The Evaluation of Student's Knowledge about Climate Change Phenomenon: Gender, Demographic Region, and Student's Attitudes toward The Environment

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INTRODUCTION

Climate change is a difficult issue to understand (Salampessy, 2018). The issue of climate change is also one of the biggest problems facing the world today (Alfiandy & Firman Ilahi, 2023). There are several studies stating that climate change is the most critical super evil problem facing civilization (Akaygun & Adadan, 2021; Cross & Congreve, 2021; Kurup et al., 2021). Climate change itself is a change in several climate elements consisting of temperature, pressure, wind, humidity, rain, and so on against normal conditions (Aldrian et al., 2011).

INTRODUCTION

DEFINITION OF CLIMATE CHANGE

The definition of climate change based on Ratag et al. (2004) is the average state of the air (weather) at a certain period shown from records of various elements that affect it. According to Setiadi (2010) the issue of climate change is one of the issues that is currently a hot topic to discuss. Climate change has been, is, and will continue to occur in the future. Cardwell (2011) says that climate change is one of the most threatening global environmental issues of this century. Global temperatures over the last century have increased by at least 0.74°C and appear to be the result of very high levels of greenhouse gases in the Earth's atmosphere which in turn causes warming or heat gain in the world's climate (Urry, 2012). In Indonesia, BMKG (Badan Meteorologi Klimatologi dan Geofisika) says that the temperature will always increase by about 0.03°C per year (Setiawan et al., 2012). So it can be expected to increase to about 0.3°C in the next 10 years

INTRODUCTION

NOVELTY AND GAP ANALYSE

Several studies show that people's knowledge about global climate change is relatively low and it is difficult to understand the scientific context behind the term climate change itself(Afiff, 2022; Nurhayati et al., 2020).

Based on research conducted by Nadhor Tsaqib et al. (2020) on University of Indonesia students, students from science and technology clumps have the right basic knowledge related to climate change, but some of them are not confident enough with the ability of the basic knowledge they have. While students who come from clumps outside science and technology, many of them lack information about basic knowledge related to climate change.

Kagawa & Selby (2012) have shown that education is one of the main components for the younger generation to raise awareness about climate change, the risks that must be faced, and the steps in handling it.

PROBLEM FORMULATION

Describing the level of knowledge of junior high school students about climate change

Describing the level of knowledge of junior high school students about climate change based on gender and demographic regions

Describing the effect of students' environmental attitudes on the level of knowledge about climate change

METHODE

RESEARCH DESIGN

The research design used in this study is included in quantitative survey research. As described in the introduction, the main targets in this research are junior high school students. The population used in this study amounted to 1,080 students obtained from various junior high schools in Sidoarjo Regency, East Java Province, Indonesia. The sampling technique in this study used random sampling techniques. A sample of 302 students was obtained, consisting of 51.5% male students and 48.5% female students

Background	Total	
	N	%
Gender		
Male	155	51,5
Female	147	48,5
Demographic Region		
Cities	181	59,9
Village	121	40,1

METHODE

RESEARCH INSTRUMENT

The research instrument used in this study is a questionnaire regarding students' interpretation of the phenomenon of climate change. This questionnaire consists of two types, (1) a questionnaire about knowledge of the phenomenon of climate change consisting of 14 question items adopted and modified from (Salehi et al., 2016); and (2) a questionnaire about students' environmental attitudes consisting of 8 question items which were also adopted and modified from (Salehi et al., 2016).

METHODE

DATA COLLECTION AND ANALYSIS

The first problem formulation, the analysis will be presented in the form of descriptive statistics to explain the response of each question item

The second problem formulation was tested through the Independent Sample T-test with the help of JASP software

The third problem formulation, the correlation was tested using Pearson Correlation with the help of JASP software.

RESULT

Junior High School Students Knowledge of Climate Change

No	Statements	Percentage (%)			
		SA	A	NA	SNA
1.	Carbon dioxide in the atmosphere affects the greenhouse effect (T)	52,6	35	7,2	5,2
2.	An overwhelming greenhouse effect may cause a global warming (T)	57,9	37,7	2,9	1,5
3.	Scientists have predicted that burning fossil fuels, especially coal will increase the greenhouse effect (T)	12,5	17,5	44	26
4.	Without clouds and water vapor, the earth would be colder (T)	22,5	38,7	25,5	23,3
5.	Without the ozone layer, life on Earth would be extinct (T)	42,3	41,7	13,9	2,1
6.	Scientists believe that large amounts of ozone in the atmosphere can increase ultraviolet radiation on the earth's surface (T)	21,1	54,6	17,8	6,5
7.	CFCs are the most serious concern for the ozone layer (T)	35,4	54,6	7,6	2,4
8.	Tropical rainforests are most likely can control the greenhouse effect (T)	30,1	45,3	20,5	3,6
9.	Exposure to ultraviolet radiation generally increases the risk of skin cancer (T)	32,4	46,3	16,2	5,1
10.	Scientists have not found evidence that ozone levels have decreased (T)	8,9	45,3	37,4	8,4
11.	Volcanic eruptions do not affected on the Indonesian climate (F)	12,5	17,5	44	26
12.	Indonesia is one of the largest greenhouse gas emitters in the world (T)	17,5	45,6	30,1	6,8
13.	By using renewable energy, global warming will increase (F)	16,2	53,9	22,5	7,4
14.	If global warming occurs, Indonesian crop and timber production would be affected (T)	33,4	52,3	9,9	4,3

UMSIDA
DARI SINI PENCERAHAN BERSEMI

RESULT

Knowledge of Junior High School Students About Climate Change Based on Gender and Demographic Regions

Table 3. Homogeneity Assumption Test

Test of Equality of Variance				
	F	df1	df2	p
Gender	0.915	1	302	0.340
Demographic Regions	0.350	1	302	0.554

Table 4. T-Test

Independent Sample T-Test			
	T	df	P
Gender	1.345	302	0.180
Demographic Regions	1.409	302	0.160

Table 5. Description of T-Test

T-test					
Group	n	Mean	SD	SE	Coefficient of Variation
Male	155	10.374	1.748	0.140	0.168
Female	147	10.634	1.593	0.132	0.150
Village	181	10.681	1.799	0.165	0.168
Cities	121	10.401	1.604	0.119	0.154

RESULT

Effect of Students Environmental Attitudes on Knowledge about the Climate Change Phenomenon

No	Statements	Percentage (%)			
		SA	A	NA	SNA
1.	Humans must live in balance with nature to survive	57,9	37,7	2,6	1,8
2.	Human interference in nature often produces results that will be destroyed later	20,1	54,6	19,8	5,5
3.	Humans were created to rule over others	9,9	12,5	43,7	33,4
4.	Humans are very destructive to the environment	9,6	36,7	39,7	14
5.	Nature's balance is easily disturbed	24,1	54,9	17,2	3,8
6.	Earth is like space with limited space and limited resources	17,5	44,7	32,4	5,4
7.	The main purpose of the creation of animals and plants is to be used by humans	24,4	44	23,5	8,1
8.	We will reach a stage where the earth cannot meet the population's needs anymore	17,8	48,6	25,1	7,9

Table 7. Correlation Test

Pearson's Correlations			
Variable		V7	V9
V7	Pearson's r	-	
	p-value	-	
V9	Pearson'r	0.303	
	p-value	<.001	

DISCUSSION

Based on the results of the research that has been carried out, satisfactory results were obtained. In the first problem formulation, many of the students have understood what climate change is. But there are also some who still do not understand how climate change can occur.

Female students are proven to have a higher level of knowledge as indicated by the acquisition of a standard value of 1.748 while male students get a standard deficiency value of 1.593. Then there is also a significant difference between students who live in rural areas and students who live in urban areas. This is evidenced by students living in rural areas obtaining a higher standard deviation value of 1.799 while students living in urban areas get a slightly lower standard deviation value of 1.604.

Based on the results of the analysis conducted in Table 7, it is known that there is a relationship between students' environmental attitudes and the level of knowledge about climate change. This is indicated by the calculated R-value of 0.303. Thus, this table informs that students' environmental attitudes only contribute 30.3% to the level of students' knowledge about climate change.

CONLUSSION

Based on the results of the research conducted, it can be concluded that the knowledge of junior high school students about climate change is relatively high. Then there is a significant difference between students' knowledge of climate change based on gender and student demographic areas where female students are higher than male students, and students who live in villages are higher than in cities. Furthermore, there is a positive relationship between students' environmental attitudes and students' knowledge about the phenomenon of climate change. It is hoped that this study provides further empirical insights into how teachers should facilitate students' knowledge of the phenomenon of climate change according to gender, demographic region, and attitude toward the environment. Suggestions for future research are to conduct similar research but using qualitative methods to examine more deeply the level of student knowledge about the phenomenon of climate change by gender, demographic regions, and attitudes towards the environment.

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