THE EFFECTIVENESS OF INDEX CARD MATCH LEARNING METHODS ON THE ACTIVITY AND LEARNING OUTCOMES OF STUDENTS

A. Introduction

Abstract

Learning reform has now shifted from teacher-centered learning to learner-centered learning, as a result, students are required to be active in following every learning process. The purpose of this study was to determine the effectiveness of the index card match method on the activeness and learning outcomes of students. This research is a quasi-experimental research with independent variables, namely learning index card match and the dependent variable, namely the activeness and learning outcomes of students on the subject matter of the Elementary Periodic System. The sampling technique is used randomly with the assumption that the population is homogeneous.

Hypothesis testing of students’ activeness and learning outcomes used with the t-test obtained the same value, namely Pvalue <0.05 = 0.00 <0.05. Thus it can be concluded that the index card match learning method is effective in increasing the activeness and learning outcomes of students on the subject matter of the elemental periodic system.

Keywords: Index card match, activeness, learning outcomes
The 2013 curriculum prioritizes understanding, skills, and character education. Students are required to understand the material, be active in discussions and presentations, and have high disciplinary courtesy. In this curriculum, students are required to be active in finding knowledge, be it from books, the internet, or related media. To achieve this, learning activities in the classroom are not enough to simply apply the lecture method which will cause less interest in the subject matter delivered, but an appropriate learning method is needed so that learning becomes more interesting and liked by students so that students will play an active role in the learning process where optimal learning outcomes can be obtained later.

The learning outcomes of students have something to do with the active learning of students, such as the activeness of students in learning that is still not visible, students rarely ask the teacher even though they do not understand the material, as well as the lack of courage and activeness of students in working on practice questions in front of the class (Kovac, 2016). Even though the activeness of students in learning is one of the factors that influence learning success. The activeness of students in learning chemistry greatly influences their learning success, where if the active learning of students is good, the results obtained are also good. Therefore, teachers must be creative in making teaching strategies that can create an active and fun learning atmosphere. That is the importance of the activeness of students in the learning process. Then the ability of students in following the learning process should be improved by students so that later students can participate in active learning activities so that student learning outcomes can be improved. Not only learning outcomes can be improved, students can also actualize themselves in the school environment, family and community.

Based on the results of the initial survey and interviews with chemistry subject teachers at SMAIT Ibnu Sina, it shows that some students are less active in taking chemistry subjects. Completeness of learning before the remedial was held, only 11 out of 20 students (55%) completed class X in the 2018/2019 academic year. The graduation standard based on the Minimum Completeness Criteria at SMAIT Ibnu Sina is 75. In connection with this, the activeness of students is needed in the learning process. To increase the activeness of students, it cannot be separated from the learning process, one of which is the use of learning methods. The learning method used in the learning process is expected to make it easier for students to accept and understand the material presented. The application of learning methods that are in accordance with the characteristics of students will help students to be able to increase their learning activity. One of the learning methods that can be applied to increase the activeness of students is the index card match learning method where students will be taught to work together in matching pairs of cards.

The index card match method is one of the active learning-based learning strategies by looking for pairs of question and answer cards, with the aim of training students to be more careful and have a stronger understanding of a subject matter (Silberman, 2013). Active Learning index card match is a problem-solving method used in increasing the activities and learning outcomes of students. Active learning strategy index card match can foster students' cooperation in answering questions by matching the index cards in their hands. This learning process is more interesting because students are looking for a partner while learning about a concept or topic in a pleasant atmosphere (Novela, Bahar, & Amir, 2017).

The index card match learning method allows students to pair up and give quiz questions to their friends (Silberman, 2013). Students listen to explanations of some important terms or names related to the periodic system of elements. To streamline time and not use the monotonous lecture method, students are given the task of matching questions and answers about the material periodic system elements that have been written on a card, each of which contains answers and some contains questions.

Finding pairs of cards is quite fun to use to repeat the learning material that has been given during the lesson. With the application of the index card match learning method, learning can take place fun and students are able to understand the material periodic system elements being taught. Because in using these learning methods, students also take an active role (Suprijono, 2009).

Based on research conducted by (Nawawi & Ibrahim, 2014) states that by using the index card match learning method students better understand the lessons delivered by the teacher because the techniques and strategies used in the index card match learning method vary, one of which is because all students actively participate in participating in learning so that the learning process becomes effective, efficient, and enjoyable.
The research conducted (Hanım, 2017) states several advantages of the index card match learning method, namely fostering joy in learning activities, the subject matter presented is more attractive to students and is able to create an active and fun learning atmosphere. Thus students will feel more enthusiastic about participating in learning and feel ready to get new material to be studied. Based on these facts, the researcher is interested in researching the effectiveness of the index card match learning method on the activeness and learning outcomes of class X SMAIT Ibnu Sina Makassar on the Main Material of the Element Periodic System.

B. Methodology

1. Research Design

The population in this study were all students of class X SMAIT Ibnu Sina Makassar, as many as 3 classes with a total of 80 students. The sample in the study was taken by means of random sampling, so that the selected sample of this study were (X.2) as a control class consisting of 26 students and (X.1) as an experimental class consisting of 28 students.

This research is a type of Quasi Experimental Design with a Post-Test Only Group Design research design. The variables in this study consisted of independent variables, namely the index card match learning method and conventional learning methods, while the dependent variable was the activeness and learning outcomes of students. The research design model is shown in Table 1

<table>
<thead>
<tr>
<th>R_1</th>
<th>T_1</th>
<th>O_1</th>
</tr>
</thead>
<tbody>
<tr>
<td>R_2</td>
<td>T_2</td>
<td>O_2</td>
</tr>
</tbody>
</table>

(Sugiyono, 2015)

Information :
R1 = The experimental class selected randomly
R2 = Control class selected randomly
T1 = Treatment in the experimental class with the index card match learning method.
T2 = Treatment in the control class with conventional learning methods
O1 = Student learning outcomes in the experimental class
O2 = Student learning outcomes of the control class

2. Instruments

The instruments used in this study were observation sheets, questionnaires and learning outcomes tests. Observation sheets are used to obtain data about student activeness in participating in the learning process through direct observation of the research subject with the help of an observer, while questionnaires are used to obtain data about student activeness by submitting a list of statements to respondents or students.

The test of student learning outcomes used multiple choice questions arranged based on indicators of learning outcomes for chemistry to be measured. The preparation of the test begins with making a grid, then arranges the questions based on the grid that has been arranged along with the answer keys, and is equipped with a scoring guide for each item.

3. Technique of Data Analysis

The data analysis technique used in this research is descriptive and inferential statistical analysis. Descriptive statistical analysis is intended to describe the level of learning activeness and learning outcomes of students at SMAIT Ibnu Sina, both for the experimental class and the control class.

Descriptive statistical analysis for activeness in the analysis by calculating the percentage from the observation sheet and questionnaire while for learning outcomes, namely calculating the highest score, lowest score, average score (mean), variance and standard deviations using IBM SPSS Statistic 22. Statistical analysis inferential for the activeness and learning outcomes of students are used to test the hypothesis, but first the data normality and homogeneity tests are carried out. Then continued testing the hypothesis to determine the effectiveness of the index card match learning method on the activeness and learning outcomes of students.

C. Findings and Discussion

1. Findings
The learning activeness of students is seen from the observation of observations using questionnaires and sheets. The questionnaire was given at the end of the meeting (posttest) while the observation sheet was carried out during the learning activity using the match index card method in the experimental class and the control class using conventional methods.

The results of the questionnaire analysis are presented in the form of a proportion table based on research data which shows that there is a clear difference in the level of activeness that can be seen in the presentation indicators of student activeness for the experimental class and the control class. This can be seen in the students in the experimental class, all indicators both in terms of participation, curiosity, self-evaluation and cognitive belong to the high category while the control class belongs to the medium category.

The results of observations during learning activities obtained data in the form of a percentage table based on research data which showed that the highest presentation of the students' activeness in the experimental class was when students actively worked on the questions given while in the control class, namely when students actively participated in group activities. The average score for the participation indicator is 61.70%, curiosity 47.00%, self-evaluation is 79.8% and cognitive is 51.2% in the experimental class, while the average value of the participation indicator is 39.24%, curiosity 19.85%, 44.9% self-evaluation and 21.8% cognitive in the control class.

Based on the test of student learning outcomes in class X1 as an experimental class that has been taught using the index card match learning method and class X2 as a control class that has been taught without using the index card match learning method, the results of descriptive statistical analysis show that there are clear differences seen on the test scores of student learning outcomes for the experimental class and the control class. This can be seen in the mean and standard deviation values for the experimental class, namely 79.76 and 7.01, which are higher than the mean and standard deviation values for the control class, namely 77.69 and 5.39. If the learning outcomes of students are grouped based on the criteria for the grade X learning outcomes of students at SMAIT Ibnu Sina Makassar, the frequency of the experimental class and the control class is obtained, which indicates that the value of learning outcomes obtained by the experimental class is higher than the control class. This shows that the use of the index card match method in the experimental class provides higher learning outcomes than the control class which only uses conventional learning.

The learning outcomes of students can be grouped based on the criteria for the completeness of the learning outcomes of students at SMAIT Ibnu Sina Makassar, table 5 which shows that the completeness category of learning outcomes where the KKM at SMAIT Ibnu Sina Makassar is 75, then the students who are classified as complete for the experimental class are more namely 23 people with a percentage of completeness of 82.14%. While the control class was only 19 people with a percentage of 73.08%.

2. Discussion
   a. Student Activity

From the results of the questionnaire analysis, it shows that in the control class there are only some students who actively participate in the learning process, students are less interested in paying attention to the teacher's explanation this is because students feel bored and bored with the use of the lecture method besides that in group learning only students who classified as smart in the class who dominates the group while the other group members are just silent so that their understanding of the periodic system of elements is less than optimal, while in the experimental class students are more active in following the learning process, students are not ashamed to ask or answer questions from teachers or other students. Students have been able to discuss orderly and well. Many students also dare to convey or respond to the results of the discussion. Learning combined with this game creates a fun atmosphere, students are directly involved in learning. This is in line with the research conducted by (Hanifah, Hanifah, & Isrok'atun, 2017) which states that by using the index card match method students better understand the lessons delivered by the teacher because all students actively participate in learning so that the learning process becomes effective, efficient and fun.

The results of the questionnaire analysis are presented in the form of a percentage based on research data in table 2.
Table 2: Analysis of the questionnaire on the level of student activity

<table>
<thead>
<tr>
<th>No</th>
<th>Indicator</th>
<th>Experiment Class</th>
<th>Control Class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Student Score</td>
<td>Category</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Percentage</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Participation</td>
<td>66.67 High</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Curiosity</td>
<td>67.56 High</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Self evaluation</td>
<td>64.95 High</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Cognitive</td>
<td>61.16 High</td>
<td></td>
</tr>
</tbody>
</table>

From the results of observations during learning activities, the following data are obtained in table 3

Table 3: Analysis of the observation sheet for the level of activity of students

<table>
<thead>
<tr>
<th>No</th>
<th>Indicator</th>
<th>Sub Indicator</th>
<th>Experiment Class</th>
<th>Control Class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>Category</td>
<td>%</td>
</tr>
<tr>
<td>1.</td>
<td>Participation</td>
<td>The concentration and attention of students when listening to the teacher's explanation</td>
<td>78.6 High</td>
<td>42.3 Moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students actively record explanations and summaries of learning</td>
<td>56.0 Moderate</td>
<td>44.9 Moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Learners actively participate in group activities</td>
<td>77.4 High</td>
<td>51.3 Moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students actively discuss the material provided</td>
<td>54.8 Moderate</td>
<td>34.6 Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students actively express opinions or ideas</td>
<td>41.7 Moderate</td>
<td>23.1 Low</td>
</tr>
<tr>
<td>2.</td>
<td>Curiosity</td>
<td>Active students ask the teacher</td>
<td>48.8 Moderate</td>
<td>19.2 Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students actively seek information from books</td>
<td>45.2 Moderate</td>
<td>20.5 Low</td>
</tr>
<tr>
<td>3.</td>
<td>Self evaluation</td>
<td>Students actively work on the questions given by the teacher</td>
<td>79.8 High</td>
<td>44.9 Moderate</td>
</tr>
<tr>
<td>4.</td>
<td>Cognitive</td>
<td>Students can conclude the material that has been taught</td>
<td>51.2 Moderate</td>
<td>21.8 Low</td>
</tr>
</tbody>
</table>

The results of the observation sheet show that the same category between the experimental class and the control class in the activity of recording explanations and learning summaries has not increased because students tend to have less motivation to learn in chemistry subjects, especially during the learning process which is proven by the presence of students who speak independently time because motivation itself serves as a driving force and driving force for a student.

In the experimental class there are several indicators that belong to the medium category which should be in this category are high because in this case it is a visitor to increase the activeness of students, including when in group discussions, expressing opinions, asking teachers, looking for information and concluding this material. This is due to the low interest of students where when students have a strong desire, students will achieve better performance because basically the interest will give birth to activities other than that the facilities and infrastructure are not supportive considering that this school is a new school where one class is wiped into two classes so that learning is not conducive because of ineffective class management which ultimately results in disruption of activities in the learning process.
The level of activity in the control class, there are only a few students who pay attention to the teacher's explanation, students still do not have the courage to respond to the teacher's questions, students tend to find themselves busy without paying attention to the teacher’s explanation, one of which is by talking and playing alone so that it makes the atmosphere become noisy, students who actively work on tasks are only a small part while some are only complementary to the group without participating in the group, this is because students who are capable are more always relied on by their group friends.

The index card match learning method makes students feel happy and enthusiastic in participating in the learning process because through this game students make serious efforts to find the pairs of cards they get. This motivates students to take an active role in learning in order to provide the best results. This is in line with research conducted by (Novela et al., 2017) which states that in index card match learning, each pair competes to get the highest points in class, this motivates students to interact with teachers or other students in index games. card match (index card) so that students are also motivated to learn and understand the material well.

The results of the descriptive statistical analysis of the questionnaire and the observation sheet showed that the learning activity of students using the index card match method in the experimental class was higher than the control class without using the index card match method. So it can be concluded that the index card match method can increase the learning activeness of class X SMAIT Ibnu Sina Makassar. This is in line with research conducted by (Utami, 20116) which states that learning using the index card match method shows an increase in the activeness of students. Students do not feel embarrassed or awkward even though they are paired with the opposite sex. They look enthusiastic in participating in the learning process, so that the learning outcomes of students show a significant increase.

The results of the questionnaire analysis can be tested by inferential statistical analysis. To test the hypothesis, a prerequisite test is first performed, where the prerequisite test shows that the data is normally distributed and homogeneous. The results of hypothesis testing using t-test analysis showed a significance level of 0.000. The p-value <0.05, which means that H0 is rejected and H1 is accepted. From the results of hypothesis testing, it is known that there is a significant difference between the activeness of students who are taught using the index card match method compared to students who are taught without using the index card match method. This is in line with research conducted by (Suwartiani, 2017) which said that the index card match learning method can increase the activeness and interest of students in the learning process and ask the teacher and his friends, an increase from 1 student (2.63%) to 27 students (71.05%).

b. Learning outcomes

This study was conducted to determine whether the index card match learning method was effective on student learning outcomes. The two classes were given different treatments, the experimental class taught by the index card match method could increase the activeness of students in the learning process compared to the control class which was taught without using the index card match method.

Based on the results of descriptive statistical analysis, it was found that the average learning outcome for the experimental class was 79.76 with a standard deviation of 7.01 and for the control class 77.69 with a standard deviation of 5.39. The average result of the experimental class is greater than the control class. This shows that the index card match method provides better learning outcomes than just using conventional learning methods. In addition, the number of students who achieved the completeness criteria in the experimental class was 23 people with a completeness percentage of 82.14%. While the control class was only 19 people with a percentage of 73.08%.

If the student learning outcomes are grouped based on the criteria for grade X student learning outcomes at SMAIT Ibnu Sina Makassar, the frequency of the experimental class and control class is obtained in Figure 1.
To test the hypothesis, the existing data is processed with inferential statistical analysis. The prerequisite test is first performed, where the prerequisite test shows that the data is normally distributed and homogeneous. The results of hypothesis testing using t-test analysis showed a significance level of 0.000. The value of P-value <0.05 means that H0 is rejected and H1 is accepted. From the results of hypothesis testing, it is known that there is a significant difference between the learning outcomes of students who are taught using the index card match method compared with students who are taught without using the index card match method.

There is a difference in learning outcomes between the experimental class and the control class on the elemental periodic system material due to the interest and activeness of students in the class while participating in learning in the control class, there are only a few students who actively participate in the learning process so that students who are not active have an understanding of the system periodic elements are less than optimal while in the experimental class enthusiastic students answer teacher questions and ask the teacher, when students match question cards and question cards they begin to exchange opinions with their partners to discuss the suitability of answers and account for question cards and answer cards so that communication is established active among students. This is in line with the research conducted (Hanifah et al., 2017) which states that the improvement of learning outcomes using an active learning strategy index card match is also followed by positive responses from students towards these learning strategies where in learning activities students seem happy and enthusiastic about participating game.

The index card match learning method makes students feel happy and enthusiastic in following the learning process. Through this game, students make serious efforts to find the pairs of cards they get. This motivates students to take an active role in learning in order to provide the best results. The role of the index card match learning method can increase the activeness of students because the success of learning for a student cannot be separated from the activeness of students during the learning process. The involvement and activeness of a student directly will give a distinct impression and students will quickly understand the lessons given by the teacher. This is in line with research conducted by (Hanim, 2017) which states that by using the index card match learning method students understand better the lessons delivered by the teacher, because the techniques and strategies used in the index card match learning method vary, one of which is that all students participate. active in participating in learning so that the learning process becomes effective, efficient, and enjoyable.

The activeness of students can affect student learning outcomes in learning chemistry, especially the elemental periodic system. This is in line with research conducted by (Novela et al., 2017) which states that the use of the right type of index card match active learning can improve student learning outcomes in learning. Thus it can be concluded that the use of the index card match learning method has an effect on the learning outcomes of class X SMAIT Ibnu Sina Makassar students on the elemental periodic system material.

For the correlation between activeness and learning outcomes in the experimental class, the number is 0.022. This figure means that the two variables have a very weak correlation because
it is below 0.5. Meanwhile, the correlation between activeness and learning outcomes of the control class results in the number -0.153. This figure means that the two variables have a weak correlation because they are below 0.5. The negative sign (-) indicates the opposite relationship, if activity is high then learning outcomes are low, and vice versa if activity is low then learning outcomes are high. Whereas in the experimental class the significance value of activeness with learning outcomes was 0.913> 0.05, so there was no significant correlation, while in the control class the significance value of activeness with learning outcomes was 0.456> 0.05, so there was no significant correlation either. So it can be concluded that activeness with learning outcomes in the experimental class and control class has a relationship but an insignificant relationship.

D. Conclusion
In general, it can be concluded that the index card match learning method is effective in increasing the learning activeness of students which can affect learning outcomes in learning chemistry, especially the elemental periodic system, but the relationship between activity and learning outcomes is not significant between the experimental class and the control class.

E. References


