positive.

E. Conclusion

Based on the research results on integrating of Local Site 3D Figure with Discovery Learning Model and Culturally Responsive Teaching approach in learning curved sided shapes (cylinder and cone) in IX-E class students at Junior High School 1 Diwek, Jombang, it can be concluded

that there has been an increase in student learning outcomes which is marked by the achievement of classical learning completeness in mathematics learning in determining the surface area of the cylinder and cone from Cycle 1 that is 77.41% to 90.32% in Cycle 2, an increase of 12.91%.

There is an increase in student activity in each cycle. Students are more skilled and active in learning activities. This is indicated by the results of the average student activity meeting in the good criteria, namely in the Cycle 1 the average student activity obtained was 3.11 with a percentage of 77.7% (good), the Cycle 2 increased even better to 3.50 with a percentage of 88.8% (Very good). Therefore, integration of local sites 3D figure can improve student's visual spatial abilities.

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