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DEVELOPMENT OF AUDIO VISUAL BASED NUMBERED HEADS TOGETHER LEARNING MODEL TO IMPROVE LEARNING OUTCOMES IN MULTIPLES AND NUMBER FACTORS

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Abstract

Audio-visual-based numbered heads together (NHT) learning model to improve the learning outcomes in multiples and number factors of mathematics subjects (This study uses a Classroom Action Research Approach for fourth grade Students of Walantaka 1 Elementary School, Walantaka District, Serang City, 2020). This research is a collaborative study between researchers, observers, and the subject under study. The purpose of this study was to improve the learning outcomes of mathematics in the fourth grade students through developing audio-visual based numbered heads together (NHT) learning models. The subjects of this research were 25 fourth grade students. The research process was carried out in three cycles. Each meeting consists of four main actions, namely planning, implementing, observing, and reflecting. At the end of each cycle a test was held using a question instrument. The results showed that the learning completeness in cycle 1 was 24%, in cycle 2 was 48%, and in cycle 3 was reached 100%. Student activeness in cycle 1 was 63.8%, increased in cycle 2 to 67.6%, and in cycle 3 reached 78.67%. The increase in the implementation of learning, in cycle 1 the score of learning implementation reached 53.2%, in cycle 2 it reached 71.6%, and in cycle 3 with an average score of learning 82.8%. This research concluded that the development of the audio-visual based numbered heads together learning model succeeded in improving students' learning outcomes in Mathematics subject of fourth grade Walantaka 1 Elementary School, Walantaka District, Serang City.

Keywords: NHT, Mathematics, Multiples and Number Factors

A. Introduction

To improve children's learning outcomes in mathematics learning, one of the factors is the existence of an effective learning process. Human knowledge that develops is something that is always changing, and that change is part of the learning outcome process. Changes experienced by a person due to learning outcomes in mathematics show the knowledge possessed by the child (Wahyudin, 2017). For example, from not knowing how to count become knowing how to count. From not knowing the various models of multiples and number factors become knowing multiples and number factors. Mathematics learning is an active process; the more active the child is in learning, the more children will remember the math lesson.

The problem faced by fourth grade students of Walantaka I Elementary School, Serang City is the low achievement of students in Mathematics learning. Based on the observations result, the low learning achievement in mathematics is due to the methods used in teaching that so far are not in accordance with what the students need. Teachers in teaching mathematics have only used monotonous methods and used conventional media, where students only listen to the teacher's explanations and are not actively involved.

This can also be seen based on the results of the final test in mathematics, of all the fourth grade students at Walantaka I Elementary School, Serang City, from 28 people, only 17 or (60,7%) students obtained the upper limit of the passing grade, while 11 or (30,3%) students are below the passing grade set by the teacher based on the minimum completeness criteria with a score of 70 in mathematics.

In planning a "situation" for good mathematics learning is the teachers' responsibility at school, the teacher needs an effective learning model and media to get a fun situation in learning mathematics (Suroyani:2016). The better way to learn mathematics, the more effective the mathematics learning process will be.

Based on research conducted by Yusuf (2016), the classroom action research method adapted the model from Kemmis and Mc. Taggart used the NHT learning model in grade 5A SD

Negeri Sukajadi District, Bandung City which was carried out in two cycles. The results of the first cycle showed that the cooperation ability was 62,28% in the sufficient category, while in the second cycle the students' cooperation ability increased until the results obtained reached 87.14% in the good category. Based on the results of this research, it can be concluded that the application is proven to have improved the students' cooperation ability.

According to Insani, Agung, and Wahyuni (2019), The series strategy in learning that combines learning mathematics with the NHT model and using audio-visual media-based technology is expected to be able to create new things to liven up the learning situation and get used to the presence of technology in every mathematics learning that seems rigid and difficult for some students, which then will improve the learning motivation which can increase the success of learning. The expected output results in this learning model and media will provide thought contributions, prototypes, and instructional video tutorials that can be studied continuously by students and teachers (Paramita, 2016). Learning mathematics means experiencing which also means experiencing something in an actual way. By experiencing the actions repeatedly, the learning will be effective, techniques will become smoother, concepts will become clearer and more conclusive.

B. Research Methodology

This research was conducted at the Walantaka 1 Elementary School, Serang City. The subjects of this research were the fourth grade students. The research was conducted in 2020 with a sample of 25 students.

The research method is a research and development method. Research and Development (R&D) Methods is a research method used to produce certain products and test the effectiveness of these products (Rahayu, 2018).

The development model in this research is a model from Dick & Carey (2009), namely:

1. The identification of learning objectives is the first step in the R&D process, determining the

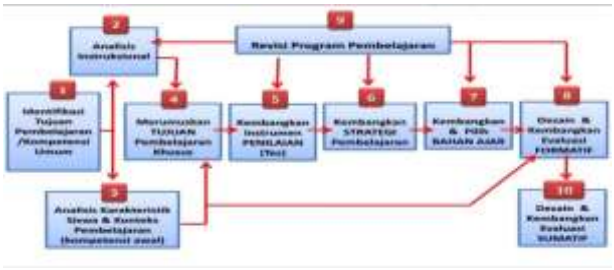
information to be displayed and taught to students. Learning objectives can come from national education goals, performance analysis, analysis of student needs, and student learning difficulties (Sugiyono, 2009).

2. After identifying the learning objectives analysis, the next step is to determine the steps to be taken so that the learning objectives are achieved. The learning analysis process will ultimately determine the knowledge, skills, and attitudes needed by students (Baharudin:2015).
3. The next stage is a parallel analysis of students, those who will learn skills and finally apply it in their lives. The students' initial skills, tendencies/priorities, and attitudes are determined along with the characteristics of learning in order to produce products that suit their needs (Prayekti, 2019).
4. Writing the specific statements of what students did when they completed the learning process. This statement comes from the skills identified in the learning analysis, identifying the skills to be learned, the conditions under which the skills will be demonstrated, and the criteria for successful learning objectives (Kadek, 2020).
5. Developing an assessment instrument based on predetermined goals, the next step is to develop a parallel assessment and measure the students' ability to do what is the goal of learning. Major emphasis is placed on the types of skills described in the objectives with assessment requirements (Fathurrohman, 2015).
6. Developing the learning according to information from the previous five steps, with the next step is to identify strategies to use in learning. Strategies are used to help students' development in learning which includes pre-learning activities (stimulating motivation and focusing attention), presenting new content with examples and demonstrations, active learning and assessment activities, and follow-up activities related to the newly learned abilities to do in the real world (Hobrin:2018).
7. Choosing the materials and developing the learning. The next

step is to produce learning materials that are in accordance with the learning strategy. Learning materials usually consist of guides for students, materials, and learning assessments (Thobroni, 2015).

8. Designing and formative evaluation after the learning draft is complete and continues the next steps to conduct evaluation. Evaluation is carried out to collect data that is used to identify problems in learning and find opportunities to make the learning better (Khalistina, 2015).
9. Revision. The final step in the design and development process is to revise the product. Data from formative evaluation is use to know the product deficiencies and then used to improve product quality (Sidik, 2016).
10. Designing and conducting summative evaluation. The final step in product development is to conduct summative evaluation. Summative evaluation is the evaluation of a product that produces absolute or relative value and occurs after the product has been formatively evaluated and revised (Sulfemi, 2020).

The Development Model from Dick & Carey



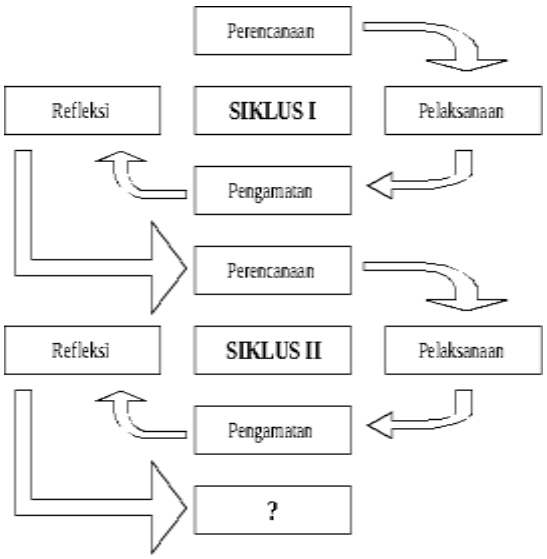
To obtain the learning outcomes, classroom action research (CAR) is used, which is a methodological procedure for solving a problem. This action research was conducted based on the spiral model of Kemmis and Mc Taggart (1988) which consists of four steps. The first step, develop a plan of action that will be taken to improve the situation as it occurs. The second step, taking action to explain the plan. The third step, observing the impact of the situation presented in the context of the incident. The fourth step, reflects on these impacts as a basis for planning and so on until a cycle is formed (Puspitasari, 2014). The thing that wanted to know through the CAR is whether this action can solve the problem currently being faced by the researchers. CAR in teacher professional development does not aim to gain new knowledge. But, to improve teacher skills in overcoming learning

problems faced by teachers in their own classes (Suharjono, 2015).

Action research emphasizes activities by trying out ideas into practice or real situations on a micro scale that are expected to be improved, and increase quality and make improvements. The essence of action research lies in natural situations to solve practical problems or increase practical qualities.

According to Kristiyanto (2010) explains that the research procedure in action is the identification and analysis of the CAR problem consisting of 3 points that must be passed in determining the focus of the research, namely 1) Problems identification, a process to sharpen problems. The problem must be a real problem that occurred, and not a subjective assumption from the teacher. 2) Problem analysis, the reflectively decomposition process of the problems identified by collaborators. 3) The choice of alternative action is a further agreement on problem analysis obtained from partnerships between researchers and collaborators that lead to an alternative action. Alternative actions can be in the form of action choices, either the main researchers' version or the collaborators version.

The classroom action research model for the proposal is uses the McTaggart Elliots model design which occur on 4 stages, namely:



Model Kemmis & Targgart (Arikunto, 2006)

a. Planning

The substance of planning in outline includes several things, namely:

1) Producing the learning scenarios
2) Preparation of learning facilities
3) Preparation of research instruments for learning
4) Simulation of the action implementation

b. Implementation of Action

The implementation of the intended action is the implementation of what has been planned.

c. Observation

A process of observing events at the time of implementing action. Thus, these observations are carried out simultaneously or together with the implementation of the action. When the action is carried out, everything that happens must be observed. This observation is in the form of a process:

1) Observation of events
2) Scrutinization of events
3) Incident recording
4) Instantaneous analysis of observed events.

d. Reflection

The stages in analyzing the data obtained during the observation. Observations are conducted with implementation of actions. As well as in the implementation of these actions, the main researcher or collaborator records important events by utilizing the observation format used. The results of observation and analysis are used to further compromise with collaborators.

C. Research Result and Discussion

The description of the results of the cycle 1 research on the learning material being taught is multiples and number factors. Measuring students' learning outcomes in this material, the researchers gave 10 items of questions that were attended by 25 students at the end of the learning activity.

Based on the data analysis by the researchers, it can be seen that the completeness achieved by the fourth grade students of Walantaka I Elementary School in this material is 24%, the data acquisition can be seen in the score recapitulation of the student learning outcomes in cycle 1 as follows:

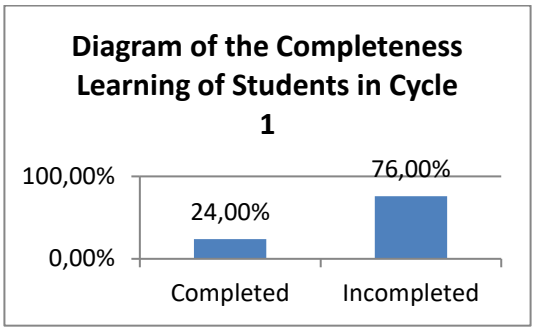
Table 1. The Score of Student Learning Outcomes in Cycle 1

Succcesses	Total Students	%	MCC
Completed	6	24	60
Intcompleted	19	76	60
Total	25	100	120
Average			60

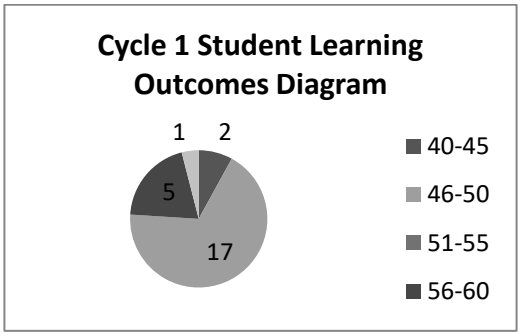
The table above shows that fourth grade students' learning completeness is 24% and those who have not completed it are 76%, meaning that 24% of students have not got the maximum results to achieve the score of the

Minimum Completion Criteria (MCC) so that it needs an increase.

The completeness level of learning achievement in cycle 1 is presented in the following histogram.



The tabulated results in the frequency distribution table are made in the pie chart as follows.



Reflection of Cycle 1 Research Results

From the results obtained from observations of the learning implementation using the NHT learning model in cycle 1 the first meeting obtained data that:

1) Students have not been able to follow the NHT method of learning properly and completely.
2) There are groups that have not completed the task optimally according to the time specified. Because some group members have not yet focused on following the learning.
3) Found groups that can maximally perform the performance of the group learning outcomes.

In an effort to increase success and improve weaknesses in the first cycle, the implementation of the second cycle is compiled as follows.

1) Increase the motivation of group learning to be more easily to understood and be active in learning
2) Providing guidance to groups that have difficulty in following the lesson.
3) Appreciate the groups and students who have been able to participate in the learning process by giving awards.

The low students' understanding about the teacher's explanation with the NHT learning model that they have never experienced while studying at school, so teacher must re-explain about the NHT learning model at the next stage of learning.

Then from the data on student learning outcomes in cycle 1 is also still unsatisfactory, even the student learning activities are still lacking, which only reaches 54%. The low level of student learning activities is because students do not know the importance of the instructions given by the researchers; students are also not used to learn using new learning models that they have never received. Student learning outcomes in cycle 1 have obtained only 24% of student learning completeness, from the results of the evaluation after learning cycle 1 is completed by giving questions to students with details of only 6 students who have completed and 19 students are still incomplete.

Research data of cycle 2 is a reflection of the learning process results in cycle 2, then the improvement of cycle 2 action planning is carried out based on the previous cycle.

a. The Student Learning Outcomes Data in Cycle 2

1) Completeness Level

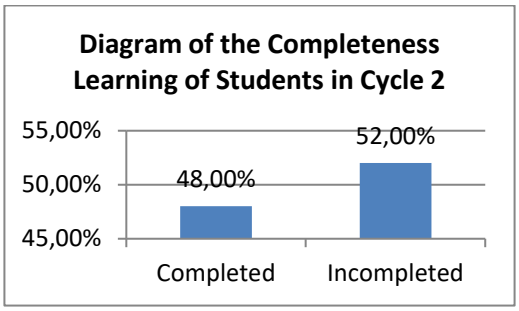
The material taught in cycle 2 is multiples and number factors. To measure student learning outcomes on this material, the researchers gave 10 items of questions that were attended by 25 students at the end of the learning activity.

Based on the data analysis carried out by the researchers, it can be seen that the completeness level achieved by the fourth grade students of Walantaka I Elementary School on this material is 48 %, the data acquisition can be seen in the recapitulation of students' learning scores in cycle 2 as follows:

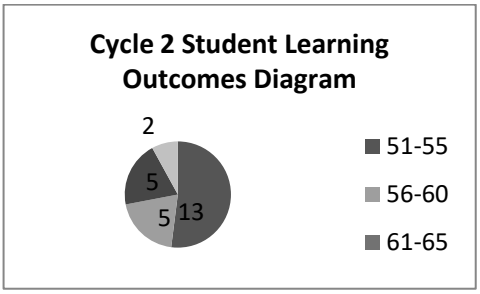
Table 2. The Score of Student Learning Outcomes in Cycle 2

Succcesses	Total Students	%	MCC
Completed	12	48	60
Intcompleted	13	52	60
Total	25	100	120
Average			60

The table above shows that students' learning completeness of fourth grade is 48% and those who have not completed it are 52 which mean that they have not succeeded in exceeding the Minimum Completion Criteria (MCC). Then these results need to be improved. The level of learning completeness in the cycle 1 of meeting 1 is presented in the following histogram.



The tabulated results in the frequency distribution table are made in the pie chart as follows.



Reflection of Cycle 2 Research Results

With the data obtained in cycle 2 can show an increase in student learning outcomes using the NHT learning model compared to the results of cycle 1, increase because the class average score reaches the set indicator, which is 60 even though with minimal scores, but for the achievement of learning outcomes completeness has not reached the set indicator. Because the learning in cycle 2 in the average scores of class learning outcomes only reaches 59.20%. Likewise, student learning activities have increased to 80.48, and assessments in learning have increased to 71.6.

Student learning and understanding have shown the results of NHT learning. Students can collaborate as a group in working on and understanding the assignments delivered by the teacher. Students have been able to participate in learning activities and work on assignments that are completed on time in the implementation process. Students show a good work results in the presentation process. Even though the scores achieved by students have not got the maximum results.

The research result data in cycle 3 is a reflection of cycle 2; therefore improvement of action planning in cycle 3 is based on cycle 2.

a. The Student Learning Outcomes Data in Cycle 3

1) Completeness Level

The lessons taught in cycle 3 are multiples and number factors. To measure the student learning outcomes on this material, the researchers gave 10 items of questions that were attended by 25 students at the end of the learning activity.

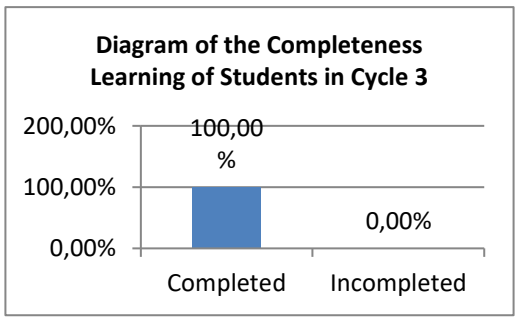
Based on the data analysis carried out by the researchers, it can be seen that the completeness level achieved by the fourth grade students of Walantaka I Elementary School on this material is 75.20; the data acquisition can be seen in the recapitulation of the students' score in cycle 3 as follows:

Table 3. The Score of Student Learning Outcomes in Cycle 3

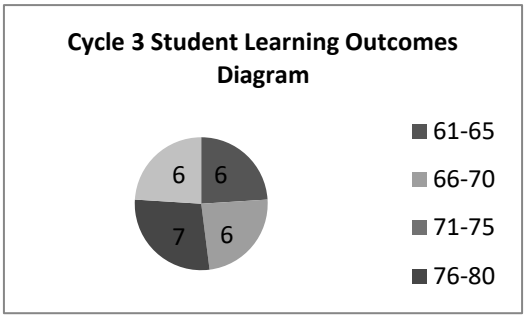
Succcesses	Total Students	%	MCC
Completed	25	100	60
Intcompleted	0	0	60
Total	25	100	120
Average			60

The table above presents the results of students' learning completeness in fourth grade is 100% and there are no students who do not complete, meaning that all succeeded in exceeding the Minimum Completion Criteria (MCC).

The student learning completeness in cycle 3 is presented in the following histogram.



The tabulated results in the frequency distribution table are made in the pie chart as follows.



Reflection of Cycle 3 Research Results

Observation of learning in cycle 3 using the NHT learning model has been running smoothly because the capital of experience in learning cycle 1 and cycle 2 and the presence of teacher guidance, students have learned well.

The successes obtained in cycle 3 are as follows.

1) Students' understanding of learning has led to the NHT learning both in process and results. Students are able to build cooperation in groups to understand the assignment given by the teacher. Students begin to be able to participate in activities and be on time to carry them out. Students begin to be able to present their work well. This can be seen from the data of the observation that learning has increased from

cycle 2 which is only 53.2 to 82.8 in cycle 3.

2) Students' understanding increases in the teaching and learning process, this is shown by increase of student activity to be more active in learning, the data prove the observations results on student activities in cycle 2 which are only 53.87 to 78.67 in cycle 3.
3) Students' understanding increases in conducting evaluations of students' abilities in mastery the learning material. This is based on the evaluation results in cycle 2 of the first meeting where the level of completeness was only 24%, increased to 100% in cycle 3.

From the learning of the NHT learning model in cycle 3, it is obtained data that learning activities have increased by a percentage of 78.67%. This data can show student learning activities are successful because they have reached indicators of success. Then for student learning outcomes have improved, because the results of the evaluation given after learning are completed by asking students to work on questions previously made by the teacher, each student gets good grades.

D. Conclusion

From the results of research and the research analysis on improving learning outcomes through the Audio-visual-based NHT learning model in mathematics subjects with a Classroom Action Research approach in the fourth grade Students of Walantaka 1 Elementary School, Walantaka District, Serang City in 2020. So the conclusion is that the application of the audio-visual-based NHT method is a learning activity that emphasizes the process of thinking systematically, critically, and makes students able to think logically and analytically in formulating problems in finding answers, so as to improve students' understanding of mathematics subjects. Audio-visual based NHT learning about multiples and number factors materials has succeeded in providing motivation to students in learning and has a positive impact on the achievement of student understanding optimally by providing a process of knowledge, understanding, finding steps in the completion of the material

that should be mastered by students, individually and groups. Learning with the Audio-visual-based NHT learning method has improved students' understanding of the multiplication and number factor material in the fourth grade of SD Negeri Walantaka 1, Walantaka District. This is evidenced by the student learning outcomes that steadily increased from cycle 1, cycle 2, and cycle 3. So students can overall achieve the minimum completeness criteria (MCC).

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