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Improving Student Mathematics Learning Outcomes with The Learning Model Cycle 5e Class VII

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ABSTRACT (10 PT)

This research is a Classroom Action Research that aims to find out whether The Learning Cycle 5e Model can improve mathematics learning outcomes. The subjects of this study were students of class VIIc MTS Al-Ikhlas Iwoimenda, as many as 34 students—retrieval of data with test results and observation sheets. Observation sheet data and mathematics learning achievement tests were analyzed using descriptive statistics. The results achieved after implementing the action through The Learning Cycle 5e Model for two cycles: a) the average score of learning outcomes in the first cycle was 63.10 from an ideal score of 100 and is in the excellent category. It increased in the second cycle to 78.43 from an ideal score of 100 and was in the excellent category. b) There was an increase in the percentage of observations of student activity in the first cycle of the first meeting by 41.67%, the second meeting was 66.67%, and the second cycle first meeting was 83.33%, the second meeting was 91.67%. From the research results on these data, the Learning Cycle 5e Model on operational material and properties of integer operations can improve the mathematics learning outcomes of class VIIc MTS Al-Ikhlas Iwoimenda.

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1. INTRODUCTION

The quality of education can refer to the quality of the process. An education is called quality if the teaching and learning process runs effectively, and students experience a meaningful learning process supported by reasonable resources (human, funding, facilities and infrastructure) (Setyawati et al., 2020). This means that logically a quality educational process will produce a quality product as well.

Implementation of learning in the classroom is one of the main tasks of the teacher. In the learning process there is often a tendency to minimize student involvement. The teacher's domination in the learning process causes the tendency of students to be more passive, so that students wait more for the teacher's presentation rather than looking for and finding the knowledge, skills or attitudes they need themselves.

Mathematics has objects that are systematic (Hasratuddin, n.d., 2008). Therefore, mathematics material is difficult for students to master and it has become a reality in the field that students' mastery of mathematics learning material is very low when compared to other subjects. Conditions like this are also an illustration of the mastery of mathematical concepts contained in MTs Al-Ikhlas Iwoimenda. The results of an initial survey with one of the Mathematics teachers at the school, that in general the condition of the results of learning mathematics from 34 class VIIc students only reached 50% who completed their studies. The average value of student learning outcomes is less than 72 which is the value of the Minimum Completeness Criteria (KKM).

If this condition is allowed to drag on without any effort to solve it, it will have an impact on the decline in students' mastery of mathematical concepts. Therefore, it is necessary to design an action to solve this problem by looking at what factors greatly influence students' lack of ability to master mathematical concepts. Basically, there are many factors that affect the high and low student learning outcomes, including the learning model used by the teacher in conveying subject matter and how the teacher's efforts to communicate the material to students.

Based on the results of the initial observations that have been made, it shows that learning mathematics at MTs Al-Ikhlas Iwoimenda uses a conventional learning model. Learning with the conventional model students only sit, listen, record, and memorize, the source of information is only from the teacher, does not emphasize concepts, and learning material pays little attention to students' abilities. The description of the learning model as above makes the class atmosphere boring because the teacher's learning activities are more active. Because the class atmosphere is boring for students, students' attention to learning material is reduced or absent altogether. This is what causes students to lack mastery of mathematical concepts, so that their learning outcomes are not satisfactory.

Based on this, the authors feel interested in applying one of the learning models as an alternative to improve mathematics learning outcomes. The learning model referred to (Budiman & Efrida Muchlis, 2019) is the Learning Cycle 5E learning model. According to the Learning Cycle 5E learning model, it can be carried out in several stages: (1) the engagement stage, namely trying to arouse students' interest in mathematics; (2) the exploration stage, namely providing opportunities for students to explore the widest possible material from various sources through group discussion activities or experiments; (3) the explanation stage, which provides broad opportunities for students to convey their ideas or ideas through classical discussion activities; (4) the elaboration stage, which invites students to apply the concepts they get by working on problem-solving questions; (5) the evaluation stage, namely evaluating student learning outcomes to determine the level of student understanding of the concepts that have been studied.

This model is expected to be very well applied in the learning process, because this learning model is a learning strategy that prioritizes collaboration between students and arouses student interest, so that students are able to explore the material presented by the teacher to achieve learning goals. So, learning activities are carried out through several stages, including the Engagement stage, the exploration stage, the explanation stage, the elaboration stage, and the evaluation stage.

1.1. The Model *Learning Cycle 5E.*

The Learning Cycle is a constructivist-based science learning model. This model was developed by J. Myron Atkin, Robert Karplus and the SCIS (Science Curriculum Improvement Study) group at the University of California, Berkeley, United States of America since 1967 Zollman and Rebello (Juhji, n.d., 2015). Constructivism theory views learning as a process of building knowledge bit by bit, which is then expanded through a limited context. Knowledge is not a set of facts, concepts, or rules ready to be retrieved or memorized. Humans must construct that knowledge and give meaning through real experience.

According to (Hadromi, 2011) that the learning cycle is a learning model that allows students to find their own concepts or solidify the concepts learned, prevents misconceptions from occurring, and provides opportunities for students to apply the concepts they have learned to new situations. The implementation of the Learning Cycle learning model in learning is in accordance with the constructivism view where knowledge is built on students themselves (Sumarsih, n.d., 2019).

Based on some of the opinions above, it can be concluded that Learning cycle 5e is a learning model with a constructivist approach, where the learning process is more student-centered, so that students can be more active in carrying out the learning process.

1.2. Learning Outcome

According to (Imelda Tumulo, 2022) suggests that learning outcomes are a result of the learning process by using measurement tools, namely in the form of tests that are arranged in a planned manner both written tests, oral tests, and action tests. Meanwhile (Siregar, et. al 2019) argues that learning outcomes are a change in individuals who learn, not only regarding knowledge, but also form skills and appreciation in the individuals who learn. Learning outcomes are the results obtained by students after following a particular subject matter in the form of quantitative and qualitative data. To see the learning outcomes conducted a study of students which aims to determine whether students have mastered a material or not. Assessment is a systematic effort developed by an educational institution aimed at ensuring the achievement of the quality of the educational process and the quality of students' abilities in accordance with predetermined goals. (Sulastri, n.d., 2017) suggests that learning outcomes can be measured in the form of changes in student behavior, namely the increasing student knowledge of something, attitudes and skills. In addition to the understanding of learning outcomes above, the author believes there are many more arguments about "learning outcomes". But most importantly, a learning outcome is obtained after the implementation of a learning process that has a specific purpose.

2. METHOD

This type of research uses PTK (Classroom Action Research). This research was carried out following the stages of classroom action research (Classroom Action Research). The action components are planning, acting, observing, and reflecting. Classroom Action

Research which is a form of reflective study by action actors (Iryani, n.d., 2020). Done to increase the rational maturity of the actions in carrying out the task, deepen understanding of the actions that were carried out, and improve the conditions in which the learning practices were carried out.

The subjects of this study were class VIIc students of MTs Al-Ikhlas Iwoimenda with a total of 34 students, consisting of 16 male students and 18 female students. The design in this study consists of two cycles, namely cycle 1 and cycle II, where each cycle consists of planning, implementation, observation and evaluation, and reflection. For more details, it can be seen in Figure 1 below:

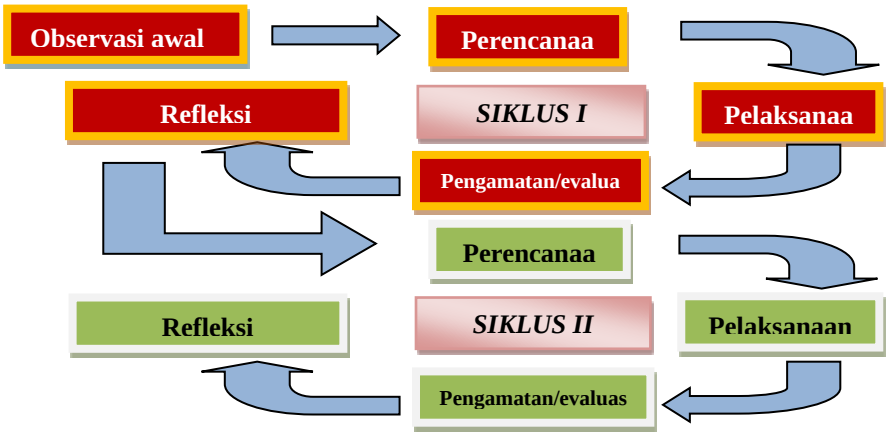

Figure 1. Research design

Based on Figure 1 above, in detail the design of this classroom action research is described in several stages as follows:

1. First Observation

The first reflection in question is to make observations in class either through observation or through the implementation of learning. Then an analysis was carried out to find problems in learning that occurred in class VII C MTs Al-Ikhlas Iwoimenda.

2. Planning

1) Researchers discussed, explored relevant theories, and identified learning problems, as well as determined alternative actions to overcome problems encountered in learning mathematics at school, namely the application of the 5E Learning Cycle learning model to material Operations and Properties of Integer Operations.
2) The researcher makes a learning plan or scenario according to the Learning Cycle 5E learning stages that will be determined to improve student learning outcomes in class VII C MTs Al-Ikhlas Iwoimenda.
3) Make worksheets for student activities in the implementation of learning in the classroom.
4) Developing a learning observation format/observation sheet, to see how the teaching and learning conditions in the class are when the Learning Cycle 5E learning model is applied and student learning outcomes.
5) Making a journal to find out self-reflection.

3. Iplementation of Action

Implementation of class action is intended as an effort to improve student learning outcomes at the level of completeness 70 in the following way:

1) Carry out the plan that has been prepared by the researcher

2) Observing student activity during core activities with observation sheets and at the end of each activity students are given a test in relation to the material being taught
3) After analyzing and reflecting on the research action, it is continued in the next cycle with the intention of improving the previous action.

4. Observation and evaluation

At this stage, observations are carried out on the implementation of actions using observation sheets that have been made intended to filter data in the form of student activity and observe whether the learning steps used by the teacher during learning activities are in accordance with the learning steps of the Learning Cycle 5E learning model. Evaluation is given at the end of learning activities that are intended to determine student learning outcomes.

5. Reflection

Reflection activities aim to analyze the data obtained at the observation stage. Weaknesses or deficiencies that occur in cycle I and will be corrected in cycle II.

The data collection technique in this study was in the form of qualitative data that was not in the form of numbers, in the form of student and teacher activity data, taken from observation sheets. and quantitative data in the form of numbers, in the form of data on student mathematics learning outcomes, taken using a learning achievement test. While the data analysis techniques using descriptive statistical techniques. as for the steps are as follows:

1. Activities during the learning process were analyzed qualitatively based on the aspects specified in the observation sheet.
2. The scoring of test results in the form of essay tests is determined by the formula:

$$\text{Test Result Value} = \frac{Number \text{ of correct answer score}}{Maksimum \text{ total score}} x100\%$$

3. Determine the average value of the test results using the formula:

$$\overline{x} = \frac{\sum_{i=1}(f_i X_i)}{\sum_{i=1} f_i};$$

with :

$\overline{x}$: Average Value (mean)
$\sum_{i=1} f_i$: The Number of Student
f_i : Frequency
x_i : Midpoint

=

4. Clasical Completeness

$$\%\ \text{Complete} = \frac{Number \text{ of correct answer completed}}{Maksimum \text{ total score}} x100\%$$

5. For qualitative data, a categorization technique with a scale of five is used based on the standard categorization set by the Ministry of National Education (Lestari et al., 2021) as follows:

Table 1. Categorization techniques with a scale of five

Quantitative Value	Category
0 – 54	Very Low
55 – 64	Low
65 – 79	Medium
80 – 89	Hight
90 – 100	Very Hight

3. RESULT AND DISCUSSION

3.1. Result

Cycle I

In Cycle I, an evaluation was carried out after completing the presentation of the material with the first two meetings presenting the material in accordance with planning, implementation of actions, observation and evaluation and reflection and the second meeting carried out planning, implementation of actions, observation and evaluation and reflection which were not carried out at the first meeting the results learning for Cycle I. The descriptive analysis of student acquisition scores after implementing learning involving The Learning Cycle 5e Learning Model on operational material and the properties of integer operations is as follows:

Table 2. Statistical Scores of Student Test Results in Cycle I

Statistic	Statistic Value
Subject	34
Ideal Score	100
Average Score	63,10
Highest Score	81,48
Lowest Score	36,90

Based on the table above, it shows that the average score of mathematics learning outcomes after applying learning that involves the Learning Cycle 5e learning model on Integer Operations Material for Class VIIc MTs Al-Ikhlas Iwoimenda the ideal score that may be achieved is 100. Meanwhile, individually the score achieved students in this application with the highest score of 81.48 and the lowest score of 36.90 of the highest possible score of 100 and the lowest possible score of 0. After the student test scores are grouped into five categories, the frequency and percentage distributions are obtained in table 3.

Table 3. Frequency Distribution and Percentage of Test Scores in Cycle I

Score Interval	Category	Frekuency	Percentage (%)
0 – 54	Very Low	11	32,35
55 – 64	Low	6	17,65
65 – 79	Medium	16	47,06
80 – 89	Hight	1	2,94
90 – 100	Very Hight	-	-
Amount		34	100%

Based on the table above shows that there are 32.35% of students who are in the very low category, 17.65% of students are in the low category, 47.06% are in the medium category, are in the high category, and 0% of student learning outcomes are in very high category. This shows that the ability level of students is still lacking. Besides that, according to the average score of the test results in Cycle I, it was 63.10. If converted into a scale of five it is in the low category. This means that the average score of class VIIc student achievement at MTs Al-Ikhlas Iwoimenda after the application of learning involving The Learning Cycle 5e Learning Model on Integer Operations Material is in the sufficient category.

To see the percentage of mathematics learning completeness of Class VIIc MTs Al-Ikhlas Iwoimenda after the implementation of The Learning Cycle 5e on Integer Operations material cycle I can be seen in Figure 2 below:

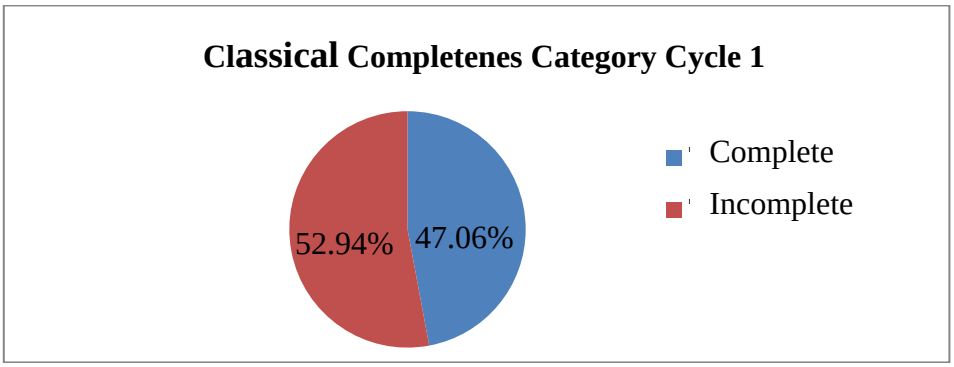

Figure 2. Classical completeness Cycle I

Based on the diagram, it can be seen that of the 34 students, there were 18 students or 52.94% whose mathematics learning outcomes were in the incomplete category, while those in the completed category were 16 students or 47.06% meaning that more students had learning outcomes. the mathematics is in the incomplete category.

Based on the results of observations on the implementation of cycle I actions, it was found that the learning outcomes with the level of completeness achieved by students had not yet reached the predetermined work indicators. Problems that arise during learning and result in not achieving classical completeness in cycle I include:

1. The teacher has not been able to organize time properly, so there is no time to give students the opportunity to ask questions that they do not understand.
2. The teacher has not been able to guide students to make learning conclusions according to the learning objectives, so that students are still lacking in concluding learning.

Based on the problems above, for the meeting in cycle II the researcher formulated corrective actions as an alternative problem solving described as follows:

1. The teacher provides clearer time limits for each student activity during the learning process so that all student activities can be carried out optimally so that the management of teacher learning includes giving students the opportunity to ask questions about things that are not yet understood, can be implemented.
2. The teacher must be able to guide students to make learning conclusions according to the learning objectives, so that students are still lacking in concluding learning.

Cycle II

Analysis of student learning outcomes scores after applying The Learning Cycle 5e Learning Model to Cycle II Integer Operation Material can be seen in the table 4.

Table 4. Statistics of Student Test Scores in Cycle II

Statistic	Statistic Value
Subject	34
Ideal Score	100
Average Score	78,43
Highest Score	96,29
Lowest Score	41,58

Based on the table above, the average score of mathematics learning outcomes after applying learning that involves the Learning Cycle 5e learning model on Integer Operations Class VIIc MTs Al-Ikhlas Iwoimenda the ideal score achieved is 100. Meanwhile, individually the score achieved by students on application this with the highest score of 96.29 and the lowest score of 41.58 from the highest score reached 100 and the lowest score reached 0. After the student test scores are grouped into five categories, the frequency and percentage distributions are obtained as follows:

Table 5. Frequency Distribution and Percentage of Test Scores in Cycle II

Score Interval	Category	Frekuency	Persentage (%)
0 – 54	Very Low	1	2,94
55 – 64	Low	3	8,82
65 – 79	Medium	13	38,24
80 – 89	Hight	13	38,24
90 – 100	Very Hight	4	11,76
Amount		34	100%

Based on the table above shows that 2.94% of students are in the very low category, 8.62% of students are in the low category, 38.24% are in the medium category, 38.24% of students are in the high category, and 11.76 % of student learning outcomes are in the very high category. This shows that the level of student ability has increased. Besides that, according to the average score of the test results in Cycle II, which is equal to 78.43 if converted to a scale of five, it is in the medium category.

To see the percentage of mathematics learning completeness of Class VIIc MTs Al-Ikhlas Iwoimenda scores after the implementation of The Learning Cycle 5e on Integer Operation Material in cycle II can be seen in Figure 3.

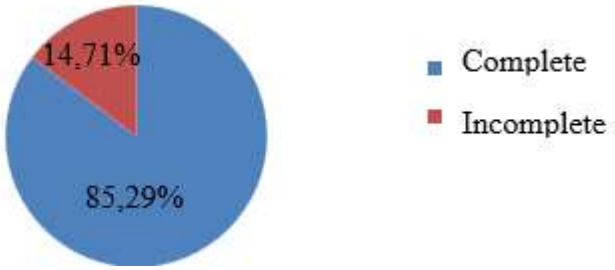

Figure 3. Classical completeness Cycle II

Based on Figure 3 above, it can be seen that of the 34 students there were 5 students or 14.71% whose mathematics learning outcomes were in the incomplete category, while those in the complete category were 29 students or 85.29%, meaning that there were more students whose mathematics learning outcomes are in the complete category.

Based on the results of the descriptive analysis above, it shows that the learning outcomes of Class VIIc students of MTs Al-Ikhlas Iwoimenda after the implementation of The Learning Cycle 5e Learning Model on material Operations and Properties of Integer Operations. This is said by looking at the increase in the average score obtained by students from 63.10 in Cycle I to 78.43 in Cycle II.

3.2. Discussion

Based on the results of the research that has been analyzed, it can be seen that the results of student evaluations after giving the questions completed have increased. This can be seen from the increase in the average score of students during this research, this means that the method applied is able to improve student learning outcomes, and there are fewer students who get low scores. The average score of student learning outcomes when converted into a scale of five categories is in the high category which was initially in the sufficient category. This shows that students' mathematics learning outcomes are increasing.

This research was declared successful after carrying out cycle II because it had achieved the predetermined performance indicators. After cycle II, students' scores increased with an average score of 78.43 with classical learning mastery of 85.29%, while in cycle I students were only able to obtain an average score of 63.10 with classical completeness of 47.06%. Based on the results of observation and evaluation, the research was stopped in cycle II, because the indicators of the success of this research had been achieved by achieving a performance indicator of 75% in this study, namely 85.29%, which was said to be complete.

The application of The Learning Cycle 5e Model to material on Integer Operations can cause students to stop being lazy. In this way students can also concentrate more on paying attention to lessons and be active in participating in the teaching and learning process in class because it can make it easier for them to solve the problems given, if the material is understood. In addition, it can make students and their friends have a desire to study together if they experience difficulties in learning.

Based on this description, it can be concluded that, "The Application of The Learning Cycle 5e Learning Model on Operational Materials and Properties of Integer Operations can improve mathematics learning outcomes in students of class VIIc MTS Al-Ikhlas Iwoimenda".

4. CONCLUSSION

Based on the results of the analysis of several cycles and discussion, it can be concluded that the implementation of learning through the application of The Learning Cycle 5e Learning Model can improve student learning outcomes for Class VIIc MTS Al-Ikhlas Iwoimenda. 2017/2018 Academic Year in material Operations and Properties of Integer Operations.

This is illustrated by the increase in student learning outcomes obtained from the results of the action tests for each cycle shown from the results of the evaluation of cycle I actions, classical completeness has not been achieved, namely 47.06% or as many as 18 students who did not complete out of 34 students who received a score of 72 with a score

average 63.10. Because the test scores for cycle I had not yet reached the indicator of success, it was continued until cycle II. From the results of the evaluation of the second cycle test, it was obtained that classical completeness was 85.29% or as many as 29 students with a complete score of 34 students who scored ≥ 72 with an average score of 78.43. ≥ 75% of students have scored ≥ 73.

REFERENCE

Budiman, R., & Efrida Muchlis, E. (2019). *Penerapan Model Pembelajaran Learning Cycle 5E Untuk Meningkatkan Hasil Belajar Matematika Siswa Kelas VIII SMPN 15 Kota Bengkulu*. Jurnal Penelitian Pembelajaran Matematika Sekolah (JP2MS), (Vol. 3, Nomor 2, hal 2018-227).

Hadromi. (2011). *Penerapan Model Pembelajaran Learning Cycle Berbasis Panel Peraga Sebagai Upaya Meningkatkan Kompetensi Mahasiswa Pada Materi Sistem Pengapian Mobil.* Jurnal Penelitian Pendidikan (Vol. 29, Nomor 2, hal 138-148).

Hasratuddin. (n.d.). *Permasalahan Pembelajaran Matematika Sekolah dan Alternatif Pemecahannya*. Phytagoras, *4*(1), 67-73

Imelda Tumulo. (2022). *Meningkatkan Hasil Belajar Siswa Melalui Pendekatan Inquiri Pada Mata Pelajaran Bahasa Inggris Kelas XII SMA Negeri 4 Gorontalo*. Jurnal Pengabdian Masyarakat: DIKMAS, *437*(2). https://doi.org/10.37905/dikmas.2.2.437-446.2022

Iryani, E. (n.d.). *Penggunaan Handphone Sebagai Media Pembelajaran Melalui Aplikasi Kine Master Untuk Meningkatkan Minat Belajar IPS di SMP Negeri 2 Banyuasin III*. Journal of History Education and Culture, *2*(2), 120-142.

Juhji. (n.d.). *Model Pembelajaran Learning Cycle 5e dalam Pembelajaran IPA*. Primary, *7*(2), 207-218.

Lestari, P. I., Riyanti, R., Murti, W., Nur, A., & Ilham, M. (2021). *Pengembangan Bahan Ajar Eco Garbage Enzyme Sebagai Media Pembelajaran di Masa Pandemi Covid-19* . Jurnal Biotek, *9*(1), 60-74.

Siregar, et.al (2019). *Meningkatkan Hasil Belajar siswa pada Pelajaran IPA di kelas VII-2 Melalui Pendekatan Pembelajaran Cara Siswa Belajar Aktif di SMP Negeri 29 Medan*. Jurnal Biolokus, Volume 2, Nomor 2, hal 217-221

Setyawati, P., Erawan, E., & Zulfiani, D. (2020). *Peran Pengawas Sekolah Dalam Meningkatkan Mutu Pendidikan di Sekolah Dasar Negeri 002 Kecamatan Loa Janan Kabupaten Kutai Kartanegara.* Jurnal Administrasi negara, *3*(8), 9208-9220.

Sulastri, dkk. (n.d.). *Meningkatkan Hasil Belajar Siswa Melalui Strategi Pembelajaran Berbasis Masalah Pada Mata Pelajaran IPS di Kelas V SDN 2 Limbo Makmur Kecamatan Bumi Raya*. Jurnal Kreatif Tadulako Online, *3*(1), 90-103.

Sumarsih. (n.d.). *Implementasi Teori Pembelajaran Konsruktivistik Dalam Pembelajaran Mata Kuliah Dasar-Dasar Bisnis*. Jurnal Pendidikan Akuntansi Indonesia, *8*(1), 54-62.