The Integration of Environmental Pollution Materials in Social Studies Learning in School for Anticipation of Climate Change

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Abstract

Social studies learning is expected to integrate environmental education, in accordance with the objectives of social studies learning to improve students' thinking skills, social problem solving skills and care for the environment In fact, social studies teachers were found to have not utilized the physical or social environment as a source of learning, despite various environmental pollutions have often occurred in Indonesia and resulted in global warming as an indication of climate change. This research was intended to 1) identify materials of environmental pollution around students as a source of social studies learning; 2) integrate environmental pollution materials in social studies learning to anticipate climate change; 3) determine the effectiveness of learning activities on the integration of environmental pollution materials to anticipate climate change. This research was classified as quantitative and qualitative research (Mix Method). Data were collected by means of interviews, observations, documentations and questionnaires. The results of the research showed that 1) materials of environmental pollution around students as a source of social studies learning consisted of water and air pollution that have an impact on global warming, thus resulting in climate change; 2) environmental pollution materials were integrated into social studies learning by reviewing core competencies and basic competencies as outlined in the lesson plan (RPP) and student worksheets (LKS) with a score of 83% (valid); 3) Learning activities on environmental pollution materials had been running more effectively, because of the integration of pollution cases in the surrounding environment to anticipate climate change. This was indicated by the significant difference in the results of the pretest and posttest tests of 0.025.

Keywords: Social Studies Learning, Environmental Pollution Materials, Anticipating Climate Change

Introduction

Advancing development without being aware of environmental balance factors may lead to environmental problems, including environmental damage and pollution (Nina Herlina, 2017). Humans and the universe are commonly known as two things that cannot be separated, and tend to interact with each other. Environmental problems initially emerged in the 21st century, because humans tend to use nature only for their personal interests and needs (Rusdina, 2015). Human needs are unlimited, thus they are likely to exploit the earth to fulfill all their needs. Environmental damage is considered to be a global concern. The environmental crisis is a social and ecological issue, resulting from the interaction of various global concerns (Van Rensburg, 1994).

Environmental damage has triggered various countries to declare their commitment to environmental conservation through ratification of agreements on the COP 22 agenda, including Indonesia, which is committed to reduce its emissions until 2022. Since joining the UNFCCC (United Nations Framework Convention on Climate Change), Indonesia has played many roles in the climate change regime. Various programs have been successfully carried out to reduce emissions as required by the Paris Agreement, particularly the climate village program (or known as *Proklim* in Indonesian),

to encourage and increase the involvement of the community and other stakeholders in climate change adaptation and mitigation activities (Kristina, 2019). However, the program is not in accordance with field conditions. This is influenced by the ease of issuing industrial permits, thereby causing many industries to develop and becoming a fairly large pollution contributor in Indonesia (Sos, 2019). Impacts that should be highly considered from industrialization activities include the emergence of B3 industrial waste, which has the potential to be a source of environmental pollution that may increase risks to the environment and human health (Nursabrina et al., 2021). In addition, one of the factors that provide influence on the environment is the problem of waste disposal and management (Hasibuan, 2016). In particular, plastic waste that lasts for years is capable of causing pollution to the environment (Karuniastuti, 2013)

Environmental problems are regarded as real problems faced by humans. Environmental problems may be handled by initially addressing human behavior (Nurulloh, 2019), because human activities are capable of leading to various environmental problems. Human behavior may be improved through education, because humans are not only provided with teaching but also the formation of attitudes and personality (Sri Hudiarini, 2017). The educational environment in Indonesia should be capable of shaping the character and civilization of the nation, specifically the potential of students to be part of citizens who actively participate in protecting the natural and surrounding environment (Syifa Siti Aulia, Dikdik Baehaqi Arif, 2018).

Education is defined as the foundation for the personal formation of students, and society in general (Wahyudin, 2018). Education has been considered as one of the solutions and pillars for a country to be able to maintain its identity on an international scale (Hilmi, 2017). Education is able to inhibit environmental damage by growing community awareness of the importance of preserving the environment, changing bad or not good habits into new and better habits, being more caring and in favor of environmental sustainability (Sitti Hasnidar, 2019). Education is also regarded as a means of self-maturation. The lack of understanding and skills in preserving the environment may result in the community being vulnerable to not paying attention to the preservation of the living environment (Masruroh, 2018). The community awareness can be achieved through social studies learning, because social studies learning includes learning experiences by studying people, places and environments (Arisona, 2018)000 tons/day, equivalent to 64 million tons/year. Waste management is very necessary to minimize the adverse effects. For this reason, it needs to be inserted in social studies learning in order to foster an environmentally caring character. The method used in this study uses the literature study method. The results show that 3R waste management (reduce, reuse,

recycle. Social studies learning consists of studies of complete environmental aspects and also means of learning in the school environment in particular and in general for the community.

Basically, the practice of teaching social studies in the 21st century is designed to prepare students to be capable of participating effectively in a post-industrial society. Post-industrial society as described by (Banks, 1990), covers a variety of global characteristics, such as; global economy, efforts to solve international problems, changing lifestyles, values, beliefs, culture and political sentiments. Climate change is caused by human activities and the industrial sector. Moreover, the industrialization process contributes to carbon emissions by 65% (Subarkah, 2019). Environmental pollution that leads to climate change is capable of being handled by improving human lifestyles, thereby education becomes an important factor in the process of changing lifestyles, specifically for the younger generation. Social studies education is primarily aimed at transforming citizens into being able to understand differences and be able to solve problems appropriately, because it is supported by information and facts. In addition, the output of social studies education is expected to address social problems and social participation in society (Hilmi, 2017).

Various learning resources are potentially available for use in social studies learning in Junior High Schools, both sources at school and outside of school. However, the learning resource environment has not been used optimally by teachers in social studies learning (Nachrawie, 2017). Teacher-centered learning is still commonly conducted, resulting in students being less sensitive to the surrounding environment. This research was intended to integrate environmental pollution materials in social studies learning. (David et al., 2013) suggested that social studies and environmental education appears to be two separate disciplines but in socio-civic functions, they have meeting point and that is the progressive improvement of mankind through the creation of enabling conditions for man to operate. Social studies teachers are therefore encouraged to create necessary awareness among the students on the danger of unclean and unsafe environment condition. In order to reduce environment problems to the barest minimum if not totally eradicated, the following recommendations are therefore put forward: 1) Environmental education curriculum should be developed and be taught at both primary and secondary levels of our educational system. 2) Social studies education should be enriched through a curriculum review to incorporate more environmental issues. 3) The missing link of social studies at the senior secondary school should be bridged as against being only taught at the junior level of the cadre of educational system to enable it perform its functions efficiently and effectively.

The integration of this material indicates that social studies learning is isolated from the real environmental conditions of

students. Teachers can use contextual learning, specifically by linking the material being taught to real-world situations, such as the occurrence of environmental pollution due to human activities. The teachers can encourage students to make connections between knowledge and its application in their lives, including protecting the environment from being polluted in anticipation of climate change. As many natural disasters are associated with climate change, including floods, landslides and so on, the social studies community can develop social studies in a global, national and regional scope by developing contextual materials to build knowledge, attitudes, and skills of students as good citizens (Nugroho, 2012). Social studies learning is related to environmental education as a solution to address environmental problems. Social studies learning aims to create awareness of unbalanced environmental hazards, leading students to preserve natural resources. Regarding to the explanations above, it is urgently needed to integrate material on environmental pollution that occurs around the students' environment, so that they are able to learn the conditions of their environment. As a result, students have a high level of concern for the environment. This research is highly considered important, because there are many climatic disasters that occur in parts of Indonesia. Thus, the environmental awareness of all levels of society needs to be improved, especially students through school education.

METHOD

Research Design

This research was classified as a quantitative and qualitative research (Mix Method). The researchers were intended to determine the integration of environmental pollution in social studies learning in schools to anticipate climate change. Mixed methods research is a research approach that combines or associates qualitative and quantitative forms (Creswell, 2014). This research was conducted using an exploratory sequential mixed method with research characteristics that lie in the focus of research. The exploratory sequential mixed method is a method of combining qualitative and quantitative research methods in a sequence of phases. Qualitative method is used in the first stage of research, while quantitative method is used in the second stage of research (Sugiyono, 2014). This method is declared sequential, because the methods are combined sequentially. The more significant method used is the qualitative method in the first stage of the research, which was then supplemented by quantitative method. The combination of data from the two methods would connect the results of the first stage of research (the results of qualitative research) and the next stage (the results of quantitative research).

Qualitative method was utilized by researchers to identify various learning resources that have been used and how teachers apply them in social studies learning at school. In response, researchers conducted observations and explored information for cases of environmental pollution that occurred around the students' environment as a source of social studies learning. The material was integrated into social studies learning in school to foster a sense of caring for the surrounding environment. Furthermore, learning tools in the form of Lesson Plans (RPP) and Student Worksheets (LKS) as well as environmental pollution materials were prepared as an indication of climate change, which were applied to students to raise their environmental awareness.

Moreover, the quantitative method was used by researchers to investigate the effectiveness of the learning through the pretest and posttest of students' environmental awareness. The aspects measured include students' environmental awareness, which consists of indicators: 1) having awareness and care for the environment, 2) being curious, critical, and caring about the environment in identifying the impact of global warming, 3) Indicating wisely the materials that generate greenhouse gases, and maintaining the balance of the ecosystem in the surrounding environment to prevent climate change. The data in this research were measured by using an ordinal scale. Before being given to the sample, this instrument had been tested for validity and reliability. Based on the results of the validity test calculation using the Pearson Product Moment Correlation technique, all environmental awareness statement items were each greater than the rtable value at a confidence level of 0.05%. Thus, all statement items were declared valid, and could be used as a data collection tool. Furthermore, the reliability test using Croanbach's alpha analysis technique obtained the value of rcount = 0.963, which was then compared with Croanbach's alpha value of 0.7. The results of the reliability test were stated to be reliable, so the environmental awareness questionnaire could be used in this research.

Participants

The selection of this research location was based on the number of industries that developed in Lamongan Regency and the community's minimal environmental awareness, thus having the potential for environmental pollution, which was used as a source of learning. Referring to that matter, Junior High School State 2 of Lamongan was selected as an alternative choice of the research site. The school has been known as the first Adiwiyata school since 2013. This junior high school has an adiwiyata program, particularly which aims to create good conditions for schools to become places of learning and to increase awareness for school community. Therefore, in the future, the school community may be able to take responsibility for saving the environment and sustainable development The subjects of this research consisted of the principal of Junior High School State 2 of Lamongan, social studies teachers, 15 students of grade VIII B. Due to the pandemic, every class was limited by an odd-even system. The samples in this research

Table 1: Core and Basic Competencies for Social Studies in 2013 Curriculum (K13) of Grade VIII, integrated into Environmental Education

Grade	Sub Material		Core Competency	Basic Competency	Learning objectives
Grade VIII	Changes in Space and Interactions Between Spaces Due to Natural Factors	Knowledge	Understanding spatial changes and interactions in Indonesia and ASEAN countries caused by natural and human factors (technology, economy, land use, politics) and their influence on the sustainability of economic, social, cultural, political life.	Examining spatial changes and interactions between spaces in Indonesia and ASEAN countries caused by natural and human factors (technology, economy, land use, politics) and their influence on the sustainability of economic, social, cultural and political life).	Analyzing changes in space and interactions between spaces in Indonesia and ASEAN caused by natural factors.
		Skill	Processing, presenting, reasoning in the concrete realm (using, parsing, modifying and creating) and abstract realms (writing, reading, counting, drawing, and composing) according to the material learned in school and other sources with the same point of view/ theory	Presenting the results of identification of spatial changes and interactions between spaces in Indonesia and ASEAN countries caused by natural and human factors (technology, land use, economy, politics) and their influence on the sustainability of economic, social, cultural and political life.	Presenting the results of identification by making an essay about climatic disasters around the student's residential area and their impact on the sustainability of human life.

Source: 2013 curriculum book

were determined by means of purposive sampling technique. Purposive sampling is perceived as a sampling technique from data sources with certain considerations. The samples in this research were determined on the basis of a review of the 2013 curriculum (K-13) for the junior high school level. In addition, a concept diagram of the application of environmental education in social studies learning can be made to care about environmental responsibility.

Referring to the curriculum review, this research was conducted on grade VIII students of Junior High School. This research involved a total of 4 male students and 11 female students with an average age of 14 years.

Data Collection

The data in this research were collected by means of interviews, observations, documentation and questionnaires. The data collection methods according to creswell (1998), are described as follows:

a. Interview Method: before interviewing the research subjects, the researcher prepared a semi-structured question framework. Interviews were conducted to find information through direct conversations with social studies teachers related to environmental learning resources used during the social studies learning process. The researchers were intended to determine the

appropriate social studies curriculum with the material on environmental pollution. In addition, interviews were also conducted with school principals to derive the information related school programs that support environmental awareness of the school community.

b. Observation: this method was carried out using observation sheets, before and during the learning process in class, according to the learning tools (RPP and LKS). Through this observation, researchers identified the student activities in reducing environmental pollution.

c. Documentation: which included learning tools (RPP and LKS), photos of learning activities, secondary data from the main report book of the environmental service regarding data on environmental pollution and climatic disasters that occurred. As well as social studies books, articles and other related books.

The collected data were then described in narrative form. Questionnaires were used before field investigations to the analysis stage in the field. Prior field-analysis consisted of validation of learning tools and research instruments. Moreover, the questionnaires were directly distributed to students during the face-to-face learning process. The pretest questionnaires were distributed before the material was given. Then, the posttest questionnaires were distributed at the next meeting, after the

students were provided with the environmental pollution material according to the learning device.

Data Analysis

This research was conducted using an exploratory sequential mixed methods analysis. Data analysis was carried out in several stages:

1. The first stage was carried out by applying a qualitative approach with a Miles Hubermen' analysis (Miles, M. B., & Huberman, 2014):

a. Data reduction (summarizing data in the field, including cases of environmental pollution that occur around students as social studies learning resources). Researchers explored environmental pollution data from the main report book of the Lamongan Regency Environmental Service, which could be integrated into social studies learning, and collected information from schools about the environment as a source of social studies learning.

b. Data display

Researchers obtained data on environmental pollution materials that could be integrated into social studies learning. Furthermore, learning tools in the form of lesson plans and worksheets on environmental pollution material were made to anticipate climate change, which were adapted to the K-13 curriculum.

The results of the validation of Lesson Plan (RPP) and Student Worksheet (LKS) would be analyzed by using a descriptive percentage technique and were categorized to determine the feasibility of RPP and LKS. Results were measured by utilizing closed questionnaires, and then presented through the following formula.

$$AP \frac{ActualScore}{IdealScore} \times 100$$

Where:

AP	= Percentage number
Actual Score	= Score given by validator
Ideal Score	= Maximum score of the product of the number of items with the maximum score of each item

Table 2: Percentage of Data Analysis

Interval	Category
81-100%	Very High
61-80%	High
41-60%	Fair
21-40%	Low
1-20%	Very Low

Verification

The percentage figures were then grouped into five categories, which can be seen in the table 2.

Researchers drawn conclusions based on environmental pollution material that would be integrated in social studies learning, which was applied to learning tools (RPP and LKS) to protect the environment in anticipation of climate change.

1. Furthermore, a limited trial of environmental awareness was carried out on grade IX students who had received social studies material in grade VIII with the aim of obtaining validity and reliability data.

2. The third stage is the stage of examining the effectiveness of learning through the pretest and posttest of students' environmental awareness. The results were then analyzed using a T-test through the SPSS application. The treatment in this research was given once, in the form of a learning video containing environmental pollution material as an indication of climate change, which contribute to climate disasters in the students' environment and the habit of caring for the environment (planting plants, waste management, saving electrical energy and so forth). The research procedure included pretest prior to being given treatment, which was then followed by posttest after being given treatment).

FINDINGS

Environmental Pollution Material as a Social Studies Learning Resource

Regarding to the results of interviews with Social Studies subject teachers, the integration of environmental pollution material in social studies learning was found to be very good, because the learning resources were derived from the environmental conditions of students. The following is a transcript of an interview with Ms. Zetin as a social studies teacher at Junior High School 2 about the social studies learning that has been carried out.
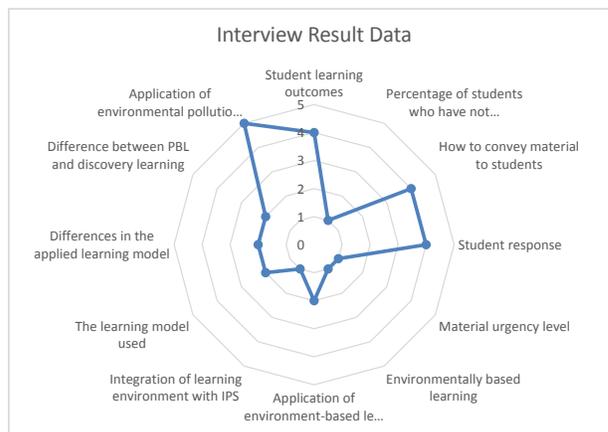
Fig. 1: Data from Interviews with Social Science Teachers

Based on Figure 1, it can be seen that the highest score is the application of environmental pollution problems in social studies learning.

The transcript of the interview with the social studies teacher related to the application of environmental problems in social studies learning is as follows

- X : *How much do you agree with using examples of cases or environmental pollution problems so that students understand well the material on climate change and interactions between spaces?*
- Y : *I totally agree, sir, because it is a real condition experienced and can be used as a learning resource, so that children can easily understand.*

From the interviews, it is known that problem-based learning in the environment around students is very good because environmental education will later provide knowledge about how to preserve the environment, so that it is expected to have responsible behavior, know the rational aspects, and of course can protect the environment well.

So far, the learning process in schools has not been able to improve students' creative thinking skills to the maximum, especially the ability to think creatively in solving problems of everyday life. Because social studies learning is still at the theoretical level.

- X: Is environment-based learning also applied to climate change and interactions between spaces?
- Y: It should be, because Environmental-based learning can provide lessons to students through their real exp*eriences. Consequently, the concept of the material will be more embedded in their minds. Students will also consider the materials on climate change and the interaction of space as important, because various impacts are commonly found in their lives.*

Referring to the statement of the social studies teacher, students could see, observe, and understand environmental conditions that are getting worse due to human activities. Furthermore, the researchers compiled learning materials for environmental pollution and climatic disasters that occurred in Lamongan Regency. These learning materials were derived from the results of the documentation study to the main report book of the Lamongan Regency Environmental Service and were delivered in the form of videos, resulting in students being able

Table 3: Environmental Pollution and Climatic Disasters in Lamongan Regency as a Social Studies Learning Resource

No	Condition	Pollution	Impact	Activity	Disaster
1	Waste disposal in the river	Water pollution	The decline in the quality of the river body, which turns into a bad smell, aquatic animals and plants that cannot develop properly and even die. Flooding because the drains are clogged with waste, thus, it overflows and floods	Cleaning the river from the waste	Lamongan Regency experiences drought, floods, and hurricanes every year Drought conditions occur in an area of 25,334 H in 9 sub-districts
	Waste incineration	Air pollution	Source of CO leads to Increased Greenhouse Gas (GHG) Emissions by 3.024 Tons CO2eq/year or around 7.7%, unpleasant odor, burning smoke, social impact	Waste management	
2	The increase in the number of vehicles causes the consumption of gasoline and diesel fuel in the transportation sector to increase by 118,010,161 L/year	Air pollution	Temperature rise Air temperature conditions tend to be high, with an average air temperature of 32.48˚C An increase in CO2 gas emissions in the transportation sector by 291,309.35 tons/year	Conducting reforestation activities Developing car free day activities	The Lamongan Regency Flood Disaster in 2019 hit 15 sub-districts with a submerged area of 10,485.51 hectares
3	Industrial Activities An increase in coal fuel consumption by 4,723 tons/year, diesel consumption by 42,124 L/year, industrial fuel oil consumption by 1,596 L/year	Air pollution	Climate change An increase in CO2 gas emission in the industrial sector by 3,712,849.07 Ton/tahun	Conducting reforestation activities Encouraging the use of environmentally friendly raw materials and minimal emissions	Extreme weather such as moderate to heavy rain accompanied by strong winds and tornadoes hit 6 sub-districts

Source: Data Analysis Result, 2021

to understand the material at ease. The results of documentation on environmental pollution that led to global warming and had an impact on climatic disasters are presented as follows.

1. Environmental materials integrated in social studies learning are presented in Table 3. Environmental pollution due to human activities causes global warming, resulting in climate disasters. The description of table 3 is as follows:

2. Waste has the potential to increase greenhouse gas emissions, due to the accumulation of unprocessed waste that can release methane gas (CH_4). Moreover, CH_4 gas has the potential to damage 20 times greater than $C0_2$ gas, thus being able to result in climate change (Rachmawati et al., 2019) it is important manage the household waste, so do on community level through \»Bank of Trash\» as an efforts in creating a Pro Climate (PROKLlM. The increase in population will affect the behavior and lifestyle as well as consumption patterns of the community. These changes will contribute to the volume and type of waste generated. Waste piles are caused by quantity (population growth) and quality (people's lifestyles and knowledge) factors. Household wastes are able to provide influence on water quality, resulting in water pollution (Nursabrina et al., 2021).

3. One of the harmful pollutants is carbon monoxide. Carbon monoxide is known as the most pollutant produced by transportation activities. The total number of vehicles in Lamongan Regency is known to be amounted to 675,642 units, because the number of transportation users increases every year. Emissions released by motorized vehicles can be in the form of carbon monoxide (CO), nitrogen oxides (NOx), hydrocarbons (HC), sulfur dioxide (SO_2), lead (Pb), carbon dioxide (CO_2) and dust (PM10) (Wakhidatul, 2021). Motor vehicles contribute almost 100% of lead, 13-44% of suspended particulate matter (SPM), 71-89% of hydrocarbons, 34-73% of NOx, and almost all of carbon monoxide (CO) to the air (Primasanti & Indriastiningsih, 2021).

4. The industrial sector is also considered a major source of sulfur dioxide. Lamongan Regency has shown an increase in the number of industries since 2017. Industrial fuel in Lamongan Regency derives from 1,596 Liters of fuel oil ; 6.0 MMSCF Gas; 4,723 Tons of coal ; 458,584 Kg LPG; 42,124 Liters of diesel. The increasing concentration of CO_2 gas in the earth's atmosphere as a greenhouse effect may cause global climate change (Pratama & Kunci, 2019). Unstable climate change may lead to large impacts, including extreme temperature increases, high tides and floods, tropical cyclones, droughts, tsunamis, and El Nio, which can pose catastrophic risks to the ecological system (Isman et al., 2012).

Environmental pollution in Lamongan Regency contributes to an increase in CO_2 gas in the atmosphere, causing many climate disasters such as floods, droughts, fires, hurricanes.

The phenomenon of environmental pollution and climatic disasters in the Lamongan Regency can be used as a source of social studies learning. Therefore, students are capable of understanding and critically thinking about the social life around them, as well as being able to actively participate in the environment, specifically in society, the country and the world (Endayani, 2018). These efforts will accordingly form good citizens according to the objectives of social studies education. The material can be summarized in a learning video, thus social studies learning becomes more fun and may assist students to learn, because digital-based learning is in accordance with learning in the midst of the covid-19 pandemic (Akyol et al., 2021).

Integration of Environmental Pollution Materials in Social Studies Learning

The integration of environmental pollution materials in schools is considered as an effort to improve students' understanding of the problems that occur in the surrounding environment. The problem of environmental pollution is capable of resulting in social and economic impacts. Thus, the learning strategy

Fig. 2: Disaster events in Lamongan Regency

may utilize environmental conditions as a source of learning to be applied in the learning process. The integration of environmental pollution materials may improve the behavior of students in protecting the environment to anticipate climate change. Students will increasingly have a sense of responsibility towards the environment.

The integration of environmental pollution materials in social studies subjects could be used as an anticipation of climate change through learning medias: the Lesson Plan (RPP) and Student Workheet (LKS). Data from the validation results of lesson plans and student worksheets would be analyzed by using percentage and category descriptive techniques to indicate the feasibility of learning medias. Each statement item on the validation sheet had a maximum score of 5 and a minimum score of 1. The RPP and LKS were analyzed by the validators, namely the Social Studies teachers at Junior High School State 2 of Lamongan. The results of the validation by the validators can be seen in table 4 below.

Based on the results of the evaluation by learning medias experts (RPP and LKS) developed by the researchers, the score of 142 with a percentage of 83% was successfully obtained. Thus, it was categorized as very high and suitable for use during the social studies learning process.

Implementation in the context of social studies education management is considered a learning effort that should be carried out by a social studies teacher in the classroom in accordance with the planning steps that had been prepared in the Lesson Plan (RPP), before the learning process activities were carried out. Before developing lesson plans, researchers were initially analyzing basic competencies (KD), thus learning could achieve the minimum competencies required by basic competencies (Supriyanto et al., 2020). Based on the results of interviews, observations and documentation studies with social studies teachers at Junior High School State 2 of Lamongan, the strategy for integrating environmental pollution materials into social studies learning can be seen in table 5.

The strategy in integrating environmental pollution material into the learning is focused on the Lesson Plan (RPP) and Student Worksheet (LKS), because lesson plans are considered as the first step that teachers should have and the estuary of all theoretical knowledge, basic skills and in-depth understanding of learning situations (Eka Putri & Fernandes, 2019). The integration of environmental pollution materials in Lamongan Regency with social studies learning is presented in Figure 3

Effectiveness of the Learning Process

Junior High School State 2 of Lamongan is an adiwiyata school with a vision of a religious school, achievement, culture, integration, environmental care and global perspective. In realizing a school that cares and has an environmental culture, environmental learning activities should involve the entire school community (Landriany, 2014). Activities carried out by students to support learning solutions to environmental pollution in anticipation of climate change included taking care of plants, sorting waste, composting, recycling used goods and saving energy.

Table 4: Results of Validation of Lesson Plan (RPP) and Student Worksheet (LKS)

Aspect	Indicator	Total Score
Clarity and Completeness of Identity	Include the name of the education unit, subjects, grades, semesters, Core Competencies, Basic Competencies, indicators/goals, and time allocation/number of meetings	40
Time Allocation Accuracy	Effectiveness of time allocated to achieve goals, Linkage and integration between Basic Competencies, achievement indicators and learning objectives	24
Suitability to Students' Learning Abilities and Needs	Consider the differences in students' ability levels and oriented to student learning needs	7
Conformity with Learning Objectives	The conformity of contextual approach with learning objectives	8
Suitability with Learning Materials	The suitability of the learning approach with the learning material	4
Compliance with Process Standards	Preliminary activities, core activities, and the accuracy of drawing conclusions, reflections, assessments, and feedback on closing activities	12
Conformity of Learning with Scientific Approach	The conformity with the Learning steps on the contextual approach to enhance the students' critical thinking	8
Suitability of Learning Resources with Learning Objectives, Learning Materials, and Student Characteristics	The suitability of learning resources in the environment around students towards the achievement of learning objectives, learning materials, and characteristics of students	19
Suitability of Assessment Techniques with Learning Objectives	The suitability of the selection of assessment techniques with learning objectives	20
	Total	142
	Percentage	83%

Source: Data Analysis Result, 2021

<div align="center">Table 5: Steps for Integration of Environmental Pollution Materials in Schools</div>

Material Selection	The selection of social studies learning materials, by analyzing the core competencies and basic competencies used or the content of the material content as indicators development is expected to be oriented towards environmental pollution and climate change, which may provide an impact on human life. This learning contains aspects of cognitive, psychomotor and affective. The results showed that environmental pollution materials could be integrated into the effects of changes and spatial interactions on life in ASEAN countries. Specifically, on the sub-material of changes in space and interactions between spaces due to natural factors for grade VIII in the first semester
Learning objectives	Conducting objective analysis of environmental pollution problems that have been associated with the subject matter. Therefore, the learning objectives set are: - Analyzing changes in space and interactions between spaces in Indonesia and ASEAN caused by natural factors, and - Presenting the results of the study by making essays about climatic disasters around your area of residence and their effects on the sustainability of human life.
Learning Resources	Creating learning resources that are suitable for students' environmental conditions and digital-based learning. Therefore, the researchers made a learning video as a source of student learning that had been uploaded on YouTube. The material explains climate change, which results in climatic disasters, particularly disasters in Lamongan Regency due to human activities that originate from pollution. Lnk youtube https://www.youtube.com/watch?v=IIItuRU1O3c.
Learning model	Determining the learning model in accordance with the material, school environment, school facilities and infrastructure.
Learning Media	Developing lesson plans. The results of the validation of the Lesson Plan (RPP) for social studies teachers had successfully demonstrated the feasibility of being tested with revisions

Source: Data Analysis Result, 2021
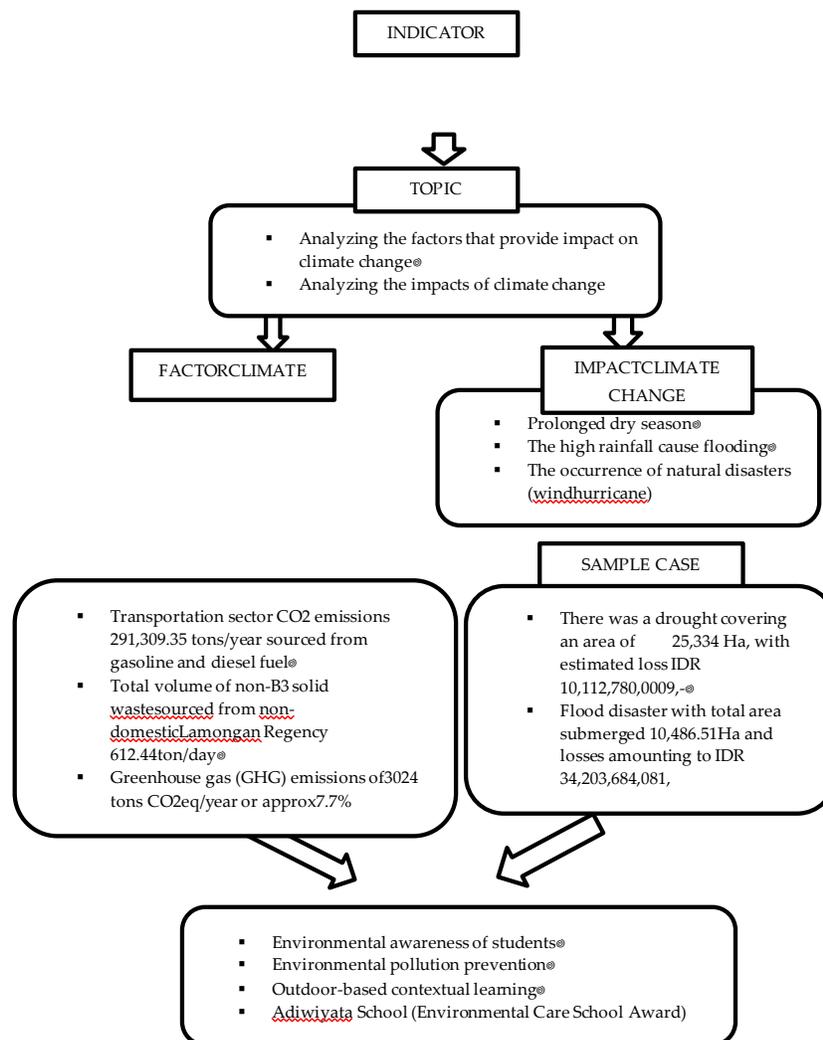
Fig. 3: Integration of Environmental Pollution in Lamongan Regency on Material Changes in Space and Interaction between Spaces Due to Climate Factors, Social Studies Subject

Fig. 4: Learning Activities on Environmental Pollution Materials in Schools to Anticipate Climate Change

Table 6. Results of pre-test and post-test

No. Respondents	Pre-test	Post-test	Difference	Percentage Increase (%)
1	105	145	40	38%
2	108	130	22	20%
3	111	117	6	5%
4	108	132	24	22%
5	106	144	38	36%
6	105	119	14	13%
7	103	137	34	33%
8	109	116	7	6%
9	108	115	7	6%
10	100	106	6	6%
11	130	128	-2	-2%
12	133	114	-19	-14%
13	112	131	19	17%
14	124	119	-5	-4%
15	130	115	-15	-12%
Nilai Rata-Rata	113	125		12%

Source: Data Analysis Result, 2021

After studying environmental pollution, climate change and climatic disasters that occurred in Lamongan Regency, students would be capable of carrying out solution activities to overcome climate change that could be carried out in schools, such as the activity in Figure 4, particularly through outdoor learning. According to Gestalt learning theory, attitudes and behavior may be generated by individual interaction with the environment and prioritizing the aspect of understanding (Insight). According to Behavioristic learning theory, attitude change is the result of the learning process (Istiqomah, 2019). Knowledge is defined as a very crucial domain for the formation of one's behavior, attitude is an emotional or affective assessment in addition to the cognitive component (knowledge of an object), while education is a conscious effort to increase knowledge (Sari & Mulasari, 2017)

Due to the COVID-19 pandemic, face-to-face learning had to be limited to an odd-even system. Grade VIII B students who were allowed to study at school were amounted to 15 students, and others should be involved in learning at home. The results of the students' environmental awareness pretest and postets were presented in table 6.

Based on table 6, it can be seen that the average pre-test score was 113 points, while the post-test average score was 125 points. Based on the comparison of the highest and

lowest scores, it can be concluded that there was an increase in environmental awareness scores of 12% from a total of 15 students.

Table 7 describes an increase in environmental awareness by 73% (11 participants from a total of 15 students), a decrease in environmental awareness by 4 students (27%). The percentage increase in this knowledge score is within the threshold value of quite good. The integration of environmental pollution materials in social studies learning can increase students' environmental awareness by more than 70%.

This is also supported by the results of the average difference in the pretest and posttest scores for students' environmental awareness in Table 8. The average difference test in this research was performed through a paired sample t test. In the paired sample t test, Ha is accepted and Ho is rejected, if the value of Sig (2-tailed) is less than 0.05. Moreover, Ha is rejected and Ho is accepted, if the value of Sig (2-tailed) is greater than 0.05. The formulation of the hypothesis is as follows:

Ha : there is a difference in the average value of pretest and posttest

Ho : there is no difference in the average value of pretest and posttest

The results of the difference test are shown as follows:

Having regard to the results of the students' environmental awareness questionnaires, it was found that the results of the pretest and posttest mean differences were less than 0.05. Thus, Ha in this research should be accepted and Ho should be rejected, which indicates that there was a difference between the average pretest and posttest scores. In other words, there was a significant effect of the integration of environmental pollution on social studies learning to anticipate climate change.

Table 7: Percentage of Increase in Pre-Post Test Results

Description	Total	Percentage
Increase	11	73
Permanent	0	0
Decrease	4	27
	15	100

Table 8: Results of Average Difference Tests

	N	Mean	Std. Deviation	Minimum	Maximum
Pretest	15	112,80	10,825	100	133
Posttest	15	124,53	11,710	106	145

	Posttest - Pretest
Z	-2,245(a)
Asymp. Sig. (2-tailed)	,025

Discussion

Learning in social studies is required to refer to the nature of social studies of scientific learning and is based on models of human behavior that grows in society. Social studies subjects consist of material on changes in space and interactions between spaces due to natural factors. An attitude of caring for the environment should be instilled through habituation in schools, particularly through social studies learning (Arisona, 2018)000 tons/day, equivalent to 64 million tons/year. Waste management is very necessary to minimize the adverse effects. For this reason, it needs to be inserted in social studies learning in order to foster an environmentally caring character. The method used in this study uses the literature study method. The results show that 3R waste management (reduce, reuse, recycle. Social studies learning aims to improve students' ability to think critically, solve social problems and care about the environment (Sya'ban, 2018). Social Studies discusses the relationship between humans and their environment. The community environment is regarded as a place for students to grow and develop as part of the community and are faced with various problems in the surrounding environment (Syaharuddin & Mutiani, 2020). Therefore, the integration of environmental pollution problems in Lamongan Regency with social studies material on climate change is in accordance with the concept of social studies education.

Education has a major role as a forum for introducing and fostering new norms according to the needs of development and environmental preservation. Thus, environmental awareness and behavior of the community can be realized. The integration of environmental pollution material into the subject is regarded as one of the alternatives to deal with the challenges of environmental problems, particularly climate change (Miranto, 2017). Awareness of global problems should be highly improved, especially environmental problems such as the ozone layer hole, global warming, and flooding. Global education encourages students to think globally and act locally. The role of social studies learning is expected to succeed in instilling an environmentally conscious attitude towards the younger generation as heirs of the earth's inhabitants in the future (Afandi, 2013).

Utilization of the surrounding environment as a learning resource is able to facilitate students to connect their experiences with new information(Irwandi & Fajeriadi, 2020). In this research, students were basically capable of understanding the negative impacts of irresponsible human activities on the environment, specifically actions that cause climatic disasters that may harm everyone economically and socially. The material was integrated into social studies subjects at school through learning medias, namely lesson plans and student worksheets. The results of the validation of the lesson plans and worksheets are shown in table 4, which

explains that the learning medias (RPP and LKS) were suitable for use, because a score of 142 with a percentage of 83% was successfully obtained. The validators were intended to assess the suitability of the material presented in the lesson plans and student worksheets. In addition, researchers also expect criticism and suggestions for improvement from validators, so that the RPP and LKS developed may succeed in encouraging students to be active in the learning process.

Referring to observations during the learning process, students were found to be more enthusiastic. Because learning activities were not only carried out in the classroom, but also held outside the classroom. Outdoor learning involved more students to play an active role in studying the material with the surrounding natural media. Consequently, student learning became more effective. This is considered as an affective assessment of students' abilities in applying environmental care attitudes in everyday life. Table 8 indicates that the value of sig (2-tailed) was amounted to 0.025, which means that there was a difference in the average pretest and posttest scores for students' environmental awareness. Social studies learning aims to develop the potential of students to be aware of social problems in society, have a positive mental attitude towards correcting all inequalities and train skills to overcome every problem that is found everyday, whether it is a problem with oneself or the community (Ida Bagus Made, 2017).

Based on the results of this research, social studies learning does not only include theory but can also involve the real conditions of the students' environment, which is supported by the existing data. Environmental pollution materials around students as social studies learning resources include water and air pollutions caused by human activities, including garbage disposal, motor vehicles, and industries that contribute various impacts on global warming, resulting in climate change. Indonesia has been known as a tropical country. Climate change will cause natural disasters that are able to provide large disruption for all communities. Therefore, environmental awareness of all parties is highly needed to preserve environmental sustainability. Environmental awareness can be formed through various efforts including knowledge, attitudes and behavior through learning in schools.

Conclusion

Schools may be utilized as a supporting facility in carrying out environmental education through knowledge, awareness and attitudes as well as rational and responsible behavior towards environmental problems. Environmental Pollution in Lamongan Regency can be used as a source of learning through integration in social studies learning by examining core competencies and basic competencies of social studies learning in schools according to the K-13 curriculum. The integration of environmental pollution materials in schools can be developed

through the Lesson Plan (RPP) and Student Worksheet (LKS) in social studies learning. The results of the evaluation by learning medias experts (RPP and LKS) developed by researchers indicated a score of 142 with a percentage of 83%, thus, it was categorized as very high and feasible to use. The learning activities in this research had been running effectively, and the effect of integration of environmental pollution on social studies learning for anticipating climate change had been successfully found. Because the learning processes were also carried out in outdoor to foster student curiosity and concern for the environment in anticipation of climate change, which has an impact on climatic disasters. Therefore, students had environmental awareness and control environmental pollution through the school environment to anticipate climate change.

Suggestion

Teachers are expected to have creativity in choosing learning materials and resources. Specifically, by taking advantage of cases that occur in the surrounding environment. It aims to bring knowledge and application in everyday life. In addition, attention to the environment will significantly grow in each individual, and increase insight and awareness of students in protecting the environment.

Limitation

This research was limited to social studies subjects, and the learning process could not be maximized due to the policy of limiting activities. Consequently, not all students could participate fully in school. Regarding to that matter, further research should be highly conducted to other relevant subjects by utilizing the environment as a learning resource.

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