http://infor.seaninstitute.org/index.php
JURNAL SCIENTIA, Volume 11 No 2, 2022 ISSN 2302-0059

IMPLEMENTATION OF PROBLEM SOLVING LEARNING TO INCREASE STUDENT LEARNING OUTCOMES ON CHEMICAL BONDING MATERIALS IN CLASS X IPA 1 SMA NEGERI 1 PURI

Solikhatiningsih
SMA Negeri 1 Puri Mojokerto
Email : solningsih672@gmail.com

Article Info

Received: 12/08/2022
Revised: 20/09/2022
Accepted: 09/10/2022

Abstract

This study aims to determine the improvement of learning quality, activeness and student learning outcomes in the application of problem solving learning in class X IPA 1 SMA Negeri 1 Puri. This research is classroom action research (CAR) which consists of two cycles with each cycle consisting of planning, implementation, observation, and reflection stages. This research was conducted in class X IPA 1 SMA Negeri 1 Puri in the odd semester of the 2019/2020 school year involving 30 students. The results showed that problem solving learning made it easier for teachers to carry out learning so that learning became quality, which was marked by an increase in the assessment of the implementation of learning, from 2.6 (good) to 3.8 (very good) in the second cycle and student activities also showed students were very active, as evidenced by the increase in student activity from 86.67% in the first cycle to 93.33% in the second cycle. In addition, problem solving learning makes it easy for students to master competencies. This is evidenced by an increase in student learning outcomes, namely an increase in mastery learning outcomes from 72.22% in the first cycle to 88.89% (completed).

Keywords: learning outcomes, chemical bonds, problem solving

1. Introduction

At the high school level, the curriculum should be designed using a holistic integrative learning approach by taking into account the classification of lessons, namely adaptive, normative, and productive. Integrative learning is a learning approach that integrates knowledge, skills, values and attitudes, and creative thinking in learning by using a theme as the subject of study. All learning activities must of course achieve the goals that have been stated in the curriculum. To achieve this goal, a plan is needed that describes what activities must be carried out by teaching staff in delivering the material.

According to the results of the preliminary study, learning that emphasizes group work is one thing that is a little difficult to do because of the characteristics of students who currently only want to work in groups with their own friends. Children who have or are considered less intelligent are usually ostracized and there are no students who want to invite them to work in groups. Apart from learning activities that do not prioritize group work, it turns out that the material that is very difficult for students of class X IPA 1 of SMA Negeri 1 Puri to understand is chemical bonding. Based on the results of the pre-test, it can be seen that the completeness of learning outcomes has not been achieved (0%).

Based on the explanation delivered by the Ministry of Education and Culture, one of the learning models that can be taken into consideration for carrying out learning activities in the curriculum is the problem solving learning model. A learning process by using certain strategies, methods, or techniques to deal with new situations, so that these conditions can be passed according to the wishes set (Purwanto, 1999:17). In addition, Zoler (Sutaji, 2002:17) states that teaching begins with questions that lead to concepts, principles, and laws, then continues with problem-solving activities. Furthermore, according to Suprijono (2012:46) problem solving is a pattern that is used as a guide in planning learning in class and tutorials. Meanwhile, Arends (Suprijono, 2012:46) states that

the learning model refers to the approach to be used, including learning objectives, stages in learning activities, learning environment, and classroom management. The research objectives are as follows: 1) To determine the quality of learning and student activity in the application of problem solving learning in class X IPA 1 SMA Negeri 1 Puri. 2) To find out the improvement of student learning outcomes through learning chemical bond problem solving in class X IPA 1 SMA Negeri 1 Puri. The results of this study are expected that high school teachers can have knowledge about problem solving learning theory as a form of learning innovation in high school. The results of this study are expected that high school teachers have a learning theory that can be used as a reference to improve chemistry learning outcomes in high school.

2. Method

This research is action research, because the research is conducted to solve learning problems in the classroom. This research also includes descriptive research, because it describes how a learning technique is applied and how the desired results can be achieved.

The research was conducted at SMA Negeri 1 Puri. This school was chosen and determined based on two considerations, namely academic and technical. Academic considerations, because innovative learning models such as problem solving are still very rarely applied in learning at SMA Negeri 1 Puri. Technical considerations allow researchers to conduct research because the researcher is a teacher in class X IPA 1 at SMA Negeri 1 Puri and it is easy for researchers to get observers who already know the students of SMA Negeri 1 Puri. The limitations of time, effort, cost and research focus encourage the need for a firm scope of research. In this case, the scope of the research is defined as follows: 1) Learning improvement is carried out using problem solving models. 2) The material studied is chemical bonds. 3) The focus of this research is on the learning process which includes teacher and student activities, as well as product learning outcomes obtained by students after taking the test at the end of each cycle.

This research was conducted in September - October 2019. The research subjects were students of class X IPA 1 SMA Negeri 1 Puri in the 2019/2020 school year, totaling 30 students. The reason for assigning research subjects to the class refers to the following considerations: 1) low motivation and interest in learning, this is evidenced by students' lack of responsiveness; 2) learning outcomes are still low, this is evidenced by the achievement of the KKM in the previous material below 70%; 3) the researcher gets a teaching assignment in the class. In accordance with the type of research chosen, namely action research, this research uses the action research model of Kemmis and Taggart (Sugiarti, 1997: 6), which is in the form of a spiral from one cycle to the next. Kemmis and Taggart (1988) divide the action research procedure into four stages of activity in one cycle, namely: planning – action and observation – reflection. The action research model is often referred to by action researchers. The research instrument consists of the implementation of the learning implementation plan (RPP). Student activity observation sheet. Product indicator achievement assessment sheet.

3. Results And Discussion

Cycle 1

The planning stage consists of: 1) Developing a Learning Improvement Plan (RPP) cycle I which is focused on planning corrective steps or action scenarios that are expected to overcome learning problems and improve the quality of the process and student learning outcomes. 2) Appropriate learning media. 3) Prepare worksheets that will be used by students individually which contain tasks that students need to complete during learning on ionic chemical bonding material. 4) Determine the criteria for success/achievement of learning improvement. In this study, learning improvement is declared successful/achieved if the individual mastery ability reaches a minimum value of 75, classical learning mastery reaches 85%.

The research was carried out according to the RPP that had been planned and observed by two observers. The results of the observations are as follows:

Table 1 Observations on the implementation of RPP

No	Activity	Cycle 1
	Management of KBM	
	A. Introduction	
1	Motivate students	3
2	Communicating goals	3
	B. Core Activities	
3	Clarification of the problem: the teacher gives the problem posed	3
4	Expression of opinion; students are given the freedom to express opinions about various amslaah solutions	2
5	Evaluation and selection; each group discusses opinions or strategies that are suitable for solving problems	2
6	Implementation; Students determine which strategy is taken to solve the problem. Then apply it until you find a solution to the problem.	3
	C. Closing	
7	The teacher and students conclude the material/lesson	2
	Class management	
	Class situation	
8	1. Enthusiastic students	2
9	2. Enthusiastic teacher	3
	Time management	
10	Time according to allocation	3
	Average score	2.6
	% implementation	100

Based on the data from Table 1, it can be seen that in the first cycle the average score was 2.6 in the good category. In the first cycle, for some syntaxes, the teacher still has difficulties so that they only get a score of 2 or enough, including in syntax explaining or demonstrating mastery in outline, providing opportunities for students to explain to others, the ability to invite students to conclude the material and increase student enthusiasm. . Teachers are still not proficient in carrying out problem solving learning, this can be seen from no one syntax that gets a score of 4 or very good. In the first cycle, it was seen that the implementation of the RPP was very good, with the percentage of the implementation of the RPP reaching 100%. The results of observing student activities during the learning process in the first cycle are shown in Table 2.

Table 2 Student activity data

No.	Student Activities	Cycle 1
1	Listen to the teacher's explanation	28.89
2	Work in groups (find ideas, ideas)	22.22
3	Ask the teacher/student	11.11
4	Communicating ideas/ideas (classical or individual)	11.11
5	Summing up the material	13.33
6	Irrelevant behavior	13.33
	% student activity	86.67

Based on Table 2 it can be stated that student activity is getting better. This is evidenced by the increased activity of asking questions and expressing opinions, and communicating ideas. Meanwhile, irrelevant behavior in the second cycle decreased. The activity percentage also shows a good percentage because it is above 75%. These student activities show that learning takes place effectively and is student-centered. This shows that the problem solving learning model provides convenience for teachers in implementing student-centered learning strategies and provides broad opportunities for

students to get used to critical thinking through discussion activities, group assignments, asking questions or expressing opinions. The learning outcomes in the first cycle are shown in Table 3.

Table 3 Learning Outcomes

	Cycle 1	
	Score	Informasi
Average	73.33	
Lowest Value	40	
The highest score	80	
Completeness	72.22	

Based on the data on learning outcomes above, it shows that student learning outcomes have increased. This is evidenced by the average student learning outcomes increase in each cycle. The average in the first cycle shows a value of 73.33 while the individual completeness also increases. This is proven in cycle 1 to be 72.22%. Based on the results of discussions with observers, reflections can be written as a form of research findings, including in general, the implementation of the RPP in the first cycle has met the research targets and indicators but needs to be continued in the second cycle to obtain definite data. In the first cycle, student activities in general have been fulfilled but further research needs to be done in the second cycle because teacher dominance is still relatively high. This is evidenced by the activity of listening to the teacher's explanation at the highest percentage. Learning outcomes in the first cycle have not been met so that the research is continued in the second cycle.

Based on the presentation of these findings, a fundamental improvement was made, namely the role of the teacher in learning. Teachers need to practice before applying learning syntax and provide more opportunities for students to explore their knowledge. The obstacles faced during learning and as evaluation material are listed in Table 4.

Table 4 constraints and alternative solutions

No.	Constraint	Solution
Cycle 1		
1	Teachers are not used to implementing problem solving learning syntax	Teachers need simulation before learning
2	Teachers do not provide opportunities for students to be able to explore their knowledge	Students are given more confidence while at the same time motivating students to be actively involved in learning

Based on the data on the constraints and solutions as shown in Table 4, it can be stated that all obstacles can be resolved properly, and do not disrupt the lesson plans that have been set. These obstacles will decrease if innovative learning models are always implemented in the classroom.

Cycle 2

In the second cycle at the planning stage, prepare a Learning Implementation Plan (RPP) by considering the inputs/suggestions in cycle 1. Compile an observation sheet for student activities, and an observation sheet for the implementation of learning activities for teachers. Arrange grids, and test question sheets that will be tested in writing to students at the end of the cycle to determine student learning outcomes in cycle II. Implementation and Observation.

Table 5 Observations on the implementation of RPP

No	Activity	Cycle 2
	Management of KBM	
	A. Introduction	
1	Motivate students	4
2	Communicating goals	4

	B. Core Activities	
3	Clarification of the problem: the teacher gives the problem posed	4
4	Expression of opinion; students are given the freedom to express opinions about various amslaah solutions	3
5	Evaluation and selection; each group discusses opinions or strategies that are suitable for solving problems	3
6	Implementation; Students determine which strategy is taken to solve the problem. Then apply it until you find a solution to the problem.	4
	C. Closing	
7	The teacher and students conclude the material/lesson	4
	Class management	
	Class situation	
8	1. Enthusiastic students	4
9	2. Enthusiastic teacher	4
	Time management	
10	Time according to allocation	4
	Average score	3.8
	% implementation	100

Based on the data in Table 5, it can be seen that in the second cycle, the score was 3.8 in the very good category. In the second cycle, it can be seen that the minimum score obtained is in the good category and even more who get a score of 4 or very good. RPP implementation is very good, with the percentage of RPP implementation reaching 100%. The results of observing student activities during the learning process during the second cycle are in Table 6.

Tabel 6 Data aktivitas siswa

No.	Student Activities	Cycle 2
1	Listen to the teacher's explanation	8.89
2	Work in groups (find ideas, ideas)	17.78
3	Ask the teacher/student	22.22
4	Communicating ideas/ideas (classical or individual)	28.89
5	Summing up the material	15.56
6	Irrelevant behavior	6.67
	% student activity	93.33

Based on Table 6 it can be stated that student activity is getting better. This is evidenced by the increased activity of asking questions and expressing opinions, and communicating ideas. Meanwhile, irrelevant behavior in the second cycle decreased. The percentage of activity also showed a good percentage because it was above 75%. These student activities show that learning takes place effectively and is student-centered. This shows that the problem solving learning model provides convenience for teachers in implementing student-centered learning strategies and provides broad opportunities for students to get used to critical thinking through discussion activities, group assignments, asking questions or expressing opinions. Learning outcomes in the second cycle are shown in Table 7.

Table 7 Learning outcomes of the second cycle

	Cycle 2

	Score	Information
Average	81.39	
Lowest Value	60.00	
The highest score	100.00	
Completeness	88.89	

Based on the data on learning outcomes above, it shows that student learning outcomes have increased. This is evidenced by the average student learning outcomes increase in each cycle. The average in the second cycle increased to 81.39. In addition, individual mastery also increases. This is evidenced in the second cycle increased to 88.89%.

Based on the results of discussions with observers, reflections can be written as a form of research findings, including based on the results of the study found data that there was an increase and improvement in learning so that the score for implementing the lesson plan was very good. In the first cycle, student activities in general have been fulfilled. The learning outcomes in the second cycle have been met. Based on the presentation of these findings, the research was completed until the second cycle. The obstacles faced during learning and as evaluation material are listed in Table 8

Table 8 constraints and alternative solutions

No.	Constraint	Solution
1	There are still few students who dare to express their opinions	Motivated so that students dare to express opinions independently

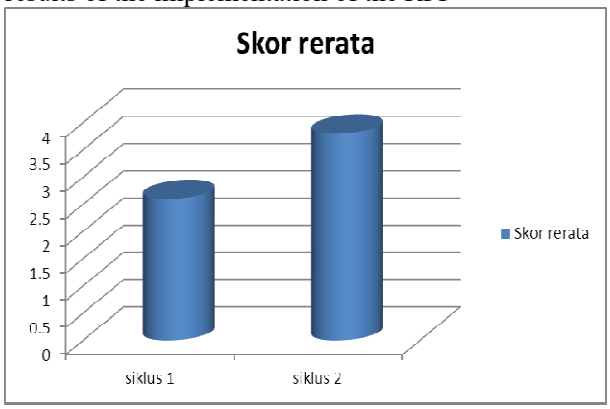
Based on the data on the constraints and solutions as shown in Table 8, it can be stated that all obstacles can be resolved properly, and do not disrupt the lesson plans that have been set. These obstacles will decrease if innovative learning models are always implemented in the classroom.

One aspect that is very influential on the success of a learning is how the skills of a teacher in managing learning. Based on Tables 1 and 5, it can be seen that learning chemistry on chemical bonding material is carried out very well as presented in the form of the table below:

Table : 9 Levels of Implementation of RPP Cycle I and Cycle II

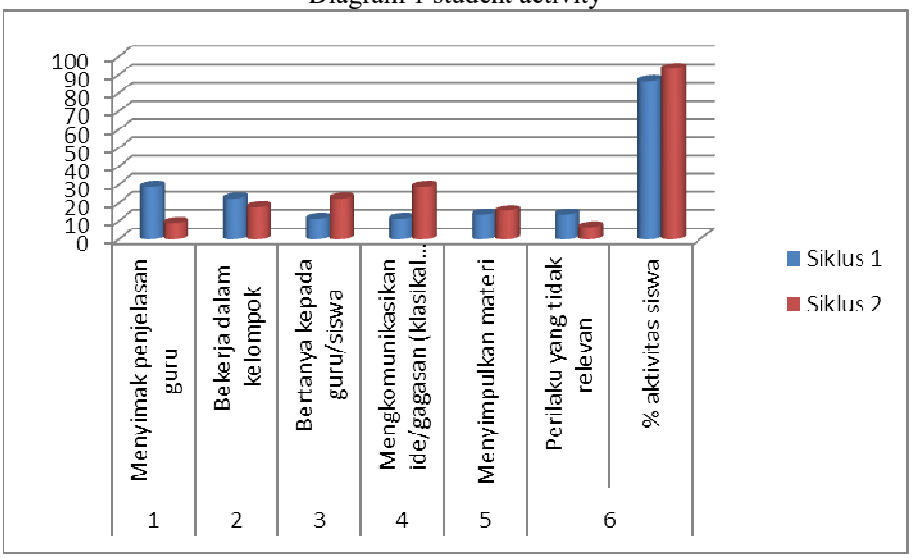
No	Stage	Implemented		Not Implemented		Average score	Category
		Amount	%	Amount	%		
2	Silkus I	10	100	0	0	2.6	Well
3	Cycle II	10	100	0	0	3.8	Very good

Diagram 1 of the results of the implementation of the RPP



The results of the study mean that if the teacher can carry out the syntax well, the quality of learning will be better, the classroom atmosphere will also be active. Student activity in both cycles shows good activity, has reached the indicator since the first cycle. The following is given diagram 1 of student activities.

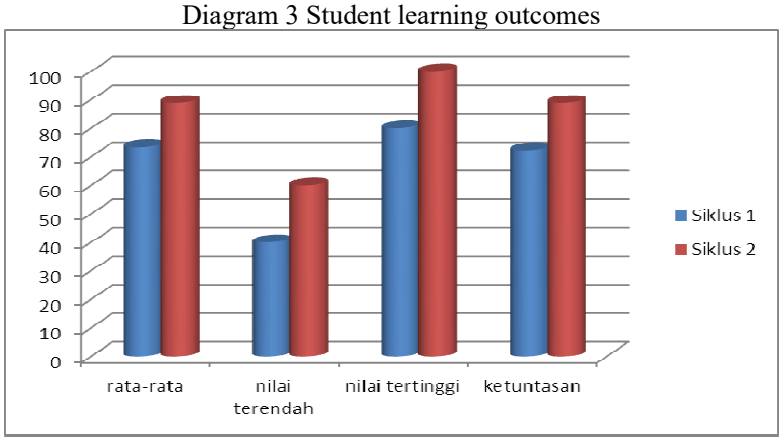
Diagram 1 student activity



These results indicate that the quality of learning gives a positive response to the increase in student activity. In this case the teacher is able to condition the class, can provide good motivation for students. These results also provide reinforcement as stated by Adam and Mbirimujo (Prasetyo, 2001) who state that problem solving learning models provide benefits for increasing motivation in class, students become more active.

The increase in these activities also confirms that student motivation can be built through extrinsic motivation, in this case the teacher. The application of the problem solving learning model is part of extrinsic motivation which will then be able to increase students' intrinsic motivation. These results also strengthen the opinion of Ngalim Purwanto (2010) which states that learning outcomes can be built from increasing student motivation first. A very important motivation is intrinsic motivation, but to generate this motivation, external encouragement is needed in the form of extrinsic motivation. Furthermore, the researchers presented data on the level of students' completeness in chemical bonding chemistry learning in the form of a diagram as follows.

Diagram 3 Student learning outcomes



From the diagram above, it can be seen that there is an increase in student mastery achievement in the repair cycle. The increase in learning outcomes was caused by (1) an increase in teacher performance in implementing problem solving learning models, teachers were familiar with the model, (2) an increase in student activity. Students are more enthusiastic and find concepts through their own thoughts and are assisted by classmates during discussion moments.

Based on the existing theory, it is explained that learning by involving students actively is able to teach learning to think high and even be able to solve problems. When faced with a question or problem, students can perform problem-solving skills to select and develop responses. Not only by memorizing without thinking, problem solving skills expand the thinking process, this is in accordance with Pepkin's opinion (Muslich, 2007).

Based on the results of the study, it can be explained that the problem solving learning model is a learning model that is able to improve students' ability to think highly so that completeness can be achieved (Wiederhold in Suyitno, 2006). This happens because the problem solving learning model provides the widest opportunity for students to solve problems with their own strategies. One of the developments of this learning model is the CPS learning method.

The results of this study are also in accordance with several previous studies including: 1) research by Restika Maulidina Hartantia (2013), 2) Arif (2010), 3) Sri Indah Rini Astuti (2011), 4) Fian Totiana (2012), 5) Rizki Amalia (2013), all of which generally state that the creative problem solving (CPS) learning model is able to improve the quality of learning, make the classroom atmosphere active, and improve student achievement or learning outcomes.

4. Conclusions

Based on the results of the learning that has been carried out for two cycles, and based on the discussion and analysis that has been carried out, it can be concluded as follows: 1) Problem solving learning makes it easier for teachers to carry out learning so that learning becomes quality, which is marked by an increase in the assessment of the implementation of learning, namely from 2.6 (good) to 3.8 (very good) in the second cycle and student activities also showed students were very active, as evidenced by the increase in student activity from 86.67% in the first cycle to 93.33% in the second cycle. 2) Problem solving learning makes it easy for students to master competencies. This is evidenced by an increase in student learning outcomes, namely an increase in mastery learning outcomes from 72.22% in the first cycle to 88.89% (completed). Based on the findings during the research, suggestions can be given: 1) Teachers should always present interesting learning with various kinds of learning innovations. 2) Further research is needed, because this research is limited to class X IPA 1 SMA Negeri 1 Puri in the 2019/2020 school year. 3) The curriculum makes learning more varied even though it makes the teacher's task more difficult, but this can be overcome if maximum learning preparation is carried out and is supported by adequate media, and the selection of appropriate models, strategies, learning methods.

References

[1] A Pribadi, Benny. 2009. Model desain system pembelajaran. Jakarta: dian Rakyat.
[2] Arif. 2010. Penerapan Pendekatan Creative Problem Solving (CPS) Dengan Menggunakan Lembar Kerja Untuk Meningkatkan Keaktifan Dan Hasil Belajar Siswa Dalam Pembelajaran Matematika Pada Bangun Ruang Sisi Datar. Skripsi. Universitas Muhammadiyah Surakarta.
[3] Astuti, Sri Indah Rini. 2011. Penerapan Model Problem Solving Melalui Strategi Pembelajaran Search, Solve, Create And Share (Sscs) Disertai Hands On Activities Untuk Meningkatkan Keterampilan Berpikir Kreatif Siswa Di SMP Negeri 1 Bulu Sukoharjo. Skripsi. Pendidikan Biologi FKIP Universitas Sebelas Maret Surakarta.
[4] Djamarah, S.B dan Zain, A. 2002. Guru dan anak didik dalam interaksi edukatif. Jakarta: Rineka Cipta.
[5] Hasanudin, Stepanus Sahala Sitompul, Hamdani. 2015. Penerapan model pembelajaran DL untuk meningkatkan hasil belajar dan aktivitas fisika siswa di SMA. Tanjungpura. Jurnal Pendidikan dan Pembelajaran (Vol 4, No 10) FKIP Untan.
[6] Ibrahim, Muslimin. 2000. Pembelajaran . Surabaya: UNESA-University Press.
[7] Isjoni. 2010. Cooperative Learning – Efektivitas Pembelajaran Kelompok. Bandung : Alfabeta.

[8] Lestari, Indah ; M.G. Rini Kristiantari , I Gusti Agung Oka Negara. 2014. Pengaruh Model Pembelajaran Problem solving terhadap hasil belajar IPA kelas V. Jurnal Mimbar PGSD Universitas Pendidikan Ganesha Jurusan PGSD (Vol: 2 No: 1 Tahun 2014).

[9] Syairozi, M. I., & Rosyad, S. (2022). Inovasi Daun Lontar Untuk Meningkatkan Produktivitas Masyarakat Desa Lawanganagung. Jurnal Pengabdian kepada Masyarakat Nusantara, 3(1), 131-136.

[10] Syairozi, M. (2015). Pengaruh Faktor Eksternal (Inflasi, Bunga) Dan Faktor Internal (Bagi Hasil, Jumlah Bank) Terhadap Deposito Mudharabah Pada Perbankan Syariah Di Indonesia (Doctoral dissertation, Universitas Brawijaya).