Implementation of Make a Match (MaM) Learning Model to the Nomenclature of Common Chemical Compounds on Motivation and Learning Activities of Class X SMA Negeri 1 Turi Academic Year 2019/2020

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ABSTRACT: The aim of this study is to find out: 1) Determine whether or not there is a significant difference between the implementation of making a match learning model with conventional learning model to the nomenclature of common chemical compounds on learning motivation, 2) Determine whether or not there is a significant difference between the implementation of making a match learning model with conventional learning model to the nomenclature of common chemical compounds on learning activities. This research was experimental research design with Posttest Only Nonequivalent Control Group Design. The population of this study was all class X students of SMA Negeri 1 Turi in the academic year 2019/2020, with a two-class research sample, namely class X MIPA 1 and X MIPA 2. Data of concept for activity variables and learning motivation taken by non-test methods in the form of questionnaires and observation. Data analysis techniques used the Mann Whitney type non-parametric statistical test for learning motivation variables and the Two Independent Sample T-Test type parametric statistical test for learning activity variables on nomenclature of common chemical compounds. Based on the results of the study, it can be concluded: 1) There was no significant difference between the implementation of make a match learning with conventional learning model to the nomenclature of common chemical compounds on motivation learning of class x SMA Negeri 1 Turi academic year 2019/2020; 2) There were no significant difference between the implementation of make a match learning with conventional learning model to the nomenclature of common chemical compounds on activities learning of class x SMA Negeri 1 Turi academic year 2019/2020.

Keywords: make a match, learning motivation, learning activities

INTRODUCTION

Education is an inseparable part of human life and is also the key to successful development [1]. The quality of education in Indonesia is still low compared to other developed countries. This will certainly affect the quality and also the quality of education in Indonesia. Efforts to improve the quality of education in Indonesia can be done through the teaching and learning process [2]. The learning process must provide understanding to students through effective interactions, both between teachers and students, between students and students, and between students and the environment [3].

At this time there are still quite a lot of students who have difficulty understanding chemistry subjects. The difficulty lies in the characteristics of the chemistry subject matter itself, which mostly contains concepts that are quite difficult for students to understand because it involves calculations, chemical reactions and concepts that are rote and abstract [4]. Based on the results of observations at SMA Negeri 1 Turi in one of the X.MIPA classes which was held in February 2020, it showed that in the process of

implementing learning the media used were power points, whiteboards, markers, and student worksheets. The teacher conveys the material using the conventional model, namely the lecture method, question and answer and assignment. During the lesson, the teacher delivered the material using a lecture method that was easy to understand. The teacher gives questions to students regarding the material being taught and provides opportunities for students to ask questions. Teachers have tried various learning methods so that students are actively involved during the learning process. One of them is through giving questions and class discussions. However, the learning methods that have been pursued by teachers such as lectures, questions and answers and assignments still make students less motivated and student activities during the learning process still tend to be lacking. According to Supardi & Putri (2011) [5] learning chemistry requires a variety of learning models because chemistry is also one of the varied materials. The use of monotonous learning can cause students to be less motivated, so that learning activities are also less fun.

Each chemistry subject teacher is expected to be able to present material using a learning model that is appropriate to the material. The application of this learning model is not only aimed at helping students understand a material but it is also expected to build motivation and learning activities from the students themselves. One of the important roles of using the learning model is to build student motivation in learning. This learning motivation will encourage someone to do something to achieve a desired goal. If students are encouraged to learn, it will form an effective learning which will ultimately make the learning atmosphere comfortable. The existence of good motivation in learning will show good results. In other words, with diligent effort and especially accompanied by motivation, someone who learns will be able to produce good results [6]. With good learning motivation for students, it will also create good and fun learning activities.

Various models of learning that are oriented to student activities have now been put forward. One of the models that can motivate and activate students while studying is the make a match type of cooperative learning model. Cooperative learning is a learning model used for the learning process, with cooperative learning students will find it easier to comprehensively find difficult concepts if they discuss with other students about a problem they are facing [7].

The make a match learning model is one type of cooperative learning. The application of the make a match learning model that needs to be prepared is the card. The cards consist of cards that contain questions and the other cards contain answers to these questions. The advantage of cooperative learning model type makes a match is that students look for pairs of cards that they carry while learning about the subject in a pleasant atmosphere during the learning process. takes place and can make students motivated so that they become active in looking for their card pairs [8].

METHOD

Research Design

The type of research used in this study is quantitative research in the form of experimental research. This research was conducted by comparing two classes where the class given treatment was called the experimental class and the class that was not treated was called the control class.The Learning Model applied in the experimental class is the make a match (MaM) model while the control class uses a conventional learning model. This research design uses a Quasi-Experimental Design, namely Post-test Only Nonequivalent Group Design on the variables of motivation and student learning activities. The research design can be seen in Figure 1.

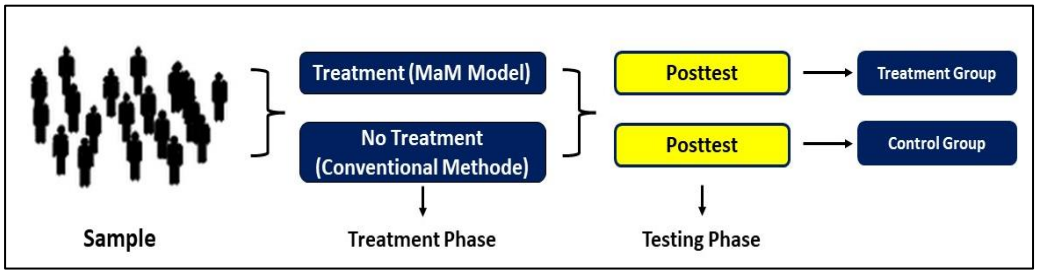

Figure 1. Research Design namely Post-test Only Nonequivalent Group Design

The steps of the MaM model can be seen in **Table 1**. [8]

TABLE 1. Syntax of make a match (MaM) of the model

Syntax of MaM Model	Activity
Syntax 1	The teacher prepares several cards containing several concepts or topics suitable for the review session, one part of the question card and the other part of the answer card.
Syntax 2	Each student gets one card
Syntax 3	Each student thinks about the answer/question of the card being held.
Syntax 4	Each student looks for a partner who has a card that matches his card.
Syntax 5	Each student can match his cards before the time limit is given a reward.
Syntax 6	After completing one round, then the cards are shuffled again so that each student gets a different card than before
Syntax 7	This stage is continued until the card runs out
Syntax 8	Conclusion

Place, Time and Subject Research

This research was conducted at SMA Negeri 1 Turi, Yogyakarta. Time this research from January to Maret 2020. Subjects in this research are SMA N 1 Turi Yogyakarta class X in the academic year 2019/2020 on Nomenclature of Common Chemical Compounds. The sample in this study consisted of two classes. The sampling technique by purposive sampling.

Data Collection

Data collection techniques used non-test methods. Form of assessment used is Questionnaire. The assessment using questionnaire of motivation and activity learning was conducted on students in the control class and experimental class. The instrument used to collect data in this study has been validated by content to experts. The results of the content validation are then calculated using the Gregory formula (i) and the results can be seen in the TABLE 2.

$$CV = \frac{D}{A+B+C+D} \quad \text{.....(i)}$$

CV = Content validity
A = Number of irrelevant items according to validator I and validator II
B = Number of items that are irrelevant according to validator I and relevant according to validator II
C = The number of items that are relevant according to validator I and irrelevant according to validator II
D = Number of relevant items according to validator I and validator II

Note:
If the results of the content validation show the value of the CV calculation > 0.7 then the instrument is Can be continued with construct validity test/test item validity.

TABLE 2. Result of Content Validity Motivation and Activity Learning Instruments

Data	Instruments	Content Validity	Conclusion
Learning Motivation	Questionnaire	0,96	Can be continued with construct validity test/test item validity
Learning Activity	Questionnaire	0,89	Can be continued with construct validity test/test item validity

After validation of the content by experts, the next step is to test the questionnaire. Questionnaire trials were carried out in classes that had received material for nomenclature of chemical compounds. After obtaining the test data, the data is processed. This data processing is used to calculate the construct validity of the questionnaire on motivation and student learning activities. Calculation of construct validity

uses equation (ii) while for reliability calculation uses equation (iii).

$$Rxy=\frac{N.\sum XY-(\sum X)(\sum Y)}{\sqrt{[N.\sum X^2-(\sum X)^2][N.\sum Y)^2-\sum(Y)^2]}} \ldots(ii)$$

Description:

Rxy	=	Coeffisient correlasi between variable X and Y
X	=	The score obtained by the subject of all items
Y	=	The total score obtained by the subject of all items
∑X.Y	=	The sum of the multiplications between the values of X and Y
$\sum X^2$	=	Square of the value X
$\sum Y^2$	=	Square of the value Y
N	=	Number of respondents

If Rxy > rtable then the statement items can be said to be valid, but if Rxy < rtable then the statement items in the instrument is invalid. The above equation is the formula used to test the validity of the statement items, namely using the product moment formula. The results of the reliability test of the questionnaire instrument on motivation and student learning activities are presented in Table 3.

TABLE 3. Result of Construct Validity Questionnaire

No	Number of Statements	Number of Statements	Number of Valid Statements	Number of Invalid Statements
1	Learning Motivation	30	18	12
2	Learning Activity	28	18	10

$$r_{11}=\left(\frac{n}{n-1}\right)\left(1-\frac{\sum\sigma^2}{\sigma t^2}\right) \ldots (iii)$$

Description:

r_{11}	=	Overall test reliability
N	=	Number of items
St	=	Standard deviation of the test (standard of variation is the root of variance)
$\sum\sigma^2$	=	Total score variance of each item
σt^2	=	Total variance

The criteria for instrument reliability can be seen from the instrument reliability value in TABLE 4.

TABLE 4. Instrument Reliability Criteria

Range	Criteria
$0,00 \leq r_{11} \leq 0,20$	Very low
$0,21 \leq r_{11} \leq 0,40$	Low
$0,41 \leq r_{11} \leq 0,60$	Enough
$0,61 \leq r_{11} \leq 0,80$	High
$0,81 \leq r_{11} \leq 1,00$	Very high

The results of the reliability test of the questionnaire instrument on motivation and student learning activities are presented in Table 5.

TABLE 5. Result of Reliability Instruments of Learning Motivation and Activity

Data	Description	Number of Statements	Reliability	Category
Learning Motivation	All statements on the instrument	30	0,80	Very high
	Only valid statements	18	0,87	Very high
Learning Motivation	All statements on the instrument	28	0,83	Very high
	Only valid statements	18	0,83	Very high

Data Analysis

Data analysis in this study using T-test. Data analysis was preceded by prerequisite tests, namely normality test and homogeneity test. The results of the prerequisite test are presented in Table 6. Furthermore, the results of hypothesis testing using the t-test are presented in Table 7.

TABLE 6. Results of Prerequisite Test

Data	Class	Normality Test		Homogeneity Test	
		Significance	Conclusion	Significance	Conclusion
Learning Motivation	Experimental	0,040	Abnormal	0,395	Homogeneous
	Control	0,115	Normal		
Learning Activity	Experimental	0,173	Normal	0,446	Homogeneous
	Control	0,199	Normal		

TABLE 7. Hypothesis Test Results

Variable	Test Method	Sig.	Test Decision	Conclusion
Learning Motivation	*Mann-Whitney*	0,085	Ho Accepted	There is no difference
Learning Activity	*Independent Sample T-Test*	0,491	Ho Accepted	There is no difference

Noted:

Ho: There is no significant difference between the application of the make a match learning model with conventional learning on the learning motivation/learning activity of grader X of SMA Negeri 1 Turi.

Ha: There is a significant difference between the application of the make a match learning model with conventional learning on the learning motivation/learning activity of grader X of SMA Negeri 1 Turi.

RESULTS AND DISCUSSION

This research is a research on the application of the make a match learning model to students' motivation and learning activities on the material of nomenclature of chemical compounds. The instruments used to measure students' motivation and learning activities are observation sheets and questionnaires. In this study, 2 classes were used, namely 1 experimental class and 1 control class. The questionnaire data collection for motivation and learning activities was taken at the end of the lesson for the experimental and control classes.

The implementation of learning in the experimental class was carried out 2 times face to face using the make a match learning model. Learning activities are divided into 3 activities, namely preliminary, core and closing activities. Preliminary activities begin with greetings, checking the attendance of students as an effort to improve student discipline. Next, the teacher conveys apperception and students pay attention to what is shown or said by the teacher related to the nomenclature of chemical compounds. Then the teacher conveys the objectives of learning that are adapted to the material that must be achieved by students in the learning process. In the core activity, the teacher conveys material to students regarding the nomenclature of chemical compounds. After that, the teacher provides opportunities for students to ask questions and the teacher provides feedback on questions posed by students. Next, the teacher gives an example of a matter of nomenclature of chemical compounds and the teacher appoints one of the students to work on the example problem. Then the teacher groups the students into six groups (one group consists of 5-6 students). The teacher gives a card that has been prepared previously to each group and each group gets 6 cards. Then each group looks for pairs that have cards that match their cards. For groups that have found their partner cards, they are immediately written on the blackboard and corrected together with the other groups. Closing activities are carried out by facilitating students to find conclusions about the material that has been studied, then ending with reading prayers and saying greetings.

The implementation of learning in the control class was carried out twice face-to-face using conventional learning models. Learning activities are divided into 3 activities, namely preliminary, core and closing activities. Preliminary activities begin with greetings, checking the attendance of students as an effort to improve student discipline. Next, the teacher conveys apperception and students pay attention to

what is shown or said by the teacher related to the nomenclature of chemical compounds. Then the teacher conveys the objectives of learning that are adapted to the material that must be achieved by students in the learning process. In the core activity, the teacher conveys material to students regarding the nomenclature of chemical compounds. After that, the teacher provides opportunities for students to ask questions and the teacher provides feedback on questions posed by students. Next, the teacher gives an example of a matter of nomenclature of chemical compounds and the teacher appoints one of the students to work on the example problem. Then the teacher divides the students into several groups (one group consists of 5-6 people), each group writes the answers to the questions written by the teacher on the blackboard. Then the teacher asks each group whether they have finished working on the questions on the blackboard and when they are finished the teacher accompanies the students to correct their answers (corrected together). Closing activities are carried out by facilitating students to find conclusions about the material that has been studied and ending by reading prayers and saying greetings.

The results of the Mann-Whitney Non Parametric hypothesis test for learning motivation using a questionnaire instrument obtained a significance value of 0.085 which means that the significance value is > 0.05 so Ho is accepted. That is, there is no significant difference between the application of the make a match learning model and the control class on students' learning motivation in the material nomenclature of chemical compounds for class X SMA N 1 Turi in the 2019/2020 school year. There is no difference in the application of the make a match learning model to students' learning motivation because the treatment between the experimental class and the control class is not much different, the only difference lies in the process of finding pairs/matching cards with other groups. There are other factors that cause no difference in the variables of learning motivation, including: 1) Students are still confused when filling out the questionnaire, so there are some students who ask answers to their seatmates, 2) Students fill out the questionnaire with a lack of confidence because they are afraid of being challenged. get a bad score on academic scores, although it has been explained previously that the questionnaire scores do not effect on academic scores.

The results of the Parametric hypothesis test of the Independent Sample T-Test type for learning activities using a questionnaire instrument obtained a significance value of 0.491, which means that the significance value is > 0.05 so Ho is accepted. This means that there is no significant difference between the application of the make a match learning model and the control class on student learning activities on the material for nomenclature of chemical compounds for class X SMA N 1 Turi in the 2019/2020 school year. There is no difference in the application of the make a match learning model to student learning activities, due to problems during the learning process. One of them is at the stage of the process of finding a partner/matching cards with other groups, making the class atmosphere less conducive, so that activities in the class become irregular and difficult to adjust with a large number of students, namely 32 students. This is in line with the weakness of the make a match model proposed by [9] that if in one class there are 30 or more students and the teacher is not wise in conditioning the class, what appears is that the class atmosphere will be difficult to control.

CONCLUSION

Based on the description above, it can be concluded that:

1) There is no significant difference between the application of the make a match learning model with conventional learning on students' learning motivation in the material nomenclature of chemical compounds for class X SMA Negeri 1 Turi in the 2019/2020 school year.
2) There is no significant difference between the application of the make a match learning model with conventional learning on student learning activities in the material for nomenclature of chemical compounds for class X SMA Negeri 1 Turi in the 2019/2020 school year.

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