The Effectiveness of Numbered Head Together with The Written Corrective Feedbacks on Mathematics Communication Skills Achievement

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Abstract---The purpose of this study was to analyze the effectiveness of the model Numbered Heads Together with Written Corrective Feedback on the achievement of mathematical communication skills. This study is experimental research. The quantitative research sampling technique is simple random sampling which in this study was taken experiment class used model Numbered Heads Together with Written Corrective Feedback and control class with discovery learning. The research data were analyzed with normality, homogeneity, completeness, and average difference test. The results showed that: 1) The mathematical communication skills of the experimental class students reached standard mastery. 2) The proportion of mathematical communication skills of students learning Numbered Heads Together with Written Corrective Feedback reached a classical completion of 75%. 3) The average results of mathematical communication skills of students who receive learning model Numbered Heads Together with Written Corrective Feedback higher than the average students who receive discovery learning.

Keywords: **Numbered Heads Together, Written Corrective Feedback, mathematical communication**

I. INTRODUCTION

Education is the determinant of a certain nation's advancement. The advancement of a certain nation strongly depends on its people's cognition and skills. Thus, education quality should be improved continuously. One of the important skills in education is communication. It is also an important part of mathematics since it is meant to convey ideas and comprehend *National Council of Teachers of Mathematics* (2000: 60). According to Hafid, Kartono, & Suhito (2016), the difficulties of learning mathematics for student are indicated by their low interest in the lesson. The rule of National Education Minister, number 22, the year 2006, about the content standard of mathematics, tells its objective to allow the learners to have skills. One of them is to communicate notions by using symbols, table diagrams, or other media. They function to explain certain conditions or problems. NTCM Hendriana et al (2017) stated that mathematics communication

skill is an essential and basic competence for mathematics and mathematics education. Without proper communication, mathematics development will be hindered. Asikin & Junaedi (2013), Zakiri, Pujiastuti, and Asih (2018) argue that communication facilitates individuals to interpret since it has a function to convey ideas. These ideas could be a faithful decree.

The development of mathematics communication skill is required to make student capable of interpreting mathematics. It does not only deal with symbols without meaning or interpretation but as a useful language to facilitate daily life problem-solving. Therefore, the teacher's role to encourage such an optimal learning process is needed. It is done through various applied models, methods, or approaches.

Therefore, teachers should select and apply a learning model that could: (a) activate student to communicate mathematically, (b) create efficiency of the learners' mathematics communication, and (c) motivate learners to do their tasks or evaluation so that an expected class discussion could influence their mathematics communication. One of the learning models is NHT typed Cooperative Learning (Numbered Heads Together). According to (Suprijono, 2009) expressed his opinion that learning the Numbered Heads Together (NHT) method is a cooperative learning type. NHT begins with Numbering. According Jarolimek and Paker (Isjoni, 2010) there are various advantage cooperative learning, some which are as follows: (1) positive interdependence, (2) recognition in responding to individual differences, (3) students are involved in class planning and management, (4) a relaxed and pleasant classroom atmosphere, (5) a warm and friendly relationship between students and teachers, (6) many opportunities to express pleasant emotional experiences. According to Lagur, Makur, and Ramda (2018), mathematics communication skills of student taught by NHT typed cooperative learning were better. Numbered Head Together learning was done online. Therefore, this NHT model could improve student mathematics communication skills.

NHT learning process will be optimal when it is applied by feedbacks. According to Suhadi (2008), feedback is an important part of a teaching-learning process. According to Anita, Darmawan, and Kartika (2017), feedback is a correction for the incorrect student answers individually. It is very useful because student will realize their incorrectness and how to revise it. According to Bitchener & Knoch (in Kisnanto: 2016), a type of feedbacks is Written Corrective Feedback (WCF), it could facilitate learners to obtain and perform their masteries by using the targeted language form and structure. Rastchi and Bakar (2018) found a correlation between student of two languages, those who preferred a certain language and those who preferred a written language, by implementing Written Corrective Feedback on mathematics and or kinesthetic quotient. Therefore, this research aims to examine the learning activity with Numbered Head Together with Written Corrective Feedback on mathematics communication achievement.

II. METHODOLOGY

This is an experimental research design with the randomized control group pretest-posttest. This research was conducted in Public JHS 4 Rembang. The research subjects were the seventh graders of A and B classes in 2019/2020. The population consisted of seven VII grades. Both classes were randomly selected. One class was a test-instrument pilot test by using simple random sampling. According to Cresswell (2016), simple random sampling is a technique of selecting the sample member in a population that has equal probability to be selected. A class was as an experimental group while the other class was as the control group. The technique of selecting the sample was simple random sampling. Thus, the experimental group was taken to be intervened with NHT and WCF. The other class was intervened by discovery learning.

The test instrument was given online. It was in the form of Mathematics Communication Skills Test questions. The questions were pilot-tested in other classes that had obtained the data presentation material. The instrument trial run was promoted to find out the validity, reliability, and distinguishing power, and index of difficulty. The data of both pretest and posttest were then processed to find out the effectiveness of mathematics communication skills taught by Numbered Head Together with Written Corrective Feedback.

The learning NHT, teacher grouped the students with maximum numbers of 5 members for each group. Those groups were labeled by number 1 until 5 based on the attendant list. Then, the teacher provided the task or asked the questions in the form of student worksheet for the student. Then, each group worked on it. All student in a group discussed together. They communicated their mathematics idea to each other. After discussing, the teacher called or

mentioned a number that represented a group. This group would then communicate its mathematics ideas to either other learners or the teacher. After explaining the discussion result, a question and answer session for the members and other groups were begun.

The applied stages in this research were to create the research instrument, to test the initial skills of the whole graders, to determine the learners' standard mastery and a passing grade, to determine which class would be used as the sample, to promote NHT learning with WCF for the experimental group and discovery learning for the control group, to analyze the quantitative data, to promote data analysis discussion, and to draw a conclusion from the research results. The data were then analyzed in terms of their normality, homogeneity, mastery, and T-test.

T-test was done to find out whether the mathematics communication skill of the student reached the standard mastery individually. The classical completeness test was done to find out whether Numbered Head Together with Written Corrective Feedback could facilitate student to achieve the learning completeness on the mathematics communication aspect. The average difference test was used to find out the differences between mathematics communication test scores of the experimental and control groups (Sudjana, 2005).

III. RESULT AND DISCUSSION

The investigation of the experimental group was done in 6 meetings. One of the meetings was used to conduct a pretest. 4 meetings were used as learning activities. The last meeting was used to promote the post-test. In this activity, the NHT typed cooperative learning was done by using these stages.

1) The teacher grouped the student in a group consisting of 5 persons.
2) Every member of a team was given numbers from 1 until 5 according to their attendance lists.
3) The teacher provided tasks or questions in the form of an online worksheet. It sent online for the student. Each group had to work on it.
4) All students in a group discuss by communicating their mathematics ideas (sharing the questions and providing the answers among group members). They were thinking together to get the most considered correct answers. They had to ensure all members knew the answers.
5) While explaining the discussion results, the teacher called a number to represent his team. This learner was asked to explain his group discussion. The students were then provided by feedbacks. They were given by the teacher in the form of written correction upon the answers. The correction were reminders about the incorrect answers. The teacher provided an equal model by providing certain codes, cross marks, or underlines.

6) After explaining the discussion result, a question and answer session for the members and other groups were begun.

In this NHT learning implementation, the initial meetings, the group discussion needed guidance because they had not been habituated with the discovery learning model. With each meeting, an improvement occurred. The learners were active to ask during the discussion because the discussed materials were taught before. The learners shared their mathematics ideas in a written manner on their worksheets.

After the learning stage, it was continued by taking the data of both groups' mathematics communication skills. Then, the data were analyzed to find out whether the obtained results were in line with the applied hypotheses or not. The analysis was also used to find effectiveness. The effectiveness of NHT learning with WFC toward the learners' mathematics communication skills was done by using several tests. They were individual completeness, classical completeness, and T-test. Before conducting the tests, the requirement test was conducted on the result of the post-student mathematics communication skill test. It consisted of the normality and homogeneity tests. The effectiveness hypothesis analysis results were: the average completeness $t_{hitung} = 8,858,85$ and $t_{table} = 1.721$. Thus, $t_{count} > t_{table}$. Therefore, H0 was denied. Thus, the student mathematics communication skills of the experimental group taught by NHT and WCF had reached the Actual Completeness Threshold. In the classical completeness test, based on z test calculation, it was obtained $z_{count} = 2.708$ and $z_{table} = 1.64$. Because $z_{count} > z_{table}$ or 2.708 > 1.64 then H0 was denied. Thus, it could be concluded that during this mathematics learning, the learners taught by Numbered Heads Together with Written Corrective Feedback reached the classical completeness with a percentage of 75%. Meanwhile, the average score difference test, based on the t-test showed $t_{hitung} = 10.81$ with $t_{tabel} = 1,721$ thus $t_{count} > t_{table}$ then H_0 was denied. Thus, the learners' mathematics communication skill average taught by Numbered Head Together with Written Corrective Feedback was higher than those taught by Discovery Learning. Thus, it could be concluded that the Numbered Head Together learning model with Corrective Feedbacks was effective toward the student mathematics communication skills.

This NHT typed cooperative learning proved the learners were more active to participate. The learners were actively involved in this learning process. Thus, it positively influences their qualified communications. From this discussion, every learner communicated his mathematics ideas in written form on their worksheet. Then, those representative learners of the group explained the discussion results for the teacher and their friends. It was then responded to by other learners from other groups.

IV. CONCLUSION

Based on the post-test result, the experimental groups' mathematics communication skills reached 65. The proportion of the learners' mathematics communication skills taught by NHT with WCF reached the classical completeness with a percentage of 75%. The average score of the learners' mathematics communication skills taught by NHT with WCF was higher. It was 80 while those taught by Discovery Learning were 62.68. Therefore, it could be concluded that Numbered Head Together with Written Corrective Feedback was effective toward the seventh graders of JHS 4 Rembang mathematics communication skills.

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