

## The Increasing of Elementary Students Learning Outcomes Through Scientific Approach Aided by Mind Map

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**Key words:** The scientific approach, mind map, learning outcomes, skills, reached, experienced

**Abstract:** This study aims to describe the activities of students and teachers in learning, analyzing learning outcomes and skills to create mind maps using the scientific approach on the style material in the fourth grade of elementary school. The use of the scientific approach with the help of the mind map requires students and teachers to more actively understand the material, discuss and present the results of the discussion so as to improve student's learning outcomes and skills in making mind maps. This study uses classroom action research type. The variables studied in the research are student and teacher activities and student learning outcomes. The method to take data is by using instrument in the form of observation sheet and test. The result of this research include; the activity of class 4D teacher in the first cycle reached the percentage 84.66% while the second cycle reached 90.34% while the student activity in the first cycle reached 82.98-89.24% in Cycle 2, the average of the students score is 73,16 in the first cycle increased to 83,57 in cycle 2 and the mastery of classical also increased from Cycle 1 which reach 71,43% increase reach 85,71% in Cycle 2, the average value of mind map skill reached 74,7 in Cycle 1-83.6 in Cycle 2. The classical mastery also experienced a significant increase that is about 17.8% from Cycle 1 which reached 78.6-96.4% in Cycle 2. It can be concluded that there is an increase from Cycle 1 and 2. This shows that the application of learning of the scientific approach aided by mind map can improve student and teacher activity as well as learning outcomes and skills of fourth grade students at SDN Jajartunggal III/452, Wiyung, Surabaya.

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### INTRODUCTION

The curriculum is a reference in learning activities undertaken in schools. But it is not merely that which is

considered in the learning in addition to the achievement of basic competencies set by the Government, learning should enrich the experience of students with knowledge that can be applied in everyday

life. Basically, the curriculum is always associated with four things: the competency standards of graduates to be achieved, standard of learning process to be delivered, standard assessment process to be performed and the standard content provided. The fundamental thing that needs to be given special attention is the learning process. In the process of learning in accordance with the Curriculum 2013, students are expected to construct their own knowledge through the experience they build from pre-school experience. So that, learning activities should bridge the initial knowledge of students with knowledge that will be accepted by students related to learning materials. By using the scientific approach contained in the 2013 curriculum it is expected to grow the ability to think scientifically, systematically and critically to understand the problems that exist in the student environment, so that they are more sensitive to environmental changes and can determine appropriate actions with the norms to address the changing environment.

The scientific approach is believed to be a golden tool for the development and development of the attitudes, skills and knowledge of learners in approaches or work processes that meet the scientific criteria, the expectation of education can produce human resources capable of creating/creating and hosting the country itself, capable of processing resources Nature, so the gold generation of Indonesia in 2045 can be realized that is becoming an independent and advanced Indonesia.

According to the observations that researchers do, the implementation of the scientific approach as the core essence of the 2013 curriculum is still implemented rigidly and impressed somewhat forced to exist in every learning step in RPP made by some teachers. Whereas it should be, these planned learning steps do not explicitly have to write down the types of activities that are consistent with this scientific approach. For example, students observed images of the activity of planting corn (observing). This will create a rigid impression on the learning step. While the impression imposed is when the type of activity is forced to sequence in accordance with the curriculum guide that is observing, asking, seeking information, reasoning and presentation. Whereas if one of the five types of activities are not in the learning step should not cause problems.

In addition, from learning activities with the application of the scientific approach, researchers analyzed the values on the daily diagnostic outcome of theme 7. Student learning outcomes thematically still showed unsatisfactory value. Of the 27 students in the classroom there are still 33% of students who have not finished learning in theme 7. While after analyzed per subject it is even more apprehensive because 59% of

students still do not understand the concept of science about style competence and style benefits in everyday life. This is because the student's understanding of this competency is still not maximal due to the step of learning activities that have not been maximized using the scientific approach.

The scientific approach in daily learning, especially in studying the concept of science can be assisted by one of the learning strategies, the mind map strategy. As outlined in the Kiong *et al.* (2012) "Buzan mind mapping is a powerful graphic technique and it is a very well thought-out tool. It confirms that buzan mind mapping is a powerful drawing technique and it is a well-known tool of thought. This includes long-term organized, colorful and easy-to-remember information because it contains the words in the line with the student's thinking flow. With the help of this strategy it is expected to make it easier for students to find concepts in their own way of thinking, so as to make the concept more embedded in the minds of students in the long term.

Buran and Filyukov (2015) asserted that by using mind map techniques in language learning, students become more active, besides teachers also become facilitators and coordinators to assist students. The most significant result in using this mind map technique is to help solve problems related to language. Problem solving and active learning are part of the scientific approach that should be developed in learning to prepare students for problem solving in everyday life.

Based on the background of the problem presented, the formulation of the problems proposed in this study are: how are the activities of students and teachers in learning using the scientific approach with the help of Mind Map? how is the improvement of student's cognitive learning outcomes on the use of the scientific approach with the help of mind maps? and how is the student skill analysis in making mind map in learning by using scientific approach? The purpose of this research is to describe student and teacher activity in learning, analyzing learning result and skill of making mind map by using scientific approach at style material in class IV primary school. So hopefully this research can contribute to the development of science lesson materials especially style and benefit for daily life and can provide views to the reader to further develop knowledge in general by using the scientific approach or using the mind map technique.

### **Conceptual framework**

**Scientific approach on learning:** Learning is one of the factors that influence and play an important role in the formation of personal and individual behavior. Whitaker in Djamarah "learning is a process in which three actions

are generated or changed through practice and experience". The word "changed" is Whitaker's keyword, so, it means that learning is a consciously planned change through a program designed to produce a certain positive behavioral change. The point is learning is the process of change. Kingsley in Rusman (2015) says that learning is the process by which behavior (in the broader sense) is originated or changed through practice or training. Learning is a process in which behavior (in the broad sense) is generated or changed through practice or practice. Learning is closely related to learning. Learning is a system which consists of various components that are interconnected with each other. These components include objectives, materials, methods and evaluation.

In Permendikbud No. 103 years 2014 stated that "Learning on curriculum 2013 using scientific approach or science-based approach, namely learning that encourages students more capable in observing, asking, gathering information, associating/reasoning and communicating. The end result is an increase and balance between soft skill and hard skills of students that include aspects of attitude, skills and knowledge competencies. The required learning model is the one that allows the creative thinking skills of students to be cultivated. The learning model should be able to produce the ability to learn, not only acquire a number of knowledge, skills and attitudes but more important is how it is gained by students.

The scientific approach is also called scientific-based approach rooted in scientific methods (scientific methods), a concept that emphasizes science more as a verb than a noun. The scientific method itself is a procedure or process, namely systematic steps that need to be done to obtain scientific knowledge based on sensory perception and involves testing the hypothesis and theory in a controlled manner (Sudarminta, 2002). Because sensory observation usually initiates or ends the process of scientific work then the work or the scientific process is often also called a circle or empirical cycle.

Thus it can be concluded that the scientific approach is a learning approach that gives students widespread opportunities to explore and elaborate the material learned, as well as actualize their abilities through teacher-designed learning activities.

Teachers need to understand the criteria of scientific learning which are the learning materials based on facts or phenomena that can be explained by a certain logic or reasoning; not limited to imagination, fantasy, legend or fairy tale alone a description of the teacher, the student response and teacher-student educational interaction free of prejudice necessarily, subjective thinking or reasoning which deviated from the groove to think logically; encourage and inspire students to think critically, analyze

and precisely identify, understand, solve problems and apply the learning materials; encourage and inspire students to think hypothetically in viewing differences, similarities and links to each other from learning materials; encourage and inspire students to understand, apply and develop rational and objective thinking patterns in response to learning materials; based on empirical concepts, theories and facts that can be accounted for and the learning objectives formulated in a simple and clear, yet, attractive presentation system (Rusman, 2015). Langkah lessons that correspond to Saintifikyaitu observing approach (observing), questioning (ask), associating (reasoning), experimenting (Try) and networking (opening the network).

**Mind map:** According to Tenriawaru (2014), mind maps balances both hemispheres, yaitulogika and imagination. As we all know that the left brain is responsible for logic while the right brain is responsible for imagination and art. So, through the implementation of mind maps, learners can generate more ideas, make learning fun and make it easier to understand the subject matter that is difficult to memorize.

The mind map acts as a line/picture line that is able to explain many words. The connecting lines in the mind map are integrated with each other to form interrelated arrangements with each other. This is in line with the development of the human brain that among the components interconnected with one another submitted by Buzan in Kiong *et al.* (2012) "that the mind map is the easiest way to put information into your brain and to take information out of your brain".

From the above understanding it can be concluded that mind map is an effective learning strategy that coordinate interconnection understanding in brain by way of pouring all idea visually in the form of graph or diagram to get comprehension or impression. Buzan (Tenriawaru, 2014) suggests that there are seven steps in making the mind map, including: begin from the middle of a blank paper whose long sides are laid flat because starting from the middle gives the brain the freedom to spread in all directions and to express itself more freely and naturally; use images or photos for the central idea because a picture means a thousand words and helps us use imagination. A central image will be more interesting, keeping us focused, helping us concentrate and activating our brains; use color because for the same color as the draw with the drawing. Color makes the mind map livelier, adds energy to creative thinking and fun; connect the main branches to the central image and connect the branches of two and three levels to levels one and two and so on. Because the brain works by association. The brain likes to associate several things at once. When we connect

the branches then we will more easily remember and understand; make a curved relationship line, not a straight line because a straight line will bore the brain; use one keyword for each line because a single keyword gives a lot of power and flexibility to the mind map use images because like the central image each picture means a thousand words.

**Learning outcomes:** Learning outcomes are a number of student's experiences that include the cognitive, affective and psychomotor aspects (Rusman, 2015). Learning is not only the mastery of the subject theory concepts but also the mastery of habits, perceptions, pleasures, interests-talents, social adjustments, skills, ideals, desires and hopes. This is in line with Hamalik (2002) opinion which states that the learning outcome can be seen from the change of perception and behavior including behavioral improvement. For example the satisfaction of community and personal needs as a whole.

So, it can be concluded that the learning outcomes are the abilities possessed by students after receiving the learning experience to achieve the competencies set in the curriculum covering both the cognitive, affective and psychomotor aspects.

## MATERIALS AND METHODS

**Research design:** This research is a classroom action research. According to Ebbutt (Wiriaatmadja, 2014), the class action research is a systematic study of the improvement of the practice of education by a group of teachers by taking actions in learning based on their reflection on the outcomes of those actions.

All these actions are done repeatedly that form the research cycle. The model proposed by Kemmis and Taggart is called the Spiral Model can be seen from the chart in Fig. 1.

In detail, Kemmis and Taggart (Wiriaatmadja, 2014) describes the steps of classroom action research consisting of four stages: plan, act, observe and reflect.

The variables studied in this study are student and teacher activities as well as student learning outcomes. The subjects of this study were students of grade IV/D SDN Jajartunggal III/452 Surabaya as many as 28 students, consisting of 13 girls and 15 boys.

**Data collection techniques:** This research uses data collection techniques in the form of observation and test. Observation to observe student and teacher activity in learning while test is used to measure achievement of student learning indicator.

The research instrument used to obtain the data is activity sheet observation sheet and test questions in the

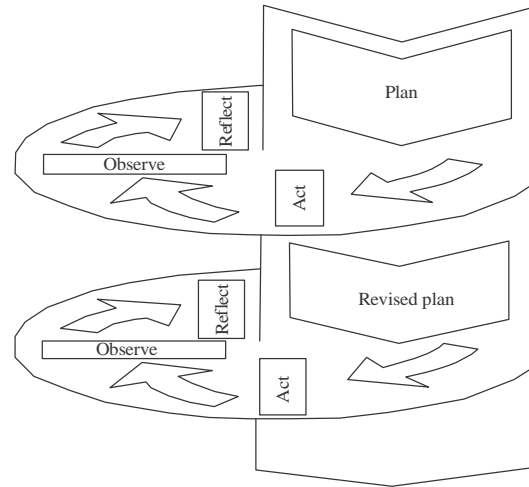


Fig. 1: The Spiral Model from Kemmis dan Taggart (Wiriaatmadja, 2014)

form of the final test which is presented in the form of written test containing the description prepared in accordance with the learning indicators to be achieved. Data analysis technique used is descriptive qualitative by using formula of percentage and mean value.

## RESULTS AND DISCUSSION

Classroom action research was carried out at SDN Jajartunggal III/452 Kecamatan Wiyung. Learning tools that have been validated by two validators are Sutjipto, M.Si as validator 1 and Julianto, M.Pd as validator 2 was used as research learning device by researcher as a teacher with collaborator Dwan Infantriani, S.Pd, MM and Yuli Piliandini, S.Pd, M.Pd. The study was conducted in two cycles, each cycle was held twice a meeting. The research results that have been implemented are as follows.

**The research results in Cycle 1:** Observations or observations were conducted during the learning process by two collaborators who observed student and teacher activities using student activity instruments and teacher activities.

The student activity at the first meeting in Cycle 1 got an average score of 81.25 with the conclusion of the good learning outcomes and the average teacher activity score was 82.38 overall as well. But there are still some students who are still ashamed to express opinions because there are two other teachers who served as observers. In addition the mind map made by students in LKPD is still less effective in terms of sentence because at this first meeting the new students know the mind map.

At the second meeting in Cycle 1, the observation of student activity got an average score of 84.72 with the conclusion of good learning outcomes. While the results of observation of this teacher activity average score is 86.93 overall very good. The results of observation at this meeting 2 increased from meeting 1. With some notes such as the increase of class control, mind map media add interesting picture and passive student motivation in learning.

In addition, to the observation of teacher and student activity, the researcher also analyzed the result of evaluation value of cycle 1, both knowledge and skill in fourth grade students about the style and benefit in daily life. Financially classical reach 71% because there are 20 students who have got value more than equal to 75. It can be concluded that the assessment of knowledge cycle 1 still not complete learning. While the result of skill evaluation analysis make mind map obtained by average value classically is 74.7 while the total number of students who have completed the study is 22 students with the percentage 78,6%. From this result it can be concluded that the learning Cycle 1 is not yet complete.

When analyzed from the learning outcomes both KI-3 (knowledge) and KI-4 (skills), still less than the minimum mastery criteria. This is because students have not understood the style material presented in teaching materials because it is still more general. While the cause of the lack of skills students make a map of the mind because students have not often do this activity, so, students are still not maximal in doing it.

**The research result in Cycle 2:** The implementation of research cycle 2 is done in two meetings with time allocation 3×35 minutes in one meeting. In the second cycle of research meeting 1 was obtained student activity data is 86.80 with the conclusion of learning outcomes very good while the activeness of teachers is 89.20 is also very good. On the observation of teacher activity in cycle 1 of this meeting 2, the average score is 91,48 overall very good meanwhile student activity earn average 91,67 with very good criterion. The results of observation at this meeting 2 increased from meeting 1.

For the analysis of learning outcomes of both KI-3 (knowledge) and KI-4 (skills), the learning outcomes of KI-3 reached 86% with an average value of 84. While the learning result of KI-4 making mind map reaches 96.4% with the average value of KI-4 (skill) is 83.6. Thus it can be concluded that Cycle 2 succeeded in exceeding the minimum mastery criteria.

**Problem in learning and efforts to solve:** In the implementation of this classroom action research, found

some problems in learning but this constraint can be solved by using several attempts. The problems in learning are experienced, among others:

- The ability of students in the presentation is still less clear due to less accustomed to the presentation of the results of the discussion
- Some students are still less responding to the work of other groups
- Crowded atmosphere as group members convey the results of the discussion
- Some students still lack confidence in delivering the work or asking something that has not been understood

While efforts to solve those problems are:

- Teachers often invite students to dialogue, questions about things that have not been understood, so that, students can get used to express opinions
- Creating a conducive learning atmosphere such as creating the familiarity of teachers and students outside of school hours
- The teacher explains the importance of respecting the opinions of others
- Teachers add breaking in the movement of learning sessions, so that, the student's attention is more focused and create a more conducive atmosphere
- Teacher asks all students to make inquiries, so that, all students can express their questions with confidence

**Observation result of students activity:**

Student-centered learning is a corresponding study of the scientific approach. Student activity can be observed by using student activation observation sheet. The recapitulation of student activity observation from Cycle 1 and 2 in Fig. 2.

Based on the above table shows that the results of observations on the first cycle meeting 1 student activity reached 81.25% and meeting 2 reached 84.72%. While in cycle 2 meeting 1 student activity reach 86.81% and meeting 2 reach 91.67%. Average of observation result of student activity in this research reach 86.11%. It can be concluded that student activity in learning Cycle 1 and 2 achieve success.

**Observation result of teacher activity:** Teacher activities conducted in this study function as a facilitator and motivator in students, so that, it becomes scaffolding for students to find and construct the knowledge they can. The results of observations of teacher activity are illustrated in the diagram in Fig. 3.

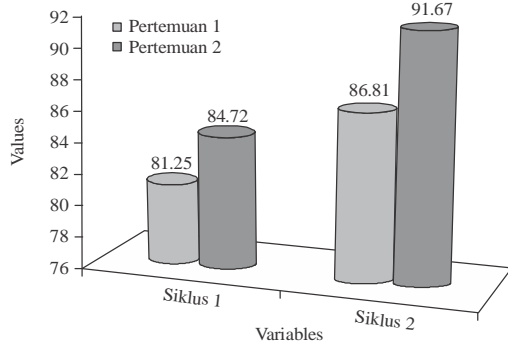


Fig. 2: Diagram of students activity

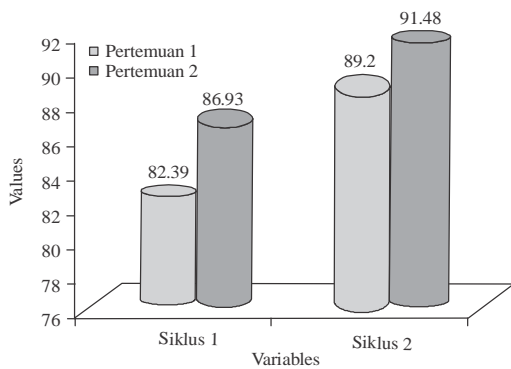


Fig. 3: Diagram of teacher activity

The result of observation on the first cycle of meeting 1 of teacher activity reached 82.39% and meeting 2 reached 86.93%. While on the second cycle of meeting 1, teacher activity reached 89.20% and meeting 2 reached 91.48%. The average result of observation of teacher activity in this research reach 82,39%. It can be concluded that the activity of teachers in learning Cycle 1 and 2 has increased and achieved success.

**Students learning outcomes:** Learning outcomes are a major indication of success in learning. When a person gets a good achievement then it can be said to have success in learning otherwise if someone gets a poor performance then it can be said that has failed in learning.

Analysis of learning outcomes that measure student's knowledge on this research in Cycle 1, the total number of students who completed the study reached 20 students with percentage reached 71.42% while the number of students who are not complete in learning as many as 8 students with a percentage of 28.58%. In the second cycle, the total number of students who completed the study reached 24 students with the percentage of completeness reached 85.71% while the unfinished in learning as many as 4 students with a percentage of 14.28%. The average results of student learning outcomes

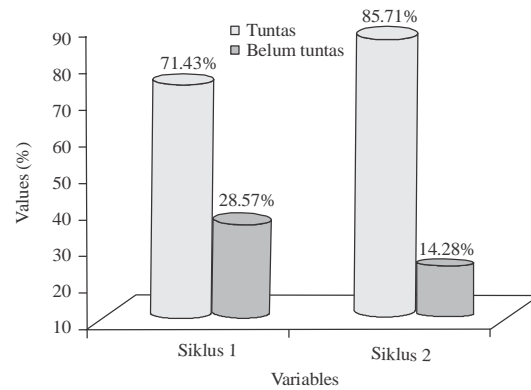


Fig. 4: Diagram KI-3 learning mastery

in the first cycle reached 73.16. While the average of student learning outcomes in cycle 2 reached 83.67. The following is the completeness of the learning outcomes that measure the student's knowledge presented in the bar chart in Fig. 4.

Psychomotor learning outcomes (KI-4) also increased from Cycle 1 which reached an average of 74.7-83.6 in Cycle 2. The classical completeness also experienced a significant increase that is about 17.8% from Cycle 1 which reached 78.6-96.4% in Cycle 2. This is because students feel more happy to make mind map because in addition to understanding the contents of the presented text they can also add colors and images on the mind map they create. Thus, this research succeeded in Cycle 2 because it has reached the predefined indicator of research that has been predetermined.

## CONCLUSION

Based on the results of the research it can be concluded as follows: application of the scientific approach with the help of mind map can improve the activity of teachers and fourth graders of SDN Jajartunggal III/452 Surabaya. This can be proven from data showing that teacher activity and student activity in learning during two cycles have increased. Application of the scientific approach with the help of mind map can improve the cognitive learning outcomes of fourth grade students of SDN Jajartunggal III/452 Surabaya. This can be proven from the results of student learning during two research cycles that have increased both individually and classically. Application of the scientific approach with the help of mind map can improve the skills of fourth grade students of SDN Jajartunggal III/452 Surabaya in making mind map. This can be proven from the results of student learning during two research cycles that have increased both individually and classically.

Based on the conclusion of the research result, the researcher can give suggestion that the scientific approach with the help of mind map can be used as a reference to

be implemented in everyday learning because it proved to increase student and teacher activity in learning proven to improve cognitive learning result of student skill.

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