Improving Student Learning Outcomes Through the Think Pair and Share Model in Chemistry Learning

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Abstract. Think Pair and Share learning is a way of learning designed for students so they can be pushed into the flow of interaction and communication. Think Pair and Share was first developed by Frank Lyman and his colleagues at the University of Maryland in 1985. Therefore, it aims to find out whether the Think Pair and Share model can improve learning outcomes in Chemistry class XI MIPA 1 SMAN 1 Sigi even semester of the 2022 academic year/2023 and to find out how to describe the application of the Think Pair and Share model so that it can improve learning outcomes in Chemistry class XI MIPA 1 SMAN 1 Sigi even semester of the 2022/2023 academic year. This study used classroom action research with research subjects being class XI MIPA 1 students with a total of 27 people consisting of 6 men and 21 women with data collection techniques, namely qualitative data and quantitative data. The results of this study indicate that the Think Pair and Share Model can improve learning outcomes in Chemistry class XI MIPA 1 SMAN 1 Sigi even semester of the 2022/2023 academic year because the highest score in cycle I is 100 as many as 1 person in cycle II the highest score increases to 100 as many as 4 people. The lowest score in cycle I was 50 for 2 people and in cycle II the lowest score was only 1 person who was worth 50.

Keywords: Learning outcomes thinking pair and share models, learning chemistry

1. Introduction

Chemistry subject is one of the compulsory subjects for class XI students majoring in Science at the high school/MA level. Chemistry is a branch of science whose development and application demand a number of activities and expertise in memorizing, calculating, and doing practical work, (Purwanto, 2016; Purwono, 2014). Complex and abstract concepts in chemistry make students think that chemistry is a difficult lesson. An understanding of chemistry demands high activity and creativity from students as learning parties and from teachers as learning facilitators, (Kowaltowski, Bianchi, & De Paiva, 2010). Therefore, a teacher is required to look for a variety of relevant learning strategies and media to obtain satisfactory learning outcomes.

In the process of teaching and learning activities and involvement of students as a whole is very important to be realized so that learning activities can be successful optimally. Especially for teachers of exact subjects such as mathematics, chemistry, physics, and biology (Mumford, Scott, Gaddis, & Strange, 2002). Most of the students have difficulty understanding academic concepts, as they are usually taught, namely by using something abstract and the lecture method. This is due to the limited facilities available in educational units.

As a supervising teacher, it is necessary to take action, namely conducting classroom action research to overcome the problems mentioned above. In this classroom action research, we try to apply the Think Pair and Share model. By applying this model, of course, it is hoped that it can improve the quality of learning which of course also improves student learning outcomes. Think Pair and Share learning when translated into Indonesian means thinking, pairing, and sharing, is a way of learning designed for students so they can be pushed into the flow of interaction and communication (Kurniasari & Setyaningtyas, 2017; Zulkarnain & Djamilah, 2016). Think Pair and Share was first developed by Frank Lyman and colleagues at the University of Maryland in 1985 (Kaddoura, 2013; Novita, 2014; Radhakrishna, Ewing, & Chikthimmah, 2012).
2. Method

This study uses classroom action research (CAR) using the Kemmis & McTaggart model. PTK is a translation of Classroom Action Research, which is Action Research conducted in the classroom (Khasinah, 2013; Mettetal, 2002; Wijaya, 2017). PTK is research conducted by teachers in their own classes through self-reflection with the aim of improving their performance so that student learning outcomes increase (Zaenal, 2009). The procedure for this research activity was carried out through 2 cycles, each cycle consisting of four stages, namely 1) Planning, 2) Implementation, 3) Observation, 4) Reflection, (Arikunto, 2021).

As for the subject of this study, the research subjects were students of class XI MIPA 1 totaling 27 people consisting of 6 men and 21 women with data collection techniques, namely qualitative data and quantitative data. Data collection techniques for each type of data are: 1) Qualitative data is collected by using observation sheets, namely making a series of direct observations of researchers during the learning process; and 2) Quantitative data is collected by giving tests at the end of each cycle. The data analysis techniques used, namely data reduction, data presentation, and drawing conclusions. And then the data obtained were analyzed using the percentage of individual absorption and classical completeness techniques obtained by students. The equation used is:

\[
\text{Percentage of individual absorption} = \frac{\text{the total score obtained}}{\text{the total score of all students}} \times 100 \%
\]

\[
\text{Classical completeness percentage} = \frac{\text{number of students who completed}}{\text{total number of students}} \times 100 \%
\]

The indicators for the success of this classroom action research are if the results of studying Chemistry Subject, Basic Competency "Analyze ionic equilibrium in salt solutions and calculating the pH" Class XI MIPA 1 Students of SMAN 1 Sigi even semester T.A 2022/2023 achieve individual absorption of at least 70% and 85% classical absorption. The success referred to in this PTK is the success of the assessment in the cognitive domain. Then the observation sheet is used to determine the implementation of teaching and learning activities carried out by the teacher/researcher using the Think Pair and Share model. The indicator of the success of this observation is if the average teacher's teaching and learning activities are good.

3. Results and Discussion

As stated in the previous section, each cycle in this study consists of several stages, namely: Initial Reflection, Planning, Implementation, Observation, and Reflection. The results obtained at each stage in each cycle are explained as follows:

3.1 Cycle I

Early Reflections

The activity carried out at this stage is for the teacher to determine learning material that is considered urgent for the problem to be handled by the teacher. The teaching material in question is the subject of Chemistry, the basic competence of "Analyzing ionic equilibrium in salt solutions and calculating the pH.

Planning

A number of activities that have been carried out at this stage include preparing: 1) Learning Plans for Chemistry subject, the basic competence "Analyzing ionic equilibrium in salt solutions and calculating the pH", with indicators: a) Explaining the Definition of Hydrolysis; b) Describe the hydrolysis of salts from weak acids and strong bases; c)
Describe the hydrolysis of salts from strong acids and weak bases; d) Describe the Hydrolysis of Salts from Weak Acids and Weak Bases; 2) Learning scenarios; 3) Prepare a package book; 4) Prepare LKS; 5) Observation sheet for observation while the teacher/researcher is carrying out learning activities; 6) The format of the assessment of learning outcomes is in accordance with predetermined indicators.

Implementation

The implementation of the actions in cycle 1 was carried out 1 face-to-face in learning activities outside of the end-of-cycle test activities. The number of lesson hours is 4 hours of lessons (4 x 45 minutes). The final test cycle used 45 minutes. The face-to-face meeting will be held on Wednesday, January 4, 2023, presenting basic competencies: "Analyzing ionic equilibrium in salt solutions and calculating the pH", with the following material: 1) Definition of Hydrolysis; 2) Hydrolysis of Salts from Weak Acids and Strong Bases; 3) Hydrolysis of Salts from Strong Acids and Weak Bases; and 4) Hydrolysis of Salts from Weak Acids and Weak Bases.

In this first cycle, the teacher/researcher presents learning material according to the plan, namely applying the Think Pair Share model. The learning steps are as follows:

1) Preliminary stage, namely a) The teacher explains the rules of the game and time limits for activities; b) Motivate students to engage in problem solving activities; c) The teacher explains the competencies that must be achieved by students; 2) Think stage, namely a) The teacher explores students' prior knowledge by providing a number of questions or problems related to the material being studied; b) The teacher gives time for students to think for themselves the answer to the question or problem; 3) Pair Stage, namely a) Students are grouped with their peers; b) The teacher asks students to discuss with their partners the answers to the assignments that have been done; and 4) Share stage, namely a) The teacher asks group representatives to present the results of the discussion. During the discussion process, the teacher monitors and supervises the work of students in groups and ensures that the learning process goes well; b) At the end of the lesson the teacher and students conclude the results of learning.

The next meeting after learning cycle I was carried out, namely on Wednesday 11 January 2023, the final test for cycle I was held. The questions given were multiple-choice questions. The results obtained can be seen in the following table:

<table>
<thead>
<tr>
<th>Acquisition Aspect</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 The number of students</td>
<td>27 People</td>
</tr>
<tr>
<td>2 Number of students who completed</td>
<td>22 People</td>
</tr>
<tr>
<td>3 Classical mastery</td>
<td>81.48%</td>
</tr>
<tr>
<td>4 The highest score</td>
<td>100 (1 people)</td>
</tr>
<tr>
<td>5 Lowest value</td>
<td>50 (2 people)</td>
</tr>
</tbody>
</table>

*Source: Results of data processing*

Of the 27 students, there were 22 students completed the classical completeness achievement of 81.48%. The highest score is 100 for 1 person, the lowest score is 50 for 2 people.

Observation

The activities carried out in this stage are observers observing the implementation of learning carried out by researchers to assess the suitability of the implementation of learning with the learning plan. The results of the observations show that the researcher has basically carried out the learning process well, in accordance with the lesson plan.
It's just that there is still something that needs to be addressed in terms of timing. The students were very enthusiastic about participating in learning.

Reflection

Based on the results of Cycle I where the classical completeness was at 81.48%. Even though the observation results show that students are very enthusiastic about participating in learning, there is still something that needs to be optimized, namely time management. The results above are a reference that the research is continued to cycle II because the achievement of classical completeness is only 81.48% but has not yet reached an indicator of success.

3.2 Cycle II

The basic competencies presented in cycle II are still the same as in cycle I but the focus of the material is different. As in cycle I, in cycle II several activities were carried out at each stage:

Planning

A number of activities that have been carried out at this stage include preparing: 1) As a follow-up to cycle I, repeated actions were held in cycle II by preparing lesson plans by presenting the same basic competencies as cycle I namely "Analyzing ionic equilibrium in salt solutions and calculating the pH" but the indicators are different, namely: a) Explaining the salt dissolution reaction; b) Explaining neutral salt; c) Explaining Salt which is Acidic; d) Explaining Salt which is Alkaline; 2) Learning scenarios; 3) Prepare a package book; 4) Prepare LKS; 5) Observation sheet for observation while the teacher/researcher is carrying out learning activities; 6) The format of the assessment of learning outcomes is in accordance with predetermined indicators.

Implementation

The implementation of the actions in cycle II was carried out 1 face-to-face learning activity outside of the end-of-cycle test activities. The number of lesson hours is 4 hours of lessons (4 x 45 minutes), while the final cycle test takes 45 minutes.

The face-to-face meeting will be held on Wednesday, January 18, 2023. The material being taught is the same basic competence as cycle I, namely "Analyzing ionic equilibrium in salt solution and calculating the pH", but the material is different, namely: 1) Salt dissolution reactions; 2) Neutral salt; 3) Acidic Salt; 4) Alkaline Salt.

At this stage, according to the plan, we still apply the Think Pair Share model. The learning steps are as follows: 1) Preliminary stage, namely a) the teacher explains the rules of the game and time limits for activities; b) Motivates students to engage in problem-solving activities; c) The teacher explains the competencies that must be achieved by students; 2) Think stage, namely a) The teacher explores students' prior knowledge by providing a number of questions or problems related to the material being studied; b) The teacher gives time for students to think for themselves the answer to the question or problem; 3) Pair Stage, namely a) Students are grouped with their peers; b) The teacher asks students to discuss with their partners the answers to the assignments that have been done; and 4) Share stage, namely a) The teacher asks group representatives to present the results of the discussion. During the discussion process, the teacher monitors and supervises the work of students in groups and ensures that the learning process goes well; b) At the end of the lesson the teacher and students conclude the results of learning.

The next meeting after the second cycle of learning was carried out, namely on Wednesday 1 February 2023 the final cycle II test was held. The questions given are multiple-choice questions. The results obtained can be seen in the following table:
Table 2.
Recapitulation of Final Test Assessment Results of cycle II

<table>
<thead>
<tr>
<th>No</th>
<th>Acquisition Aspect</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The number of students</td>
<td>27 People</td>
</tr>
<tr>
<td>2</td>
<td>Number of students who completed</td>
<td>24 People</td>
</tr>
<tr>
<td>3</td>
<td>Classical mastery</td>
<td>88.89%</td>
</tr>
<tr>
<td>4</td>
<td>The highest score</td>
<td>100 (4 people)</td>
</tr>
<tr>
<td>5</td>
<td>Lowest value</td>
<td>50 (1 people)</td>
</tr>
</tbody>
</table>

*Source: Results of data processing*

Out of a total of 27 students, there were 24 students who completed the classical completeness achievement of 88.89%. The highest score is 100 by 4 people, and the lowest score is 50 by 1 person.

**Observation**

The activities carried out in this stage are observers observing the implementation of learning carried out by researchers to assess the suitability of the implementation of learning with the learning plan. The observation results show that the researcher has carried out the learning process well, and all aspects of the assessment are of good value according to the lesson plan.

**Reflection**

Based on the results of Cycle II where the classical completeness was 88.89%. This figure shows that the individual absorption capacity indicator of at least 70% and the classical absorption capacity of 85% has been achieved. For this reason, this research only reached cycle II.

**Discussion**

Completeness of Student Learning Outcomes

After observing the scores/results of cycle I and cycle II tests, it turns out that there is a significant difference. The difference in value in question is that from a total of 27 students, 22 students (81.48%) completed in cycle I increased to 24 students (88.89%) in cycle II. The highest score in cycle I was 100 by 1 person in cycle II the highest value increased to 100 by 4 people. The lowest score in cycle I was 50 for 2 people and in cycle II the lowest score was only 1 person who was worth 50. For more details, see the table below:

Table 3
Comparison of Final Test Results for Cycle I and Cycle II

<table>
<thead>
<tr>
<th>No</th>
<th>Acquisition Aspect</th>
<th>Cycle I</th>
<th>Cycle II</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The number of students</td>
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<td>100 (1 people)</td>
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</tr>
<tr>
<td>5</td>
<td>Lowest value</td>
<td>50 (2 people)</td>
<td>50 (1 people)</td>
</tr>
</tbody>
</table>

*Source: Results of data processing*

**Teacher Ability in Managing Learning**

Based on the results of observations in the first cycle, learning management generally went well, but there were still things that needed to be improved, namely time management and enthusiasm, students were initially a bit shy with their partners, but that did not last long because the teacher/researcher monitored and guided students. well.
However, in cycle II the management of learning has increased where all aspects are of good value.

4. Conclusion

Based on the results of the class action research above, it can be concluded that: "The Think Pair and Share model can improve learning outcomes in Chemistry class XI MIPA 1 SMAN 1 Sigi even semester of the 2022/2023 school year because the highest score in cycle I is 100 1 person in cycle II the highest score increased to 100 as many as 4 people. The lowest score in cycle I was 50 for 2 people and in cycle II the lowest score was only 1 person who was worth 50.

References


