International Conference on Lesson Study
Muhammadiyah University of Gresik
E-ISSN : xxxx-xxxx
DOI : .....
Vol 1 No 1: Fostering a Learning Community Engagement Though a Lesson Study

IMPLEMENTATION OF DIFFERENTIATE LEARNING IN EFFORTS TO IMPROVE ACTIVITIES AND MATHEMATICS LEARNING OUTCOMES OF CLASS VII A STUDENTS OF SMPN 2 TAMAN

Mustiko Mulyo Meinur[1], Nourma Yunita[2], Hari Gunawan[3]

[1,2] Gresik Muhammadiyah University; Indonesia
[3] SMPN 2 Taman; Indonesia

ARTICLE INFO

Keywords:

Differentiated Learning;
Learning activity;
Learning outcomes

ABSTRACT

This research aims to increase the activity and mathematics learning outcomes of class VII A students at SMPN 2 Taman, even semester of the 2022/2023 academic year. This research uses differentiated learning by involving students' initial interests and abilities. This research is a classroom action research which is divided into two cycles. Each cycle consists of planning, implementing actions, observing, evaluating and reflecting. The research was carried out in class VII A students of SMPN 2 Taman even semester of the 2022/2023 academic year. The results of research carried out in the first cycle of 36 students showed that the percentage of achievement of student learning activities was 61.94%, while the percentage of achievement of student learning activities in the second cycle, which was attended by 28 students, was 84.29%. Meanwhile, student learning outcomes increased from cycle Ito cycle II, in cycle I the number of students who completed was 13 students (36.11%) while the number of students who had not yet completed was 23 students (63.89%) with anaverage score of 62.78 . Then in cycle II there was a very high increase compared to the previous cycle, namely 25 students who had reached the KKTP (89.29%), while 3 students who had not yet completed it, with an average score of 86, 43. Thisresearch shows that the application of differentiated learning can improve the activity and mathematics learning outcomes of class VII A students at SMPN 2 Taman for the 2022/2023 academic year.

Corresponding Author:
Mustiko Mulyo Meinur
Gresik Muhammadiyah University; Indonesia; mustiko.mulyo@gmail.com

INTRODUCTION

Education is a means or bridge for humans to be able to develop their own potential through the learning process they obtain (Fitri, 2021). With education, it is hoped that it can give birth to the nation's next generation with intelligent and qualified individuals, which means a generation that is able to make the best use of existing progress. Therefore, education is very important and must be given to every citizen from an early age..

The quality of education in Indonesia is currently facing challenges in the form of the Covid-19 pandemic which has caused learning loss and increasing learning gaps. Meanwhile, the results of the 2018 Program for International Student Assessment (PISA) for Indonesia show below standard results, especially in three areas, namely mathematics, science and literacy. In the field of reading (literacy), Indonesia is ranked 6th lowest (73rd out of 78 countries) with an average score of 371. In the mathematics (numeracy) category, it is ranked 7th lowest (72nd out of 78 countries) with an average score of 379. Meanwhile, for the science category, Indonesia is ranked 9th lowest (70th out of 78 countries) with an average score of 396. Based on the data above,.

Changes in the curriculum framework require adaptation of all elements of the education system. This process requires careful management so that it can produce the desired impact, namely improving the quality of learning and education in Indonesia. Kepmendikbudristek No. 56 of 2022 relating to curriculum implementation guidelines in the context of learning recovery, currently there are three curriculum options that can be used in education units. Among them are the 2013 Curriculum, the simplified 2013 Curriculum, and the Independent Curriculum (Prototype Curriculum). The operationalization of the Independent Curriculum can be adapted to the characteristics of students and school conditions while still referring to the curriculum framework that has been prepared by the government. The Merdeka Curriculum provides flexibility for teachers to create quality learning that suits the needs and learning environment of students (freedom of learning). To realize freedom of learning, we cannot just go through one route. There must be differentiation of activities implemented through various activities at school. This is in line with learning a new paradigm.

The new learning paradigm provides teachers with the freedom to formulate learning and assessment plans according to students' characteristics and needs. The new learning paradigm ensures that learning practices are student-centered. Every student needs meaningful learning, so the teacher must be able to understand the special needs of each student in the class in order to be able to realize learning activities that can be oriented towards the goals to be achieved and able to answer the needs of students as learning subjects so that students are able to develop their potential. This is why teachers need to carry out differentiated learning in learning.

Differentiated learning is a very important way of thinking about the teaching and learning process in the 21st century. Differentiated learning is nothing new in the world of education. Differentiation learning is also known as differential learning. According to Schöllhorn in Naibaho and Dwi Putriana (2023), differential learning is a motor learning model that is based on the importance of movement variability and is rooted in the dynamic systems theory of human movement. Differentiated learning is in line with Ki Hajar Dewantara's philosophy, that education (opvoeding) provides guidance for all the natural strengths that students possess so that they are able to achieve the highest safety and happiness, both as a human being and as a member of society. According to Tomlinson (2001), Differentiated learning means mixing all the differences to get information, create ideas and express what they learn. In other words, differentiated learning is creating a diverse class by providing opportunities to obtain content, process ideas and improve the results of each student, so that students can learn more effectively.

Tomlinson (2001) said that in categorizing students' learning needs, at least based on 3 aspects. These three aspects are student learning readiness, student interest, and student learning profile.

.

Student learning profiles include language, culture, family circumstances, learning styles, and so on. There are 3 types of learning styles, namely Visual (learning by seeing), Auditory (learning by hearing), and Kinesthetic (learning by doing). According to Andini (2016), differentiated learning uses multiple approaches (multiple approaches) in content, processes and products. In differentiation classes, teachers will pay attention to 3 important elements in differentiation learning in class, namely (1) Content (input), namely what students learn, (2) Process, namely how students will get information and create ideas about what they have learned, (3) Product (output), how students will demonstrate what they have learned. The three elements mentioned above will be modified and adapted based on the assessment carried out according to the student's level of learning readiness, interests and student profile (learning style).

Based on this description, the researcher is interested in conducting research with the title "The Application of Differentiated Learning in an Effort to Increase the Activities and Results of Learning Mathematics for Class VII A Students of SMPN 2 Taman.

METHODS

The research used is Classroom Action Research. There are four steps in preparing Classroom Action Research (PTK), namely planning, acting (implementation), observation (observation), and reflection. The PTK design carried out each cycle consists of: 1) Planning, namely carrying out careful and thorough planning. In PTK planning, there are three basic activities, namely problem identification, problem formulation, and problem solving. In each activity, there are sub-activities that should be implemented to support the perfection of the planning stage. 2) Implementation, namely implementing what has been planned in stage one, namely acting in class. 3) Observation, is a tool for recording how far the effects of actions have reached the target. Research should describe the type of data collected, method of collection, and data collection tools/instruments (tests, questionnaires, etc.). 4). Reflection, namely an activity to restate what has been done.

Meanwhile, for data collection techniques, 1) Observation, namely systematic observation and recording of symptoms that appear on the research object. The observation used in this research is to observe students' activities in the learning process directly, in order to complete quantitative data by recording observation sheets. 2) Learning Outcomes Test, is a test that measures a person's achievement in a field as a result of a unique learning process, which is carried out deliberately in the form of knowledge, understanding, skills, attitudes and values. This learning outcomes test was used by researchers to measure the mathematics learning outcomes of class VII A students at SMP Negeri 2 Taman using the Learning Goal Achievement Criteria (KKTP) in comparative mathematics subject matter.

Analysis of student learning activity data in participating in learning was carried out by observing. According to Hasanah (2017), observation is an activity that involves all sensory powers such as hearing, sight, taste, touch and taste based on empirical facts. The researcher chose a type of structured observation, which means carrying out observations referring to guidelines that have been prepared in advance by the researcher.

.

Table 1. Observation Guidelines Grid

Aspects of Learning Activities	Information
A	Pay attention to the delivery of material by the teacher
B	Record study material
C	Work together with friends in groups
D	Express opinions, ask questions, or make suggestions
E	Dare to give a presentation or answer a quiz

Table 2. Criteria for Interpretation of Student Activity Observation Results

Evaluation	Category
0% - 44%	Less Active
45% - 63%	Quite Active
64% - 82%	Active
83% - 100%	Very active

Data analysis method used on student learning outcomes through quantitative data. Quantitative data were obtained through learning achievement tests. There are several opinions about the meaning of learning outcomes, one of which is according to Dimyati and Mujiyono inSuwartiningsih (2021), learning outcomes are things that can be viewed from two sides, namely from the student and from the teacher's side. From the student's point of view, learning outcomes are a better level of mental development than before learning. The level of mental development is manifested in the types of cognitive, affective and psychomotor domains. For quantitative analysis, it is calculated using a simple statistical formula to determine student learning outcomes as follows:

To calculate the average value, the formula is used: $\bar{x}=\frac{\sum x}{n}$

Information : $\bar{x}$= Average value

$\sum x$= Sum of all values

n = Number of data

FINDINGS AND DISCUSSION

Findings

a. Cycle I Results

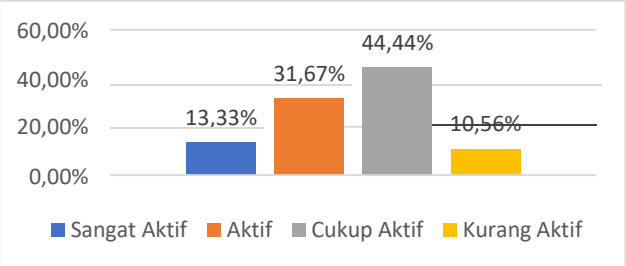
Analysis of student learning activity data in learning is done descriptively. The criteria for classifying student learning activities are arranged based on the percentage of each aspect in the guidelines for observing student learning activities.

.

Table 3. Data Obtained from Observation of Student Learning Activities in Cycle I

No	Aspect	Very active		Active		Quite Active		Less Active		Per Aspect
		f	%	f	%	f	%	f	%	
1	A	7	19,44	10	27.78	14	38.89	5	13.89	63,19
2	B	3	8.33	12	33.33	19	52.78	2	5.56	61,11
3	C	5	13.89	16	44,44	12	33.33	3	8.33	65.97
4	D	5	13.89	5	13.89	17	47.22	9	25.00	54,17
5	E	4	11,11	14	38.89	18	50.00	0	0	65,28
Average		4,8	13.33	11	31.67	16	44,44	4	10.56	61.94
Classical		61.94%								
Qualification		Quite Active								

Figure 1. Cycle I Student Learning Activity Diagram



Observations of student learning activities carried out in cycle I, the number of students attending from class VII A of SMPN 2 Taman for the 2022/2023 academic year was 36 people. It was found that the percentage of achievement of student learning activities in cycle I was 61.94%. Linked to the established criteria, the level of student learning activity in cycle I is classified as quite active. Meanwhile, data on student learning outcomes is presented in table 4 below:

Table 4. Data on Student Learning Outcomes for Cycle I

No	Aspect	Description
1.	Number of students who took the test	36 people
2.	Number of students who completed	13 people (36.11%)
3.	Number of students who did not complete	23 people (63.89%)
4.	Total value	2260
5.	The highest score	100

.

No	Aspect	Description
6.	Lowest Value	30
7.	Average	62.78

Table 4 shows that the highest posttest score obtained by students in class VII A of SMPN 2 Taman for the 2022/2023 academic year was 100 and the lowest score was 30. The average score achieved was 62.78. Of the 36 students who had completed, 13 students (36.11%) and 23 students (63.89%) had not completed it. For students who did not complete the treatment to do remedial as strengthening understanding of the material in cycle I.

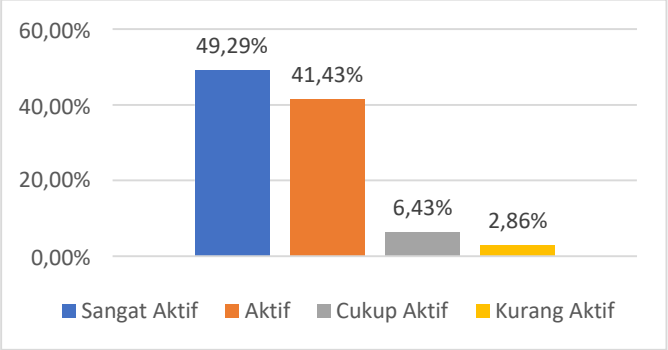
b. Cycle II Results

Observation data at the first meeting the number of students who attended was 36 people and at the second meeting was attended by 30 students. The following is a table of data on student learning activities in the second cycle:

Table 5. Observation Data Observation of Student Learning Activities Cycle II

No	Aspect	Very active		Active		Quite Active		Less Active		Per Aspect
		f	%	f	%	f	%	f	%	
1	A	23	82,14	10	17.86	0	0	0	0	95.54
2	B	7	25.00	17	57.14	3	10.71	2	7,14	75.00
3	C	12	42.86	14	50.00	2	7,14	0	0	83,93
4	D	15	53,57	8	35,71	1	3.57	2	7,14	83,93
5	E	12	42.86	17	46,43	3	10.71	0	0	83.04
Average		13,8	49,29	12	41,43	2	6,43	1	2.86	84,29
Classical					84.29%					
Qualification					Very active					

Figure 2. Cycle II Student Learning Activity Diagram



.

Observations of student learning activities carried out in cycle II showed several increases in activity and learning outcomes. If the first cycle uses process differentiation based on interests, then the second cycle uses process differentiation based on initial abilities. The number of students present from class VII A of SMPN 2 Taman for the 2022/2023 academic year at the cycle II meeting was 28 people. It was found that the percentage of achievement of student learning activities in cycle II was 84.29%. Linked to the established criteria, the level of student learning activity in cycle II is classified as very active. Meanwhile, data on student learning outcomes is presented in table 6 below:

Table 6. Data on Student Learning Outcomes for Cycle II

No	Aspect	Description
1.	Number of students who took the test	28 people
2.	Number of students who completed	25 people (89.29%)
3.	Number of students who did not complete	3 people (10.71%)
4.	Total value	2420
5.	The highest score	100
6.	Lowest Value	50
7.	Average	86,43

Table 6 shows that the highest posttest score obtained by students in class VII A of SMPN 2 Taman in the 2022/2023 academic year in the second cycle was 100 and the lowest score was 50. The average score achieved was 86.43. Of the 28 students who had completed as many as 25 students (89.29%) and students who did not complete as many as 3 students (10.71%). For students who did not complete the treatment to do remedial as strengthening understanding of the material in cycle II.

Discussion

Based on the results of the analysis of data collection, it is concluded that activity data and students' mathematics learning outcomes are obtained. Recapitulation of student learning activities and outcomes per cycle through the application of differentiated learning can be seen from the following table:

Table 7. Recapitulation of Student Learning Activities

Student Learning Activities	Active Student	
	Percentage of Achievement	Information
Cycle I	61.94%	Quite Active
Cycle II	84.29%	Very active

.

The implementation of the action plan in cycle I showed an increase in student learning activities compared to the learning implemented previously, but the results shown were not as expected. This is based on the percentage of achievement of student learning activities, namely 61.94%, which is quite active, so it needs to be improved. In cycle II, which is an action improvement in cycle I, has given more optimal results. The percentage of student learning activity achievement was 84.29%, an increase of 22.35% compared to the percentage of student learning activity achievement in cycle I.

Table 8. Recapitulation of Student Learning Results

Description	Complete Student		Incomplete Students		Average
	Frequency	%	Frequency	%	
Cycle I	13	36.11%	23	63.89%	62.78
Cycle II	25	89.29%	3	10.71%	86,43

In cycle I, there were 13 students who had completed it with a percentage of 36.11% and 23 students who had not completed it with a percentage of 63.89% and in cycle II there were 25 students who had completed it with a percentage of 96.55% and students who had not completed it. as many as 3 students with a percentage of 10.71%.

From the research and discussion it is explained that the implementation of differentiated learning can improve students' mathematics learning outcomes, especially in comparative material. The results of the learning evaluation showed an increase in cycle I from 36.11% and in cycle II to 89.29%.

The way of presenting material by implementing differentiated learning can improve student learning outcomes. This is proven by the increase in average results each cycle. In cycle I, the average was 62.78. Meanwhile in cycle II the average value was 86.43. So based on the results of research and observations from cycle I to cycle II with the application of differentiated learning in mathematics subjects, the results in cycle II were better than the results in cycle I.

CONCLUSION

Based on the research results, it was concluded that the application of differentiated learning can improve the activity and mathematics learning outcomes of class VII A students at SMPN 2 Taman for the 2022/2023 academic year. The increase in learning activities is shown by the increase in the percentage of student learning activity achievements in cycle II, namely 84.29%, an increase of 22.35% compared to the percentage of student learning activity achievements in cycle I, namely 61.94% and learning outcomes in cycle II also experienced enhancement. This is obtained from the number of students who have completed, namely 25 students (89.29%) while students who have not completed are 3 students (10.71%). Meanwhile, the average value increased by 23.65, from cycle I the average was 62.78, then in cycle II the average was 86.43..

Suggestions that can be conveyed related to the results of this study are as follows. 1) With the success of this research, it is hoped that junior high school mathematics teacher colleagues will consider implementing differentiated learning in the learning process in other classes and on different materials. 2) It is hoped that the application of differentiated learning in mathematics learning can provide an alternative that can be used to carry out teaching and learning activities. Teachers must strive for learning that can meet the needs of students by adjusting the characteristics of students.

.

REFERENCES

Andini, DW (2016). "Different Instruction": Learning Solutions in Student Diversity in Inclusive Classrooms. Trihayu, 2(3), 259034.

Fitri, SFN (2021) 'Problematics of Quality of Education in Indonesia', Tambusai Journal of Education, 5(1), pp. 1617–1620.

Hasanah, H. (2017) 'Observation Techniques (An Alternative Method of Collecting Qualitative Data in the Social Sciences)', At-Taqaddum, 8(1), p. 21. doi: 10.21580/at.v8i1.1163.

Naibaho. Dwi Putriana (2023) 'Differentiated Learning Strategies Can Improve Students' Understanding of Learning', Journal of Creative Student Research (JCSR), 1(2), pp. 81–91.

Suwartiningsih, S. (2021) 'Application of Differentiated Learning to Improve Student Learning Outcomes in Science Subjects, Land and Life Sustainability in Class IXb, Even Semester, SMPN 4 Monta, Academic Year 2020/2021', Indonesian Journal of Education and Learning (JPPI), 1(2), pp. 80–94. doi: 10.53299/jppi.v1i2.39.

Tomlinson, CA (2001). How to differentiate instruction in mixed-ability classrooms. ASCD. Tomlinson.

Trianto. (2011). Integrated Learning Model Concepts, Strategies and Implementation in the Education Unit Level Curriculum (KTSP), Jakarta: Bumi Aksara.