



THE EFFECT OF THE ENVIRONMENTAL EXPLORATION APPROACH ON CURIOSITY, CRITICAL THINKING SKILLS, AND SCIENCE LEARNING OUTCOMES

Annisa Cahya Rahayuningtyas¹, Budi Utami², Annisa Nur Khasanah³

^{1,2,3}Science Education, Faculty of Teacher Training and Education, Universitas Sebelas Maret, Indonesia

Abstract

The natural environment around students can become a learning object that provides students with real experiences. This research aims to determine the effect of the Exploring the Natural Environment (JAS) approach on (1) students' curiosity, (2) students' critical thinking skills, and (3) student learning outcomes. This research uses a quasi-experimental design. The population consists of seventh-grade junior high school students. Data collection techniques are carried out using tests and observations. Prerequisite tests are carried out using validation tests, homogeneity tests, and normality tests. The hypothesis analysis technique is carried out using the independent simple t-test. The research results obtained are, One, there is an influence of the JAS approach on students' curiosity with a sig-2tailed result of $0.011 \leq 0.05$, Two, there is no influence of the JAS approach on students' critical thinking skills with a sig-2tailed result of 0.080. This is because students still do not fulfill the six categories of critical thinking according to Facione, Three, there is an influence of the JAS approach on student learning outcomes with a sig-2tailed result value of $0.003 \leq 0.05$. This research concluded that the natural exploration approach (JAS) had an influence on students' learning outcomes and curiosity, but had no effect on students' critical thinking skills. The obstacle in this research is that the time used is still very limited, so better time management is needed.

Keywords: JAS Approach, Critical Thinking Skill, Curiosity, Learning Outcomes

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²Correspondence Address:

Science Education, Faculty of Teacher Training and Education,
Sebelas Maret University, Indonesia
E-mail: budiutami@staff.uns.ac.id

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INTRODUCTION

Life and Education are two things that cannot be separated. Edward Thring explained that Education is a transmission of life from one person to another (Taneja, 2005). Education can be successful through a good teaching and learning process; this is because the quality of good Education is influenced by the teaching and learning process. The skills and abilities of a teacher influence the success of the teaching and learning process. One of a teacher's skills is obtaining appropriate teaching and learning strategies and methods. Learning strategies and methods will influence the teaching and learning process, so teachers must choose the right learning strategies.

This is because learning strategies and methods encourage students to be actively involved, which can improve their thinking skills (Utami et al., 2019). The right approach must support the right learning strategies and methods.

Science lessons require critical thinking skills and students' curiosity about the lesson. Science prioritizes direct experience to develop the ability of students to be able to study nature scientifically. Exploring the environment around students can help them discover and study the problems around them so that students can gain real experience (Ahmadi, 2021). Students need to understand and study nature, accompanied by students' curiosity and critical thinking skills in analyzing problems. Critical thinking is assessing and measuring one's decision-making ability through logical and fair thinking (Utami et al., 2021). Faizah (2017) conducted research using a natural exploration approach and obtained results that students' critical thinking skills and curiosity increased after treatment.

Based on the results of interviews by science teachers on 03 May 2023, it was found that students' curiosity, critical thinking skills, and learning outcomes had not yet reached their maximum value. Based on the results data obtained from the school, it was found that student learning outcomes had not reached 60% and completed KKM 75. The average pretest score for students' curiosity and critical thinking skills was less than 50% of students who met the criteria. Indicators of curiosity and critical thinking. Based on the PISA results, it is also known that Indonesian students are at level 1 with a score of 396 from the average score for all students in the world which is 489.

An approach that uses the natural environment as a learning object is the Exploring the Natural Environment (JAS) approach. Alimah and Miranti (2016) stated that the JAS approach is an approach that utilizes the

environment and invites students to recognize problems and then find conclusions. The natural exploration approach encourages students to create information through exploration and investigation. Using a natural exploration approach, the learning process makes students more active in learning, has more social meaning, and utilizes multiple resources and assessments (Cahyaningtyas et al., 2019).

After describing the problem in this research, the problem formulation can include: (1) Does the natural exploration approach affect students' curiosity? (2) Does the natural exploration approach affect students' critical thinking skills? (3) Does the natural exploration approach affect student learning outcomes?

This research has the following objectives: (1) determine the effect of the environmental exploration approach on students' curiosity about environmental pollution material; (2) determine the effect of the environmental exploration approach on critical thinking skills on environmental pollution material; (3) determine the effect of the environmental exploration approach on student learning outcomes in environmental pollution material.

METHODS

This research is quantitative research with a quasi-experimental control group design. This research has one experimental class and one control class, which will be tested by giving a pretest-posttest. This research design has steps taken in its implementation: (1) selecting samples randomly; (2) giving a pretest to both groups; (3) providing treatment to the experimental and control classes; (4) giving a posttest to the experimental and control groups. The population used is class VII junior high school students. The sample, according to Hardani et al. (2020), is a part of the population that represents the entire population selected using a sampling technique. The sample in this study, namely two classes, was selected using a cluster random sampling technique. According to Sugiono (2017), the cluster random sampling technique is a way of selecting samples based on equal opportunities for members of the population to be selected as samples. The experimental class will be given learning treatment using the Environmental Exploration Approach, while the control class will be given learning treatment using the Scientific Approach.

The data in this research was obtained using test techniques, questionnaires, and observation. Test techniques are used to obtain data from learning outcomes and students' critical thinking skills. The questionnaire technique was used to obtain data in the form of student curiosity.

Observation techniques are used to determine students' curiosity.

The instrument in this research was tested for validity using construct validity, which was carried out by consulting the research instrument with experts. The data that has been obtained is analyzed using prerequisite analysis tests and hypothesis testing. The prerequisite tests carried out are normality tests and homogeneity tests. After the data was declared customarily distributed and homogeneous, the hypothesis test

was carried out using an independent sample t-test.

RESULT

The research results obtained were in the form of question scores for learning outcomes data and critical thinking skills data, as well as questionnaire scores for student curiosity data. The data will be presented in the form of statistical data regarding the mean, minimum score, maximum score, and N-gain, which is processed with the help of the SPSS 25 application.

Table 1. Results of statistical tests on student curiosity

		Mean	Min	Max	N-Gain
Experiment	Pretest	47	18	80	0.33
	Post-test	74	48	90	
Control	Pretest	50	15	73	0.42
	Post-test	66	28	85	

According to Table 1. the pretest score for students' curiosity was obtained from a questionnaire completed by students before being given treatment. The questionnaire given was on a Likert scale with 41 questions that students in the experimental and control classes needed to answer. Posttest scores for students' curiosity are obtained from questionnaires

completed by students after receiving treatment. The questionnaire given was a Linkert scale with 41 questions that students in the experimental and control classes needed to answer. The average score on the posttest results increased from the pretest results before being given treatment. It increased by 14.15 in the experimental and 21 in the control classes.

Table 2. Statistical test results on student learning outcomes

		Mean	Min	Max	N-Gain
Experiment	Pretest	65	26	89	0,46
	Post-test	79	62	86	
Control	Pretest	55	33	78	0,28
	Post-test	76	62	85	

According to Table 2. The pretest questions given were 40 multiple-choice questions, which were administered before being given treatment. Meanwhile, posttest scores are obtained from posttest questions, which are added with task scores, attitude scores, and psychomotor scores.

The average value of the posttest results increased from the pretest results before being given treatment, in the experimental class, there was an increase of 26.17, while in the control class, there was an increase of 18.51.

Table 3. Statistical test results of critical thinking skills

		Mean	Min	Max	N-Gain
Experiment	Pretest	31	12	56	0,32
	Post-test	54	40	69	
Control	Pretest	30	13	54	0,25
	Post-test	48	24	70	

According to Table 3. The pretest scores for students' critical thinking skills were obtained from the questionnaire completed by the students before being given treatment. The post-test scores for students' critical thinking skills were obtained from the post-test scores after the treatment. The questions given were 12 essay questions and were carried out after being given a natural exploration approach in the experiment and a scientific approach in the control class. The average value of the posttest results increased from the

pretest results before being given treatment; in the experimental class, there was an increase

of 22.23, while in the control class, there was an increase of 18.64.

Table 4. Results of hypothesis testing on students' curiosity

Signification Score	Result
0,023	H ₀ rejected

Based on Table 4. the results of the independent simple t-test hypothesis test for students' curiosity obtained a result of $0.023 \leq 0.05$, so the results of the hypothesis test for students' curiosity showed the influence of the JAS approach on students' curiosity. These results are from research by Kurnianingsih (2017), which found that the surrounding environment in the form of local wisdom can increase students' curiosity because learning with local wisdom can develop interest and motivation in learning, as shown by the increasing number of students who actively ask questions increase, this situation is also by Octaviani et al (2020) who obtained results where students asked and responded to questions from the teacher more often during the learning process. The results of this research are also by the statement of Alimah et al. (2016), which states that the JAS approach can develop students' curiosity, especially in the exploration

component; in this component, students will explore the surrounding environment, which encourages students to discover problems in the environment.

Students' curiosity increased after being given treatment using an environmental exploration approach. Students become more enthusiastic about learning by exploring the environment around the school; they also ask more questions and are more enthusiastic about paying attention to objects of observation. This is by Oktaviani's (2021) statement that students' curiosity arises when they are given conditions that create interesting challenges in the surrounding environment. This is also by interviews conducted with students where they preferred studying outside the classroom because they could pay attention to the objects/environment directly in more detail.

Table 5. Results of hypothesis testing on Student Learning Outcomes

Signification Score	Result
0,003	H ₀ rejected

Based on Table 5. the results of the independent simple t-test hypothesis test for student learning outcomes obtained results of $0.003 \leq 0.05$, so the hypothesis test results for student learning outcomes showed the influence of the JAS approach on student learning outcomes. Based on the post-test results obtained from cognitive, psychomotor, and affective scores, it was found that there was an increase in overall student learning outcomes in both the control class and the experimental class, as indicated by the number of students who obtained a complete score above 75. In the experimental class, there was an increase of 48%. Students who completed, and in the control class, there was an increase of 26% in students who completed. These results are from research by Berdanus (2017), who used the surrounding environment in science learning and obtained the results of a significant increase in student learning outcomes. Happened because learning that utilized the natural environment madestudents more active and enthusiastic

because learning was fun. The natural environment is closer and easier to learn by observing phenomena that occur according to students' abilities (Mardana, et al. 2023). The JAS approach implements constructivist learning theory, which means students build and discover their theories and facts related to the material through interaction with the environment. This can make it easier for students to understand and remember the material studied (Kalamu, et al. 2021). Problem-solving skills and scientific attitudes influence student learning outcomes (Kusuma et al., 2021). The JAS approach encourages students to be actively involved in learning and construct their knowledge by seeing and observing the natural environment directly. Learning by problem-solving encourages students to become independent (Kusuma et al., 2021).

Table 6. Results of Hypothesis testing on Critical Thinking skills

Signification Score	Result
0,080	H ₀ Accepted

Based on Table 6. the results of the independent sample t-test hypothesis test for critical thinking skills obtained a result of $0.080 \geq 0.05$, so the results of the hypothesis test for critical thinking skills did not contain the JAS approach to critical thinking skills. These results are similar to research by Havinsha et al. (2021), which found that the JAS approach with audio-visual assistance improved students' critical thinking skills. Anggraini et al. (2019) conducted research using environmental teaching materials and found that students' critical thinking skills had improved.

The results of this research are not the same as Alimah & Marianti's (2016) research, which shows that the natural exploration approach can develop several characteristics in students, one of which is critical thinking. The JAS approach has several disadvantages in the form of (1) an uncontrolled learning process, (2) requires a lot of time, and (3) learning activities become less effective. This deficiency was felt when carrying out research with a lack of time to carry out environmental observations due to reduced lesson time because it coincided with Ramadan, so students were less than optimal during the observation process. They could not observe the surrounding environment in more detail. The time used in learning is also minimal, so students cannot develop their critical thinking skills to the maximum, even though, according to (Utami et al., 2019), learning that builds critical thinking skills depends on the conditions and atmosphere of the class.

According to Ennis, critical thinking is a thinking process that revolves around finding what to believe and implement (Ennis, 2011). Several aspects of critical thinking are expressed according to Facione (2015), namely interpretation, analysis, inference, evaluation, explanation, and self-regulation. Students still do not fulfill the 6 categories of critical thinking, according to Facione (2015) so students cannot be said to have high critical thinking skills. When working on individual questions, students can answer questions by providing arguments and reasons for their answers and not just short answers. This happens when students cannot make conclusions based on data; then students will make conclusions with their predictions (Utami et al. 2019). This situation is also not by Nur'azizah, et al (2021) statement that students' critical thinking skills can provide

straightforward explanations, make conclusions, and even further explanations. However, because the students' thinking skills have not been developed optimally, students cannot work on the questions.

Several factors influence critical thinking. Mahapoonyanot (2010) conducted research and found that external and internal factors of the individual influence critical thinking skills. Factors within the individual include achievement factors, students' self-efficacy, learning motivation, learning intentions, learning attitudes, and emotional intelligence. Factors outside the individual include learning and teaching factors, learning factors, individual factors, and concerns. Dores, et al. (2020) also obtained results that critical thinking skills include psychological and physiological factors, learning independence, and interactions between teachers and students. Referring to several factors that have been mentioned in this research, many students still depend on their friends in learning activities. In many groups, only 2-3 people discuss and the rest just listen without saying anything. This is due to the condition of many students who are weak and less enthusiastic due to the condition of the majority of students who are fasting, as explained by Rosmaini (2023) one of the factors that influence critical thinking skills is a physical condition, where the better the student's physical condition, the better they will be critical thinking skills.

CONCLUSION AND SUGGESTION

Conclusion

Based on the results and discussion, it can be concluded that the Exploring the Natural Environment (JAS) approach influences student learning outcomes and curiosity. The natural exploration approach encourages students to construct their knowledge through student interactions with their environment. Students can explore the surrounding environment and find problems in the environment, thus making students ask more questions and be enthusiastic about observing objects. However, the natural exploration approach did not influence students' critical thinking skills. The lack of time given to students in analyzing causes students' critical thinking skills to be less honed.

Suggestion

In the future, it can be studied in more depth regarding the natural exploration approach to learning outcomes, curiosity, and critical thinking skills with different materials. The school environment used can be more comprehensive, and time needs to be paid attention to during the learning process so that teaching and learning activities can take place effectively.

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