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Disclosure of Sustainability Consciousness in Elementary School Students: Application of Education for Sustainable Development through the Introduction of Green Behavior

Ade Yulianto[1], Ari Widodo ✉[2], Ernawulan Syaodih[3]

[1,2,3] Primary Education Study Program, School of Postgraduate Studies, Universitas Pendidikan Indonesia

adeyulianto@upi.edu ; ✉ widodo@upi.edu ; ernawulansy@upi.edu

Abstract. After the "2030 Agenda for Sustainable Development" with 17 Sustainable Development Goals (SDGs) has become a global consensus in 2015, its implementation raises questions about the role of education in achieving these goals. Because education clearly covers the content of all the SDGs and provides the skills and competencies needed to face the challenges of a sustainable future. Education for sustainable development (ESD) is the role of education to promote sustainable development, which in this study is applied through the introduction and implementation of green behavior activities in elementary schools. The purpose of this study is to measure the sustainability consciousness of elementary school students through the implementation of ESD in elementary schools. This research is an experimental research in the form of pre-experimental design (single group designs). The instrument used in this research is the Sustainability Consciousness Questionnaire (SCQ) which allows the investigation of students' knowledge, attitudes, and behavior of sustainability. The results of this study indicate that students who have been given an education for sustainable development program through the introduction of green behavior experience a significant increase in sustainability consciousness. The implications of this research provide an overview of cognitive and affective responses to students regarding issues that are the scope of ESD such as global issues, issues related to human sustainability, consciousness of recovery from environmental damage that is happening today, and thinking about how to preservation is able to survive and can fulfill life in the future.

Keywords: ESD, Sustainability Consciousness, SCQ, Elementary School.

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INTRODUCTION ~ After the "2030 Agenda for Sustainable Development" with 17 Sustainable Development Goals (SDGs) has become a global consensus in 2015, its implementation raises questions about the role of education in achieving these goals. Since education clearly covers the content of all the SDGs and provides the skills and competencies, necessary to meet the challenges of a sustainable future, very basic questions must be answered clearly in order to proceed: What is Educational for Sustainable Development (ESD)? To understand what is meant by "Education for Sustainable Development", it helps to reflect on the expression of the theme of its single components. Following this approach, "education" is clearly an instrument or means to support or strengthen the process of "sustainable development", where this process clearly has the desired goal, namely "sustainability". ESD generally focuses on developing and strengthening individual competencies, enabling individuals to contribute and participate in sustainable development processes of various types and dimensions (Hoffmann & Siege, 2018). ESD has 3 pillars that adopt the concept of sustainable development, namely the environment, economy and society (UNESCO, 2017). Where through the concept of sustainable development, there is an overarching goal to balance the welfare and improvement of people's

lives globally in space and time, while at the same time conserving natural resources and ecosystems (Pauw et al., 2015). Goleman et al., (2012) explained that green behavior is human behavior in protecting and maintaining the environment in their immediate environment. Green behavior arises because of human consciousness to love the universe. According to Syaodih & Handayani, (2015) explained that green behavior needs to be instilled in children from an early age so that in the future children will become adults who have the behavior of loving the universe. Green behavior is a reflection of responsibility and concern for the environment that must exist and be owned by every human being. The formation of human behavior towards the environment is related to attitudes and values that come from knowledge, feelings and tendencies to act (Putri & Nikawanti, 2010).

In this context, education for sustainable development specifically involves the acquisition of a number of competencies (de Haan, 2006). Where building competence means a special capacity for action and problem solving, those with this competence can help, through their active participation in society, to change and shape the future of society, and to guide social, economic, technological and ecological change in society. along the lines of sustainable development (de Haan, 1999). Or it means having the skills, competencies and knowledge to make changes in economic, ecological and social behavior without such changes always only being a reaction to pre-existing problems (de Haan & Seintz, 2001). In addition to the above which explains the meaning of sustainability and the competencies that need to be developed, there is another integral aspect of sustainability, namely sustainability consciousness (SC) to evaluate ESD projects that include environmental, social, and economic dimensions (Olsson et al., 2019). The term sustainability consciousness means a person's knowledge, attitudes and behavior about social, economic and environmental matters (Kalsoom & Khanam, 2017). Berglund & Gericke, (2016) and Olsson et al. (2016) describe sustainability consciousness as a concept that consists of knowledge, attitudes, and sustainability behaviors about the environment, social and economy. Similarly, Pauw et al. (2015) defines sustainability consciousness as an idea that is incorporated into environmental, social, and economic issues, as well as psychological constructs related to knowledge, attitudes, and behavior regarding these issues. Sustainability consciousness is more than just knowledge about sustainability, Kollmuss & Agyeman, (2002) state the complex concept between cognitive and affective. The cognitive aspect involves knowledge or information about social, economic and environmental problems and their interrelationships. Meanwhile, the affective aspect relates to a deeper level of consciousness and concern about sustainability issues which is reflected through one's attitudes and behavior. The concept of sustainability consciousness (SC) gives an indication that students are able to consider all dimensions of Sustainable Development and with the operationalization of Sustainability Counciousness through a questionnaire it is possible to investigate whether there are differences between students regarding the perception of Sustainable Development (Olsson et al., 2016). The evaluation of student responses used in

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Likert scale questionnaires can be divided into three categories: cognitive, affective and behavioral, (Fishbein & Ajzen, 2010 in Gericke et al., 2019) and it is said that by basing the Sustainability Counciousness Questionnaire (SCQ) or consciousness questionnaire sustainability in knowledge, attitudes and behavioral items related to Sustainable Development and can be built into the construction of Sustainability Consciousness. Cognitive responses can be described as thoughts, opinions or ideas about an object, and are mostly found in knowledge items, but in certain cases they are found in attitude items. Affective responses consist of emotions, moods or feelings, and are mostly reflected in attitude items, because attitudes can be defined as lasting positive or negative feelings about some object, person or problem (Kollmuss & Agyeman, 2002 in Gericke et al., 2019).

Therefore, the concept of sustainability consciousness (SC) was developed and operationalized into a survey instrument (Gericke et al., 2019). The concept of sustainability consciousness includes aspects of environmental sustainability, as well as social and economic sustainability. The Sustainability Consciousness Questionnaire (SCQ) allows the investigation of students' knowledge, attitudes, and behaviors of sustainability (Gericke et al., 2019). In addition, the SCQ covers important aspects of education that are critical to the investigation of overall sustainable development consciousness and the readiness of the current generation for future action on sustainability issues. The issues that are within the scope of ESD are related to global issues, as well as those related to the sustainability of human life, ESD not only guides people to be aware of the recovery from environmental damage that is happening today, but also thinks about how to make conservation sustainable and sustainable. fulfill life in the future (Segara, 2015). From the description above, researchers measure sustainability consciousness on the agenda to determine the students' basic abilities in sustainability consciousness that they already have, the results of this measurement are used as a reference to further develop appropriate and effective ESD programs to be applied in the context of learning in elementary schools. As for the process of analyzing data on sustainability consciousness in elementary school students, the use of rocky Rasch modeling with the Winsteps 5.14 application. The Rasch model which provides psychometric analysis techniques can be used by teachers to develop test items as well as an important tool that can provide relevant information regarding student assessments of learning (Sumintono, 2018). The analysis of this test instrument using the Rasch model is included in the theory of item response measurement. This measure describes the interaction between the subject and the test item. This will make measurements have more precise and objective results (Sumintono & Widhiarso, 2014).

METHOD

The method used in this study is a quantitative method. In the quantitative method, experimental research is carried out in the form of pre-experimental design. The pre-experimental design did not have a control group to compare with the experimental group, and some did not even test the experimental group before the experiment and random sample

selection could also be omitted (Walliman, 2017). The pre-experimental designs used in this study were single group designs (one group pretest-potstest design). Single group designs (one group pretest-posttest design) usually involve three steps: (1) conducting a pretest that measures the dependent variable; (2) applying experimental treatment X to the subject; and (3) perform a posttest, re-measure the dependent variable. The differences associated with the application of the experimental treatment were then evaluated by comparing the pretest and posttest scores (Ary et al., 2010). The single group designs (one group pretest-potstest design) are as follows:

O_1	X	O_2
Pretest	*Treatment*	*Postest*

Figure1. Experimental Design One Group Pretest-Posttest (Creswell, 2014)

Determination of the research sample is done by using purposive sampling technique where the sampling of data sources is based on certain considerations. Data was collected through the provision of a sustainability consciousness questionnaire (environmental domain) to elementary school students. Furthermore, the data that has been collected will be processed and analyzed through Rasch modeling with the help of the Winsteps 5.14 application. All items used have been tested for validity with the result that all items used are valid and have a reliability value (Cronbach's Alpha) of 0.8.

RESULT & DISCUSSION

Education for sustainable development (ESD) program which was developed through the introduction of green behavior by adopting several principles of The Earth Charter 1) Respect earth and life in all its diversity; 2) Care for the community of life with understanding, compassion, and love; 3) Adopt patterns of production, consumption, and reproduction that safeguard Earth's regenerative capacities, human rights, and community well-bein. The concept of green behavior was then integrated into integrated thematic learning. Theme 9 "My Country Rich", Sub-theme 3 "Preservation of Indonesian Natural Resources" for grade 4 Elementary School. The results of this study reveal students' abilities regarding sustainability consciousness before and after the implementation of the ESD program through the introduction of green behavior. The data processing uses racking analysis through Rasch modeling assisted by the Winsteps 5.14 application. to find out changes in students' abilities based on the items on the sustainability consciousness questionnaire (SCQ).

Table 1. Results of Data Racking Analysis Pretest-Posttest Sustainability Consciousness

No. Item	Logit Item Pretest	Logit Item Posttest	Perbedaan Logit
1	-1,11	-1,89	0,78
2	0,43	-0,79	1,22
3	0,67	-0,49	1,16
4	2,14	0,67	1,47

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5	1,92	0,24	1,68
6	0,18	-1.67	1,85
7	0,55	-0,64	1,19
8	1,07	-0,94	2,01
9	1,12	-1,47	2,59

The results of this study revealed that all items of the sustainability questionnaire filled out by elementary school students experienced a significant increase in terms of the difference in logit items, where this information can be used as an illustration for the development of the ESD program in elementary schools. The calculation of the logit difference is done by looking for the difference between the logit of the pretest item and the logit of the posttest item or (the pretest item logit is less than the posttest item logit). If the logit item difference is > 0.5, there is a significant change between the results of the pretest and posttest, (Sumintono, 2015). Information on the level of sustainability consciousness is revealed through an analysis process using Rasch modeling assisted by the Winsteps 5.14 application. Rasch modeling in the process of disclosing students' competencies, abilities or levels of consciousness has been widely used by previous researchers, among others, to measure students' critical thinking skills in STEM learning in elementary schools (Hamdu et al., 2020) or reveal the level of high-level thinking skills in students. elementary school (Yuliato, 2021). In addition, it is used to develop an instrument of mathematical anxiety, character, and student confidence in elementary school students (Karlimah et al., 2020; Nur et al., 2020; Rusmana et al., 2020). The analysis of sustainability consciousness in elementary school students underlies the description of how the development and implementation of the ESD program in elementary schools.

Based on the findings obtained, it can be interpreted that students experience an increased consciousness of sustainability where researchers focus the analysis process on the environmental domain. Consciousness of student sustainability can be seen from the aspects of cognitive, attitude and behavior. In the cognitive aspect, students can understand sustainability consciousness such as consciousness of the importance of reducing water use for future life, the importance of preserving biodiversity and understanding the importance of saving oneself in the event of a disaster. Furthermore, in the attitude aspect, students can assume that excessive use of natural resources actually threatens the health and well-being of future generations, students need to act to overcome problems related to climate change and students are of the view that stricter regulations are needed to protect the environment. Whereas in the behavioral aspect, students will recycle as much waste as they can, students if there is an opportunity will always separate food scraps and other types of waste and students will always change their lifestyle in order to reduce waste. It can be understood that learning is carried out by stimulating students to have access to various sources relevant to the problem under study, which facilitates understanding and ensures task completion (Gorghiu et al., 2015). A task

that will be developed by the teacher with an orientation to improve students' intellectuality in the thought process (Carless, 2004; Kang, 2017). Sustainability consciousness students are able to achieve indicators such as environmental consciousness indicators defined by the OECD described: (1) Consciousness of environmental issues: A measure of how informed students are about current environmental issues; (2) Perception of environmental problems: A measure of how concerned students are about environmental issues; (3) Environmental optimism: A measure of students' belief that their actions or humans can contribute to maintaining and improving the environment (Amran et al., 2019). Utilization of the issue of sustainability consciousness can be used as an effort to increase students' consciousness of sustainable development around them, as well as increase student literacy in problem-solving efforts around them (Piasentin & Roberts, 2017; Ashmann & Franzen, 2015).

CONCLUSION

This research provides information that students understand and are able to apply the basic concept of sustainability, namely meeting the needs of the present without compromising the ability of future generations to meet their needs. Students develop an understanding of the historical context in which the definitions, concepts, and principles of sustainability are. Students recognize the concept of sustainability as a dynamic condition characterized by the interdependence of ecological, economic, and social systems and how these interconnected systems affect the well-being of individuals and society. Students understand and experience their relationship and interdependence with nature. Students develop a multidisciplinary approach to learning knowledge, skills, and attitudes for sustainability. Students can understand and can describe their vision of a sustainable world, along with the important changes that need to be made by individuals, communities or countries.

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