

# Natural Environment Exploration Approach: The Case Study in Department of Biology, Universitas Negeri Semarang

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# Natural Environment Exploration Approach: The Case Study in Department of Biology, Universitas Negeri Semarang

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## ABSTRACT

The study reports the evaluation and analysis of the implementation of the Nature Environment Exploration approach in the Department of Biology, Universitas Negeri Semarang State University. The method used was survey method. The results showed that the implementation of the Nature Environment Exploration approach was still far from optimal results determined in the indicators within learning preparation, implementation of the process of learning, and assessment of learning outcomes, even to the level of understanding of lecturers in implementing the approach in the classroom. The implementation of JAS approach was needed a model of teaching, one of which is Experiential Nature Environment Exploration (EJAS).

## KEYWORDS

Nature environment exploration approach, case study, department biology

## ARTICLE HISTORY

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## Introduction

The Department of Biology Universitas Negeri Semarang has developed an approach to learning biology named "Nature Environment Exploration (JAS)". The development of JAS approach conducted based on the findings of fact in the field of the study that time. The implementation of teaching biology at the school level and higher education is still dominated by teacher as the main source of knowledge. As Lecturing is the main choice of teachers in teaching biology, the scientific approach has not been accustomed to in the process of learning biology. Therefore, the process of learning biology to gain the knowledge, skills, and

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attitudes is focused on cognitive outcomes not on the process through scientific activities.

JAS approach as a solution to solve the problem is a contextual approach in teaching biology developed based on the theory of cognitive and social constructivist learning in the learning process. It was supported by Muijs & Reynolds (2008); Smith (2009); Arends (2008), which revealed that the learners are more effective in their learning process if the cognitive structure actively reconstruct good experience when interacting with natural phenomena and learners' social conditions.

The goal of this approach in learning biology is to create open-minded learners and allow them to relate learning concepts in real life through direct interaction with the real world around them, so that the learning becomes meaningful and useful for the future. According to these objectives, the activities of the learning process designed by teachers should be constructivist learning oriented. Thus, learning biology is not only about memorizing the concepts but also observing phenomenon that occurs in nature through scientific activities.

The outcomes of studying biology using JAS approach also measure the acquisition of skills and attitudes as the tool of communication between learners and teachers, so that learning biology become meaningful activities in learners' real life. This kind of activities make learners easier to achieve the expected competencies in the learning process and to improve the quality of teachers and teachers' candidates who are competent in accordance with standards competency of biology subjects in accordance with Government Regulation.

The results of study on the learning biology through JAS approach by can be concluded that combining the models, methods, and strategies for active learning JAS approach in the process learning biology is able to: develop students cognitive, motivate student in learning, improve student learning outcomes significantly, explore the skills, attitudes and scientific thinking of students, create more meaningful and enjoyable atmosphere of learning, facilitate students discover and understand the material, provide more active students in the learning process, teach students to think and act scientifically in finding concept, train students become cooperate, respect the opinions of others, responsible, honest on the data obtained; and to train students to give decision.

Evaluation of the implementation of the JAS approach showed that 75% of lecturers in the Department of Biology understand of JAS approach and its implementation in teaching (Suwarsi, et al, 2010). This was verified by 65.16% of all subjects had JAS approach in the process of lecture. However, the implementation of the JAS approach was still considered not optimal because it was found that the use of learning resources by students is still a 65.7% module/diktat/experimen instructions that cause 89.4% of students in the learning activities were still listening to the lecturers on the course theory and follow the dictates directives/instructions while the lecture lab practicum and learning outcomes assessed only on the level of cognitive ability. This happens because the lack mastery of active learning strategies, management strategies and the use of learning resources in the environment, and evaluation of learning outcomes by the lecturer, so that the learning process run separately between theory and practical activities and not integrated with each other.

As the result, the implementation of learning theory and experiemnt/lab work separate from each other causing the biology of learning designed with JAS

approach becomes ineffective and inefficient. This was supported by Joyce & Weil (2009); Gentry, (2012) which states that the effectiveness of learning can be achieved when the lecturer is able to use or combine learning models to achieve certain goals in the learning process and the achievement of the final result of learning process include achieving cognitive, affective and psychomotor.

Some important things to consider in applying the JAS approach are the components of the approach. The following are six components of JAS approach that should exist in every implementation in the classroom. The components of JAS is exploration, constructivist, scientific process, learning community, bioedutainment, and assessment autentic.

### Research Methods

This study applied survey method in which the data were collected by observation, documentations, questionnaires and interview. Questionnaires as the primary data was triangulated by using structured interview, documentations, and observations to give the information to be explored in more detail so that the research objectives achieved. Survey in this study is limited to the acquisition of data collected from a sample population to represent the entire population. The populations in this study were all active students in the Department of Biology, Semarang State University. Data were obtained from interviews, observations, documentations, and questionnaires were analyzed descriptively to be discussed.

### Results and Discussion

The results of the survey activities in the Department of Biology, Universitas Negeri Semarang showed that 94.12% of the students stated need to be trained with other materials to support the mastery of professional competence in their learning process. Students stated that the process of lecturing biology might not support their personal capability. Students thought that these capabilities can support personal and social competence to be a competence teacher in school workplace.

In relation with the use of variety of learning resources in learning process, it has not been sufficiently able to apply in the classroom. The data depicts 72.55% of the students responded that the subjects were followed up by the sixth semester has not fully provide direct experience (the experience of interacting directly with the object of study) on the field during the process of learning biology takes place primarily they find it difficult to understand.

The data from the survey indicates that learning activities only focus on the cognitive abilities of students as the output from the learning process that has been done. The fact is not in line with Joyce & Weil (2009); Gentry (2012); Prasetyo (2012) which states that the achievement of the final result of learning process include achieving cognitive, affective and psychomotor. The findings show that 72.73% of learning activities were focused on lecturing. It impacts on learning outcome; thus the achievement of learning outcomes focuses on the achievement of cognitive abilities.

Various methods that were used learning process was notable to train and raise the confidence of students in oral communication, especially the ability of students in a discussion of expression when the method is used in the lecture. The fact is supported by 70.60% of the students stated that in the process of learning biology they could not integrate various capabilities competence as biology teacher

candidates. The fact is in line with Smith (2009) which states that students as humans being and in his soul there is a potential that can be developed cognitive, and affective psychomotoric through a learning process.

The results of a preliminary survey of core competencies of biology teachers' candidate, students hope to be trained and integrated into the lecture field of biology so as to facilitate them achieve these outcomes. The statement was supported by the fact that 23.98% of students stating require provision of personal capabilities that are part of personal competence, 26.32% stated they need the ability to communicate, which is part of the social competence, 23.98% of them require a trained ability to cooperate which is part of social competence and 25.73% of them stated the importance of the ability of mastery of the material that is part of the professional competence.

Results of the needs analysis survey activities result that 94.12% of the students expressed the opinion that in the process of lecture courses field of biology needs to be trained ability beyond the cognitive abilities during this full potential they did not get from the lecture. The results of interviews with students in the third year of Department of Biology, in Semarang State University, obtained information that the ability of personal and social skills are needed by students in order to support their profession as a biology teacher candidate as well as preparation for Practice Field Experience (PPL) in partner schools. The findings show evidence that in understanding the cognitive abilities they never get in the lecture, especially the lecture on non-educational courses. The fact is in line with Rusilowati's statement (2012) which revealed that the need for mastery of pedagogical, social, professional, and personality of the student as a potential future biology teacher is necessary to prepare them for practical field experience (PPL), so that these competencies should be integrated in their learning process.

Some thought and research that has been conducted confirms that it is important to design a learning model that can accommodate the lack of JAS approach implementation in the learning process. Based on the findings of the study, biology teacher candidate hope that they have the right to determine and provide input on what they learned. The findings also indicate that 94.12% of students agree that in their learning process provided other the mastery of biological materials. The findings are supported by Muijs & Reynolds (2008); Joyce & Weil (2009), which revealed that in the learning process teachers help learners to master the skill to make them easier for mastering the concepts, facts, and skills as well as give them the opportunity to express their ideas, ideas, experiences and opinions in performance both oral and written.

The specifications of learning model offered as a form of implementation of the JAS approach in the learning process is Experiential Nature Environment exploration (EJAS) model. The model was designed to be implemented in the process learning biology with the aim of providing a direct experience refers to JAS approach and the ability to integrate personal, social, rational thinking, metacognition, and cognition of students in their learning process.

EJAS model specification developed and supported by the statement of the students' aspirations of the adults to determine the activities of their learning process. Results of survey on research showed that 94.12% of the students in the learning process support when they are done by interacting directly with the object of learning through collaboration and communication activity in groups study and provided with the ability other mastery of biological materials such as the ability of personal, social, communication, and metacognition.

EJAS defines as a learning model that provides hands-on experience in the learning process of learners through investigation by exploration and direct interaction with the object of learning around the learners as the main learning resources in the learning process both designed in indoor or outdoor to acquire the knowledge, skills, and attitudes as a result of learning through its five phases; interaction, communication, reflection, and evaluation (Alimah, 2013). Visually, EJAS's cycle model can be seen in the following Figure 1:

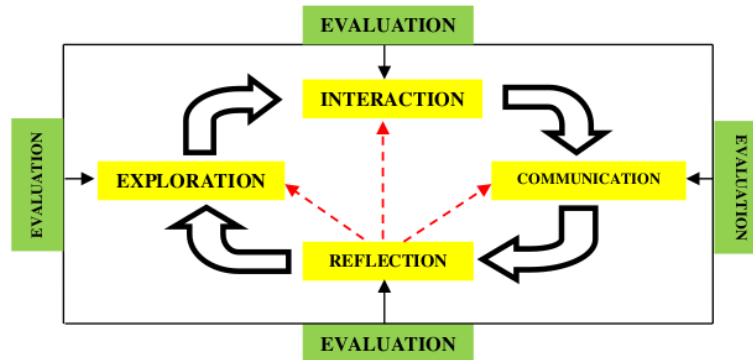


Figure 1. EJAS's cycle model

Flow diagram of EJAS learning model describes the class structure, the management and the learning environment when applied EJAS models inside and outside the classroom or performed by teachers / lecturers and learners. The main phase of the EJAS model are the exploration, interaction, communication, reflection, and evaluation of learning outcomes applied in the learning process with EJAS model continuous with one another.

Exploration phase in EJAS' model is the exploration of the environment around learners with observations. The environment is not only the physical environment, but also social, cultural and technological. Exploration activity requires students able to develop ideas or experiences through environmental investigation of the problems dealing with (Keeley, 2011).

An observation is information someone gathers about an object or event using one or more the senses, and it can be quantitative or qualitative (Finson, 2010). Observation and scientific processes in learning biology make the results learning more meaningful and observation capability raises the problem in question is able to improve the learners' ability to think logically and questions can improve the ability to think (Olivera, 2010; Spellman & Villano, 2010).

Interaction phase is the classroom which implementing contextual approach, suggest teachers to implement learning in groups study. Members of the group should be heterogeneous and consists of 3-4 people, so the clever student can teach the less intelligent and helping each others Learning outcomes obtained from sharing between friends, groups and high order thinking. By working together, the members of the small groups are better able to: (1) be confident, (2) speak to the audience, (3) over come a variety of obstacles, (4) act independently with full responsibility, (5) trust others, (6) share an opinion, (7) takes a decision, (8) respect for others, and (9) listen to others, and (10) establish mutual consent (Dart, 2006).

The information will be meaningful when students involve in classroom activities and connect the information with the personal and social environment around them (Johnson, 2007; Lederman, 2010).

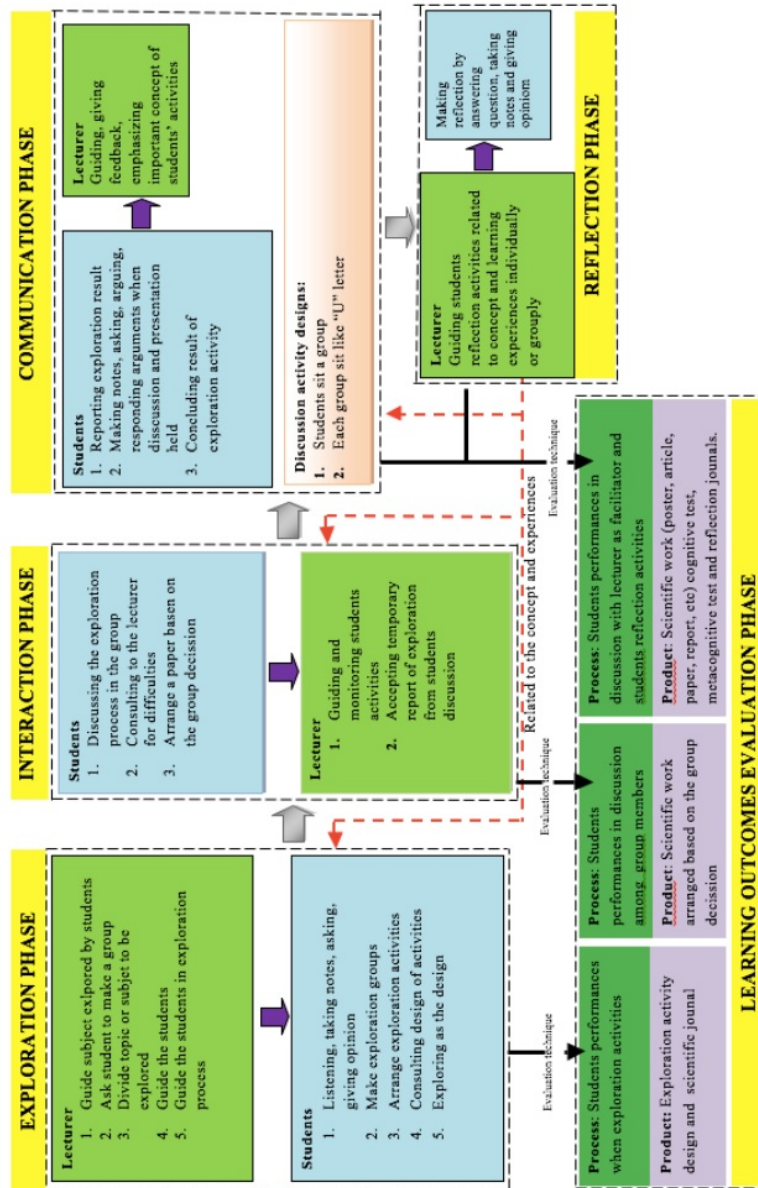


Figure 2. EJAS's flowchart models

Evaluation phase of learning outcomes is done before, during and after the learning process takes place. Evaluation phase of learning outcomes do not stand alone and not just done at the end of the learning process; it is integrated with the exploration phase, interaction, communication, and reflection so that its implementation in the learning process is not separate from the previous phase. Measurement of students' learning outcomes was done in exploration phase, interaction, communication, and reflection. A series of steps or measures were done using a measuring instrument developed based on the purpose of the evaluation conducted on the learning process.

### Conclusion

Based on the description and discussion of the results of the study, it can be concluded that the implementation of JAS approach might be integrated with a learning model that was developed based on six components. They were exploration, constructivist, scientific, bio-edutainment, community learning, and alternative assessment as the judgment. Thus, the expected implementation of JAS approach is more effective and efficient in learning biology.

### Disclosure statement

No potential conflict of interest was reported by the authors.

### Notes on contributors

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