Establishment of conservation character and metacognition capability's students through plant anatomy lesson with JAS (neighborhood exploration) approach

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Abstract. This study aims to test the effectiveness of JAS (Neighborhood Exploration) approach to shaping the character of conservation and metacognition ability in the students so that it can realize UNNES vision as a conservation university. Metacognition ability is very important because it determines the success of learning. Conservation characters include eight (8) values that are, inspiration, humanist, care, innovative, creative, sportive, honest and fair. The formation of conservation character in the students, besides done through the subject of Conservation Education, can also be implemented through the course of Plant Anatomy. This research is quantitative descriptive. The study was conducted in the even semester of 2017-2018. The population is even semester student of Biology Education program. Determination of sample taken by cluster random sampling obtained a sample of student semester four (4). The lessons were held for 4 meetings. At the end of each course, the students are asked to fill out a questionnaire about their attitude, and metacognition ability, to know the progress. Data were analysed descriptively. The results showed that of the three meetings, students' metacognitive abilities increased. Developed attitudes are religious, honest, responsible, care, innovative and sportive. Conclusion, lecture Plant Anatomy with JAS approach effective to form conservation character and developability of student metacognition.

1. Introduction
Character education really needs to be instilled as early as possible to anticipate increasingly complex problems in the future such as the low attention and care of children towards the surrounding environment, lack of responsibility, and low self-confidence [1]. Character education is very beneficial and supports students to know themselves, understand their strengths and weaknesses, and more importantly to build relationships with others [2]. Character education teaches honesty, discipline, responsibility, patriotic, respect, and care so that it is truly acceptable, internalized and implemented in daily life both in class, at home and in the life of society and state [3]. Character education is the process of giving guidance to students in order to become a whole person with a character in the dimensions of heart, mind, body, taste, and intention [1,4].

Universitas Negeri Semarang (UNNES) is a conservation-oriented university, so graduates from UNNES are expected to have conservation characteristics developed by eight faculties comprise inspirational, humanist, caring, innovative, creative, sportive, honest and fair. At UNNES there is a Conservation Education course which is a General Basic Course which must be followed by all students. It is hoped that through this course, it can build the character of conservation for students. However, if you only rely on Conservation Education courses to build the character of conservation for students, it...
seems that the Vision and Mission of UNNES as a Conservation-oriented University requires a very long time to achieve it.

Biology as a branch of science has its own characteristics compared to other natural sciences. Biology is categorized as science because it has four characteristics: Rational, Objective, Empirical, and Accumulative. Learning Biology means trying to get to know living things and their life processes in the environment so that they need approaches and methods that characterize and base work in concept development. By studying biology in depth, we as humans are expected to be able to appreciate, be grateful to God and gifts of God, and work together to maintain the balance of the ecosystem that has been created by God Almighty. Science is the foundation for the creation of other applied sciences that we have known today.

Plant Anatomy is one of the Biology courses that study the cell structure, histology, and organology of vascular plants, so as to produce intelligent students, tolerant towards fellow creatures, responsibility, and discipline as well as have a high religious sense. It is taught by innovative methods in the classroom and in the laboratory so as to produce intelligent students, tolerant of fellow beings, responsibility, and discipline.

Cognitive development is considered as a determinant of intellectual intelligence, cognitive ability continues to develop along with the educational process and is also influenced by physical development factors, especially the biological brain. The next development related to cognitive is how to manage or regulate cognitive abilities in responding to situations or problems. Cognitive aspects cannot run alone separately but need to be controlled or regulated so that if someone will use his cognitive abilities, then it needs the ability to determine and regulate what cognitive activities will be used. One must have an awareness of his own thinking abilities and be able to manage it. Experts say this ability is called metacognitive.

In order to meet the standard qualifications for tertiary education graduates according to the demands of the IQF (Indonesian National Qualification Framework), it does not only require a broad mastery of material covered in the lecture process. Ability and thinking skills and acting are very decisive factors. Therefore, learning in the university should pay attention to and apply high-level thinking learning schemes or learning of higher order thinking skills [5-7]. The learning of higher order thinking skills scheme emphasizes the understanding and reconstruction of material, the development of creativity and the ability of student metacognition.

Biological learning with JAS (Neighbourhood Exploration) approach uses the surrounding natural environment, physical, social, cultural and technological environments as objects of learning whose phenomena are learned through scientific work. According to Alimah and Marianti [8], the impact of studying Biology using the JAS approach (Neighbourhood Exploration) is: (a) add/strengthen confidence in the greatness of God Almighty based on the existence, beauty, and regularity of the nature of His creation, (2) providing an understanding of living things, various natural phenomena, principles and concepts of biology and their interrelationships, (3) develop curiosity and a positive attitude towards other living beings and their environment, (4) provide experience to students to plan scientific work so that a scientific attitude is formed, (5) increase awareness to maintain and preserve the environment and natural resources, (6) provide basic knowledge to continue to the next level of education, (7) the approach used in Biology learning is student-oriented, the teacher is the facilitator. Learning experiences are obtained by students through a series of activities to explore the environment through active interaction with the environment, friends and other resource/learning resources.

Based on the explanation above, a study entitled "Building Conservation Characteristics and Students' Metacognition Ability Through the Anatomy of Plants with JAS Approach" was conducted to examine the effectiveness of the JAS Approach in building students' conservation character and metacognition abilities.

2. Method

This research is a quantitative descriptive study carried out in the even semester of the academic year 2017 - 2018. As the population in this study were all Biology Education students even semester 2017 -
The sample was determined by cluster random sampling technique, obtained by 4th-semester students as samples. Learning was carried out using the JAS approach for 4 meetings. At the end of each lesson, the students were asked to fill out a questionnaire about their attitudes and metacognitive abilities. The attitude developed is religious, honest, responsible, caring, innovative, and sporty which is the translation of the character of Conservation. Data were analysed descriptively.

3. Results and Discussion

At the beginning of the study, an explanation was given to students about the Character of Conservation which should have been understood by UNNES students. 4th-semester students have taken Conservation Education courses so that they understand what is meant by Conservation character. At the end of each learning session, instruments about attitudes and metacognition are shared with students.

From the lesson of Plant Anatomy, data were collected four times, namely in the material of Parenchymal, Root, Stem and Leaf Networks. The results obtained regarding metacognitive abilities through the Plant Anatomy lesson are presented in Figure 1.

![Figure 1. Metacognitive ability of students through the lesson of plant anatomy with the JAS approach](image)

Metacognitive is a human ability to control or monitor his mind, and its application in Education, metacognitive is the ability of students to monitor, plan and evaluate a learning process. Students who have developed their metacognitive skills will be independent in terms of the material or knowledge they learn, being honest with their abilities, meaning realizing the strengths and weaknesses they have and dare to try new knowledge to gain knowledge and improve abilities.

Based on Figure 1 we can see that metacognitive abilities have increased and decreased at each meeting. This possibility is due to the characteristic, or difficulty level of the lecture topics that are taking place. The lowest achievement is topic of stem among other materials, although in general, the students' metacognitive abilities were 100% good and very good. The rise and fall of metacognitive abilities because in the stem topic there is new material that had never been studied in high school that is about aberrant growth/anomaly in the stem. While other material had been studied in high school, only the discussion in college was more profound.

According to Livingstone [9], metacognition is the ability to think, which is the object of thinking is the process of thinking that happens to oneself. Plant Anatomy lesson using the JAS approach encourages students to explore or explore references and observe plant anatomical structures, interact
directly with facts in the real world, which will encourage the development of students' thinking skills. The implementation of lectures with discussion will guide students to develop the habit of asking questions. This questioning habit can also develop student metacognition skills. In addition, JAS was developed based on a combination of exploration, investigation, constructivism, process skills and cooperative learning, which is student-centered, so as to develop cognitive, affective and psychomotor skills [10].

Metacognitive abilities are related to the students' personal abilities and social abilities. There are several indicators to measure students' personal abilities, namely: (1) completing assignments on time; (2) giving enthusiasm and motivation to friends; (3) realizing self-deficiency; (4) gratitude for his favors; (5) sensitive to others; (6) efficiently managing time during lectures; (7) reporting observations according to data obtained in the field; (8) carry out all activities according to procedures, and (9) skill in communicating verbally. Based on the above indicators, data on student's personal ability is obtained through the Plant Anatomy Lesson presented in Figure 2.

From Figure 2 it can be seen that the personal abilities of students are also not permanent, but they experience an increase and decrease. In the parenchyma topic, the students' personal abilities were 41.67% very good and 58.33% good. In the root topic, there was a significant decline because 100% of students only achieved enough personal ability. Personal ability describes the ability of students to manage themselves in completing tasks, be aware of their own abilities and weaknesses, and able to communicate well. In the next material, the material stem, students experienced a rapid increase, reached the category of good and very good, although there were still 2.56% with sufficient personal ability. This certainly cannot be separated from the characteristics and level of difficulty of the material that students learn. In the next material, the leaves increase so that they reach 50% very well and 50% good.

Figure 2. Personal ability of students through the course of plant anatomy with the JAS approach

To measure students' social skills there are also several indicators, namely: (1) participating in team activities; (2) actively participate in teamwork; (3) actively asking if you don't understand; (4) can be compromised; (5) mutual assistance in teamwork; and (6) skilled at communicating scientifically orally. This data is shown in Figure 3.

Based on Figure 3, the highest achievement for student social skills in a root topic is 85.71% very good and 14.29% good. Then it experienced a decrease in stem topic because there were still 2.56% of which had sufficient capacity. In leaf topic, there is an increase of 80% very well and 20% good. These students' social skills illustrate the ability of students to work and discuss groups and communicate the
results of their scientific discussions. Here clearly the ups and downs of students' social abilities are influenced by the level of difficulty of the material being discussed.

Figure 3. Student social ability through the course of plant anatomy through the JAS approach

The JAS approach in the lesson of Plant Anatomy is also expected to shape the religious attitudes of students and the scientific attitudes studied here are: caring for the environment, honesty, tolerance, discipline, and responsibility. Data on student attitudes can be seen in Table 1.

Table 1. Establishment of attitudes through plant anatomy learning with JAS approach

| Lesson | Topic   | Religious | Environment care | Honest | Tolerance | Discipline | Responsible |
|--------|---------|-----------|-----------------|--------|-----------|------------|-------------|
| Plant  | Parenchyma | Very good | Good            | Good   | Very good | Very good  | Enough      |
| Root   | Very good | Good      | Very good       | Good   | Very good | Very good  | Good        |
| Stem   | Very good | Good      | Very good       | Good   | Very good | Very good  | Good        |
| Leaf   | Very good | Good      | Very good       | Good   | Very good | Very good  | Good        |

From Table 1 it can be seen that the JAS approach is very effective in shaping religious attitudes, and discipline in students. At each meeting shows a very good attitude. This is because in lectures it is accustomed to always pray at the beginning and end of the lecture. The course in Plant Anatomy uses various types of plants for practicum, which are observed in their anatomical structure. By observing plant anatomical structures that are always related to their function can increase faith and increasingly believe in the majesty of Allah SWT.

Likewise regarding discipline, it is always emphasized that to achieve success must be discipline. Starting and ending the lecture must be on time. Especially for practicum, students who are late are not permitted to take part in the practicum because before the practicum begins, a test is conducted first to see the readiness of students in participating in the practicum.

For environmental care and tolerance on the topic of parenchyma, it has shown a good attitude and on the next topic, it has improved very well. This is because in the discussion there was a discussion, one group presented the material responded by the other group. With this habit of discussion, it turns
out that it can foster an attitude of tolerance for students. While the discussion about Plant Anatomy in practicum using various types of plants can develop a sense of environmental care for students.

Based on the data in Table 1 it seems that planting the most difficult responsibilities among other planting attitudes. Therefore, the attitude of responsibility should be instilled from an early age, as a child, in a family environment. Planting cannot be done in just a few meetings.

4. Conclusion

Based on the discussion above it can be concluded that learning using the JAS approach can increase students’ independence in learning, be more aware of the strengths and weaknesses they have and dare to try new knowledge to gain knowledge. This means learning using the JAS approach is effective for developing metacognitive abilities.

The attitude developed through learning with JAS approach is religious attitude, honesty, tolerance, caring for the environment, discipline, and responsibility, which is a description of the character of conservation. The JAS approach is very effective in developing religious attitudes, honesty, and discipline in students, because students are accustomed to starting and ending lectures with prayer together. The habit of discussing in learning with JAS can develop tolerance for students. While the discussion about Plant Anatomy in practicum using various types of plants can develop a sense of environmental care for students. Develop the most difficult attitude of responsibility among the development of other attitudes.

Acknowledgments

Our thanks go to the Rector and Head of LP2M UNNES who have provided the Research Fund for Scientific Development so that this research can be carried out.

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