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The Use of Herbarium Media Assisted by Bigbook in Science Learning to Improve Students' Critical Thinking Ability

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Abstract
This research is motivated by the low critical thinking ability of fourth-grade students at MIN 1 Mataram City. Out of 30 students, 13 had low critical thinking skills. The purpose of this study was to improve students' critical thinking ability through the use of herbarium media assisted by a bigbook in class IV MIN 1 Mataram City in the 2025/2026 academic year. This type of research is classroom action research (CAR). The research setting was at MIN 1 Mataram City. The target of this research was to improve students' critical thinking ability through the use of herbarium media assisted by a bigbook. This research was conducted in two cycles, each cycle consisting of four stages: planning, implementation and observation, evaluation, and reflection. The instruments used were observation and tests. Data analysis was conducted qualitatively and quantitatively. The results showed that the use of herbarium media assisted by a bigbook could improve students' critical thinking ability. The average score of critical thinking skills increased from pre-action conditions of 40% to 63.33% in cycle I (good category), and 86.66% in cycle II (very good category). Teacher activities in learning increased from 68.05% in cycle I to 84.72% in cycle II, while student activities increased from 63.19% to 83.33%. This improvement includes aspects of solving problems clearly, directedly, and purposefully, being able to analyze and conclude ideas according to phenomena and events that occur, and being able to draw conclusions and solve problems systematically with valid opinions

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1. Introduction

The 21st century is a century where all fields are undergoing changes, one of which is education. The aspiration of our nation, Indonesia, to improve the quality of education as a maximum effort to adapt to changing times is being vigorously pursued, one of which is by changing the face of the educational curriculum from the 2013 curriculum to the independent curriculum. The independent curriculum is a form of real government response as stated in Permendikbud No. 24 of 2016 which explains that the 2013 curriculum in primary and secondary education implements learning using thematic learning, institutions are required to carry out learning by integrating literacy and displaying 21st-century skills including: Creative, Critical Thinking, Communicative, Collaborative skills, better known as 4C, as well as Higher Order Thinking Skills (HOTS).

Science as one of the components of subjects included in the thematic domain in this study was deliberately separated by the researcher to be able to see more specifically the improvement of students' thinking abilities after the action was taken. Science lessons are content that requires

students to be able to find problem solving, of course, skills that support the implementation of the learning process in the classroom are needed. One applicable skill is critical thinking.

Critical thinking in Desmita's perspective is the ability to think logically, spontaneously, and productively, implemented in assessing something to take and determine all the best considerations and decisions. Indicators of someone who has critical thinking skills are being able to solve problems clearly, directedly, and purposefully, being able to analyze and conclude ideas according to the phenomena and events that occur, and being able to draw conclusions and solve problems systematically and with valid opinions (Desmita, 2010).

If students can only solve a problem without understanding the basis or basic concept of why it is implemented, then it can be said that they do not yet have critical thinking skills. In more detail, NCTM explains the indicators of critical thinking ability: 1) Understanding the problem and being persistent in solving it, 2) Being able to think abstractly and quantitatively, 3) Creating science models, and 4) Finding and using structures and frameworks. From the description above, it can be concluded that critical thinking ability is the ability to analyze, create and use criteria, and evaluate objectively (NCTM, 2011).

Referring to the results of the researcher's initial observations at MIN 1 Mataram City, specifically in class IV, the level of students' critical thinking competence was still concerning. This was evidenced by the low ability of students to analyze problems (science assignments) and solve them not according to the instructions and demands of the job description (unsystematically). Students experienced difficulties in solving problems or tasks given; this difficulty could be seen from the answers given which did not yet have alternative answers besides the known answer. Several people could answer correctly, but the concept of its application was also difficult to explain, which impacted the conclusions drawn or made becoming inaccurate. Regarding student persistence in doing assignments, it was also lacking or low, seen from the attitudes shown: not focused, restless, unenthusiastic, scribbling in books aimlessly, interaction with the teacher during question and answer was less active, students were more often silent without asking many questions.

The low critical thinking skills of students are caused by the lack of variety in the use of learning media during the learning process in the classroom. The delivery of science material quantitatively is still more often done through lectures (conceptual). The teacher has not optimally provided opportunities for students to ask questions, express ideas, and voice problems they face. The situation and conditions as described by the researcher, if continuously ignored, will have a negative impact on the critical thinking skills of fourth-grade students at MIN 1 Mataram City. In fact, this critical thinking ability is one of the main assets that students must have to survive facing the world and their future with all the challenges amidst the rapid currents of scientific and technological development and to be able to solve problems that arise from themselves and their surrounding environment.

An alternative solution to the problems mentioned above is the use of learning media, in this case, herbarium media assisted by a bigbook. This learning media consists of morphology or parts of plants that are dried (preserved) in a special way and then attached to a bigbook, accompanied by explanations of names, functions, and their respective accompanying explanations. Usually, herbarium mounting uses manila paper the size of a newspaper which is rolled up after use, causing the herbarium to not be usable for a long time. Therefore, the researcher initiated using a bigbook to make it safer and more durable.

Based on the background description above, it is important and interesting to research. Therefore, the researcher determined the title "The Use of Herbarium Media Assisted by Bigbook in Science Learning as an effort to minimize the low Critical Thinking Ability of Fourth Grade Students at MIN Mataram City in 2026."

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2. Method

2.1 Participants

The participants of this study were fourth-grade students of MIN 1 Mataram City, totaling 30 students consisting of 13 male students and 17 female students. The reason for choosing the fourth grade was because the researcher found a problem in the form of low critical thinking skills of students in the learning process. While the object of this research was improving critical thinking skills in fourth grade of MIN 1 Mataram City using herbarium media assisted by a bigbook.

2.2 Data Collection

2.2.1 Instrument of Collecting Data

The data collection tools in this study used observation sheets to collect data related to students' critical thinking activities during classroom learning activities in the science learning process using herbarium media assisted by a bigbook. Second, tests were used to collect data on students' critical thinking abilities. The test used was in the form of essay questions..

2.2.2 Techniques for Collecting Data

Data collection techniques are working methods to obtain data from specific objects. The data obtained in research can be quantitative and qualitative in nature. Data are the results of researcher records, whether in the form of facts or numbers (Arikunto, 2010:193). The data collection techniques carried out in this study are as follows::

Observation

The observation method is a data collection method by systematically observing and recording the phenomena under investigation. This method was used to observe the improvement of students' critical thinking skills. The data collection tool for this observation technique was an observation sheet regarding students' critical thinking activities during classroom learning activities. The activities observed were the learning process using herbarium media assisted by a bigbook used by the teacher, as well as observing student activities and seeing their critical thinking skills.

Test

Critical thinking skills were tested through working on practice questions on student worksheets related to the subject matter that had been taught. The results of these exercises were then evaluated to be used as a measure of student success on the topic that had been discussed. Data collection using this test technique was carried out to see the improvement of students' critical thinking skills. Meanwhile, the data collection tool for the test technique was a sheet of essay test questions

2.3 Data Analysis

After the research data were collected through observation and testing, data analysis was then carried out. Data analysis with the calculation of the data is as follows:

Quantitative Data Analysis

Analysis of the results of the observation sheets on students' critical thinking skills was analyzed with the following steps:

1. Giving a checklist mark on each aspect
2. Summing the scores on each aspect
3. Calculating the percentage using the formula:
   Percentage = (Total score) / (Maximum score) x 100

Then the determined scores were adjusted to the predetermined criteria. Aries and Hariyono (2012:95) explained that the level of action success calculated with the percentage criteria is as follows:

No	Score	Success Level
1	85-100	A (Very Critical)
2	70-84	B (Critical)
3	55-69	C (Quite Critical)

4	40-54	D (Less Critical)
5	≤39	E (Very Less Critical)

Meanwhile, the results of the students' critical thinking ability tests were analyzed with the following steps:

1. Individual completeness and classical learning completeness were achieved if they reached a minimum score of 2.66 with a predicate of B (good), chosen because it matches the minimum completeness criteria listed in the knowledge competency score range and KKM of class IV MIN 1 Mataram City. This data is processed using the formula: Score = (Total score) / (Maximum score) x 100
2. Range of knowledge competency scores:
   (Table as in original, values 1.00 to 4.00 with predicates D to A+)

Qualitative Data Analysis

Qualitative descriptive analysis was used in this classroom action research, where qualitative description analysis is a research method that describes reality or facts adjusted to the facts obtained from the results of observation sheets on students' critical thinking skills and teacher activities during the learning process.

3. Results

The use of herbarium media assisted by a bigbook in science learning was carried out following the classroom action research (CAR) procedure. The procedures were planning, implementation and observation, evaluation, and reflection. This research was conducted in two cycles. Cycle I was conducted in three meetings and cycle II was conducted in two meetings. For more clarity, it is described as follows.

Cycle I

Planning: The researcher prepared a science teaching module using herbarium media assisted by a bigbook, discussed with the fourth-grade teacher as a form of collaboration. Observation sheets for teacher and student activities and tests to measure critical thinking skills were also prepared.

Implementation and Observation. (Detailed descriptions of three meetings in Cycle I are provided in the original text, summarizing teacher and student activities). Evaluation was carried out through observation of teacher and student activities. Teacher activity improved from good in meeting I and II to very good in meeting III. Student activity improved from less active (average score 1.7) in meeting I, to quite active (2.47) in meeting II, to active (50-75%) in meeting III.

Assessment of critical thinking skills showed an average score of 66 (52.63% classical completeness), meaning it had not yet reached the classical completeness target of 85% or an average score of 70. Approximately 18 students did not pass, with the lowest score being 42.

Reflection: Notes were made on the teacher needing to present material more calmly and sequentially, and to change teaching style to increase student attention, which improved to over 50% in meeting II and 75% in meeting III.

Cycle II

Planning: The researcher prepared a science teaching module based on reflections from Cycle I, along with observation sheets, student worksheets, and critical thinking tests.

Implementation and Observation. (Detailed descriptions of three meetings in Cycle II are provided). Teacher activity in meetings I and II was very good. Student activity in meetings I and II was very active (scores 3.27 and 3.87 respectively, above 75%). Assessment of critical thinking skills showed classical completeness of 86.84% with an average score of 81.36. Approximately 5 students did not pass, with the lowest score being 50.

Reflection: Teacher activity was categorized as very good. Student activity was categorized as very active (above 75%). The teacher had maximally guided and trained students in developing critical thinking skills using herbarium media assisted by a bigbook

4. Discussion

Based on the research conducted from cycle I to cycle II, there was an improvement in students' critical thinking skills through the chosen action using herbarium media assisted by a

bigbook in class IV MIN 1 Mataram City. The action design carried out by the researcher included four stages: planning, implementation, observation, and reflection.

In the planning stage for each cycle, the teacher planned and prepared the learning tools to be used, including lesson plans, teaching materials, media, materials to be studied, observation sheets for students' critical thinking skills and teacher activities during the learning process, student worksheets, and end-of-cycle evaluation questions for cycles I and II. In the implementation stage for each cycle, it was carried out over 2 meetings. Meetings I and II were used to carry out the learning process using herbarium media assisted by a bigbook to improve students' critical thinking skills. The final evaluation was carried out at the end of each cycle at the second meeting.

In the observation stage, the teacher observed changes in students' critical thinking during the learning process and gave a checklist according to the existing characteristics. At this stage, the teacher could determine the percentage of critical thinking ability of each student, so the teacher could also conclude whether there was an improvement in each cycle by referring to the predetermined success criteria.

In cycle I, the average classical score of the end-of-cycle evaluation was 2.53 with a predicate (B-) or a class success percentage from the test results of students who passed was 45.5%, while the observation results in cycle I showed a class success percentage of 61.4% with a predicate (C). In cycle I, the success percentage had not reached the success criteria set by the researcher, which was 70%, so the research continued to cycle II.

The final stage was reflection, namely analyzing the observation results and identifying actions that should be maintained, improved, corrected, or even eliminated. The results of the reflection in cycle I were used to improve or perfect the actions to be taken in the next cycle. Based on the reflection in cycle I, several things were found regarding both students and the teacher. Activities that needed to be maintained in cycle I, conducted over 2 meetings during the learning process, included carrying out initial activities by motivating students and conducting reflections at the end of the learning. Meanwhile, teacher activities that needed to be improved included directing students to make learning more effective, guiding rigid students to actively participate during the learning process, providing motivation and direction to students to be more confident in expressing opinions and presenting results in front of the class, and improving time allocation so that learning could run as expected

5. Conclusions

Based on the results of the study, it can be concluded that the use of herbarium media assisted by a bigbook can improve students' critical thinking ability in Class IV MIN 1 Mataram City in the 2025/2026 academic year. This improvement can be seen from the increase in teacher activities, student activities, and students' critical thinking ability.

In cycle I, teacher activities appeared good, good, and very good. Student activities appeared less active, quite active, and active. Then, regarding students' critical thinking ability, classically, the percentage of students' critical thinking ability was 52.63%. In other words, the average score of students was still at 66. This means that students' critical thinking ability had not yet achieved classical completeness of 85% or an average student score of 70. In Cycle I, approximately 18 students did not pass.

In Cycle II, teacher activities appeared very good and very good. Student activities appeared very active and very active. Then, regarding students' critical thinking ability, classically, the percentage of students' critical thinking ability was 86.84%. In other words, the average score of students was at 81.36. This means that students' critical thinking ability had achieved classical completeness above 85% or an average student score above 70, specifically 81.36. In Cycle II, approximately 5 students did not pass.

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