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TEACHER'S STRATEGY IN DEVELOPING ENVIRONMENTAL CARE THROUGH SIMPLE SCIENCE EXPERIMENT TOWARDS ELEMENTARY STUDENTS

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Abstract

This research was conducted since the decline of sense of responsibility and the concern towards environment. The emergence of natural disasters is caused by the hands of human in taking advantage of natural environment. The objective of this research to reveal the teacher's strategy in developing environmental care through simple science experiment. This research uses quantitative approach with survey method regarding to nature of science, simple science experiment, and caring attitude towards the environment. The research data were obtained online using google form. There were 224 of elementary school teacher as respondents that become sample, the teachers were from different schools in West Java. The instruments used in this research are questionnaire related to implementation of nature of science and caring attitude towards the environment. The results showed that environmental care attitude to students that had been carried out frequently by the teacher through simple science experiment scored average value 38.5 %. Moreover, the research indicates there were several teachers had never developing environmental care attitude to their students scored 5.25%. It shows that it is necessary to conduct alternative activity as an improving effort through teacher's strategy in developing environmental care attitude towards elemntary school through simple science experiment.
Keywords: Nature Of Science, Simple Science Experiment, Environmental Care, Elementary School.

Abstrak

Penelitian ini beranjak dari menurunnya kecenderungan rasa tanggung jawab dan kepedulian terhadap lingkungan. Munculnya berbagai bencana alam salah satunya disebabkan oleh ulah manusia dalam memanfaatkan lingkungan alam. Tujuan penelitian ini adalah berupaya mengungkap strategi guru dalam mengembangkan peduli lingkungan melalui percobaan sains sederhana. Pendekatan yang digunakan dalam penelitian adalah kuantitatif dengan metode survey terkait dengan hakikat sains, percobaan sains sederhana, serta sikap peduli terhadap lingkungan. Data penelitian diperoleh secara online menggunakan media *google form*. Dalam penelitian ini jumlah responden yang menjadi sampel dalam penelitian ini adalah 224 guru SD yang tersebar di wilayah Jawa Barat. Instrumen yang digunakan dalam penelitian ini adalah angket mengenai penerapan hakikat sains dan sikap peduli lingkungan. Hasil penelitian menunjukkan bahwa sikap peduli lingkungan pada siswa sudah sering dilakukan oleh guru melalui percobaan sains sederhana dengan rata-rata nilai sebesar 38.5%. Selain itu, penelitian mengindikasikan adanya sebagian guru yang belum pernah mengembangkan sikap peduli lingkungan terhadap peserta didiknya dengan persentase sebesar 5.25%. Hal ini yang membuat perlunya dilakukan alternatif kegiatan sebagai upaya perbaikan melalui strategi guru dalam pengembangkan sikap peduli lingkungan pada siswa sekolah dasar melalui percobaan sains sederhana.
Kata Kunci: Hakikat Sains, Percobaan Sains Sederhana, Peduli Lingkungan, Sekolah Dasar.

INTRODUCTION

Human and natural environment are two elements that affect each other. Environment is a place of the whole living being on the face of earth, such as human, animals, and plans. Environment has important roles for living things survival, then it is a must for us to keep it sustainable because if the environment is damaged, it is going to be so difficult for the living things to survive (Mardiyani et al., 2020). Suntainability of environment will decide the life of human itself and another living things, so vice versa that human have ability to determine the condition of their environment. The problem of environment becomes very important for the life of human beings that interact each other. In that interaction, human always try to control their environment with all the power and effort they have. The implementation of suntainable development and controlled utilization of natural resources are the goals of management of environment (Herlina, 2015). Lately, Indonesia has experienced a lot of natural disasters that caused by the mistakes and the treament way of human towards the environment such as flood, landslide, and etc. The disasters happened because of so many factors, one of them is environmental damage. Human tend to exploit environment for their own appointment without concerning the environmental sustainabilty. One of the ways to keep the environmental sustainability is to instill environmental care attitude.

Environmental care is a common attitude towards the quality of environment that can be idealized through self-willingness to declare actions that can increase and sustain the quality of environment in every behavior which has relation with its environment. Environmental care attitude also can be concluded as someone's reaction towards his environment by not harming the environment. By instilling environmental care attitude, it will be created a clean and beautiful environment (Tamara, 2016). Character instilling since early stage can be strong basic for instiling environmental care character, so that the youth generation will have provision of understanding about environment (Lestari, 2018). Environmental care character is one of the characters that must be developed is school (Jeramat, Mulu, Jehadus, & Utami, 2019). The Character of environmental care can be instilled according to the school curriculum nor planned programs by school.

According to Ismail (2021), he mentioned that to instill the environmental care behavior towards student can be started from keeping class and school clean by throwing garbage in its place, conducting class picket, taking care of plans, and etc. Furthermore, it also can be started by getting students used to wash their hand during break hours, washing hand before and after eating, and washing hand after sport lessons. Students also get used to

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care about surrounding environment. It is also expected as an effort to prevent environmental damage and a development to fix natural damages that have happened (Lestari, 2018).

Since the implementation of the online learning system in order to break the chain of the spread of Covid-19, the trend of environmental care behavior has decreased. This can happen because the implementation of environmental education practices in schools cannot be carried out as usual. In this New Normal era, the government makes policies that require teachers and students to reduce face-to-face social contact so that the implementation of Environmental Education is less effective (Hidayah & Baedowi, 2020). This can be handled by implementing an environmentally friendly attitude from home that can be linked to science learning.

Science is a group of knowledges or knolwledge as product of science, the way of thinking or knowledge as scientific product and the way of investigating or science as scientific process (Hermansyah & Witarsa, 2017). Science learning in elementary school have a strategic role to in increasing the awareness about nature and sustainability of environment (Fasha, 2020). In line with (Lestari, 2018) stated that science learning can direct students to understand the importance in taking care of environment. Through science learning, students can experiment, explore, and observe surrounding environment (Wahid & Suyanto, 2015). Specific characteristic possessed in science material is to study factual phenomena of nature, either it is a reality or incident and the relation of cause and effect. Other than that, science lesson is not theoretical only, but alsorelated to the problems that happened in real life (Pamungkas, Subali, & Linuwih, 2017). Proper science lesson to do in time of online learning is through simple science experiment. Simple science experiment is an experimental method that uses simple tools and materials that can be obtained easily and takes advantage of home tools and materials. The process of simple science experiment can help students to start thinking critically and logically. In this method, the whole students are involved in doing, proving, and drawing conclusion about an object by themselves, or about specific process (Subekti & Ariswan, 2016).

Based on the problems above, so this research focuses the study on the teacher's strategy in developing environmental care through simple science experiments towards elementary school students. In addition, this study also aims to see the effect of the nature of science on increasing environmental care attitudes in students. This research was conducted on elementary school teachers in several schools in West Java.

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METHOD

The method used in this research is survey method by quantitative approach. Survey method in this research is more focus on the explanation quantitatively regarding the trend of individual behavior by researching its individual sample. Survey research seeks to describe quantitatively the tendencies, attitudes, or opinions of a particular population by examining a sample of that population (Creswell, 2009). This research analysed teacher's strategy in developing environmental care behavior of elementary students through simple science experiment. Simple science experiment in question is simple practices in elementary school students' lesson by taking advantage of tools and materials that can be obtained easily around their surrounding environment.

The questionnaire is a data collection technique by giving a set of questions or written statements to respondents to answer them (Sugiyono, 2010). The questionnaire used by the researcher as a research instrument, the method used is a closed questionnaire. The questionnaire instrument must be measured for the validity and reliability of the data so that the research produces valid and reliable data. A valid instrument means that the instrument can be used to measure what should be measured, while a reliable instrument is an instrument that, when used several times to measure the same object, will produce the same data. The instrument used to measure the variables of this study was using a 5-point Likert scale (Ukkas, 2017). The 5-point Likert consists of (1) SS: Very Often, (2) S: Often, (3) J: Rarely, (4) P: Once, (5) TP: Never.

The amount of respondents that became sample in this research is 224 teachers who were consist of 129 female teachers and 95 male teachers around west Java. The instruments used in this research are questionnaire regarding to the conducted strategy by the elementary school teacher in developing elementary school students' environmental care behavior through simple science lesson. There are two instruments, they are indicator, it is the area of environmental care behavior (by the statement number 1-8) and area of nature of science and simple science experiment in elementary school (by the statement number 9-20). The data collecting and processing used docs.google.com system. The document directly produced data description according to the answered question by the respondents. Respondents' answers obtained are categorized into a predetermined 5-point Likert scale. Then, the average value of the data is calculated to see the largest and smallest percentage values for each region.

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RESULTS AND DISCUSSION

Results

The research results about elementary school teacher's strategy in developing environmental care attitude towards the elementary students are explained on the **Tabel 1**. According to the results, it can be seen that the development of environmental care attitude to the elementary school students had done frequently by the teacher with the highest average of percentage, it is 38.5%. Meanwhile, the lowest average percentage is 5.25% in the never been done category.

Tabel 1. Area of Environmental Care Behavior

No	Statement	Percentage (%)				
		VO	O	R	E	N
1	Reminding the students to throw the garbage in its place.	33.5	26.8	17.9	14.3	7.6
2	Reminding the students to keep the water clean.	23.7	40.2	17.4	13.4	5.4
3	Reminding the students to keep the fertility of the soil.	17.9	41.5	20.5	15.2	4.9
4	Inserting values about environment in every lesson.	17	43.3	21	14.7	4
5	Guiding the students to identify the various of pollution	7.6	42.9	24.1	20.1	5.4
6	Explaining the impact of pollution to the living beings.	12.9	40.6	26.8	16.5	3.1
7	Conducting investigation to figure out the impact of pollution to the environment.	9.8	33	29.5	21.9	5.8
8	Communicating the results of investigation about the impact of pollution to the environment.	7.1	40.2	27.7	19.2	5.8

Notes:
VO: Very Often, O: Often, R: Rare, E: Ever, N: Never.

The results regarding to implementation of nature of science in the elementary school are explained on the Tabel 2.

Tabel 2. Area of Nature of Science and Simple Science Experiment

No	Statement	Percentage (%)				
		VO	O	R	E	N
1	Implementing nature of science (scientific product, scientific process, and scientific attitude) during science activity in progress.	17	38.4	25.4	17.4	1.8
2	Taking advantage of nature resources of surrounding environment in the implementation simple science experiment (e.g: mixing colors, measuring things).	14.3	43.7	27.2	12.9	1.8
3	Preparing the condition of existing school environment in order to support the convenience of learning teaching activity.	13.8	52.2	21.4	10.3	2.2

4	Setting learning objectives and skill of science process that want to be achieved (including observing skill, classifying, predicting, measuring, communicating, concluding).	8.9	48.7	25.4	13.8	3.1
5	Proposing somekind of problem that must be solved by the students.	12.1	42.9	23.7	16.1	5.4
6	Preparing worksheets to guide the students in conducting science process.	7.1	40.6	30.8	14.7	6.7
7	Guiding the students during science process activity.	10.3	45.5	19.2	15.6	9.4
8	Guiding students in finding answers or the results of science process.	9.8	42	23.7	18.8	5.8
9	Guiding students in grouping observed object according to the similarity or difference.	7.6	47.3	24.1	15.6	5.4
10	Guiding students to predict upcoming events orally or written.	8.9	37.5	31.3	16.1	6.3
11	Guiding students to deliver information in form of tabel, graphic, or diagram.	2.7	35.7	34.4	23.7	3.6
12	Guiding students to decide an object situation or phenomenon based on fact, concept, and known pronciple.	7.6	42.4	28.1	17.4	4.5

Notes:
VO: Very Often, O: Often, R: Rare, E: Ever, N: Never.

According to the research result, it can be found that the implementation of nature of ecience in science learning process in the elementary school have done by the teachers scored the highest average percentage, it is 43%. Meanwhile, the lowest average percentage is 4.6% in the never category.

Discussion

Teacher is one of influence aspects that can affect learning process. In conducting the process of simple experiment, teacher needs to pay attention on seceral aspects, such as giving guidance, let the students to improve their ability to work independently, planning the experimental steps will be doing, giving problems that need to be solved through the experiment, availability of learning resources, and realistic time alocation in conducting the experiment (Gumala, Nurkaeti, Aryanto, Syaodih, & Samsudin, 2020). Hence, the teacher's strategy needs to be noticed in developing environmental care attitude towards elemtary school students.

Environmental care is an action and attitude to prevent the damage in surrounding natural environment and developing efforts that can be done to fix the happened natural damage (Kasi, Sumarmi, & Astina, 2018). Environmental care character according to Kemendiknas (in Al-anwari, 2014) is an act and attitude that always try to prevent the environmental damage and its surrounding and developing efforts to fix happened natural damage. Ecological intelligence is needed in growing and developing envinronmental care to

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the students. It is line with (Rahmawati & Rahayu, 2021) that ecological intelligence is human skill in implementing what they have learned and known to the caused impact for the surrounding environment, so that way human can choose to use a product which is considered safe without causing side effect and will get used to do things that friendly to the environment. The goal of development of environmental care attitude towards the students is to give them habit support in managing environment, avoiding the damaging environment behavior, cultivating sensitivity to the surrounding environment, and to become an example of student of environment savior (Purwanti, 2017). Here are the categories about what make students being claimed to care about environment, they are throwing garbage in its place, do not do any activity that can harm or damage the environment, being able to sort out and choose between organic and anorganic trash, preparing organic and anorganic trash can, take advantage of garbages through recycle.

The process of environmental care attitude towards the students is more precise if the learning process is being related to aspects of nature of science. The implementation of nature of science explicitly and reflectively in learning process through direct interaction with the nature already recommended by Liu and Lederman in Taiwan. This can give chance to the students to interpret phenomena as an concept of understanding through problems directly that happened in daily life. This is also strengthened by Abd-El Chalick who states that nature of science can be used to understand the nature where students can have experience through science process directly which is expected can give understanding science concept through the process. Moreover, nature of science also can be given to study the essence of knowledge itself (Fasha, 2020).

The nature of science itself is a knowledge that gives explanation regarding how science works and how a scientist conducting a research to gain new knowledges (Listiani & Kusuma, 2017). The learning of nature of science is very important to study by teachers nor students because by understanding science, they can have important background and detailed about how science and scientist work, how knowledge can be created, how knowledge is being validated, and how knowledge is influenced. Still they will be able to have right view about what science is, what kind of questions that can be anwered through science, the difference between science and another knowledge, advantages and limitations of scientific knowledge, and be able to recognize dan refuse the scientific products in daily life (Adi & Widodo, 2018). According to Harlen and Qualter, nature of science have eight aspects, they are (1) In scientific investigation, different kinds of methods are used, (2) Scientific

Knowledge is based on empirical prove, (3) Scientific knowledge is opened to be revised, (4) Method, law, process, and scientific theory exlplain about scientific phenomena, (5) Science is a way to understand, (6) Scientific knowledge describes an organized and consistent system, (7) Science is the result of human effort, and (8) Science always gives statement reagarding to nature and universe. Those aspects are important reference for science lesson in elementary school (Fasha, 2020).

There are three main focuses that need to noticed in science learning in elemntary school. First, the process of science learning development for kids must go through effective process so that science learning experience can give more meaningful and deeper impression about phenomena of nature and it is expected can increase the awareness and wisdom. Second, experience through the right science process, as expected of science learning can stimulate the skill of thinking scientificly that is going to be very useful for the life and learning experience. Third, the experience of science learning by considering nature of science's principles can give awareness to the students about human possition and role in empowering the potential of nature and its preservation efforts (Fasha, 2020).

In science learning process, determination of method is one of important things. In this aspect, teacher must be able to determine the right method so that the learning objectives can be achieved. One of the methods that can implement the essecnce of science's aspects is experimental method. Experimental method is an activity that give more attention to the process and results of an experiment. Through experimental method, it is expected that the kids will be able to develop the whole aspects of their development, especially their cognitive development (Wahyu, Debita, & Rohmalina, 2019). Simple experimental method is an experimental method by taking advantage of existing tools and materials around the students environment in learning activity. This will be more meaningful for the kids because the directly experience what they are learning.

Thus, to develop environmental care attitude, in the learning process needs to be connected with nature of science's aspects because essensce of science can give awareness to the students about empowering potential of nature and its preservation efforts, one of them is by caring towards surrounding environment. The development process of environmental attitude is based on essence of the most approriate science's aspects that is conducted through experimental method because this method can involve every existing aspect in nature of science. The kinds of good experiment for elementary students is a type of simple experiment

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because it uses tools and materials that easily to obtained, they can be found in daily life and not dangerous for the students,

In Table 1 is explained about the development of environmental care attitude of the elementary students that is incliding to the one of nature of science's aspects, it is aspect of attitude. According to the research result in tabel 1, it can be seen that the development of environmental care attitude have been done by the teachers frequently. It is also strengthened by the answer of question number 1-3 where it proves that in the aspect of teacher's moral knowing oftenly reminds the students to throw the garbage in its place, to keep the water clean, and to keep the soil fertility. The character itself consists of three parts, moral knowing, moral feeling, moral behavior. The good character consists of knowing the good, desiring the good, and doing the good. Hence, it needs an habituation in thinking (habits of mind), habits of the heart, habits of the action (Cahyaningrum, Sudaryanti, & Purwanto, 2017). As well as the answer of question number 4 and 5 where it proves that on the aspect of moral feeling which is trully implemented in the science learning in elementary school with the highest percentage in every statement, it is the 'Often' choice. The assessment of aspect of moral behavior is stated through the statement number 6-8 that concern about the impact and influence of pollution towards environment and how to deliver the result of investigation in form of tabel, graphic, or diagram, and being validated after with the concept and fact that have learned.

In Tabel 2 is explained about the implementation of another aspects of nature of science, they are aspect of product and process in science learning in elementary school as an effort to develop environmental car attitude. Based on the results in the Table 2, it can be seen that the nature of science had been implemented oftenly by the teacher. It is also strengthened by the the answer of question number 9 which proves in accordance to the answer of question number 9-20 where it proves that nature of science was trully implemented in the science learning in science learning in the elementary school with the highest percentage to each statement, it is on 'Often' choice. The nature of science itself consists of three important aspects, they are product, process, and behavior (Sardinah, Tursinawati, & Noviyanti, 2012). The assessment of aspect of product towards nature of science is stated through the statement number 16, 19, and 20 that concern about the determination of answer or the results of science process that had been conducted and how to deliver the result in form of tabel, graphic, or diagram, and validate the results by the concept or fact that have been learned. The assessment of aspect of process to the nature of science is

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stated through the statement number 14, 15, 17, and 18 that concern about processes will be going through by the students during the experiment. Meanwhile, aspect of attitude in nature of science is stated through the statement number 13 which concerns about giving a problem to the students that can be solved through experiment. The goal is to increase the curiousity of students. Still, there is also aspect of behavior which is developed, it is nature of science in elementary school learning that have been analyzed through in Tabel 1.

According to the results of this research as a whole, it can be found that teachers in elementary school students in West Java have implemented the nature of science through simple experiment to increase the environmental care attitude of the students. However, there were still few teachers who had never implement the nature of science, never conducting simple experiment, and never developing environmental care attitude to the students. It describes that the awareness of teachers towards the thing is still not equally spread in West Java. Then, there must be done alternative activities, such as socialization or training to the elementary school teachers evenly about how important to determine the right method in science learning, the implementation of nature of science in science learning process, and the development of environmental care attitude. Furthermore, by conducting alternative activity also is expected to increase the awareness to the teachers in elementary school to always implement nature of science in process of science learning and the development of environmental care attitude in learning activity at schools.

CONCLUSION

Environmental care is how to grow and develop the act and attitude as an effort to prevent the surrounding damage of nature and also to fix the damage of nature. One of the teacher's strategies in developing environmental care attitude is by connecting nature of science to involved through simple science learning because the nature of science can give awareness to the students regarding to empowering of natural's potency and its conservation efforts, one of them is by caring towards the environment. One of the learning method that can include aspects of nature of science is experimental method. The results of this research show that the implementation of nature of science through simple science experimental in science learning process at elementary school had been carried out oftenly by the teachers by looking carefully at careness towards environment with average value 38.5%. Besides of it, this research also indicates there were few teachers who had not and even never conduct

simple science experiment and develop environmental care attitude to the students with average score 5.25%. Hence, there needs to do alternative activity to improve it through teacher's strategy in developing environmental care attitude towards elementary shool students through simple science experiment.

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