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The Effect of Applying the Outdoor Learning Process on Concept Understanding and Scientific Attitude

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Abstract

This study aims to determine the effect of applying the Outdoor Learning Process on concept understanding and scientific attitude regarding the Spermatophyta sub-material in Grade X students. Learning using the Outdoor Learning Process method was conducted in the greenhouse and school garden. This research is a quasi-experiment using a non-equivalent control group pretest & posttest design. The population in this study included all Grade X students of SMA Negeri 1 Jetis. The research sample was determined using cluster random sampling techniques, with class X1 as the experimental class and class X2 as the control class, totaling 64 students. Data collection was carried out through testing techniques, observation, interviews, and documentation. Research instruments used pretest and posttest questions. The obtained data were analyzed descriptively and inferentially. Inferential analysis used: MANOVA (Multivariate Analysis of Variance) to determine the effect of the Outdoor Learning Process on students' concept understanding, and Gain Score calculation to determine the improvement in students' concept understanding. The results showed that: the application of the Outdoor Learning Process affects the concept understanding of Spermatophyta sub-material in Grade X students, evidenced by a significance value of $0.000 < 0.05$ and a medium improvement category from the N-Gain Score calculation of 0.7513. The Outdoor Learning method is able to accommodate students in obtaining direct learning experiences¹⁴. Direct learning experiences make students more enthusiastic about learning, more concentrated on the material, and develop their thinking power, thereby making it easier for students to understand the material better.

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1. INTRODUCTION

Biology as a science has different characteristics compared to other sciences. Biology is a field of science that studies living things and their lives from various aspects of problems and organizational levels. Biology learning must be designed to provide opportunities for students to discover facts, build concepts, and discover new values through processes similar to how scientists discover knowledge.

Based on field observations, students stated that the learning often conducted by teachers in the classroom uses lecture and discussion methods as well as assignment giving. Students are accustomed to receiving information from the teacher, resulting in a lack of initiative to seek the truth of the information they have received and a lack of deep understanding of the material concepts in learning. Therefore, for an active participatory learning process, appropriate approaches and methods are needed. Based on interviews with students of SMA Negeri 1 Jetis, one of the biology concepts considered difficult to understand is *Plantae*.

The low concept understanding of students can be seen from their daily assessment scores. Based on data from the last 3 years, the average Daily Assessment score for Plantae material is still below the Minimum Completeness Criteria (KKM) or below 70. Students mentioned that this difficulty is because the scope of Plantae material is quite large and complex, resulting in difficulty distinguishing the characteristics of the Plantae kingdom members. Additionally, students consider that Plantae material tends to be rote memorization, making them easily forget. Choirina, Ramli, & Rinanto (2019: 54) state that the Plantae concepts not yet understood by students concern the differences between monocots and dicots in the Spermatophyta group, plant reproduction, plant classification, and plant structure.

The problems experienced by students above, if not immediately overcome, will certainly hinder the student learning process and will impact the achievement of learning objectives. Mulyasa (2013) in Widiaworo (2017:22) states that in developing facilities and learning resources, teachers must not only be able to make their own learning tools and props but must also take the initiative to utilize the environment around the school as a concrete learning resource. Utilization of the environment around the school as a learning resource includes, for example, utilizing plants, rocks, soil, natural conditions, markets, surrounding community conditions, etc.

Based on the description above, this research was conducted to determine the effect of applying the Outdoor Learning Process to improve concept understanding and scientific attitude on Spermatophyta sub-material in Grade X students at SMA Negeri 1 Jetis Bantul.

2. RESEARCH METHOD

This study uses a quantitative approach, which is research that emphasizes analysis on numerical data processed using statistical methods. The quantitative approach is used with the aim of finding the truth value of the relationship between each research variable. The relationship between variables referred to here is the relationship between the application of Outdoor Learning Process with the improvement of students' concept understanding and scientific attitude.

This study uses the Quasi-Experiment method. The Quasi-Experiment method was chosen because the determination of students as research subjects could not be controlled because it was determined by the school (naturally formed intact group), so the selected sample could not be ensured to be homogeneous. This experimental research provides treatment in the form of the Outdoor Learning Process method to students as the researched subjects, followed by observation and assessment of the effects of the treatment.

This study uses two classes, namely the experimental class and the control class. The experimental class was given treatment using the Outdoor Learning Process method, while the control class used the lecture-discussion method. This study uses a Non-equivalent Control Group Pretest & Posttest research design to test the significance of the difference in treatment effects. Then, a comparison of pretest and posttest results from the 2 (two) classes that became research subjects was carried out.

3. RESULT AND DISCUSSION

3.1. Result

Based on the differences in methods visible in the learning steps, the division of experimental and control classes was carried out. The learning process using the Outdoor Learning Process method was carried out in open spaces such as gardens and greenhouses so that students could explore objects directly using their senses, while learning using the lecture-discussion (conventional) method was carried out in the classroom, with students observing pictures on student worksheets.

Before parametric statistical testing was carried out, prerequisite tests were first conducted consisting of normality tests, homogeneity tests, and Box's M tests.

Data on the Effect of Outdoor Learning Process Application on Students' Concept Understanding and Scientific Attitude

1. Normality Test

Based on the data, the pretest and posttest values of the experimental and control class students for concept understanding and scientific attitude showed normality test results with a significance value exceeding the determined level, which is above 0.05 (sig. > 0.05), meaning all data are normally distributed.

2. Homogeneity Test

Based on the homogeneity test results, the pretest and posttest values of the experimental and control class students on concept understanding and scientific attitude produced data with homogeneous variants with a significance of more than 0.05 (sig. > 0.05).

3. Box's M Test

Based on the Box's M test results, the pretest and posttest values of the experimental and control class students on concept understanding and scientific attitude provided results where the variance/covariance matrix

of students' concept understanding and scientific attitude is the same with a significance of more than 0.05 ($0.967 > 0.05$).

4. Hypothesis Testing (MANOVA Test)

The prerequisite test results showed that the data in this study were normally distributed (sig. > 0.05), homogeneous (sig. > 0.05), and had the same variance/covariance of dependent variables (sig. > 0.05). These results lead to hypothesis testing with MANOVA. The MANOVA test is used to see the effect of dependent variables simultaneously.

Table 1. MANOVA Test Results of Students' Concept Understanding and Scientific Attitude

Multivariate Test ^b			
Effect	Value	Hypothesis df	Sig.
Pillai's Trace	0,502	3,000	0,000
Wilks' Lambda	0,498	3,000	0,000
Hotelling's Trace	1,007	3,000	0,000
Roy's Largest Root	1,007	3,000	0,000

The data in Table 1 shows the significance value obtained for the Wilks' Lambda test statistic is smaller than sig. 0.05 ($0.000 < 0.05$). It can be concluded that there is a significant difference in students' concept understanding and scientific attitude in biology learning using the Outdoor Learning Process method compared to lecture-discussion learning. This shows that the Outdoor Learning Process method affects students' concept understanding and scientific attitude simultaneously.

Furthermore, the effect of the Outdoor Learning Process method on each dependent variable can be known by looking at the MANOVA test results on the Tests of Between-Subjects Effects output.

Data on the Effect of Applying Outdoor Learning Process on Student Concept Understanding and Student Attitude

Table 2. MANOVA Test Results for Student Concept Understanding

Data	Sig.	Sig. Level	Decision	Explanation
Posttest Concept Understanding	0.000	Sig. < 0.05	H0 rejected	Significant difference exists

Based on the data in the table above, the significance value obtained for the between-subjects effects test statistic is smaller than sig. 0.05 ($0.000 < 0.05$). It can be concluded that there is a significant difference in student concept understanding in biology learning using the Outdoor Learning Process method compared to lecture-discussion learning. This indicates that the Outdoor Learning Process method affects students' concept understanding.

Table 3. MANOVA Test Results for Student Scientific Attitude Data

Data	Sig.	Sig. Level	Decision	Remarks
Posttest Scientific Attitude	0.016	Sig. < 0.05	H0 rejected	Significant difference exists

Based on the data in Table 3, the significance value obtained for the between-subjects effects test statistic is smaller than sig. 0.05 ($0.016 < 0.05$). It can be concluded that there is a significant difference in student attitude in biology learning using the Outdoor Learning Process method compared to lecture-discussion learning. This indicates that the Outdoor Learning Process method affects students' scientific attitude.

Table 4. Calculation Results of N-Gain for Student Concept Understanding

Class	Average Score (Pretest)	Average Score (Posttest)	N-Gain Score	Criteria
Control	49.69	70.31	0.41	Medium
Experiment	54.84	83.75	0.64	Medium

Based on the data in Table 4, it is known that the N-Gain score for concept understanding of control class students is 0.41, included in the medium improvement criteria, while the N-Gain value for concept understanding of experimental class students is 0.64, also included in the medium improvement criteria. The improvement in concept understanding of control class and experimental class students are both in the medium criteria; however, the improvement score for experimental class students is much higher.

3.2. Discussions

Based on the inferential analysis results, it can be concluded that the Outdoor Learning Process method is more effective in improving student concept understanding results compared to the lecture-discussion learning method. The research results on experimental class students with the learning process using the outdoor learning method showed a high average post-test value and percentage; this is due to the demand on students to explore the environment around the school.

This understanding is in line with the results of research conducted by Widayanti (Husamah, 2013: 27), stating that learning with the outdoor learning method can make students have higher enthusiasm in learning. As for the learning results conducted in the control class using the conventional method, the results obtained were certainly different. This is because students were not very active in the learning process; they more often listened to and recorded material provided by the instructor.

According to Suyadi (Husamah, 2013: 25), some advantages of applying the outdoor learning method are making learning feel more comfortable, close, varied, and recreational, which results in a clearer mind due to brain relaxation during the learning process. The Outdoor Learning Process is a student-centered learning method. Students are directed to discover and understand the concepts they obtain during the learning process. Sardiman (2007: 21) stated that if students discover the concepts they study themselves, the retained knowledge is 90%. This is reinforced by the statement of Lestari, Fatchan & Ruja (2016: 479) that Outdoor Learning can improve learning outcomes because students become more active in learning and have high learning interest.

Through the application of the Outdoor Learning Process method, students' ability to solve problems becomes better. Students learn not only to prepare for tests or exams but also to understand and solve their own problems related to real life. Based on the hypothesis testing results, it is known that the Outdoor Learning Process method is effective in improving students' scientific attitude. The Outdoor Learning Process method places students as the main actors in learning. This is because, in the learning process, students will find a case or learning topic that will subsequently be discussed and resolved in a group discussion forum (Siberman, 2016).

Bogner and Wiseman (2004: 45) revealed that Outdoor Learning increases students' knowledge and provides opportunities for students to interact directly with nature.

4. CONCLUSION

Based on the research results, the following conclusions can be drawn:

1. The application of the Outdoor Learning Process has an effect on the concept understanding of Spermatophyta sub-material in Grade X students, evidenced by a significance value of $0.000 < 0.05$ and a medium improvement category from the N-Gain Score calculation results. The Outdoor Learning method is able to accommodate students in obtaining direct learning experiences.
2. The application of the Outdoor Learning Process has an effect on the scientific attitude regarding Spermatophyta sub-material in Grade X students, evidenced by a significance value of $0.000 < 0.05$. The Outdoor Learning method facilitates students to explore plants around the school so that students have high curiosity and critical thinking towards biological problems.
3. Additionally, the application of the Outdoor Learning Process simultaneously affects the concept understanding and scientific attitude regarding Spermatophyta sub-material in Grade X students. The Outdoor Learning Process method is able to improve several aspects of scientific attitude such as curiosity and students' critical thinking skills.

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