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# Implementation of the Numbered Head Together (NHT) Learning Model to Improve Student Chemistry Learning Outcomes in Vocational Schools

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**Abstract:** Implementation of Numbered Head Together (NHT) learning model to improve the student learning result in senior high school (SHS). This research aimed to determine the implementation of Numbered Head Together (NHT) learning model to improve the student learning result in senior high school (SHS) in studying chemistry. This research is conducted in SMKN 4 Palembang which the subject of research is students in X class. The populations are class X TKJ 3, the subjects were 36 students. The research is conducted by teaching students with Numbered Head Together (NHT) learning model. This research was conducted in two cycles, each cycle consisting of two meetings. The data were obtained by using observation sheet and test instrument of student learning result which was done at the end of the meeting. Improvement of student learning outcomes can be seen from the average of student learning outcomes before the action done (T0) of 70,00 with mastery learning 58,33%, an increase in cycle I (T1) to 77,22 with mastery learning 77,78% and in cycle II (T2) increased to 83,06 with learning mastery 86,11%.

**Keywords:** classroom action research, numbered head together (nht) learning model, student chemistry learning result

## ▪ INTRODUCTION

Technological progress does not just develop in the world. There is a role of education which is essentially very important in developing a person's interests, talents and abilities. Education is a forum for developing better than before. Therefore, education is one of the most important things in this modern era (Rohmah, 2011:1). Education is very important to build a person's character. Everyone involved in education will be required to play a maximum role which will be useful for improving the quality of education because education is very important in order to make the nation's life intelligent.

As a branch of science, chemistry has a big influence on the development of Science and Technology (IPTEK). However, until now chemistry learning in schools, especially in vocational schools, in general has not been able to show satisfactory results, because students in vocational schools often think that chemistry lessons are not important for the major they are taking. Based on data from interviews with chemistry teachers at SMK N 4 Palembang, in the previous material the abilities of class X TKJ 3 students showed low abilities. Students who achieve a completeness score are only around 60%, while learning is said to be successful if they achieve 85% completeness. This means that class X TKJ 3 students at SMK N 4 Palembang experience problems/difficulties in understanding the material provided by the teacher.

Apart from that, the obstacle that is also faced is that teachers deliver chemistry learning material only by providing material in one direction, namely the teacher giving

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a lecture, without any feedback received by the teacher so that students just stay silent and listen to what the teacher says. Therefore, student learning outcomes and abilities must be improved. Realizing that students' abilities and learning outcomes are not optimal, which is characterized by low student learning outcomes and 40% of students who have not succeeded in achieving the predetermined KKM, teachers are required to make learning improvements, so that students' abilities and learning outcomes in chemistry subjects can increase.

One effort that teachers can use to improve/improve chemistry learning outcomes is by using the Numbered Head Together (NHT) learning model. The reason the researcher chose the NHT learning model is because this learning method is expected to make students more active and take full responsibility for understanding the subject matter both in groups and individually because later the teacher will call one number at random to represent the group and present the results of the group's work. , so that students always prepare themselves to show their abilities in front of the class, which in the end can improve their learning outcomes.

In the results of research by Retnani, Y.F., et al, (2014), Numbered Head Together (NHT) learning apparently increased student achievement and motivation on periodic system material, atomic structure and chemical bonds XI IPA 4 SMA Negeri 2 Boyolali for the 2013/2014 academic year. Apart from that, Adi, YK, et al (2014) also conducted research using the NHT method. The result is that the Numbered Head Together (NHT) type cooperative learning method equipped with the use of macromedia flash provides better student learning achievement than the Numbered Head Together (NHT) type cooperative learning method which is equipped with the use of handouts in learning chemistry of colloidal materials.

Several previous studies have shown that the Numbered Head Together (NHT) type cooperative learning method can improve learning outcomes in each class and with different subject matter. Based on the thoughts that have been conveyed, researchers are interested in conducting research using the Numbered Head Together (NHT) type cooperative learning method in Electrochemistry learning because the author has not found research that focuses on this subject matter and it is hoped that the Numbered Head Together (NHT) type cooperative learning method can improve Student learning outcomes in Electrochemistry learning. The title of the research is Application of the Numbered Head Together (NHT) Learning Model to Improve Chemistry Learning Outcomes for Class X TKJ 3 Students at SMK Negeri 4 Palembang.

The formulation of the problem in this research is whether the Numbered Head Together (NHT) Learning Model can improve Chemistry Learning Outcomes for Class X TKJ 3 Students at SMK Negeri 4 Palembang? Meanwhile, the aim of this research is to improve the chemistry learning outcomes of class X TKJ 3 students using the Numbered Head Together (NHT) learning model at SMK Negeri 4 Palembang.

The benefits of this research include (1) training students to play a more active role in the learning carried out and students can work on questions related to electrochemistry. (2) for Civil Service teachers as material for consideration by teachers to develop other learning models so that student learning outcomes can improve and (3) for researchers to find out whether the implementation of the Numbered Head Together (NHT) Learning Model can improve student chemistry learning outcomes in vocational schools. Apart from that, it can be used as a reference for further research.

## ▪ METHOD

### Types of Research

This research is classroom action research where there are 4 important stages in this research, namely the planning, implementation, observation and reflection stages.

### Time and Place of Research

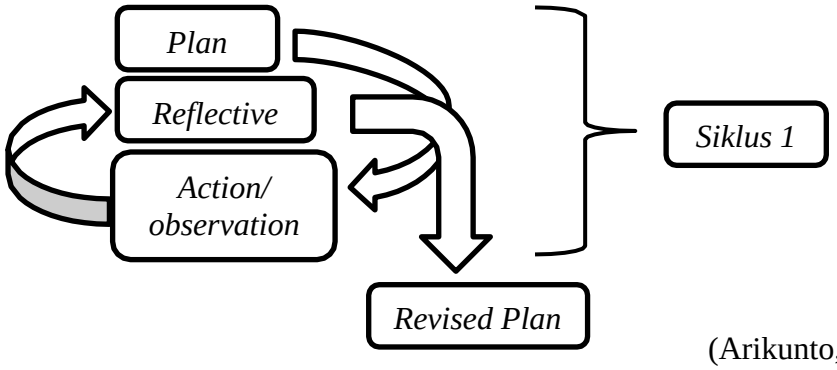
This research was carried out on April 1 - May 10 2018. The research was carried out at SMK Negeri 4 Palembang class X TKJ 3 even semester 2017/2018.

### Research Subject

The research subjects were 36 students of class X TKJ 3 SMKN 4 Palembang in the 2017/2018 academic year.

### Procedure

The research carried out the implementation of the Numbered Head Together (NHT) learning model for students of X TKJ 3 SMKN 4 Palembang. This classroom action research was carried out in 2 cycles. Each cycle consists of 2 meetings with one meeting consisting of 3 lesson hours x 45 minutes. Each cycle carries out the stages of planning, implementation, observation and reflection. The implementation plan can be seen in the following chart:




(Arikunto, 2006:74)

### Data, Instruments, and Data Collection Techniques

The data sources collected consist of student data, teachers and student documents. The type of data collected is quantitative data, namely the results of repetition of previous material which becomes the state of cognitive learning outcomes before students use the learning model (To) as well as the final evaluation tests of cycle I (T1) and cycle II (T2) which become the state of cognitive learning outcomes after applying the model. Numbered head together (NHT) learning. The observation sheet is used to determine the results of student activities after implementing the Numbered Head Together (NHT) learning model.

### Data Analysis Technique

The instrument used to collect observation data is an observation sheet with activity percentages using the class average system using the following formula.

$$NP = \frac{R}{SM} \times 100\%$$

Note:
NP = Percentage value sought or expected
R = Raw score obtained by students
SM = Maximum Score

**Table 1.** Observation assessment guidelines

| Interval | Kriteria |
|---|---|
| 86% - 100% | Sangat Baik |
| 76% - 85% | Baik |
| 60% - 75% | Cukup |
| 55% - 59% | Kurang |
| ≤54% | Kurang Sekali |

The cognitive data analysis used is quantitative data analysis. Quantitative data was obtained from cognitive tests on student learning outcomes. Analysis of learning outcomes uses Webb's Depth of Knowledge or DOK (2002). To calculate student learning outcomes, the formula is used:

$$skor\ siswa\ (N) = \frac{skor\ perolehan}{skor\ maksimum} \times 100$$

And the calculation of the percentage of cognitive learning completeness is measured using the formula:

$$ketuntasan\ belajar = \frac{jumlah\ siswa\ yang\ tuntas}{jumlah\ siswa} \times 100\%$$

Students who complete the lesson are students who achieve a KKM score of 75.

## ▪ RESULT AND DISCUSSION

In this research, the Numbered Head Together (NHT) learning model is applied, where this model has the advantage that all students are expected to be ready to present the results of their respective group discussions because this model will randomly select the number of students who will present the results of the group discussion. From the research classroom actions that have been carried out, obtained research results in the form of observations of student learning activities and student learning outcomes. The explanation of the research results for each cycle is as follows:

### Cycle I

Based on all the information that has been obtained, researchers carry out several activities in the research planning process. The activity carried out at this stage is to create a learning scenario that will be implemented at the first and second meetings. The first and second meetings lasted for 135 minutes and discussed Electrochemistry material in the voltaic cell subchapter.

Actions in cycle I were carried out on April 16 2018 for the first meeting and April 23 2018 for the second meeting with the main topic being voltaic cells. The

implementation of learning in cycle I refers to the syllabus and learning plan that has been prepared using the Numbered Head Together (NHT) learning model. During learning, colleagues observe the activities of students and researchers. At the end of cycle I, a student cognitive learning outcomes test was held. The average score of learning outcomes and learning completion in cycle I and before cycle I can be seen in table 2 below:

**Table 2.** Average student cognitive learning outcomes before and after cycle i

| Tes | Skor Rata – rata hasil belajar | Keterangan | Ketuntasan belajar klasikal (%) | Keterangan |
|---|---|---|---|---|
| $T_o$ | 70.00 | Belum Tuntas | 58.33% | Belum Tuntas |
| $T_1$ | 77.22 | Tuntas | 77.78% | Beum Tuntas |

Table 2 shows that in cycle I, the final learning evaluation results had reached an average score of 77.22. Apart from that, the percentage of classical learning completeness reached 77.78%. This shows an increase in students' cognitive learning outcomes before and after implementing the Numbered Head Together (NHT) learning model even though the percentage of classical learning has not been met.

At the observation stage, observation sheets are used when learning activities are taking place, to find out how the Numbered Head Together (NHT) learning model is applied to student learning activities, by checking whether or not all activities are carried out through the stages of the Numbered Head Together (NHT) learning model. In this research, the observation sheet was used as a complementary instrument and took the form of a checklist (yes and no). The percentage of student scores obtained is accumulated to determine student activity in participating in the learning process for cycle I. The percentage is obtained from the average percentage of student learning activity in every meeting. The large percentage at meeting I with an average percentage score of 63.16% and meeting II with an average percentage score of 65.5% with an average student score in cycle I of 64.33% shows that the criteria are sufficient for the Numbered Head Together (NHT) learning model. ).

The Numbered Head Together (NHT) learning process is carried out in 6 phases. The first stage/phase 1 is preparation where students are given an introduction to the material from the teacher to stimulate students before having a discussion. At this stage, students are seriously listening to the teacher's explanation, but there are students who arrive late, which slightly disrupts the learning process. Phase 2 is group formation where students are divided into 7 groups and the teacher distributes LKPD and teaching materials for discussion. At this stage students are still confused about forming groups so the class is no longer conducive. Phase 3 is asking questions where students read the instructions for working on the LKPD and the questions on the LKPD. Phase 4 is a discussion to answer questions. In this phase, students still tend to work on questions individually and there are still students who do not discuss in groups. Phase 5 is giving answers where students present the results of their group discussions. The teacher randomly picks 3 numbers where the numbers drawn will present the results of their group discussion. At this stage, students were still reluctant to convey the results of their group discussions because some of the numbers called did not understand the results of their own groups. Phase 6 is concluding where students convey conclusions from the results

of the class discussion and are assisted by the teacher to straighten out the students' conclusions.

At the reflection stage, the application of the Numbered Head Together (NHT) learning model in the chemistry subject of voltaic cells has shown success compared to previous learning results. However, the success achieved in the first cycle of research was not satisfactory. The research results in cycle I which included student learning activities and student learning outcomes could still be improved by making improvements to several activities. The shortcomings that exist when studying include students often playing around in their groups, which causes learning to be less effective and classical learning not being complete. Apart from that, students are also not used to using the group learning model and are still seen reading and discussing questions individually without discussing them as a group. Students also do not get used to recording the results of discussions and only a few students make special notes about the material they have studied. Apart from students, from discussions with colleagues, teachers are still in a hurry to deliver introductory material, this is because many students are late for class so the time needed to start learning is slightly reduced. The number of students who were late for the first meeting was more than 5 people, this is one of the teacher's duties to reprimand students who are late so that they enter class on time so that the learning activities that have been arranged run effectively.

Based on the shortcomings above, the researchers together with the tutors made improvements so that the same thing does not happen in the next cycle. Based on the results of the final evaluation of learning I, student learning outcomes have not reached the predetermined indicators of success. This can be proven by the average class score during cycle I, namely 77.22 with a classical learning completion percentage of 77.78%. Student learning outcomes are not yet satisfactory, because there are several students who have not reached the KKM. Based on the results of the first evaluation test, there were 8 students who got a score of less than 75. Some students were not able to answer the questions given during the end of cycle evaluation. After being examined, the low student learning outcomes were caused by several things related to student learning activities, namely: (1) students did not pay attention to the teacher's guidance; (2) students are not used to the group discussion model (3) students do not note down important things and (4) students tend to study individually without having group discussions. The results of reflection in cycle I will be the basis for continuing cycle II research with improvements in planning, implementation and observation, so that cycle II can run better than cycle I.

Apart from the shortcomings above, there are advantages to the teaching and learning process. These advantages include (1) students become more active in looking for answers to the questions asked (2) with the implementation of the Numbered Head Together (NHT) learning model, students become more prepared in presenting the results of their respective group discussions.

**Cycle 2**

Based on cycle I reflection, the implementation of the Numbered Head Together (NHT) learning model is still not effective. From the results of the evaluation test on student learning outcomes, there are still 8 students who have not reached the KKM of 75. Based on several deficiencies in cycle I, the researcher took corrective action so that the same thing did not happen in cycle II. Actions taken include (1) guiding students more in the discussion process so that all students can discuss in their groups (2) giving each student the task of noting important things in the discussion (3) warning students who

enter class late (4) minimizing student activities that are not related to the learning process. In cycle II, the first and second meetings lasted 135 minutes and discussed electrochemical material in the corrosion subchapter. At the second meeting of Cycle II, the researcher gave a test of learning outcomes regarding the material that had been discussed at the first and second meetings.

Actions in cycle II were carried out on 30 April 2018 for the first meeting and on 7 May 2018 for the second meeting with the main topic of corrosion. The implementation of learning cycle II still uses the Numbered Head Together (NHT) learning model with several improvements. The average score of learning outcomes and classical learning completion in cycle II can be seen in table 3 below:

**Table 3.** Average cognitive learning outcomes of cycle i students

| Tes | Skor Rata - rata hasil belajar | Keterangan | Ketuntasan belajar klasikal (%) | Keterangan |
|---|---|---|---|---|
| $T_2$ | 83.06 | Tuntas | 86.11% | Tuntas |

Table 3 shows that in cycle II, the final learning evaluation results had reached an average score of 83.06. Apart from that, the percentage of classical learning completeness reached 86.11%. This shows an increase in classical learning completeness from the previous cycle, namely from 77.78% to 86.11%. So this research does not need to be continued to the next cycle because it has achieved classical learning completeness.

In the implementation of teaching and learning activities in cycle II, observations are the same as observations made in cycle I. Observation sheets are used when learning activities take place, to find out how the Numbered Head Together (NHT) learning model is applied to student learning activities, by checking what is done or whether or not all activities go through the stages of the Numbered Head Together (NHT) learning model. The percentage of students' scores is accumulated to determine students' activities in participating in the learning process for cycle II. The percentage is obtained from the average percentage of student learning activities at each meeting. The percentage in the first meeting of the second cycle with an average score percentage of 70.32% and the second meeting of the second cycle with an average score percentage of 73.10% with the average score obtained by students in the first cycle of 71.71% shows that the criteria are sufficient for the Numbered learning model. Head Together (NHT). Even though the percentage of student learning activities is still at sufficient criteria, there has been an increase from cycle I.

The Numbered Head Together (NHT) learning process in cycle II has been improved from cycle I and is carried out in the same 6 phases as cycle I. In the preparation stage, students who originally arrived late have started to arrive on time, making learning effective. Meanwhile, at the discussion stage, to answer questions, students also begin to discuss in groups so that the group discussion learning process begins to develop. By being given the task of recording the results of the discussion for each student, group discussions become effective.

The application of the Numbered Head Together (NHT) learning model in the chemistry subject of corrosion has shown success compared to its application in cycle I. The improvements in cycle II are able to increase students' cognitive learning completeness and student activity in learning. The deficiencies in cycle I can be corrected in cycle II, including (1) the teacher plays a more active role in the discussion process by

being more intensive in guiding the discussion process so that no more students are busy with their own activities (2) students often playing around when learning is being carried out, starting to help their group friends in group discussions because the teacher gives each student the task of taking notes on important things from the group discussion and in implementing the Numbered Head Together (NHT) learning model, students are required to be more prepared in presenting the results of their group discussions. each because in this model all group members have the same opportunity to present the results of their respective group discussions (3) from several students who were often late to class, after being given a warning they began to gradually enter class on time in cycle II so that the teaching and learning process did not disturbed by students who are late for class.

Based on the results of the final evaluation of cycle II, students' cognitive learning outcomes have achieved the predetermined indicators of success. This can be proven by the average class score during cycle II, namely 83.06 with a classical learning completion percentage of 86.11%. Student learning outcomes have increased compared to cycle I, although there are still 5 students who have not reached the KKM score of 75.

In cycle I, the results of this research did not achieve satisfactory results. After reflecting on cycle I with several improvements, the researcher continued the research in cycle II. As the percentage of student learning activity in this research increases, cognitive learning outcomes will increase. This is reinforced by research conducted by Sulfiani (2016) which states that increasing student activity will be in line with increasing student learning outcomes in chemistry learning on the main subject of Atomic Structure, Periodic System of Elements and Molecular Forms. The overall results achieved in cycle II have achieved classical learning completeness, namely above 85%. This shows that the use of the Numbered Head Together (NHT) learning model will help students be more active in learning which will influence activities and learning outcomes during learning. Based on the explanation above, it can be concluded that through the application of the Numbered Head Together (NHT) learning model it can improve student learning outcomes in class X TKJ 3 SMK Negeri 4 Palembang.

## ▪ CONCLUSION

The Numbered Head Together (NHT) learning process in the core activity starts with a brief delivery of material followed by group division, asking questions, group discussions to answer questions, delivering answers and concluding. There is an increase in students' cognitive learning outcomes by implementing the Numbered Head Together (NHT) learning model in class X TKJ 3 SMK Negeri 4 Palembang. The increase in learning outcomes can be seen from the average value of student learning outcomes before action (T0) was 70.00 with learning completeness 58.33%, there was an increase in learning outcomes in cycle I (T1) with an average learning outcome of 77.22 and learning completeness was 77.78% and experienced an increase in cycle II (T2) with an average learning outcome of 83.06 and learning completeness 86.11%

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