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# The Impact of Mind Mapping on Science Learning on Student Learning Outcomes

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## Research Article

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**ABSTRACT**

*Background:* Science learning in schools has long focused predominantly on products such as facts, laws, and theories, with limited attention to processes and attitudes. This approach often results in students struggling to understand and apply concepts in real-life contexts. In response, Aim: this study examines the application of the Mind Mapping strategy in science learning to improve students' cognitive and affective outcomes, particularly on ecosystems. *Method:* The research employed a descriptive qualitative method involving 27 seventh-grade students at Junior High School Satap 8 Bulik in the 2023/2024 academic year. Data were collected through pre-tests, learning activities, post-tests, and interviews with teachers and students, and analyzed through data collection, reduction, presentation, and conclusion drawing. *Results and discussions:* The results showed that learning management using the Mind Mapping strategy was well executed, supported by validated learning tools. Cognitive outcomes achieved 100% classical mastery, while affective outcomes reached 80.6%, slightly below the Merdeka Curriculum target. Students responded very positively, with the majority perceiving Mind Mapping as enhancing creativity, focus, and material retention. However, challenges included limited time allocation and difficulty translating ideas into visual form. *Conclusion:* Overall, the implementation of Mind Mapping positively influenced students' engagement and learning outcomes, demonstrating its potential as an effective approach to science instruction.

**Keywords:** Science Learning, Mind Mapping, Cognitive Outcomes, Affective Outcomes, Ecosystem



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## INTRODUCTION

Science teaching in schools, until now, tends to emphasize science products only, such as facts, laws, and theories, which have a dominant portion, so that the process and attitude aspects do not get enough attention. This is reinforced by the implementation of science learning in the field, where teachers give more lectures and several materials that students must be forced to memorize, so that they can answer the questions. It is not uncommon for students to complain because they do not understand the material or concepts the teacher teaches. This is very contrary to the nature of science learning, which includes products, processes, and attitudes. This causes students to be less trained to develop their reasoning power in solving problems and applying the concepts they have learned in real life (Surahmi, 2022). The current Merdeka curriculum implies competency-based learning and the basic principle of individualized completion for students for each basic competency.

Science learning is a very difficult subject. Students are familiar with science because the material covered in science directly applies to everyday life. However, students often struggle to understand science concepts because there is so much to learn (Desilia et al., 2022). In addition, one factor contributing to the low quality of science learning is the lack of teacher readiness to understand science content as a whole. Science learning should be taught in an integrated way to provide understanding that there is still something that separates the fields of biology, physics, and chemistry. Many teachers still do not incorporate integration into science teaching, The competency-based learning process involves more of the learner's ability to develop the potential that exists in him such as the ability to think, ability to behave and do things by with demands competencies basic competencies, so that students can orient the disciplines they acquire in the school environment with the daily reality outside school (Adilah, 2017). Seeing the conditions above, there needs to be an effort made to assess reassessment and renewal to see suitability with the nature of science learning and child development. Adjustment: This adjustment is expected to bring color to the practice of science education in the formal education environment (school). Based on the results

of research from Rizal (2020), it is stated that one of the recommendations for teachers in implementing science learning is to place children's real activities with the object of study, which is the main thing to be developed. Implementing science learning is to place children's real activities with the objects studied, which is the main thing to develop.

Children must have various opportunities to come into direct contact with the objects to be studied. With such learning activities, children are struggling with what is called science. They are guided to search for problems, look for various explanations of the phenomena they see, develop their physical abilities, and train them to use their reasoning to solve the problems faced by various relevant experiments (Faisal, 2019). The condition of students who do not have an effective way of learning supports the weak concept of student mastery of science concepts, and handbooks such as package books and LKS make students feel calm because they feel they already have complete notes. As a result, students rarely make notes to organize information in teaching and learning activities.

Mind mapping is one strategy that can help students remember details about key points, understand key concepts, and see connections. This note-taking technique was developed by Tony buzan cited in (Rahmawati 2021), and it is based on research on how the brain works. The brain often remembers information through images, symbols, sounds, shapes, and feelings. Mind maps use visual and sensory reminders in a related idea, like a road map for learning, organizing, and planning. It can generate original ideas and trigger easy recall. It is much easier than traditional note-taking methods because it activates both brain hemispheres, hence the " Whole Brain Approach" (Buzan, 2006).

This journal was conducted at Junior High School Satap 8 Bulik in Kujan Village, Bulik District, Lamandau Regency. This school is not a favorite school in the district, but it is one of the first-level schools developing and heading towards accreditation. So it is interesting to take research on the Application of Science Learning with Mind Mapping Strategy to Student Learning Outcomes (Case Study of Junior High School Satap 8 Bulik).

## METHOD

The writing method used is descriptive qualitative, to describe the events that occur when something is applied. The targets in this research are seventh-grade students of Junior High School Satap 8 Bulik in the 2023/2024 school year, totaling 27 students, consisting of 12 female students and 12 male students. 15 male students. Data collection techniques by practicing learning mind mapping strategies in classroom activities with three stages of initial tests, learning, and final tests. As well as data collection by conducting interviews with teachers and several students on implementing learning activities. Data analysis techniques include data collection, reduction, presentation, and conclusion drawing.

## RESULTS AND DISCUSSION

### Results

In the results and discussion section, the author will divide into four main discussions to be described. The four points are, first, Science Learning Management with Mind Mapping Strategy. Second, Student Mind Mapping Results. Third, student learning outcomes. And Fourth, Student Response. As follows the description of the four 4 in the results and discussion section:

First, Management of Science Learning with Mind Mapping Strategy.

The management of learning with the Mind Mapping strategy has been carried out well, supported by several factors, including the preparation of learning tools (Teaching Modules and Student Books) (Astuti, 2019). Mind Mapping assessment sheets and post-tests have been prepared well in advance. That students who get a range of scores between 65-79 amounted to 4 students with a percentage of 12.9% which is in the good category, while students who get a range of scores between 80-100 amounted to 23 students with a percentage of 87.1% which is in the very good category. This is because the learning tools used follow the Mind Mapping strategy, which is supported by the validation results, which are generally good. Good validation results indicate that learning devices are feasible to use.

Good learning management is the initial requirement for conducive classroom learning. A conducive class will create a pleasant learning atmosphere and make learning more meaningful. (Eka. M, 2023) Meaningful learning can be grouped into two dimensions. The first dimension relates to how information or material is presented to students through discovery or acceptance. Reception learning presents the material in its final form. Discovery learning requires students to find some or all of the material taught themselves When learning Mind Mapping, students are shown an example of Mind Mapping with the concept of vacation. Students must be able to find their own concepts about ecosystems through Mind Mapping. The second dimension relates to how students can relate information or material they already have. Students must recall the ecosystem material they received in elementary school so that Mind Mapping on the ecosystem concept becomes complete.

Second, Student Mind Mapping Results.

The students' Mind Mapping results can be seen from the evaluation results given at the end of learning, which are assessed based on the proportional form of Mind Mapping and the suitability of the material content. Based on the Minimum

Completeness Standard at Junior High School Satap 8 Bulik, students who are complete in making Mind Mapping (Mind Map) individually if they reach a score of 2.70, and the classical completeness of students in making Mind Mapping (Mind Map) is 70.9%. This study's completeness percentage is not in line with expectations, because it has not reached 85% of the total number of students set by the Merdeka Curriculum. This shows that learning activities with the Mind Mapping strategy still need to be improved. Students find it difficult to pour imagination into Mind Mapping, even though when making Mind Mapping, students are required to imagine (Hidayat, 2018). Being creative in expressing their ideas is based on concepts, principles, theories, and their relation to students' daily lives related to the subject matter. At this time, the student's Mind explores the area of material being studied (Buzan, 2006). The next obstacle experienced by students is the problem of time in making Mind Mapping; students feel that the teacher gives less time. One of the benefits of making Mind Mapping is that it can help us plan things faster and efficiently, solving problems and saving time. Students need Mind Mapping to take notes and summarize the material taught by the teacher so they can remember it more easily. Taking notes using Mind Mapping makes it easier for students to recall information/knowledge that they will use to answer questions during exams, and will affect the learning outcomes obtained by students.

This is supported by Nur's theory (2019), which distinguishing two kinds of knowledge: declarative and procedural. Declarative knowledge is knowledge students have about something, such as the definition of ecosystem, ecosystem units, ecosystem components, and so on. Procedural knowledge is students' knowledge about how to do something; for example, it is about the steps to make mind maps. Used as effective notes. The results of Vygotsky's research gave rise to two important concepts related to the Mind Mapping strategy: learning assistance that allows students to perform a skill (scaffolding).

During Mind Mapping activities, teachers provide learning assistance to students by guiding them on how to make Mind Mapping well and correctly, which includes the proportional form of Mind Mapping and its suitability to the content of the material. At the next stage, students can solve a problem or skill independently, without the help of a teacher or other people (zone of proximal development). This means that after receiving guidance from the teacher on how to make Mind Mapping (mind map) properly and correctly, the results of Mind Mapping (mind map) made by students are also good.

Third, student learning outcomes. Student Cognitive Learning Outcomes,

Student learning completeness can be seen from the student learning outcomes test (Post-test) conducted at Junior High School Satap 8 Bulik, which found that students were declared complete if they scored≥ 70 based on the Minimum Completion Criteria. That shows the classical completeness obtained is 100%. The highest percentage was in the 80-100 range, with a rate of 87.1%. This shows that the scores that students have achieved are very good. (Masita, 2020). With the acquisition of the average value, which is very good, it can be said that good learning management will also affect students' cognitive learning outcomes. This can be interpreted as applying science learning with the Mind Mapping strategy can affect students' cognitive learning outcomes obtained through the post-test.

Students' prior knowledge determines the possibilities of new learning. Prior knowledge is important in teaching to help students build bridges between new and pre-existing knowledge. Learning science with the Mind Mapping strategy allows students to focus more on the studied subject matter. Students' mindsets will be more developed by bringing up ideas in the process of learning science, so that the Mind Mapping strategy can improve student learning outcomes (Wicaksana, 2012). The learning process in the classroom involves students and requires them to carry out learning activities. Students must listen, pay attention, and understand the lessons delivered by the teacher; besides that, students must actively ask the teacher about unclear things to create a good learning process that can improve student learning outcomes.

Students' Affective Learning Outcomes. As with assessing students' cognitive learning outcomes, students' affective learning outcomes can be seen from the completeness of their affective learning outcomes. At Junior High School Satap 8 Bulik, it is stipulated that students who are declared to have completed learning individually, if they are concerned, have reached a score of 70 per the school's Minimum Graduation Standard (SKL). Minimum Graduation Standards (SKL) at the school, out of 27 students, 25 students were complete, and two students were not complete. Classical completeness obtained in the affective assessment of students is 80.6% so it has not reached the classical completeness as expected in this research, because it is not by the Merdeka Curriculum that has been determined, which is 80%. This shows that the affective aspects in science learning activities with the Mind Mapping strategy still need to be improved, because students are still not active in the learning process. After all, students are still not active in following every activity related to affective assessment. Affective assessment in science learning with strategy Mind Mapping strategy strategy includes social skills listening which or consisting of: attention to the teacher's explanation, discussing or asking questions with fellow students/teacher students/teachers to make Mind Mapping, students express their answers or opinions, present results (Supratjana, 2021), while character consists of: punctuality in learning, and students working together in their groups. Some students did not do this activity while discussing or asking questions with fellow students/teachers to make Mind Mapping. Instead, they do other activities such as: busy with a Handphone or doing other homework.

This shows that the teacher is lacking in organizing classroom conditions. In the activity of students expressing their answers or opinions, some students do not express their answers or opinions because these students are afraid of being wrong or embarrassed in front of the teacher or their friends (Rilga, 2023). This scientific attitude can be developed in them when students conduct discussions and express opinions. In this case, the meaning of an inquisitive attitude as part of a scientific attitude is an attitude that always wants to get the right arrow from the observed object. Through group work, the "wall of ignorance can be uncovered to gain knowledge. Here, cooperation takes place. Cooperation is intended to gain more knowledge. Through cooperation, students will be cooperative and realize that the knowledge possessed by others may be more perfect than what they have (Sulistyorini, 2017).

Fourth, Student Response

Student responses are given after students learn science by applying Mind Mapping strategies to the Ecosystem material. Student responses are given to students at the end of the meeting. This shows the results of the responses given by students to science learning with the Mind Mapping strategy (mind map) on the Ecosystem material, which received a very strong response. There is even one statement from the existing response that reaches a percentage of 100%, namely, in the statement "Mind Mapping makes students more creative". Because the ecosystem material has many new terms or definitions, it is not easy to memorize them. However, it turns out that some students have no difficulty in memorizing and understanding ecosystem material because they have previously received the material in elementary school, and the ecosystem material taught is almost the same as that taught in ecosystem material in junior high school.

Some students who mastered ecosystem material with Mind Mapping got a percentage reaching 27.2%. This situation shows that students rarely encounter the Mind mapping strategy used in learning activities so far, especially at Junior High School Satap 8 Bulik. So it takes time for students to adjust to the Mind Mapping strategy. Other things show that some students are less willing to use Mind Mapping in subsequent materials because not all materials are suitable for applying the Mind Mapping strategy. It depends on the characteristics of the material. In general, the response given by students to learning science with the Mind Mapping strategy is very strong, which explains that the learning is very effective. The learning process applied to students fosters a sense of interest and enthusiasm for learning that is quite high because learning is very fun (Riduwan, 2003).

A high enough interest and enthusiasm for learning can foster a positive tendency towards learning to follow the learning process well so that it can help improve student learning outcomes in terms of cognitive and affective aspects. As previously described, learning science with Mind Mapping strategies can motivate students in learning, make students more creative, save time, solve problems, focus attention, remember better, and can train students to imagine to be able to create original ideas, and can help learn more quickly and efficiently (Buzan, 2006). With some of the advantages of learning science with Mind Mapping strategies, it produces a very strong response from students to learning activities in the classroom. The very strong response from the students shows that it affects the learning outcomes of students after the implementation of the learning.

## CONCLUSION

Based on the results of research on the application of science learning with the Mind Mapping strategy (mind map) to student learning outcomes on Ecosystem material in class VII SMP Negeri 3 Madiun, the following conclusions are obtained:

1. The teacher's ability to manage science learning using the Mind Mapping strategy can be managed well.
2. After applying science learning using the Mind Mapping strategy, students' cognitive and affective learning outcomes achieved 100% and 80.6% completeness.
3. Implementing science learning with the Mind Mapping strategy affects students' learning outcomes.
4. The results of the response of seventh-grade Junior High School Satap 8 Bulik students to implementing science learning with the Mind Mapping strategy.

Science learning implementation with the Mind Mapping strategy on the Ecosystem material shows a very strong response.

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