

The Effectiveness of Century Skill-based Authentic Science Assessment Media to Improve Critical Thinking Skills for Grade 4 Elementary School Students

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Abstract: The purpose of this study was to determine the effectiveness of century skill-based authentic assessment media to improve critical thinking skills in elementary school students. The method used is a pre-experiment using One design Group Pretest-Posttest Design. Learning the content of science learning is carried out in six face-to-face meetings, one pre-test, and one final test. The population used is grade 4 the elementary school students of 2 Tipar with a total of 20 students. The results obtained are 87.375% of students responded very well. N-gain test obtained a significance level of 0.6 (enough). This shows that between the pre-test before using the century skill-based authentic assessment media and the post-test after using the century skill-based authentic assessment media experienced a significant difference. Based on the results of several tests, it was concluded that the century skill-based authentic assessment media was effective in developing critical thinking skills

Keywords: authentic assessment media, century skills, critical thinking, elementary school students

1. Introduction

curriculum changes not only change the order of learning but also change the paradigm of the 20th century to the 21st century. The broad implementation of the 2013 curriculum is to make students the center of learning ¹. The concentration of learning on students must also be carried out as a whole starting from the introduction of learning to evaluation or assessment. The assessment used is usually a

comprehensive assessment including cognitive, affective, and psychomotor.

Authentic assessment is all student learning outcomes both at the time of learning and learning outcomes from various aspects, both cognitive, psychomotor, and affective aspects ². Another source states that authentic assessment is an assessment that invites students to solve problems in everyday life based on their knowledge, skills, and attitudes ³

In fact in most schools The basis in Indonesia is mostly instruments authentic assessment especially for 3 domains, namely: attitude or affective aspects, knowledge (cognitive) and skills (psychomotor) still low. Meanwhile, in the implementation authentic assessment is also ineffective because class teacher every day must assess 3 domains that, doing class administration, implementation of daily tests, explain learning materials in class, and correcting each assignment, daily test, mid-assessment semester, the final assessment of the semester work students⁴. Therefore, the implementation authentic assessment cannot be carried out maximum. This is because the class teacher takes a long time in do it all. The presence of a researchers in developing instruments authentic assessment, especially spiritual attitudes and social attitudes in this study are very needed by the classroom teacher as an activity innovation in the world of learning. That fact can be strengthened by research that implemented by Utari (2014), the results shows that the implementation of the assessment authentic for the affective domain by 52.8%, the psychomotor domain by 48.4% and the cognitive of 98.8% more dominant, namely

of 98.8% it can be concluded that the implementation of authentic assessment is still lacking optimally ⁵

Science is one of the lessons that is closely related to real life. Through science, students' abilities can be obtained by conducting experiments, observations, and theories that provide explanations about the symptoms that exist in everyday life ⁶. According to Chopra (2013) ⁷, the positive influence on science subjects is obtained from the material being taught, methods, and media used by teachers in teaching so that they can support students in enjoying the lessons given.

Science is one of the subjects in elementary school that requires assessment. Because science is real science that students can get from observing the natural surroundings. But sometimes what is seen is different from the theory that is taught. Assessment here serves as a tool to improve their understanding obtained by way of inquiry with the theory being taught. Science assessment itself tends to be complex because the domains that are assessed are not only cognitive but psychomotor and affective. This assessment is easier when using an authentic assessment because it includes all the required assessments. Authentic assessment involves various forms of performance measurement that reflect students' learning, achievement, motivation, and attitudes in activities relevant to learning ⁸. It is therefore important to develop an authentic science assessment media.

The initial analysis of science learning at SD N 2 Tipar shows that authentic assessment is still based on the Tema book. Limited human resources and school administration make some teachers choose to use authentic assessments.

the data from the authentic assessment that is obtained has also not been used as a mapping of the authentic assessment of the child. Based on the above problems, it is necessary to implement MPA media at SD N 2 Tipar by comparing the students' pretest and posttest scores.

2. Literature

Assessment is an integral part of learning. In every learning, assessment serves to measure the extent to which students can achieve the learning objectives that have been set. Rating in learning assist teachers in evaluating the effectiveness curriculum, teaching strategies, and learning activities that include competencies knowledge, attitudes, and skills of students. According to Arifin ⁹, the assessment of is a systematic and continuous process or activity for collect information about student learning processes and outcomes to make decisions based on certain criteria and considerations. Assessment is not only limited to grades but through teachers assessments can be done celebrate achievements and support students in facing challenges study.

Several studies on the application of authentic assessment of the 2013 curriculum, among others; descriptive qualitative research by Aji ¹⁰ to describe the implementation or application of authentic assessment to the curriculum 2013. A similar study on implementation and teacher's understanding of authentic assessment 2013 curriculum has also been carried out by Mutiia ¹¹. Next research on the

implementation of assessment authentic 2013 curriculum in social studies learning This research also aims to obtain Overview of implementation authentic assessment, ever done by Safitri ¹², and has been researched by Sabri, Retnawati¹³ results The study describes the obstacles that faced by teachers in applying assessment authentic, one of which is the many aspects that I think this will take more time long.

My research focuses more on analyzing and describing the effectiveness century skill-based authentic assessment media. if in previous research it was only on authentic assessment, while my research puts forward century skills or 21st-century skills that must be mastered by elementary school children. Authentic assessment media are also equipped with examples from everyday life as well as attitude, cognitive and psychomotor assessments.

3. Material & Methodology

The research used is pre-experimental quantitative using a one-group pretest-posttest design ¹⁴. The following is a research design on the Effectiveness of Century Skill-based Authentic Science Assessment Media to Improve Critical Thinking Skills for Grade 4 Elementary School Students

Table 1. Research design one group pretest-posttest design

Pre-test	Treatment	Post-test
O ₁	X	O ₂

This research was conducted at SDN 2 Tipar in the even semester of 2020/2021. The number of samples taken is in accordance with the number of students in the class, namely 18 children. Sampling was adjusted to the existing health protocol. Authentic learning media are arranged according to the existing curriculum and analysis of the age of elementary school students in grade 4. The data collection techniques used in this study were test and non-test techniques. The test technique is used to measure students' critical thinking skills. While the non-test technique was used to measure student responses to the use of Century Skill-based authentic science assessment media. Analysis of the data used is the descriptive analysis of the questionnaire and T-test analysis of the results of the pretest and posttest. Descriptive analysis to determine student responses to authentic research media by analyzing the answers to the student response questionnaire from qualitative to quantitative, the questionnaire itself uses a Likert scale then converted to the % index number. Then test the Paired Sample T-test. The test was carried out with the aim of knowing whether there was a significant change in the average value before and after using the Century Skill-based authentic IPA assessment media.

4. Result and discussion

The data obtained from this study are questionnaire data for student responses and pretest and posttest data. The student response questionnaire contains 12 questions with 4 main aspects, namely media readability, Critical Thinking, media interest, and media completeness. Student response questionnaires are given if the treatment using authentic century skill-based assessment media has been carried out. The student response questionnaire was given to all samples. The following are the results of student responses to the century skill-based authentic science assessment media.

Table 2. Results of Student Responses to Century Skill-Based Authentic Science Assessment Media

No	Aspect	Persen
1	media readability	87,4
2	Critical thinking	85,6
3	media interest	88,7
4	media equipment	87,8
Average		87,375

Based on the results of student responses, the aspect that received the highest score was media interest, this was because many illustrations were presented in accordance with reality and were illustrated in cartoon form. The form of illustrations is presented in accordance with real conditions and some experiments are adapted to the equipment or furniture at home, this is an additional value that makes it easier for students to understand science material.

The second aspect of the completeness of the century is skill-based authentic science assessment media gets a percentage of 87.8%. The data can be used as a reference that the authentic science assessment media has good media completeness that fulfills all assessments and materials that must be understood by students.

Next is the readability of the media according to the results of student responses getting a percentage value of 87.4 percent this can be stated as a good response because the media can be read by all students very well this is in accordance with previous research that the value of 81%-100% is said to be a good response. very feasible ¹⁵ As well as research by Rachmawati ¹⁶ on student responses to web-based learning media.

Furthermore, the results of the effectiveness of authentic assessment media to improve students' critical thinking skills were tested using the n-Gain test using student pretest and post-test data. The following is the data from the students' pre-test and post-test results

Table 3. Value N-gain

No	Data	minimum value	maximum value	average value
1	Pretest	60	80	65,6
2	Posttest	70	90	75

From these results, the N-gain test is then carried out, and the N-gain value obtained can be used as a reference for improving students' critical abilities before using authentic assessment media and after using authentic assessment media. Based on the results of the N-gain test, a value of 0.6 was obtained. This result indicates that the improvement in students' critical thinking skills is in moderate condition. This may be caused by several things, namely:

1. Data collection is carried out during the Pandemic
2. Data retrieval is done online so sometimes the explanation is interrupted by network problems
3. Students are less able to be conditioned in online learning.
4. some practicums are done at home but not done

Aspects of critical thinking in this study are taken from research such as the Setyawati ¹⁶ research, which is being able to explain simple concrete things by doing practicum, having basic skills after conducting experiments at home with parents, making further explanations of several activities in authentic science assessment media, and concluding the entire material described in the authentic natural science assessment media.

Century skill-based authentic IPA assessment media has critical thinking aspects that must be achieved. 4 aspects as described above are measured by test tests. Based on the test results after using authentic assessment media equipped with performance activities. This activity allows students to provide a simple explanation of the concept. Activities with parents are expected to make students have basic abilities and students can develop the ability to explain further. The last critical thinking skill is to conclude. Based on the results of the research, it is easier for students to have the first 3 aspects of critical thinking. While critical thinking skills conclude that students have some difficulty making the right conclusions. Overall learning using authentic assessment media can improve students' critical skills and

can create a fun learning so that it can have a positive impact following aris's research¹⁸. The process of learning activities that go well and have a positive impact on the development of students' minds can actively build new knowledge or revise the knowledge that students already have.

5. Conclusion


- a. The implementation of the century skill-based authentic assessment media got a student response value of 87,375. Based on this value, it can be said that the student's response to the authentic assessment media was quite good.
- b. The value of N-gain is 0.6 based on this value, the improvement of students' critical thinking skills is at a moderate level.
- c. This research can be developed for other subjects in elementary school as well as for thematic learning

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