RESEARCH ARTICLE

THE INFLUENCE OF COOPERATIVE LEARNING MODEL TYPE STUDENT TEAMS ACHIEVEMENT DIVISION (STAD) THROUGH GUIDED INQUIRY APPROACH TO THE IMPROVEMENT OF LEARNING RESULTS IN HIGH SCHOOL STUDENT ON THE SUBJECT CHEMICAL EQUILIBRIUM.

Zulkifli Zam Zam and Tesa Mery K.

Chemistry Education Department of Universitas Khairun Jl. Bandara Babullah P.O.Box 53 Akehuda Ternate 97721, North Maluku, Indonesia.

Manuscript Info

Abstract

Student Teams Achievement Division (STAD) through guided inquiry approach to improving student result class XI IPA SMAN 3 Halmahera Utara in subject chemical equilibrium. The population in this study were students of class XI IPA SMAN 3 Halmahera Utara totaling 45 students spread on two classes. The technique used to determine the sample was saturated sampling technique in which all members of the study population sampled. The research data were analyzed using Anacova test to determine student learning outcomes. Based on the analysis of data there are significant cooperative learning model Student Teams Achievement Division (STAD) through guided inquiry approach to improving student learning outcomes class XI IPA SMAN 3 Halmahera Utara in chemical equilibrium with the material test results Anacova where $t_{account} = 2.60 > t_{table} = 1.681$ with a huge influence, namely the increase in 87 %. In the affective aspect of student learning results obtained for the experimental class of 86% and 76% control class. As for the psychomotor aspects of student learning results obtained by 84% the experimental class and control class was 68%.

Introduction:-

Success in learning can be determined by the amount of students' participation in following the learning process, the more active students take part in learning activities, the more successful the learning process. The fact that in the process of learning in class most of the students are less active, where the cause is learning still occurs conventionally that makes students lazy and lose motivation to learn. Similarly, teachers will have difficulty in teaching because of lack of students' motivation during the learning process. One of the materials that is considered difficult is the chemical equilibrium material, especially on the factors that influence the direction of equilibrium shift and at the price determination of equilibrium constants. Therefore, it needs effort from teacher in teaching to apply the right model, approach, and method so that student become active and have spirit in learning. The above problem can be overcome by using cooperative learning model of Student Teams Achievement Division (STAD) type. This model is a fun and innovative learning model because students learn together in a group so that students will be more motivated and enthusiastic to learn. STAD type cooperative model is good for chemical equilibrium material because there are counts then inter-group cooperation is needed in understanding chemical equilibrium material through guided inquiry approach.

Corresponding Author:- Zulkifli Zam Zam.
Address:- Chemistry Education Department of Universitas Khairun.

Methods:-

The population of this study is all students of class XI IPA SMA Negeri 3 Halmahera Utara odd Semester of 2016. While the sample used is Saturated Sampling (Riduwan, 2014) with the amount 45 students. To determine the effect of using learning model to learning outcomes for cognitive domain, there used test techniques, while for the affective and psychomotor aspects are using observation. To see student and teacher responses to learning models, there used questionnaires. Before being used, instruments' of test are analyzed first by testing the students in grade XII IPA SMA Negeri 3 Halmahera Utara in order to know the reliability, the level of difficulty, and the differentiation of the problem. Before the data of test result is analyzed, firstly done the analysis prerequisite test that is normality test and homogeneity test. According to Supardi (2013: 138), normality testing is performed to determine whether the distribution of data is normal or not, with the test criterion if $\chi2$count $<\chi2$table, then H0 is accepted, while if $\chi2$count $> \chi2$table then H0 is rejected. Testing homogeneity is to know the uniformity of experimental class and control class. After the data is declared normal and homogeneous then followed by hypothesis test, then the learning outcomes in cognitive domain is analyzed by using Anakova test which is continued by using gain value formula to calculate the influence of the use of cooperative learning model of Student Teams Achievement Division (STAD) through guided inquiry approach to improvement of student learning outcomes. The affective and psychomotor domains are analyzed by descriptive way through the performance results, while the questionnaire is analyzed using Likert scale.

Result and Discussion:-

Question Try Out:-

Before question instrument is being used to obtain research data, these 15 items of questions in the form of essay are first tested on the students of class XII IPA SMA Negeri 3 Halmahera Utara, with the amount 20 students. Based on the results of reliability calculation analysis, the level of difficulty, differentiation of question, and the results of the validity of the question with the supervisor, then obtained 10 items worth to use in research. The formula used to determine the reliability of the problem is the alpha formula. According to Sudjiono (2015: 207), in order to determine whether the test results of the learning form of the description that has been prepared have a high reliability or not yet, generally people use a formula known as alpha formula. Reliability analysis results obtained $\alpha = 0.77$, the results of difficulty analysis obtained 9 questions included in the category of medium questions and 6 questions of difficult category, while the results of the differentiation of the problem analysis obtained 9 questions are in sufficient category , 5 questions are in poor category, and 1 questionis in good category. Based on the analysis results, there obtained 10 items which is worth to use in research. The selection of question instruments that will be used in the research are seen from the results of reliability calculation, the degree of difficulty of the problem, and the differentiation of the question.Where, the question used is a question that has a moderate and difficult level and level of differentiation is quite and good. According to Arikunto (2012 : 225) stated that questions that are too easy or too difficult, do not mean they should not be used, this depends on their use.

Cognitive Learning Result:-
Data of Posttest Result:-

Result of analysis of learning completeness in experiment class and control class based on KKM SMA Negeri 3 Halmahera Northis 70 can be seen in table 1.

Table 1:- Learning Result Completeness Score

Class	Posttest Learning Result Completeness			Percentage	
	Total Students	Complete	Not complete	Complete	Not complete
Expertiment	24	15	9	63%	37%
Control	21	0	21	0	100%

Test Prerequisite Analysis:-

Result of calculation of normality test and homogeneity test can be seen in table 2

Table 2:- Normality Test Result

Experiment Class (X_1)	χ^2_{hit}	2,26	Normally distributed
	χ^2_{tab}	31,144	
Control Class (X_2)	χ^2_{hit}	5,43	Normally distributed
	χ^2_{tab}	23,685	

Based on the result of homogeneity test, it is obtained **F_{count}= 1,60, F_{table} = 2,83 dan α (degree of significance)** = 5%

Hypothesis Test:-
After the result of normality test and homogeneity test of both samples stated normal distribution, then statistical test can be continued on hypothesis test. There are two types of hypothesis testing that is main effect and simple effect. Result of main effect test obtained Fcount>Ftable or 6,763> 4,07 which shows acceptance of hypothesis hence need further testing of hypothesis simple effect by using formula of t-test of anakova. The results of hypothesis testing simple effect can be seen in table 5.

Table 4:- Simple Effect Hypothesis Test Result

simple effect	**Db**	t_{hitung} t_{count}	t_{tabel} t_{table}	**α (taraf signifikan / degree of significance)**
	43	2,60	1,681	0,05

Because t_{count}> t_{table} or 2,60 > 1,681, the H_0 is rejected and H_a is accepted.

The next is to calculate how much the influence of the use of STAD type cooperative learning model through guided inquiry approach to improving student learning outcomes on chemical equilibrium materials. Results of gain analysis obtained with the gain score; X1 = 87% and X2 = 85%

The students' cognitive learning outcomes were measured using 10 question items in the form of a description given to the students at the beginning of the meeting (Pretest) and at the final meeting (Posttest). Purwanto (2014: 66) The learning result test (THB) is a test of mastery, because this test measures students' mastery of the material taught by the teacher or after the students obtain some materials.Based on the analysis results there is an increase in student learning outcomes from pretest to posttest. Enhancement of student learning outcomes of experimental class is higher than the results of student learning control classes. There are two types hypothesis testing that is main effect and simple effect. From the result of hypothesis testing of main effect obtained Fcount>Ftable or 6,763> 4,07 then H0 is rejected and Ha is accepted so that it can be concluded that there are differences of learning result significantly between experiment class and control class. By testing the simple effect hypothesis data, it is obtained t_{count}= 2.60 and t_{table}value = 1.681. Because t_{count}>t_{table} then H0 is rejected and Ha is accepted. Based on the result of hypothesis analysis, it shows that there is influence of STAD type cooperative learning model through guided inquiry approach and student learning outcome using conventional learning model on chemical equilibrium material. The result of hypothesis testing of simple effect can be seen in Figure 2.
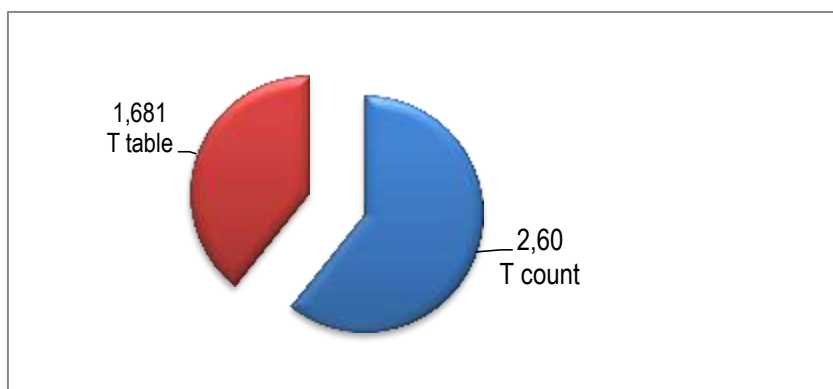
Figure 2:- Diagram of Anakova Test Result

The effect of using the model for the experimental class is bigger than the result in control class. This is because the use of STAD type cooperative learning model through guided inquiry approach makes students have a good understanding of the chemical equilibrium material because this learning requires students to work together between groups, so indirectly the students will work harder in understanding the material equilibrium. According to Wisudawati and Sulistiawati (2014: 54) STAD is useful to motivate learners to support each other and help each other in mastering the knowledge given. Furthermore, to find out how much increase in student learning outcomes by using the formula of gain value, it is obtained there is increase of learning outcomes experimental class by 87% and control class by 85%. Based on the results obtained, it shows that there is a big difference in the influence of the use of learning models in both classes. However, differences in learning outcomes in both classes are not too high. This is because the use of different models

Affective and Psychomotor Learning Result:-
Results of affective and psychomotor learning based on the results of the analysis obtained, the average value of the experimental class is higher than the average value of control class, in detail; The Average Value of the experimental class affects 82.3 (86%) and control class 64 (76%). While the mean value of experimental class psychomotor 81 (84%) and control class 57 (68%). During the learning process, both in the experimental class and in the control class, which is considered not only the students 'learning outcomes on the cognitive aspect only, but the students' learning outcomes on the affective aspects are also assessed. According to Nana Sujana (2014: 30), even though the teaching materials contain the cognitive domain, affective domains must be an integral part of the material and should appear in the learning process and learning outcomes achieved by the students, therefore, it is important to assess the results. Differences in affective and psychomotor learning outcomes in the experimental and control classes are presented in Figure 3.
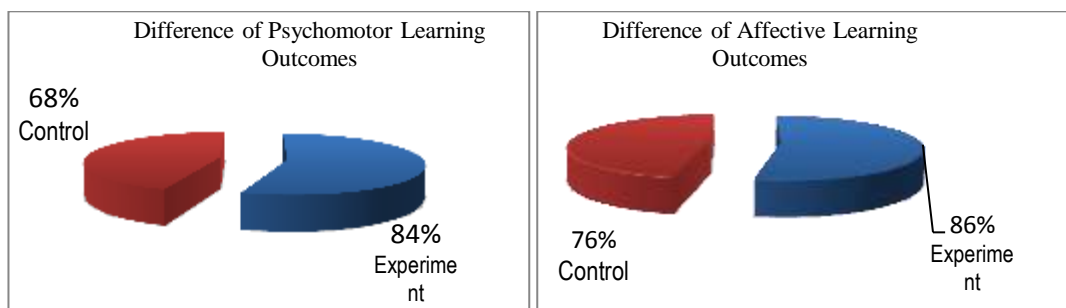

Figure 3:- Diagram of Students' Affective and Psychomotor Learning Outcomes

Students' scores obtained are calculated on average and the percentage. The result shows that the mean of affective and psychomotor learning result of the students taught using STAD type cooperative learning model through guided inquiry approach is higher than the students taught by using conventional learning model. This is because in the class taught by using the model STAD type cooperative learning through guided inquiry approach are more motivated to know the material of chemical equilibrium, and in this learning also students are required to help each other and work together in groups, and able to present the discussion results in front of the class. According to Aris Shoimin (2014: 188), the main idea behind the STAD model is to motivate the students, encourage and assist one another, and to master the skills presented by the teacher. While Suyanto and Jihad (2013: 122) mentioned that learning with the discussion model will provide an opportunity for students to channel their ability to discussion fellows. In classes taught using conventional learning models, students are more silent and less active during the learning process.

Questionnaire of Student and Teacher Response to STAD Type Cooperative Learning Model through Guided Inquiry Approach:-
Based on the results of the recapitulation analysis questionnaire of students and teachers' responses, there obtained an average score for students 4.6 good categories, and for teachers 4.7 with very good category. The student feedback questionnaire, consisting of 10 statements, is distributed to the experimental class students after posttest. Researchers also assess students' responses to the model and learning approach used. Based on the data analysis of student responses, it can be obtained that the learning using STAD type cooperative learning model through guided inquiry approach well used in learning, this can be known from the average value obtained as much as 4.583 and included in the category very good. Percentage of questionnaire of students response of each indicator can be seen in figure 4.
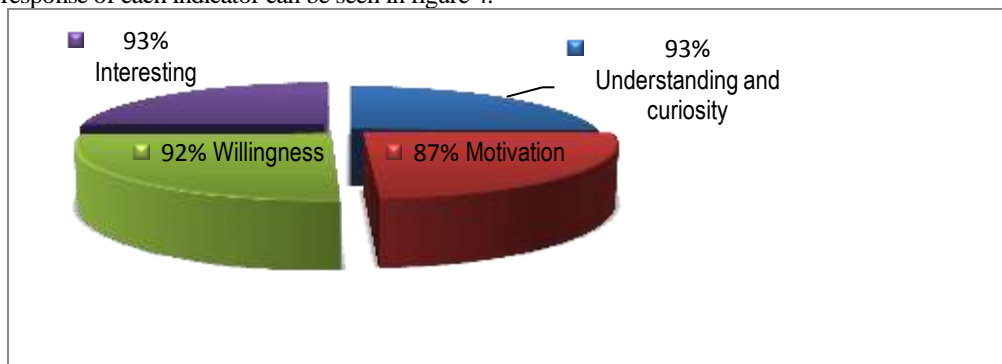

Figure 4:- Diagram of Questionnaire of Students Responses Percentage for Each Indicator

Based on the results of the analysis, it obtained the percentage value on the first indicator (Understanding and curiosity of students to the material) and the fourth (learning more interesting) is 93% which is higher, it means that learning using STAD type cooperative learning model is more interesting and makes students more active about equilibrium chemistry. But there are also some students who are less motivated to the chemical equilibrium material which at the time of less active learning, especially in discussions, thus affecting the learning outcomes achieved where the value of posttest is low. The percentage for the indicator of students' motivation in following learning is 87%. According to Oemar Hamalik (2015: 161), the motivation will determine the level of success or failure of student learning, learning without motivation would be difficult to succeed. As for the questionnaire of teacher responses showed that learning using STAD type cooperative learning model through guided inquiry approach is well used in learning, this can be known from the average value obtained that is as much as 4.7. STAD type cooperative learning through guided inquiry approach has the effect of improving student learning outcomes both on the aspects of cognitive, affective, and psychomotor.

Conclusion:-
Based on the result of the research, it can be concluded that the influence of STAD type cooperative learning model through guided inquiry approach to the improvement of student learning result of class XI IPA SMA Negeri 3 Halmahera Utara on chemical equilibrium material with result obtained that is tcount > ttable or 2,60> 1,681 where H0 is rejected and Ha is accepted. The influence of the use of cooperative learning model type Student Teams Achievement Division (STAD) through guided inquiry approach to improving student learning outcomes of grade XI IPA SMA Negeri 3 Halmahera Utara on the material of chemical equilibrium is equal to 87%.

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