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**THE EFFORTS TO INCREASE STUDENTS
MATHEMATICAL COMMUNICATION SKILL THROUGH
THE USE OF POWERPOINT AND GUIDED DISCOVERY
METHODOLOGY ON THE STUDY OF CURVED-FACE-
THREE-DIMENSIONAL OBJECT
(STUDY CASE ON CLASS IX B MTsN CIMAHI – WEST
JAVA, INDONESIA)**

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Abstract

The background of this research is due to the low ability of students' mathematical communication in class IX B MTs Negeri Kota Cimahi. The purpose of this study to determine how the implementation of mathematics learning using power point and to determine the improvement of students' mathematical communication skills on the Curved-face-three-dimensional object after applying the method of guided discovery. The research method used is Classroom Action Research (PTK) with 3 cycles that are packaged in Lesson Study program. Data collection techniques used documentation, observation, and tests. The result of the research shows that the implementation of mathematics learning using power point with guided discovery method runs conductively and shows positive response, and there is improvement of mathematical communication ability on the 3rd cycle. This is proven by tackling the students' formative value seen from the absorptive power of classical cycle 1 65.39% to 72.94% in cycle 2 and to 86.59% in cycle 3. Based on the results obtained is expected that educators can apply powerpoint spinning with good planning and implementation so that the ability of students' mathematical communication can increase

Keywords: PTK, Lesson Study, Guided Discovery, Mathematical Communication, Power Point

Abstrak

Latar belakang penelitian ini disebabkan rendahnya kemampuan komunikasi matematik siswa di kelas IX B MTs Negeri Kota Cimahi. Tujuan Penelitian ini untuk mengetahui bagaimana pelaksanaan pembelajaran matematika yang menggunakan *power point* serta untuk mengetahui peningkatan kemampuan komunikasi matematik siswa pada materi bangun ruang sisi lengkung setelah menerapkan metode penemuan terbimbing. Metode penelitian yang digunakan adalah Penelitian Tindakan Kelas (PTK) dengan 3 siklus yang dikemas dalam program *Lesson Study*. Teknik pengumpulan data yang digunakan dokumentasi, observasi, dan tes. Hasil Penelitian menunjukkan bahwa pelaksanaan pembelajaran matematika menggunakan power point dengan metode penemuan terbimbing berjalan dengan kondusif dan menunjukkan respon positif, serta terdapat peningkatan kemampuan komunikasi matematik pada siklus ke 3. Ini dibuktikan dengan meningkatnya nilai ter formatif siswa dilihat dari daya serap klasikal pada siklus 1 sebesar 65,39% menjadi 72,94% pada siklus 2 dan menjadi 86,59%

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pada siklus 3. Berdasarkan hasil yang diperoleh diharapkan pendidik dapat menerapkan pembelajaran *powerpoint* dengan perencanaan dan pelaksanaan yang baik agar kemampuan komunikasi matematik siswa dapat meningkat

Kata Kunci: PTK, Lesson Study, Penemuan Terbimbing, Komunikasi Matematika, *Power Point*

INTRODUCTION

The ability of mathematical communication is an important part on math learning, because through communication skill students can filter ideas and clarify the understanding. If students have that ability then it will surely bring students to a deep mathematical understanding. In the learning process, communication of mathematical ideas can occur between teacher and students, books and students and even it is happen between students. Thus, the idea should be tailored to the ability of the person to communicate with.

On learning process, communication can stimulate students to share ideas, thoughts, conjectures and mathematical solutions. Further, in current mathematics education syllabus it is emphasized that students should be able to express their ideas of interpreting and understanding the ideas presented and participating constructively in the discussion of ideas, processes and mathematical results.

The low level of Indonesian students' mathematical communication skills is also demonstrated by international research results such as the Program for International Student Assessment (PISA) and Itrends in International Mathematics and Science Study (TIMSS). PISA (2009) states that the ability of junior high school students in Indonesia to solve problems of mathematical problems is very weak. The results of the PISA survey report show that in 2009, the achievement of Indonesian students was at position 68 of 74 countries surveyed. The average score of mathematical communication ability of Indonesian students is 371 below the average score of mathematical ability of students in other countries that is 496. In addition, 2009 also shows the low mathematical ability of Indonesian students when compared to other countries in the world.

Associated with students' mathematical communication skills, TIMSS (Kemendiknas, 2011) conveyed that students were weak in working on questions that demanded to argue and communicate. The report of the study shows that only 1.15% of students answer correctly. 1.35% answered the correct half. 75.93% tried menjawab but wrong, and that did not answer 21, 57%. The results of this study illustrates that Indonesian students have not been able to develop the ability of mathematical communication to the fullest. One of the factors that cause them is the lack of student learning experience which involves maximal communication abilities derived from their thinking.

One effort to improve the learning process is to choose the appropriate and innovative learning methods in mathematics learning. One of the learning models that can be applied to improve the ability of mathematical communication is through guided discovery learning method using powerpoint software.

According to Depdiknas (2006), the ability of mathematical communication is the ability or ability of a student to be able to declare and interpret mathematical ideas orally, written, or demonstrating what is in math problems. According to Abdulhak (Permana, 2010: 22), communication is interpreted as a process of delivering messages from the sender of the message to the recipient through a certain channel for a particular purpose.

The Methods sections should be brief, but they should include sufficient technical information to allow the experiments to be repeated by a qualified reader. Only new methods should be described in detail. Cite previously published procedures in References.

The indicators of mathematical communication used in this research are: (1) Explain the idea, situation, and mathematical relation in writing. (2) Stateing daily events in language or mathematical symbols.

Discovery learning method is a method of learning where in the learning process where the teacher gives students specific examples of topics and guides students to understand the topic (Jenny in Eggen 2012: 177).

The learning steps of guided discovery according to Setiawan in Simamora (2010: 4), are as follows:

- 1) The teacher formulates the problem that will be confronted to the student, with sufficient data. Formulation must be clear, in the sense that does not cause misinterpretation, so that the direction taken by students is not wrong.
- 2) From the data provided, the students prepare, process, organize and analyze the data. In this case teacher guidance can be given as far as necessary only. This guidance should lead students to move in the right direction. For example through questions or LKS.
- 3) Students construct conjectures (forecasts) from the results of the analysis it does.
- 4) If necessary, the conjecture above is checked by the teacher. This needs to be done to ensure the correctness of student forecasts.
- 5) If it has been obtained the certainty of the truth of the conjecture, then the verbalization of conjecture should be submitted also to the students to arrange it. After students find what they are looking for, the teacher should provide additional questions to check whether the findings are true.

METHOD

The method used in this research is classroom action research. The purpose of the PTK is to solve the problems faced by the educator while teaching in the classroom. The action given is learning with guided discovery method using power point software with the implementation stages which include planning, implementation of action, observation / evaluation and reflection cyclically.

This study was conducted from November 8, 2017 to November 15, 2017 in the odd semester of the academic year 2017/2018 at MTs Negeri Cimahi with the subject of the study were the students of class IX.B with a total of 37 students consisting of 18 men and 19 women . The instrument used is student activity obseration sheet and formative test to see the ability of mathematical communication

Sources of data in this study are students and educators. The type of data obtained is in the form of qualitative data and quantitative data taken from the observation, educator's diary at the time of teaching, the results of evaluation through the test at each end of the cycle. The

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data obtained from this research is derived from the obervation sheet conducted by observers or observers and tests in each cycle. All the data in if using excel software by calculating the average and see the average comparison of each cycle.

RESULTS AND DISCUSSION

RESULTS

1. The result of cycle 1

a. Plan

The things that are done at this stage are (1) Making Lesson Plan (RPP) for two hours of lesson in cycle I. (2) Creating teaching materials and LKPD for 3 hours of lesson. (3) Creating learning media to help educators in delivering learning materials. (4) The researcher also made a research instrument that includes an observation sheet to observe the learning conditions in the classroom. (5) Develop an evaluation tool that aims to measure students' mathematical communication skills using power point software through guided discovery learning.

b. Do

Implementation of the action is done by the teacher of mathematics class IX.B in Mts Negeri Cimahi, while the researcher acts as observer (observer). The first cycle of learning is carried out in a single meeting. The first class presentation was held on November 8, 2017 with the material "Surface Area Tubes". Rpp which has been prepared beforehand using guided discovery method Software Power Point assisted. The observers observed some predetermined groups and then made a small note of how the students' activities were in cycle one.



Figure 1. Observer is observing students

c. See

After the presentation of this first class, teachers and researchers discuss some of the shortcomings that occur in learning activities. In this case, it is found that there are constraints on the one cycle, the students are still lack of cooperation to each group, there are still those who still lack understanding of the subject matter, there are still some students who are still less focused in learning, and the students still have difficulties in understanding LK language. Then the researchers also calculate the average percentage of mathematical communication ability test results given last 30 minutes on learning.

The average value of the test cycle I is 65.39% means it has not reached the minimum completeness criteria (KKM) in kasikal. Then calculate the average student activity, where there is an average of 17% means that there is still no student activity.

2. The Result of Cycle 2

a. Plan

Based on the results of observation and evaluation on the action of cycle I, the researchers together with the teacher plan the action cycle II, so that the weaknesses that occur in the implementation of the action cycle I can be improved and achieve maximum results. The things that teachers need to improve on the implementation of the second cycle of action are as follows: 1) on the perception of educators gives a little more time to recall the material of the pre-paid. 2) educators rearrange group seating positions, such as crossing between male and female students. 3) improve LK language and make LK more interesting.

b. Do

Implementation of the action is done by the math teacher class IX.B in MTs Negeri Cimahi, while the researcher acts as observer (observer). The second cycle learning action was conducted in one meeting. The first class presentation was held on 14 November 2017 with the material "Volume of Tubes". Rpp which has been prepared beforehand using guided discovery method Software Power Point assisted. The observers observed some predetermined groups and then made small notes containing how the students' activities were in cycle II.



Figure 2. Observer is Observing students

c. See

After the presentation of this first class, teachers and researchers discuss some of the shortcomings that occur in learning activities. In this case found constraints on the second cycle that students have a less reading culture. Then the researchers also calculate the average percentage of mathematical communication ability test results given last 30 minutes on learning and average student activity. The average value of the second cycle test that is 72.94% means it has not reached the minimum completeness criteria (KKM) in kasikal. Then calculate the average of student activity, where there is an average of 24% meaning still less student activity in learning process.

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3. Research Results cycle III

a. Plan

Based on the results of observation and evaluation on the action cycle II, the researchers along with the teacher plan action cycle III, so that the weaknesses that occur in the implementation of action cycle II can be improved and achieve maximum results. Things that must be improved by the teacher on the implementation of action cycle II that teachers should be more emphasis back to improve the reading culture to students.

b. Do

The presentation of cycle III was held on 15 November 2017 with the material "Luas Cone". Rpp which has been prepared beforehand using guided discovery method Software Power Point assisted. The observers observed some predetermined groups and then made a small note of how the students' activities were in cycle III.



Figure 3. Observer is Observing students



Figure 4. Researcher is give a question to students

c. See

After the presentation of this first class, teachers and researchers discuss some of the shortcomings that occur in learning activities. In this case no longer found lack of students. Then the researchers calculate the average percentage of mathematical communication ability test results given last 30 minutes on learning and average student activity.

The average value of the second cycle test is 86.59% meaning that the final test score of the cycle III has met the success indicator of research is $\geq 85\%$. And the average for students' activity 26% means students' activity is very active based on student activity criteria.

Discussion

Tabel 1. Recapitulation of Student Activity Observation Analysis Results

| No | Indikator Aktivitas Belajar | Siklus I | Siklus II | Siklus III |
|------------------------------|-----------------------------|----------|-----------|------------|
| 1 | Visual Activities | 21 | 24 | 27 |
| 2 | Oral Activities | 16 | 22 | 22 |
| 3 | Listening Activities | 18 | 25 | 24 |
| 4 | Writing Activities | 16 | 22 | 27 |
| 5 | Motor Activities | 16 | 25 | 27 |
| 6 | Mental Activities | 16 | 25 | 27 |
| 7 | Emotional Activities | 16 | 24 | 27 |
| Average percentage cycle (%) | | 17% | 24% | 26% |

Based on table 1 it can be seen that student activity is experiencing improvement. In cycle I the average percentage of student activity is 17% and increased in cycle II to 24% and increased again 26%.

| No | Mathematical Communication Capability Indicators | Percentage of Cycle I | Percentage of Cycle II | Percentage of Cycle III |
|----|--|-----------------------|------------------------|-------------------------|
| 1 | Describe the situation ideas and mathematical relations in writing | 65,03 | 72,84 | 87,94 |
| 2 | Stating the daily events in a language or mathematical symbol | 65,75 | 73,04 | 85,24 |

Table 2 Recapitulation of Mathematical Student Mathematical Communication Ability Analysis Results

Table 2 shows that for indicators to identify data coverage for mathematical communication, the percentage increase is 65.39% in cycle I to 72.94% in cycle II and 86.59% in cycle III. The increase is in line with the increased activity of educators in managing learning in the cycle II and III.

Discussion

CONCLUSION

Based on the results of data analysis and discussion, it can be concluded

1. Student learning activities during the learning process through guided discovery method using power point software has increased with the percentage in cycle I of 17% to 24% in cycle II then 26 on cycle III.
2. The ability of students' mathematical communication after learning through guided discovery method using software power point increased from cycle I to cycle II and to cycle III. The increase can be seen from the classical absorption in the first cycle of 65.39% to 72.94% in cycle II and to 86.59% in cycle III.

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