Application of Active Learning Strategy with Rotating Trio Exchange (RTE) Type Accompanied by Media Question Box to Achieve Student’s Mastery Learning on the Subject of Chemical Bonds

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Abstract: Research on the application of strategy active learning with Rotating Trio Exchange (RTE) type accompanied by media Question Box has been done to achieve student’s mastery learning on the subject of chemical bonds in class X SMAN 1 Bandar Seikijang, Pelalawan. The type of research is pre-experiment research with one-shot study case design. Data retrieval time is from 22 October to 26 November 2014. The sample was selected from the three existing classes, namely class X MIA.1. Data analysis technique used is to calculate percentage of mastery classical learning. Based on the results, mastery classical learning is 90.91%. It means that the application of strategy active learning with Rotating Trio Exchange (RTE) type accompanied by media Question Box can achieve student’s mastery learning on the subject of chemical bonds in X MIA.1 class of SMAN 1 Bandar Seikijang, Pelalawan.

Keywords: Rotating Trio Exchange (RTE); Question Box; Mastery Learning; chemical bonds.

1. Introduction

Learning is the interaction between learners with the environment so that there is a change in behavior towards the better. Learning is programmed activities of teachers in instructional design to make students active learning that emphasizes the provision of learning resources [3].

The learning process experienced students very influence success achievement aim of character education [8]. To improve activity learn students, teachers must choose and apply method/technique appropriate to learning use to reach completeness of learn of students [3]. Completeness of learning rejects measuring for determining successful at least a learning process. The learning process is complete if results of students are 75% [2].

Learning completeness can be interpreted as a full mastery in learning materials that can be proven by good learning outcomes on learning materials. To know the completeness of learning, it is necessary to test the competence in the form of daily tests in writing, oral, or deeds, semester rehearsals, semester final repetition and repeat class increase. Schools gradually and sustainably need to establish and improve the KKM to achieve ideal mastery. In this case each subject has the characteristics and the analysis results are different, so the KKM defined in each lesson will be different and varied [4]. For chemical subjects, SMAN 1 Bandar Seikijang, Pelalawan, teachers of chemistry set KKM to 76. Highlights in chemistry nature does not just memorize, but it needs the understanding, analysis and the ability of students to associate learning in life everyday among them the subject of chemical bonds.

Chemical bonds subjects are theoretical, experimental and experimental subjects that require a high level of understanding in answering questions related to the subject. Chemical bond is one of the relatively difficult materials for students. They will feel very boring if the learning process is not
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supported by appropriate strategies and media. Students in class X MIA.1 is one of the classes with learning motivation and inadequate student activity. Special tips are needed to overcome this in order to achieve the learning objectives can be completed.

Application strategy Expected learning could resolve difficulty of students learning that is with create atmosphere to make students motivated and active in learning. With thereby completeness students learning will achieved. Alternative strategy of expected learning that could motivate and activate students in learn is strategy learning of Rotating Trio Exchange (RTE). Strategy learning is a bid new highly interesting for development adult education in Indonesia. Rotating Trio Exchange (RTE) gives chance to students for working with others students in a group. Through application of Rotating Trio Exchange, expected completeness of students learning will be achieved.

In addition to create student interest in learning, it is needed a supporting medium. One of the media that make students interested are the questions box media. Media of questions box is a simple media made from an old box. According to [9], the superiority of the media is the media's questions Boxes can be made by all teachers in an easy way. [10] also states "questions box media is a way for teachers to stimulate emotional and intellectual involvement of students in proportion". The use of questions box media in the classroom certainly reduce the dependence of students to teachers, so that the learning in the classroom is not only centered on the teacher. Student is encouraged to seek the latest information related to the topics to be discussed in the class. Therefore, the learning process in the classroom must really involve the full potential and ability of the students optimally.

Step-by-step application of active learning strategies of Rotating type Exchange with Question Box media is as follows:

a) Begin Activities
   1. greeting
   2. teachers check presence of students
   3. teachers do apperception and motivation
   4. teachers deliver aim of learning

b) Core Activities

   Exploration
   1. Teachers deliver material on line corresponding with aim learning.
   2. Master directs discussion and reminds students about rules of discussion in strategy learning of Rotating Trio Exchange and organize students for sit in group that has determined.
   3. Teacher gives student worksheet/LKS to each individual for discussed in trio group.

   Elaboration
   1. Representative every group takes question in Question Box.
   2. Every group discusses trio question first and teachers supervise the way of discussion. After discussion for question first complete, students present in front of class.

   Confirmation
   1. Teachers give strengthening to students answer.
   2. Appreciated group given to the best trio based on value development.

c) End Activities

   1. Teachers together with students conclude results of discussion.
   2. Evaluation.

Note: group number trio 0 for smart students (permanent members) with (red card); 1 for middle intelligence students (yellow card) counterclockwise rotation, and 2 for low intelligence students (green card) clockwise rotation [7].

Application of active learning type of Rotating Trio Exchange (RTE) with Question Box Media can train students to have ability and skills for asking and replying question. This could improve liveliness students in suggest the good idea in suggest question about material that has not been understood as well as explanation about material. With existence problems in the question box will train students in solving problems about material bond chemicals. It can add understanding of students and remember material that has been learned. Thus, implementation of the strategy Rotating Trio Exchange (RTE) with Media Question Box can achieve mastery students learning on the subject of chemical bonds in Class X SMAN 1 Bandar Seikijang, Pelalawan.
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2. Related Works

Rotating Trio Exchange (RTE) is a learning strategy that uses the method of discussion to resolve the various problems faced by the students in groups of three people [6]. Procurement of media certainly also greatly affect the learning to solve various problems faced by learners. According to [9], the superiority of the media is the media's question Boxes can be made by all teachers with easy way. [10] also states "questions box media is a way for teachers to stimulate emotional and intellectual involvement of students in proportion". By increasing cooperation between students and involving all students in the class are two behaviors that will be found in the learning process that prioritizes students.

Combination of Rotating Trio Exchange (RTE) with Question Box media by [1] in his research states that learning strategies of Rotating Trio Exchange (RTE) with Question Box is able to achieve mastery students mathematics learning at 96.6%.

3. Material & Methodology

3.1. Data

Data taken from value post-test were then calculated students mastery with:

1. Knowledge Data

   Based on data obtained from test formative, completeness of students knowledge could be calculated with the percentage of students mastery classically.

   Based on data obtained from test formative, completeness of students knowledge could be calculated with formula:

   a. Percentage of completeness aim learning individual could be calculated with:

   $\text{KTPI} = \frac{\text{Scores achieved in one aim learning}}{\text{maximum score of one aim learning}} \times 100\% \tag{1}$

   where:

   KTPI = Complete aim learning individual

   b. Percentage of completeness of aim of classical learning could be calculated with:

   $\text{KTPK} = \frac{\text{total of aim learning is completed}}{\text{total of aim learning}} \times 100\% \tag{2}$

   where:

   KTPK = Complete aim of classical learning

   c. Percentage of completeness of each aim learning could be calculated with:

   $\text{KMTP} = \frac{\text{total of students who aim learning is completed}}{\text{total of students}} \times 100\% \tag{3}$

   where:

   KMTP = Complete each aim learning

   d. Percentage of completeness of learn individual (KI) to whole aim learning with formula:

   $\text{KI} = \frac{\text{B}}{\text{N}} \times 100\% \tag{4}$

   where:

   KI = Percentage of completeness of individual

   B = Total of questions answered correct

   N = Total of question items

   Conversion scale 4: Value = $\frac{\text{total of score achieved}}{\text{score maksimum (100)}} \times 4 \tag{5}$

   e. Percentage of completeness of classical learning (KBK) with formula:

   $\text{KBK} = \frac{\text{ST}}{\text{SS}} \times 100\% \tag{6}$
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where:

KBK = Percentage of completeness classical 
ST = Total of students who complete 
SS = Total of students

Student is said complete if he has value of knowledge ≥ 2, 66 (B⁺)

2. Attitude Data
Based on data obtained from rubric assessment attitude. Completeness of students attitude could be calculated with formula:

\[
\text{Value} = \frac{\text{total of score achieved}}{\text{score maksimum}} \times 100\% 
\]

Conversion scale 4: predicate = \[
\frac{\text{total of score achieved}}{100} \times 4
\]

Students are said to be thorough if they have a good attitude (B).

3. Skills Data
Based on data obtained from rubric assessment skills. Thoroughness skills students could be calculated with formula:

\[
\text{Value} = \frac{\text{total of score achieved}}{\text{score maksimum}} \times 100\% 
\]

Conversion scale 4: predicate = \[
\frac{\text{total of score achieved}}{100} \times 4
\]

Student is said complete if he has value of skills ≥ 2, 66 (B⁺).

3.2. Method
This study is pre-experimental study with design one-shot study case. Design of research according to [5] can seen on table 1

<table>
<thead>
<tr>
<th>Class</th>
<th>Pretest</th>
<th>Treatment</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>-</td>
<td>X</td>
<td>T₁</td>
</tr>
</tbody>
</table>

where:

X : Treatment of experimental class with strategy learning active type of Rotating Trio Exchange (RTE) accompanied with Question Box Media

T₁ : Final data (data after treatment), taken from value of post-test.

4. Results and Discussion

4.1. Result

1. Mastery classical learning (KBK)

<table>
<thead>
<tr>
<th>No.</th>
<th>Criteria</th>
<th>Total of students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>Completed</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>Uncompleted</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>33</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
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2. Assessment Attitude Scientific Student

Table 2. Values Attitude

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Value</th>
<th>Total of students</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>SB</td>
<td>18</td>
<td>54.55</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>15</td>
<td>45.45</td>
</tr>
<tr>
<td>II</td>
<td>SB</td>
<td>20</td>
<td>60.61</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>13</td>
<td>39.39</td>
</tr>
<tr>
<td>III</td>
<td>B</td>
<td>13</td>
<td>39.39</td>
</tr>
<tr>
<td>IV</td>
<td>SB</td>
<td>21</td>
<td>63.64</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>12</td>
<td>36.36</td>
</tr>
<tr>
<td>V</td>
<td>SB</td>
<td>22</td>
<td>66.67</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>11</td>
<td>33.33</td>
</tr>
<tr>
<td>VI</td>
<td>SB</td>
<td>21</td>
<td>63.64</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>12</td>
<td>36.36</td>
</tr>
</tbody>
</table>

Remarks: SB = Very Good

B = Good

3. Assessment Skills
a. Presentation Performance

Table 3. Value Performance Presentation

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Value</th>
<th>Total of students</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>A</td>
<td>6</td>
<td>18.18</td>
</tr>
<tr>
<td></td>
<td>A-</td>
<td>4</td>
<td>12.12</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>23</td>
<td>69.70</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>8</td>
<td>24.24</td>
</tr>
<tr>
<td>II</td>
<td>A-</td>
<td>6</td>
<td>18.18</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>19</td>
<td>57.58</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>5</td>
<td>15.15</td>
</tr>
<tr>
<td>III</td>
<td>A-</td>
<td>6</td>
<td>18.18</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>22</td>
<td>66.67</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>6</td>
<td>18.18</td>
</tr>
<tr>
<td>IV</td>
<td>A-</td>
<td>6</td>
<td>18.18</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>21</td>
<td>63.64</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>8</td>
<td>24.24</td>
</tr>
<tr>
<td>V</td>
<td>A-</td>
<td>4</td>
<td>12.12</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>21</td>
<td>63.64</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>10</td>
<td>30.30</td>
</tr>
<tr>
<td>VI</td>
<td>A-</td>
<td>13</td>
<td>39.39</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>10</td>
<td>30.30</td>
</tr>
</tbody>
</table>
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b. Practicum Assessment

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Value</th>
<th>Total of students</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>III</td>
<td>A</td>
<td>10</td>
<td>30.30</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>23</td>
<td>69.70</td>
</tr>
</tbody>
</table>

From Table 1 we can see that the number of completed students is 30 person. It means that completeness classical learning is 90.91%. This shows that the completeness of classical learning has been achieved, because more than 75% of students are complete. From Table 2, it can be seen that the attitudes of students in the learning process on average good. Table 3 shows that the performance of students in the presentation has been completed. Table 4 shows that in doing practical work, more than 69% of students do lab work well and the rest ones can do lab work very well.

Judging from the completeness of individual learning goals and the completeness of the goals of classical learning based on National Completeness Standard (SKN) as a whole can be said to have reached completeness. This can happen because in discussion groups using a strategy Rotating Trio Exchange (RTE) and active interaction both between students during the learning process. Students are more active in expressing their opinions and responding to what other students are saying through verbal communication.

4.2 Discussion

Mastery classical learning shows that the mastery of learning has been achieved that is equal to 90.91%. This can happen because in discussion groups using a strategy Rotating Trio Exchange (RTE) and active interaction between students during the learning process. Students are more active in expressing their opinions and responding to what other students are saying through verbal communication. Question box media is able to attract students 'interest or motivation in learning and reduce students' dependence on teachers. High student learning motivation is very visible during the learning process. From the data that has been obtained, the data analysis supports the hypothesis, that the application strategy learning active type Rotating Trio Exchange (RTE) with question box media could reach completeness of students learn on principal discussion of chemical bonds at class X SMA Negeri 1 Bandar Seikijang, Pelalawan.

5 Conclusion

Application of strategy learning active type of Rotating Trio Exchange (RTE) with question box media on the subject of chemical bonds can achieve learning exhaustiveness classically that is 90.91% with the criteria of national completeness standard (SKN) ≥ 66.5%, completeness attitudes achieved 100% as well as completeness of skills achieved 100% in class X MIA.1 of SMA Negeri 1 Bandar Seikijang. It can be in the right recommendations to teachers of chemistry in order to implement the strategy learning active type of Rotating Trio Exchange (RTE) with question box media as an alternative in learning to achieve student’s mastery learning, specially on the subject of chemical bonds.

References

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