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A STUDY OF STUDENTS' ENTREPRENEUR CONCEPTS AND INTERESTS IN SUSTAINABLE LEARNING CONCEPT IN *SPERMATOPHYTA* MATERIALS OF STUDY

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Abstract

Based on Curriculum 2013, science learning process should apply an integrated concept. This study aims to investigate the effects of learning sustainability charged on Spermatophyta material by explored local plants in Muria's mountains to understand the concept and interest of entrepreneur students in class X. Implementation of research conducted in the even semester of academic year 2016/2017 with research population of class X MIPA in one SMA Negeri in Kudus District. The sample used is class X MIPA 5 as experiment class and class X MIPA 7 as control class. Purposive sampling and nonequivalent control group design used as sampling techniques. The results of data analysis show that there is an increase in concept understanding in experimental class and control class. The experimental class' retention is higher than control class; the control class is in a low category while in the class in the medium category. Student entrepreneur's interest in experiment class was higher than control class, and t-test showed the significant difference ($p < 0.05$).

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INTRODUCTION

In Indonesia, sustainability means berkelanjutan. It means that every nation, city, or region as well as individual will growth sustainably; thus, it needs sustainable development concepts. Development does not only give many positive impacts, but it also gives negative impacts from the excessive exploitation of natural resources. One of the negative impacts is destroying the environment which affects to human resources (Omer, 2008).

The conference of United Nations (UN) regarding "Human's Environment" in Stockholm, Swedia, 1972, becomes the initial moves for the human to focus on the environment. In the following conference, global community emphasizes on the firm interrelation between environment and social and economic issues ranging from poverty to regressive development. Since the 1980s, sustainable development grows as the conceptual response to the needs of economic and social development concerning on the environment and natural resources conservation. According to Bruntland Report (1987) in (UNESCO Education Sector, 2012), sustainable development is a development which can fulfill people's current necessity without sacrificing the needs of future generation.

Suprastowo *et al.* (2010), explains that sustainable development can be reached through education; since education is the tool to change perception, behavior, and human's attitude. Every aspect of intelligence are coped in education; thus, there should be a synergy to the economy, socio-culture, and environment in managing and utilizing natural resources. The sustainability should be applied in sustainability concepts materials in formal education or school. The task of teachers is making learning process with learning context which can direct the students to form the current condition which can be sustainable in the future. After that, according to Grigorov and Fleuri (2012), to create a sustainable social reality transformation directly with a context to the environment, there should be actions to prevent, preserve, and build. Through these actions, there will be a preservation of nature, welfare of current or future generation, and creating a sustainable life. Sustainable development learning is formulated as education which means, functions, and aims to: (1) development which can fulfill the necessity of current generation without necessarily neglect the necessity of future generation, (2) improving human's living quality by staying alive under the support of the ecosystem, and (3) giving benefit to all creatures in the earth (human and ecosystem) recently or in the future (Suprastowo *et al.,* 2010).

Sustainable development based learning can explore local potentials. A local wisdom in Kudus is the local vegetation in Muria highlands which has not been utilized maximally. Wibowo *et al.* (2012) inform that there is only a few of information regarding the utilization and potentials of the vegetation in Muria. The use of the plants is limited only to be sold or simply cooked with no innovation to diversify its production as other product. From this local potential, there should be maximum utilization which can open new job fields as well as preserve local plants in Muria highlands. The knowledge regarding the potentials of local vegetation should be given to society, including high schools' students, in Kudus regency that they can also participate in preserving it.

In another hand, the majority of problems faced by students in biology is the difficulty of students in understanding concepts. Since, the materials need the mastery of concepts, not only simple memorization. From the concepts, teachers always spend their meetings by explaining detail materials with less time on giving students chance to explore local potentials in mind on and hand on (Khusniati, 2014). It makes the students passive in learning and understanding concepts. Students should be taught to solve the authentic problems around them to solve problems regarding natural science and technology.

Besides, one of Indonesia's recent problems is the high number of unemployment. ILO states that the number of unemployments in Indonesia reaches 6.25% in August 2013. Approximately, the number is increasing annually. 70% of those people are coming from 15-29 years jobless people. This high number is caused by many graduates of high school which does not continue their education to higher education, the limited number of job files, and fewer skills possessed by high school graduates to be independent (Kristanti *et al.*, 2012).

Based on Robert *et al.* (2008), the high number of unemployment from high school graduates can be handled by giving students understanding of entrepreneurship. Entrepreneurship has three pillars which should

be owned by people to do: (1) Scientific and managerial; scientific to find organic materials which are potential to be a commodity, (2) Technology; to support productive activity, (3) Money; as the main capital.

Based on this background, this research aims to investigate the influence of local vegetation in Muria highlands in sustainable development based learning in spermatophyte materials to students' interest and the concept of entrepreneurship. It is assumed that in the school, bioecology of local vegetation in Muria can be applied to every material of biology for high school students. One of the materials which should be mastered by X grade high school students is about Spermatophyte. The main study of this materials is the general characteristics of spermatophyte, its classification, reproduction, and its role in human's life. The material of spermatophyte is a bit difficult material since it has the very wide scope of many examples. There should be theoretical information given to students with correct learning media. Likewise, in biology, the entrepreneur is easy to develop since spermatophyte material discusses the impact of the plants on local potentials' sustainable development. This contextual material is then actualized in learning practicum to develop local potentials' product. The outcome of this learning will be used to give students model of entrepreneurship based on Education for Sustainable Development principles, economy, socio-culture, and environment.

METHODS

This research used Quasi-Experiment approach with Non-Equivalent Control Group Design Model. This research was done at State Senior High School (SMAN) in Kudus regency. It was done in the even term of 2016/2017 academic year in January-February 2017. The population of this research was all students in X MIPA class. The samples were taken using purposive sampling in 2 classes, including X-5 MIPA as the experiment class, and X-7 MIPA as the control class. The instrument of research to the experiment class was learning materials for sustainable development based materials, including syllabus, lesson plan, and students' worksheet focusing on spermatophyte which is integrated to the perspective of Education for Sustainable Development (Suprastowo *et al.*, 2010); UNESCO Education Sector, 2012; Hoelman *et al.*, 2015; Grigorov and Fleuri, 2012); the materials for the control class did not use the same materials (sustainable based). The items of the test given to students were multiple choice for concept understanding and questionnaire to measure students' interest to entrepreneur.

Sustainable development learning with local vegetation in Muria highlands in spermatophyte with ESD perspective and indicator enhanced with the formula of preventing, preserve, and build can be seen as follows:

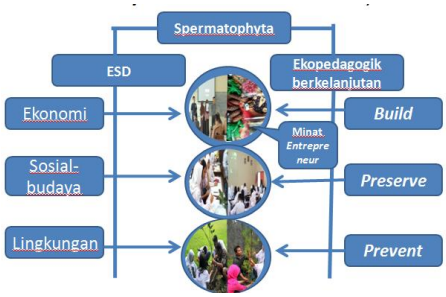

Figure 1. The Design of Sustainable Development based Learning focusing on Local Vegetation in Muria Highland

This sustainable development based learning in spermatophyte should be applied to design and innovate products from local plants in Muria highland as the implementation of build aspect and economic aspect. Then, there should be an application of local wisdom and culture's introduction to society in Muria highland, particularly in utilizing the local plants as people's job in the form of video. It is the implementation of preserve aspect along with socio-culture. Next, in the learning process, students should also be invited to plant endemic seeds of Muria highland as the attempt of conservation. This learning process shows the implementation of sustainable in environmental aspect as well as prevent. These activities create exciting learning for students.

The analysis of pretest and posttest of students understanding used normalized N-gain to know the improvement. It was also mesmerized by paired samples t-test to know the understanding of the concept in experiment and control class. The data of students' interest in entrepreneurship used independent samples t-test to know the difference between experiment and control group.

RESULTS AND DISCUSSION

Conceptual Understanding

The data of students' conceptual understanding of pretest and posttest score of experiment and control class can be seen in Table 1 as follows.

Table 1. Concept Understanding in Experiment and Control Class

	Control		Experiment	
	Pretest	Postest	Pretest	Postest
Average	49.75	53.25	46	63.25
Min	30	30	30	35
Max	65	70	60	90
N-Gain	0.05 (Low)		0.30 (Moderate)	

From Table 1, there was an increase of concept understanding both in experiment and control class. The understanding of experiment class was somehow higher than control class. Based on Hake (1998), concept understanding in experiment class was medium, and the control class was categorized as low. It is supported by the result of paired samples t-test pretest-posttest showing that tcount of -7.506 with the degree of freedom (df) of 39 and Sig. (2-tailed) Of 0.000. Based on the comparison of ttable and tcount, it obtained ttable of 2.023 with tcount of -7.506. Thus, tcount was not in the acceptance area of Ho. Therefore, there was a significant difference in the average score of pretest and posttest in the experiment class. Meanwhile, the control class showed tcount of -1.590 with the degree of freedom (df) 39 and Sig. (2-tailed) Of 0.120. Based on the comparison of ttable with tcount, it obtained ttable of 2.023 and tcount of -1.590. It means – ttable < tcount < ttable ; thereby, Ho was accepted. Thus, there was no significant difference in pretest and posttest score in control class. The increasing understanding of concepts in experiment class was higher than control class due to the application of sustainable development concept in spermatophyte materials, mainly focusing on socio-culture, economy, and environment; and the implementation of prevent, preserve and build simultaneously using local issues of local vegetation in Muria highlands along with direct identification of the plants and planting the seeds of local plants in school environment as the attempt of conservation. It was successfully able to motivate students to be more active in assimilating, accommodating, organizing, and constructing concepts inside students' mind; thus, students in experiment class will be easier to understand the concepts than the control class with traditional learning. Rahman and Rochintaniawati (2001) explain that students' directed activity is the extrinsic factor which influences their interest, behavior, and attitude to construct knowledge that forms their conception and understanding to the materials. Besides, in accordance to Mumpuni *et al.* (2013), contextual learning directs the learning process to find concepts and relate that to the real-life activity which encourages the students to understand the materials and implement it into their daily life. The use of local plants in Muria in this sustainable learning is one of the ways of direct learning. In the learning process, there is a process of relating new information to relevant concepts in students' cognitive behavior (Rahman and Rochintaniawati, 2001). In line with Wiratini *et al.* (2011), contextual learning can encourage the students to find more sources of information that they can be more motivated to learn actively and master the material well. Then, biology will be more meaningful to them from the concrete learning sources that they experience directly. Learning with real sources will deliver more natural learning which will guarantee students' success than the abstract ones. It is caused by learning from real sources will make our senses organs play more vital roles in sending information to our brain.

In control class, the mastery of concepts was low with no significant difference on the average pretest and posttest score. Since the students considered that the learning was boring, and it made them less enthusiastic in following it. Spermatophyte materials were only presented with media of pictures and existing plants around the school from the beginning to the end of the meeting. This process did not dig students' ability deeper. Otherwise, if they are given more facilities, they will have more educational stuff absorbed and inserted (Arsyad, 2011). The increase of concepts' understanding based on Bloom's Taxonomy in experiment and control class can be seen in Figure 2 as follows.

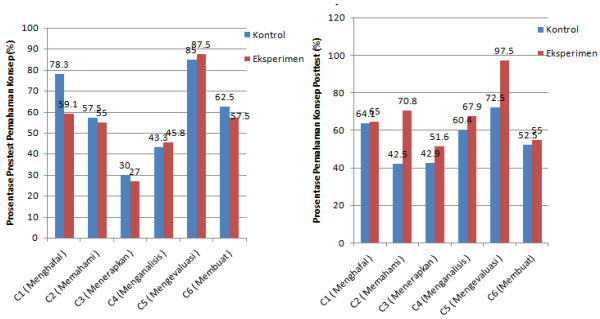

Figure 2. The Graphics Showing the Increase of Concept Understanding in Pretest and Posttest of Control and Experiment Class

In Figure 2, it can be seen that the conceptual understanding of control class in C4-C6 (the most difficult concepts' understanding) experienced a decrease while the experiment class only experienced that in C6. In addition, experiment class got an increase of C4 and C5 with the activities of pointing out their mind from identification, applying the identification in classification, analyzing the mutagenesis of plants, analyzing the problems of Muria highlands' forest, analyzing the activities of Highlanders in Muria, evaluating the roles of local plants to Highlanders, and innovating products from the plants. Those activities taught students to use their factual, conceptual, procedural, and metacognitive understanding comprehensively and continuously. The decrease of understanding in C6 was caused by students' difficulty to plant the correct ways of plants' conservation in Muria highlands.

Interest in Entrepreneurship

The average of students' interest in entrepreneurship in experiment and control class is delivered in Table 2.

Table 2. Average Interest to Entrepreneurship of Students in Control and Experiment Class

No	Category	Control		Experiment	
		Σ	%	Σ	%
1	High	29	72.5	39	97.5
2	Medium	10	25	1	2.5
3	Low	1	2.5	0	0
Total		40	100	40	100
Means		67.81		77.31	
Deviation Standards		14.3		22.2	

The data of entrepreneurship interests showed that students in experiment class had higher score comparing to control class from the mean and categories. T-test obtained tcount of -5.989 with the degree of freedom (df) of 78 and Sig. (2-tailed) of 0.000. Based on the comparison of ttable and tcount, it obtained ttable of 1.991 with tcount of -5.989. It means that tcount < -ttable ; thereby, Ho was rejected. Finally, there was a significant difference of interest to entrepreneurship of students after learning Spermatophyte using local plants in Muria highland added with sustainable development concepts and with the only conventional method. It is because, in the learning process, students in experiment class were invited to know how is the life of Highlanders in Muria as well as invited to design an innovation of products from local plants in Muria. As research done by Suharti and Sirine (2012), there was a positive and significant influence on academic support variable to people's interest in entrepreneurship. Academic support is an academic process which can motivate creative ideas that can be developed to train people to be an entrepreneur. Likewise, Rosana (2014) says that education should be used as a cultural tool which can be directed to sustainable development, especially in developing individuals continuously. It is in line with Law Number 20 The year 2003 about National Education System Chapter III Clause 3 stating that education is held to make people civilized, to build their characters, and empowering them. UNESCO's conference in 2005 recommended to make education always be directed to sustainable development as those above. Good education should be able to produce graduates who are unique knowledge and always develop their ability. Therefore, the parameter of the success of a learning process cannot be measured only by the level of achievement after the learning process is finished. Nonetheless, it should also be predictive to know how far is the insertion of sustainable development for students' independent development, specifically in developing their interest in entrepreneurship.

The date of students' interest in entrepreneurship in both experiment and control class is delivered in Figure 3. In Figure 3, it can be seen experiment class had the higher score in the environment, personal appreciation, vision, as well as income and confidence than the control class. Since the user of local vegetation in Muria motivated the students to be able to use the plants

as a commodity for entrepreneurship. Besides, students were also challenged to use local potentials from their origin places. Meanwhile, in opportunities and personality, experiment class students had the lower score than control class. Since they thought that it was difficult to develop the resources in Muria and use it for entrepreneurship, and it was not easy to change students' behavior to be more independent.

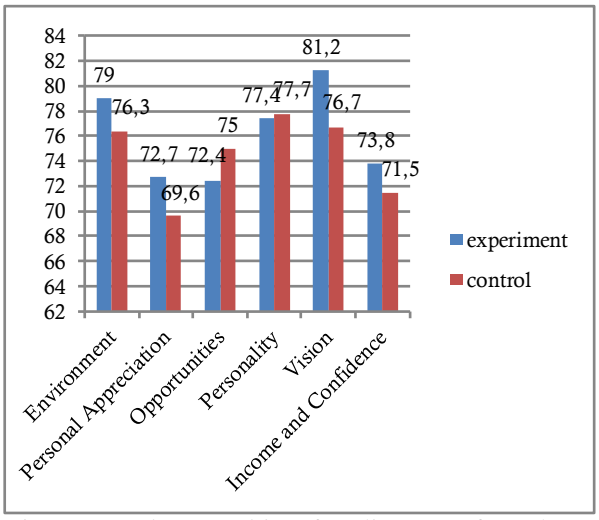

Figure 3. The Graphic of Indicators of Students' Interest to Entrepreneur in Experiment and Control Class

CONCLUSION

The implementation of sustainable development learning for spermatophyte with the use of local plants in Muria highlands provided the positive influence to students' understanding of concepts and entrepreneurship. It can be seen from the increasing score of pretest and posttest in experiment class which was categorized as medium, yet the control class had the low N-gain score. Also, there was a significantly different ($p < 0.05$) to students' interest in entrepreneurship with a class using sustainable development material than the class which used conventional learning.

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