

Implementation of the Problem-Based Learning Approach in Increasing Mathematics Learning at Sman 1 Cisarua, Bandung Barat Regency

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Abstract

The learning carried out by the teacher should always be able to improve the learning process and results, because over time the teacher's knowledge and experience always increases every day. However, the conditions in the field proved that the learning carried out by the teacher was not optimal. The purpose of this research is to examine how the implementation of the problem-based learning approach improves the quality of mathematics learning at SMAN 1 Cisarua, West Bandung Regency. The approach in this study uses a qualitative approach, the method uses case studies, and the data collection technique uses interviews and observation. The findings from this study indicate that the planning and implementation of the problem-based learning approach in improving the quality of mathematics learning at SMAN 1 Cisarua, West Bandung Regency, is in accordance with the Regulation of the Minister of Education and Culture Number 22 of 2016 concerning process standards. While the assessment has been done by assessing the process and learning outcomes.

The learning process carried out in high school should further improve the learning process and the quality of student learning, through a fun, challenging and motivating learning process for each student. This is stated in the regulation of the Minister of National Education Number 22 of 2016 concerning Process Standards, explaining that learning in educational units must be held in an interactive, inspiring, fun, challenging manner, motivating students to participate actively, and

providing sufficient space for initiative, creativity, and independence in accordance with the talents, interests and physical and psychological development of students. Based on the rules above, the teacher should direct students to be more active in the learning process.

In improving mathematics learning, teachers are still not maximally motivating students to be more active, one of which is that teachers have not been able to use an approach that encourages students to be more

active, so there are still many potential students who have not yet developed. Obstacles that impede the learning process include those related to teachers, students, classrooms and teaching aids (Oemar Hamalik, 2015: 16 factors that hinder learning consist of teachers, students, families and facilities (Ahmad Rohali, 2004: 157). In general, many high schools level are still teacher-centered, tending to make less changes in the learning process. There are still many teachers who are not able to direct students in solving problems in learning, require expensive fees, take a long time, student activities carried out outside of school are difficult to monitor by teachers, teachers are constrained in directing students to work together in groups, only a few students are actively involved (Harriyanto dan Warsono, 2012: 52).

Learning that can increase students to be more active, one of which is learning that uses a Problem based learning approach. The Problem based learning approach is learning that creates students with a problem, students will develop their social, thinking skills and independence. The Problem based learning approach is an approach that uses problems as a focus to improve problem solving abilities. Eggen, Paul, Kauchak (2012: 307) argued that:

Problem based learning is a learning model characterized by the existence of real problems as a context for what students learn to think critically and problem-solving skills and acquire knowledge. The essence of this approach expects students to carry out the process of oriented students to problems, organize students, guide individual and group investigations, develop and present work, analyze and evaluate problem-solving processes on everything related to the learning process itself. Through this approach students are expected to think scientifically and be able to study and work in groups to solve given problems so as to achieve optimal learning achievement.

The problem-based learning approach directs students to actively participate in learning through the following stages: understanding students'

problems, organizing students, guiding individual and group student studies, developing and presenting student work, reviewing and evaluating problem solving by students in the process learning.

By using a Problem based learning approach, teachers can provide convenience and encourage students to participate in supporting the success of the learning process. Therefore, teachers should be able to use a problem-based learning approach to improve their role and competence as teachers. In the current condition, the teacher is right to use the problem-based learning approach, because this approach can condition students to participate in learning activities, students can master the concepts being taught, students are more flexible to get their potential development and improve their thinking skills. This is appropriate to support in optimizing students' potential, because the development of learning does not only develop cognitive and psychomotor but students' attitudes and character.

The quality of learning is still an unresolved problem, in fact there are more and more problems in several places, which demand to be handled appropriately. The quality of learning will appear in the quality of graduates. The quality of graduates will increase if the implementation of learning is done properly and with quality. The quality of the implementation of learning will be carried out well if it is supported by supporting factors in the learning process. A quality learning process must be supported by personnel such as administration, teachers, counselors, and quality and professional administration. This is also supported by educational facilities and infrastructure, facilities, media, and adequate learning resources, both quality and quantity and sufficient costs, proper management and a supportive environment. (Sukmadinata, 2011: 7).

The quality of learning is strongly influenced by the quality of interaction between teachers and students, the quality of learning can be seen in the process and learning outcomes. The learning process can be said to be of quality if all learning

components are involved in the learning process. However, conditions in the field related to the quality of learning still need to be improved, improving the quality of learning needs to be focused on the learning process through the right approach.

The quality of learning still needs to be improved regarding the learning design, related to the orientation of student problems, motivating students to learn, guiding student research independently and in groups, developing and presenting student work, reviewing and evaluating student problem solving processes. In the implementation of learning that can activate students, they still encounter obstacles regarding students, the competence of the teacher, infrastructure and management.

The results of research conducted by Dodi Dahnuss (2014) shows that the application of Problem based learning can improve cognitive abilities, science process skills and creative thinking skills of students. The application of Problem based learning projects has positive responses from students, can increase motivation in learning and can help students find concepts by constructing their own knowledge.

The results of the preliminary study conducted by the researcher show that the math teacher at SMAN 1 Cisarua, West Bandung Regency, has taken a problem-based learning approach, but the implementation is still not optimal, it seems that some teachers still do not understand the steps for problem-based learning.

B. Research Question

The Research Question in this study is how to implement the problem-based learning approach in improving the quality of learning at SMA Negeri 1 Cisarua, West Bandung Regency?

1. How is the problem-based learning approach planned in improving the quality of mathematics learning at SMAN 1 Cisarua, West Bandung Regency?
2. How is the implementation of the Problem based learning approach in improving the

quality of learning mathematics at SMAN 1 Cisarua, West Bandung Regency?

3. How to evaluate the Problem based learning approach in improving the quality of learning mathematics at SMAN 1 Cisarua, West Bandung Regency?

C. Research Methodology

This study uses a qualitative approach, while the method uses the case study method, the data collection technique uses interviews and observation, the research location is at SMAN 1 Cisarua, Bandung Regency, the research subject is a mathematics teacher, the data is analyzed qualitatively. The research steps are to carry out the orientation stage, the exploration stage and the member check stage.

Research Findings and Discussions

Research Findings

Learning Planning Using a Problem Based Learning Approach

Based on the results of the interviews and observations conducted by the researchers, it was shown that the mathematics teacher at SMAN 1 Cisarua, West Bandung Regency, had carried out lesson plans using a problem-based learning approach. This planning was carried out through joint curriculum development workshops at the beginning of the year. The preparation of learning plans for mathematics subjects is outlined in the Lesson Plan (RPP). The previous step first analyzed the passing standards then analyzed the syllabus, by analyzing the relationship between core competencies and basic competencies, analyzing the subject matter, analyzing the time allocation based on the educational calendar listed on the syllabus.

The RPP describes core competencies and basic competencies into competency achievement indicators. In the 2013 curriculum the core competencies consist of core competencies 1 covering spiritual attitude competencies, core

competencies 2 covering social attitudes, core competencies 3 covering knowledge competencies and competencies 4 covering skills competencies. Core competencies 1 and 2 are not translated into competency achievement indicators. While the core competencies 3 and 4 in the syllabus are translated into competency achievement indicators.

The teacher includes learning objectives, media, tools, materials and learning resources at each meeting in the lesson plans, which are relevant to what has been determined in the elaboration step of the learning activity process. However, in the learning process that uses the Problem based learning approach, it uses the syntax approach, namely formulating problems, identifying problems, formulating hypotheses, collecting data, testing hypotheses, formulating recommendations for solving problems. In the RPP the teacher has described learning activities using a Problem based learning approach in detail at each meeting and wrote down student and teacher activities in 6 (six) Problem based learning approach syntax. In addition, the teacher lists the time location for each meeting, 2 x 45 minutes. 10 minutes for opening, 65 minutes for main activities and 15 minutes for evaluation and closing activities. The time location is complemented by the development of the assessment, including the scope, techniques and assessment instruments as well as scoring guidelines.

The Implementation of Problem Based Learning Approach

Implementation of the Problem Based Learning Approach at SMAN 1 Cisarua West Bandung Regency is described in the initial, main and final activities. In the initial activity, conducting student roll call, fostering pleasant relationships, creating an atmosphere that is not tense, conducting questions and answers related to the material that has been studied, then conveying the material to be discussed. The teacher stimulates by explaining the learning indicators then the basic concepts,

references needed for learning. The teacher conducts brainstorming where students are faced with stimuli in the form of pictures/videos/animations related to the material being discussed. Students find various problems, difficulties and things they don't understand related to the material provided by the teacher with pictures/videos/animations.

In the second phase of the problem statement (problem statement/identification) the teacher tries to help students by defining and organizing what is a problem or difficulty and things that are not understood by students. Students are grouped heterogeneously, each analyzing the activity sheet, discussing the things that must be done, the basic concepts that must be discussed, and several questions that must be answered.

In the third phase, data collection (data collection) the teacher guides students in solving student problems related to the material being discussed, students try to carry out discussions in groups while collecting data to create and develop their ideas in formulating problems related to the material to be discussed on sheets activities, students identify various ways of solving problems related to the problems that have been formulated.

In the fourth phase of data processing, students answer several questions on the activity sheet, try to display the answers in the form of a written report and display the results. findings or results of discussion and conclusion. In the fifth phase of verification, the teacher guides students to analyze the results of problem solving they have produced, discusses the results of the trial by paying attention to some of the questions on the student activity sheet. Students compile and submit reports and conclusions on the results of discussions or results of discussions. The teacher evaluates the learning outcomes of the material studied by students. In the sixth phase of generalization (drawing conclusions/generalizations) students discuss in making conclusions about the material that has been discussed.

By using media that attracts students, the teacher demonstrates showing pictures/videos/animations about the material that has been discussed. The teacher presents several ways to simplify calculations for each material discussed, assigns students to work on questions and students convey or present their work to the teacher, while the teacher conducts an assessment done by students.

Teachers and students carry out closing activities by compiling conclusions on learning outcomes together. The teacher gives assignments to learn the material that will be discussed next time. The teacher also provides positive comments for students who have been able to work on some of the questions or questions given by the teacher. The teacher provides motivation by raising students' abilities even though the form is small and simple. However, the teacher is still careful about conveying the deficiencies that students have or deficiencies that are carried out by students, so that the desire of students to carry out activities in groups discussing learning material remains enthusiastic and feels happy and comfortable.

c. Assessment of Problem Based Learning Approach

Assessment of the Problem based learning approach to learning mathematics at SMAN 1 Cisarua, West Bandung Regency by conducting an assessment of the process and learning outcomes. Assessment is carried out on learning outcomes and learning processes with regard to knowledge, attitudes and skills. To assess knowledge competence, the teacher uses written tests and assignments while to assess students' attitudes the teacher makes observations with a rating scale. To assess the competence of the teacher's skills assess aspects of communication, insight, self-confidence, enthusiasm and appearance during group work and presenting the results of group work.

Assessment of learning outcomes included that learning was fun, many students were active, those

who had mastered learning material became peer tutors by providing assistance to students who were still less able/understanding, many works produced by groups related to the material that had been discussed. These works are assessed, and used as materials or illustrations to discuss the material by the next student.

Discussions

Planning a Problem Based Learning Approach

Planning for the Problem Based Learning Approach has been carried out at SMAN 1 Cisarua, West Bandung Regency, it is proven that there is a planning process that begins with analyzing graduate competency standards, discussing the syllabus, compiling core and basic competencies, which are linked to learning materials, described in the form of indicators of achievement of abilities. It is intended that learning is focused on achieving student competency and ultimately on achieving graduation standards. The making of learning planning is described in the RPP. Teachers feel that they are not socialized properly about the 2013 curriculum changes. So that some teachers still adopt lesson plans from other schools, because they feel unsure of their ability to make lesson plans.

The steps for preparing the lesson plans carried out by the teacher include focusing on learning objectives, scope, infrastructure, number of students, time allocation, sources of learning materials. This is in accordance with the Regulation of the Minister of Education and Culture Number 22 of 2016 concerning learning in primary and secondary education conveying that in preparing a lesson plan it is required to follow the steps: (1) Reviewing the syllabus, (2) Formulating KD achievement indicators, (3) Learning materials, (4) elaboration of learning activities, (5) determining time allocation, (6) developing learning assessments, (7) determining remedial learning strategies, (8) determining

media, tools, materials and learning resources. Then the components that must be in the RPP according to the 2014 Minister of Education and Culture Regulation, namely (1) RPP Identity, (2) Core competencies, (3) Basic competencies, (4) Competency Achievement Indicators, (5) Learning materials, (6) Learning activities, (7) Assessment, Remedial and Enrichment Learning, (8) Media/tools, materials and learning resources.

Implementation of Problem Based Learning Approach

In implementing the Problem based learning approach to learning mathematics, it is in accordance with the steps contained in the Regulation of the Minister of Education and Culture Number 22 of 2016 concerning learning in primary and secondary education, namely formulating problems, identifying problems, formulating hypotheses, collecting data, testing hypotheses, and formulate recommendations for solving problems. These steps have been taken even though they are not sequential according to the Ministerial Regulation and seem successful even with simple tools and media.

Learning mathematics using a Problem based learning approach is carried out with three activities, namely initial activities, main activities and final activities. In the initial activities carried out by the teacher greeting, taking student attendance, breaking the ice for learning, asking about previously discussed material, conveying material to be discussed, conducting pre-tests on previously discussed material. In the main activities the teacher does the first phase, namely motivating and simulating, the second phase is doing problem statements, the third phase is doing data collection, the fourth phase is doing data processing, the fifth phase is doing *verification* dan fase keenam melakukan *generalization*. In the final activity the teacher and students make conclusions on learning outcomes and provide material to be discussed at the next meeting and assign students to study it. Then the teacher conducts an assessment of student learning outcomes, providing reinforcement of student work. The activities carried out by the

teacher related to the implementation of the problem based learning approach in learning mathematics have made students happy to participate in learning.

Assessment of Problem Based Learning Approach

The activity of assessing the Problem based learning approach in learning mathematics is carried out by assessing the process and learning outcomes. Process assessment carried out by mathematics teachers uses an authentic assessment approach by assessing student readiness, learning processes and outcomes. This assessment is in accordance with what is stated in Permendikbud number 23 of 2016 concerning the assessment of learning outcomes in primary and secondary education.

Daryatno (2014:112) Argued that :

This kind of assessment is able to describe the increase in student learning outcomes, both in solving problems, building networks and others. Authentic assessment provides opportunities for students to apply their knowledge, skills and attitudes in various assignments. These tasks include reading and summarizing, writing essays, class discussions, projects, surveys and experiments.

Learning assessment serves to see student progress in learning and detect the need to improve student learning outcomes. Student learning outcomes can be analyzed, the results can be used for the purposes of improving the value of student learning outcomes. By looking at the needs of students, the teacher will be facilitated and not too complicated to fix them and the results will be right because they match the needs. Accuracy in improving learning outcomes will support the objectives of assessing learning outcomes listed in Permendikbud number 22 of 2016 conveying (1) determine the level of mastery of attitudes, knowledge and skills competencies, (2) determine the completeness of mastery of student learning competencies within a certain period of time, (3) determine improvement or enrichment programs based on the level of competency mastery for

them, (4) improve the learning process at the next semester meeting.

Mathematics teachers in conducting knowledge assessments often use written test assessment techniques and assignments in the form of multiple choice questions or essays. Meanwhile, to assess the competency skills of mathematics teachers using performance assessment, the tool used is in the form of a checklist. Based on the learning results obtained showed a very good improvement. However, to conduct an attitude assessment, teachers often experience obstacles.

Conclusion

1. Planning for a problem-based learning approach in improving the quality of learning mathematics at SMAN 1 Cisarua, West Bandung Regency, shows that it is in accordance with the Regulation of the Minister of Education and Culture Number 22 of 2016 concerning Process Standards for primary and secondary education, namely preparing lesson plans, basic and core competencies, goals earning, preparing media, learning resources, preparing assessment tools and learning steps.
2. The implementation of the problem-based learning approach in improving the quality of learning mathematics at SMAN 1 Cisarua, West Bandung Regency, has been carried out in accordance with the Regulation of the Minister of Education and Culture Number 22 of 2016 concerning Process Standards for primary and secondary education by dividing the learning process into three activities, namely pre-activity, main and post-activity.
3. The assessment of the problem-based learning approach in improving the quality of learning mathematics at SMAN 1 Cisarua, West Bandung Regency, shows that learning assessment has been carried out by assessing the process and learning outcomes.

References

Hamalik, Oemar (2015). *Kurikulum dan*

Pembelajaran. Jakarta: Bumi Aksara

Kauchak, Eggen. Paul. (2012). *Strategi dan Model Pembelajaran Mengajar Konten dan Keterampilan Berpikir*. Jakarta : Indek.

Kementerian Pendidikan dan Kebudayaan Republik Indonesia (2016) Peraturan Pemerintah Nomor 22 Tahun 2016 tentang Standar Proses

Kementerian Pendidikan dan Kebudayaan Republik Indonesia (2016) Peraturan Pemerintah Nomor 23 Tahun 2016 tentang penilaian hasil belajar pada pendidikan dasar dan menengah.

Sukmadinata, N.S (2011). *Kualitas Proses Pembelajaran*. Tersedia:

<http://sambasalim.com/pendidikan/kualitas-proses-pembelajaran.htm>