COMPARISON OF STUDENTS' LEARNING OUTCOME ANDACTIVITY IN EXCRETORY SYSTEM TOPIC USINGMAKE A MATCH AND WORD SQUARE MODELFOR GRADE XI SMA SWASTA AL-ULUMACADEMIC YEAR 2013/2014

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ABSTRACT

This quasy experiment research aims to investigate the comparison of student learning outcome and activity between make a match and word square model on the excretory system topic. The population was all of students in grade XI IPA SMA Swasta Al-Ulum. Cluster random sampling technique was used and obtained 30 students of word square class and 30 students of make a match class. Observation sheet as non-test instrument and and cognitive test in form of multiple choices as test intrument was used to obtain data. The research result revealed that there is no significant difference in student learning activity in both of class experiment meanwhile student learning outcome was taught by word square model is higher than student learning outcome that taught by make a match in SMA Swasta AL-ULUM Medan academic year 2013/2014.

Keywords: word square, make a match, students' activity, learning outcome

INTRODUCTION

The quality of education in Indonesia is still low. This is evident from the result of an international study which stated that the ability of Indonesian students below international average score of 500. Among these, TIMSS (Trends in Mathematics and Science Study) is the largest and the most comprehensive comparative international study of education ever undertaken. Indonesia has participated in TIMSS since 1999, 2003, 2007 and 2011. Achievement of students in Indonesia during the TIMSS is below average. Last, in 2011 ranked 40 of 42 countries with an average value of 406 (Martin, 2012).

The low ability of Indonesian students in science is also reflected in the Programme for International Student Assessment (PISA). PISA is the study of international student assessment program organized conducted one over 3 years and ongoing since 2000, aims to assess the extent to which the student is sitting at the end of primary education or students aged 15 years and has mastered the essential knowledge.

Achievement of Indonesia in 2012 was ranked 64 0f 65 countries. In this case, Indonesian student learning outcome is low (OECD, 2012).

From data above clearly defined that student learning outcome on science still dissappointed. Efforts of teachers in teaching process is a very important part in achieving the success of the learning objectives that have been designed. Generally, the purpose of teaching is the learning materials are delivered fully mastered by all students. This mastery can be addressed as a result of learning or student outcome. Whether or not a goal of learning is strongly influenced by the strategies, methods and models applied learning by teachers.

Based on interview of Biology teacher in SMA Swasta AL-ULUM, Biology teaching methods employed are often the lecture method, this method makes the teacher dominates the classroom teaching and learning activities so that students become passive. Some students are listening and taking notes. The learning model that used less attractive and make students become saturated. Some students are talking to each other and do not pay attention seriously to the teacher explanation. Teachers serve as the only one source of information so that learning activities take place in one direction only, and impact on student learning outcomes, which is still about 45 % of the students who achieved the KKM while 55 % below the minimum completeness criteria (KKM) which is 75.

Based on the above issues teacher needs to choose learning model that can improve student achievement and activity. Make a match model is one of the cooperative learning model that introduced by Curran in Eliya (2009). Make a match is an learning model to find pairs of cards that is the answer to question before the time is out. Students are able to match the card will be given points and who do not succesfully match the card will be punished in accordance with the agreement. Teachers act more as facilitators and classroom also needs to be organized to support cooperative learning.

Word Square learning model is a development of enriched lecture method. It can be identified through the clustering method enriched lecture-oriented to student activity in learning as mentioned by Mujiman (2007). Word Square is a model of learning model that combines the ability to answer questions with matching answers foresight in the answer boxes. Teachers can program a number of selected questions that can stimulate students to think effectively. (Kompasiana, 2010).

It is important to find out the comparison of student learning outcome and activity between the model of Make a match and the model of Word Square. By applying these model is expected to help students achieve goals and can create student interaction.

RESEARCH METHOD

Location and Time of Research. This research was done in SMA Swasta Al-ULUM Jl. Amaliun / Cemara No. 10 Medan and conducted in April– May2014.

Population and Sample. The population in this research was all students of class XI SMA Swasta Al- ULUM in the academic year 2013/2014.Samples in this study were drawn using a cluster random sampling technique. The sample in this study was a class XI IPA 1 with 30 people as the Word Square class and class XI IPA 2 with30 people as Make a match class.

Kind of Research. This research was a quasi experimental study.

Variable of Research. The independent variable were Make a match Model and Word SquareModel and the dependent variable were studentlearning outcomeand activity in Human Excretory System (Kidney) sub topic.

Design of Research. A pre-test—post test design of comparative research was adopted in this study.

Procedure of Research. There were two classes in this research, namely (1) class which taught by Make a match model, and (2) class which taught by Word square model.As preparation, the location and time of research were defined. The treatment class was selected by draw randomly. Researcher act as a teacher taught both of classes. The entire instruments like lesson plan and media was prepared by researcher based on syllabus. The implementation of lesson plan was conducted in four meetings of Human Excretory System (Kidney) sub topic.

Instrument of Research.

a. **Instrument for learning outcome (Test).** The instrument research that used in this research was students post-test result. The test given twice, pre-test and post-test.

b. **Instrument for Students Activity (Non-Test).** Observation used to observe the student activity then compared and determined student activity which arranged in observation sheet.

Instrument Test

a. **Validitys.** To test the validity of the test used Product Moment

   With the criteria testing if $r_{calculation} > r_{table}$ for $\alpha = 0.05$ and then can be said as valid.

b. **Reliability.** To find the reliability problems can use the formula: Kuder Richardson 20 or KR-20. With the criteria testing if r calculation> r table for $\alpha = 0.05$ then the test is declared reliable.

c. **Difficulty Index.** To calculate the level of difficulty index of questions

d. **Determination Index.** To calculate the determination index,

Data Analysis Technique. Prior to data analysis, requirements analysis then tested beforehand to determine whether student learning outcomes are normally distributed and whether the two groups have homogeneous variance testing the normality and homogeneity.

1. **Students Activity Data.** Observation result of students activity during the learning process.

2. **Students Cognitive Data**

   Normality Test. Liliefors test is used to test whether student learning outcome data arenormally distributed or not

   Homogeneity Test. Data must be normally distributed or the sample comes from a normally distributed population. To determine the sample variance, homogeneity test is used.

   Hyphotesis Test. Statistical testing is used to test the hypothesis in the research. The static hypothesis are:

   Ho1 : There is no difference of learning outcome between students who taught by using *Make a match*and those who taught by using *Word square* model on Human Excretory System (Kidney) sub topic in SMA AL-ULUM Academic year 2013/2014.

   Ha1 : There is difference of learning outcome between students who taught by using *Make a match*and those who taught by using *word square* model on Human Excretory System (Kidney) sub topic in SMA AL-ULUM Academic year 2013/2014.

   Ho2 : There is no difference of learning activity between students who taught by using *Make a match*and those who taught by using *Word square* model on Human Excretory System (Kidney) sub topic in SMA AL-ULUM Academic year 2013/2014.

   Ha2 : There is difference of learning activity between students who taught by using *Make a match*and those who taught by using *word square* model on Human Excretory System (Kidney) sub topic in SMA AL-ULUM Academic year 2013/2014.

   The *t* test is used to test the hypothesis with significance level = 0.05 and degree of freedom (df) = $n_1 + n_2 - 2$.

if:t-$_{count}$> t$_{table}$; Ho is rejected,t-$_{count}$< t $_{table}$; Ho is accepted

RESULT AND DISCUSSION

There are 30 multiple choices that used as instrument test in this study to get data of student learning outcome. This instrument is given to both of Word Square and Make a Match class in the initial and final meeting as pre test and post test.

Pre test is given to two classes of grade XI IPA. The result of pre test of those classes is calculated using t test in order to select two classes as the object of this research. The classes that have no significant difference in pre test result were chosen as word square and make a match class. Pre test score of word square and make a match class are 48.06 and 47.9. Statistical analysis indicates there is no significant difference in pre test of students between word square and make a matchclass. It means both classes have the same level before treatments given.

Using of word square in class facilitated students to think efectively. Every question given stimulated students to find the answer by thinking efectively. Through this learning model, students not only invited to learn, but slipped the play that makes the students do not easy to get bored in studies. The meaning of this play is to provide distraction to students when learning takes place, but not out of subjects content covered to the satisfactory and enjoyment of the students to not quickly get bored and tired. Researcher distributed appropriate activity sheets and students were told to answer the questions then shading the letters in the box of appropriate answer.

The average post test result for multiple choice in word square is 86.2 and it is higher than make a match class average score 75.5. The difference is 10.7 points. This condition means that critical thinking ability of students in order to answer post test in word square class is better than students of make a match class. Word square was helping students to understand the key concepts in learning that delivered by selected question given to find the answer in word square.

The analysis result showed the students outcome in Word square model experienced a significant improvement compared with students learning outcome in Make a Match model. It is relevant with the finding of Winny (2013) in class VIII SMPN 1 Tebing Tinggi showed that students learning outcomes of biology is increasing by using of word square model.
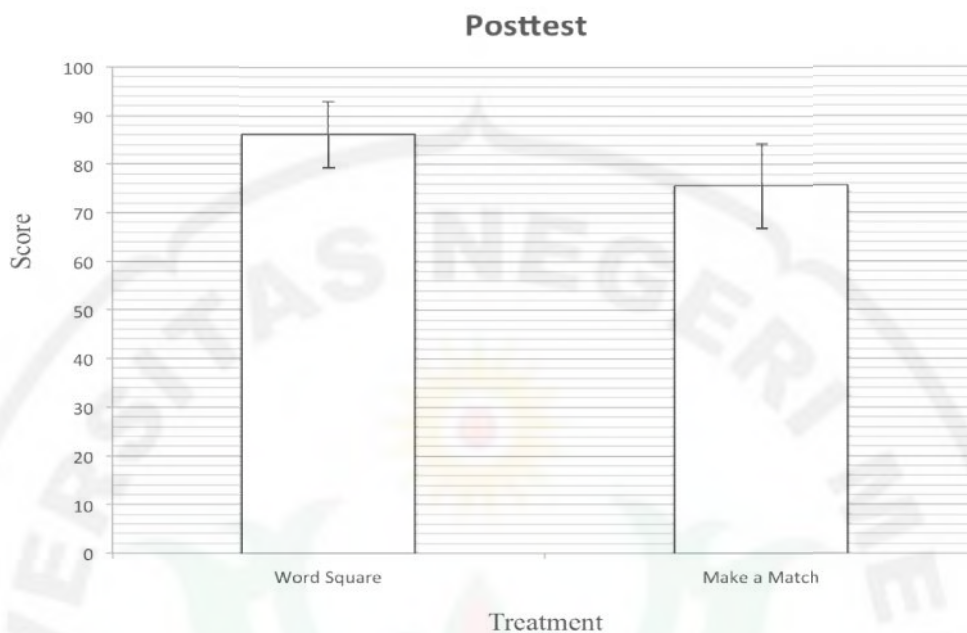
Figure 1 Comparison of students learning outcome in excretory system. Asterisk indicates that Word square significantly increasing students learning outcome. (t test = 5.311 ; P = 0.000)

Word Square were helpfully constructing students understanding. According to Dewi (2012) using word square model where the students learn in a group and practiced their understanding in the form of game. Students stimulated to think efectively in order to find the answer of concept-based question which given by researcher. After finding the answer, students asked to explain their understanding of that word. This activity forces student to be more understood about learning topic.

Word Square Model is learning model that contains elements of the game that can make learning more fun and make the subject matter will be more easily understood and remembered by students. Student understanding about the topic can improve their learning outcome. According to Jamaluddin in Mandala (2011), this model as encouragement and reinforcement to learning material which delivered by teacher. It also practicing student accuracy in answering and searching the answer in worksheets. And of course that is emphasizedis the effective thinking, which is the most appropriate answer According to Kirinawaty in Bancin (2011) the strengths of word square model are encourage student understanding to leaning material and practicing student be discipline. On the other hand, word square model has weakness students just accepting and can cheating to their friend's answer higher than make a match model in learning kidney subtopic.

Using of Make a match in other class facilitated students to match the card will be given points and who do not succesfully match the card will be punished in accordance with the agreement. Researcher had prepared some cards containing multiple concepts or topics that are suitable for review sessions, one part about the card and other parts of the answer card. Each student got a card about question/answers. Each student thought of answers/questions from cards held. Each student was seeking matching pairs of cards with the card.

Make a match model facilitated student to find out the relation between some conceptual word but student less encouraged to buid their understanding of those concept given. In word square, students were asked to understand the concept-based question given to find the answer word in the box. Students forced to buid their understanding of question. In make a match, students were given cards which contain some conceptual words and asked to matching them. This activity causing student could only use their memories about the words matching. Students just trying to find the pairs and does not stimulate their mind to think over. According to Rukamana (2010) the strengths of this model can create fun learning codition and does not asily get bored. But the other hand the weakness is students get hard to concentrated in finding the pair cards with limitation of time.

Make a match model also increasing student understanding, it is relevant with the research conducted by Wahyuningsih (2012) showed that Make a Match can improve student learning outcome, Beside that research conducted by Aprilia (2011) showed that post test score of student taught by Make a Match is better than conventional class in grade X SMA Negeri 5 Surakarta, academic year 2010/2011. Both of those model can improvge student learning outcome, but in this study researcher found that using word square model improved learning outcome.

Word square was helping students to understand the key concepts in learning that delivered by selected question given to find the answer in word square. This study found that using word square model improved learning outcome higher than make a match model in learning kidney subtopic in SMA SWASTA Al-Ulum Medan academic year 2013/2014.

Student Learning Activity

Observation sheet which used to collect data of student activity contains ten indicators.There are asking question, answering teacher's question, giving opinion, doing assignment, perform in front of the class, work team, paying attention to the teacher, paying attention to the media, writing and making notes, having spirit in learning process.

Each indicator consists of three levels of contribution. The total percentage of each indicator was calculated and categorized based on criteria.

The result of student activity in class which taught using word square shows that the contribution of students for all indicators is categorized as active.The highest percentage in word square class is students were asking question to the teacher explanation during the learning process. Student was actively asking question because in word square model students are expected to understand every concepts which given in questions in order to find the answers in word square. This condition is relevant with the result of classroom action research conducted by Kurnia (2011) obtained that implementation of word square model stimulated student's motivation in learning and reduce the boredom of students.

In class which taught using make a match model, the contribution of students for all indicators is also categorized as active.The highest percentage in make a match model is paying attention to the media. Students was actively paying attention to the media during learning process because Make a match attracted students to know how to play it.There are two indicators in student learning activity of make a match class categorized as fair. They are giving opinion and paying attention to the teacher. Because these models of learning force students to work and do not facilitate students in giving opinion.

Overall, the average of all indicators of student activity in Word Square class is 66% and categorized as active class. Then student activity in make a match class is 65% and also categorized as active class. Both of Word square and Make a Match are coopertaive learning model, where these model can improve atudent learning activity during learning process and can facilitating students to independent learning as well as providing the oppurtunity to students to interact and learn with their peers.Statistical analysis for the average of student activity for both classes is relatively similar. It indicates student learning activity in learning kidneysubtopic which taught using word square model is similarlyas active as student which taught using Make a match in SMA SWASTA Al-Ulum Medan academic year 2013/2014.

CONCLUSION AND SUGGESTION

Conclusion

Based on the result using Word Square and Make A Match Learning Model in teaching and learning kidney subtopic in Grade XI SMA SWASTA AL-ULUM Medan, It can be concluded that:

1. Student learning outcome taught using Word Square model is higher than using Make A Match model. There is a significant difference on student learning

outcome between Word Square and Make A Match model on the topic kidney subtopic in Grade XI IPA SMA SWASTA AL-ULUM Medan Academic Year 2013/2014.

2. Student learning activity taught using Word Square model is relativelysimilar with Make A Match model. There is no significant difference on student learning activity between Word Square and Make A Match model on the topic kidney subtopic in Grade XI IPA SMA SWASTA AL-ULUM Medan Academic Year 2013/2014.

Suggestion

Based on the conclusion above, it's recommended to :

1. Students should use Word Square model to improve their learning outcome because it's attractive to stimulate themselves to be involed in the learning process.

2. Teachers are suggested to apply Word Square Learning Model in teaching and learning kidney subtopic because average score of student' activities and learning outcome was higher than using Make A Match learning Model. It can enhance teacher's creativity and awareness to develop alternative strategies in teaching.

3. Teachers are suggested to introduce about the mechanism of model using in first meeting and get the data in next meeting.

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