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# Knowledge, Beliefs, and Attitudes of Junior High School Students in Palembang Towards Climate Change Issues

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**Abstract:** Climate change is one of the most pressing problems at all levels of government around the world, threatening the global economy as well as the very existence of planet earth. This study aimed to examine the knowledge, beliefs, and attitudes of Palembang City junior high school students on climate change. The research method used is qualitative research. Data were obtained through questionnaires. There were 744 junior high pupils in the study, ranging in age from 11 to 16. The results showed that students' initial knowledge about climate change was 65.73%, students' beliefs about the causes and impacts of climate change were 65.50%, and students' attitudes to mitigating climate change were 69.50%. Students' beliefs about climate change opinions are also influenced by the contribution of the general media by 34.50%.

**Keywords:** Climate change; Belief; Understanding; Mitigation

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## Introduction

Climate change is one of the most pressing problems at all levels of government around the world, threatening the global economy as well as the very existence of planet earth. Some of the factors that cause climate change are changes in world global temperatures (not only increasing hot temperatures, but also cases of extremely cold weather, sea-level rise, and changes in wildlife cycles) (Blunden and Boyer, 2021), and considering various sources that affect climate earth (not only human activities but also natural factors such as variations in ocean temperature or volcanic activity) (Djalante, et.al., 2021).

Climate change is also responsible for an increase in the number and intensity of disasters, especially hydro-meteorological causes (WMO, 2019). There is growing evidence that certain disaster typologies such as floods, storms, heavy rains, heatwaves, fires, clean water crises, and droughts are increasing due to variability and

climate change (Case, et al., 2007; Klau, 2015). According to the most current study on the state of the global environment, approximately 63 million people were affected by climate change in 2018. Extreme weather-related climate change displaced 2 million people (Lytic and Membr, 2020; WMO, 2019). This shows that climate variability and change greatly affect both fast and slow disasters and are responsible for the loss of lives, livelihoods, culture, and heritage (Blunden and Boyer, 2021).

The issue of global climate change in education programs has been extensively addressed in recent reform initiatives in national school curricula in various countries (Anon, 2012; Australian, 1945). This endeavor starts with climate change education, which particularly connects present global warming to human actions, explains the effects of climate change on humanity, and promotes awareness about various mitigation strategies (Hung, 2013). To put it another way, climate change education as planned should pave the path for future

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generations of citizens (Poortinga, et al., 2018) to understand climate change science (UNHCR, 2021), preparing them to participate as citizens who can tackle climate change problems (Chryst, et al., 2018; Dupigny-Giroux, 2010; Ekborg and Areskoug, 2012; Herman, et al., 2017).

The specificity of the issue of climate change, unlike other social scientific issues such as air pollution, for example, the issue of climate change is concerned with hazards that are not yet fully visible, and people's understanding of these issues can be complicated by information that negates harm (Seroussi, et al., 2013). Therefore, teachers and students need to increase their understanding of climate change. One of the factors that can increase knowledge about climate change is the contribution of social media, and the systematic instruction given by teachers in schools to students (Clayton, et al., 2015; Stevenson, et al., 2016). In this study, the knowledge, beliefs, and attitudes of junior high school students on climate change in the city of Palembang were analyzed.

## Method

The qualitative research method was employed in conjunction with questionnaire-based data collection procedures. The number of samples used was 744 students in the city of Palembang with 40.9% male, 59.1% female with an average age of 13.8 years. Participants who took part in this study came from 7 public schools and 6 private schools spread across the city of Palembang. Each participant was selected randomly to represent the population representatively so that the data obtained can be used as a special conclusion for junior high students in Palembang City. The students answered the online questionnaire and were kept anonymous.

The Research Questionnaire contains 16 items from two globally published questionnaires on global warming. The first questionnaire was quoted and modified from a questionnaire developed by the Yale Project on understanding and belief in Climate Change (Leiserowitz, et al. 2019; Leiserowitz, et al., 2014; Stevenson, et al., 2014, 2016). A second questionnaire was developed by Tobler, Visschers, and Siegrist (Tobler, et al., 2012) on beliefs about climate change.

The dimensions that researchers measure in the questionnaire are knowledge: A Basic understanding of the greenhouse effect and global warming, Knowledge of the causes of climate change, and Knowledge of the consequences of climate change. Belief: The belief that climate change is happening, The belief that scientists have reached a consensus on a global warming model, and also Beliefs about human causes of climate change. Global Attitude: Concern for the future regarding climate change, Readiness to act to slow climate change,

and the last Readiness to make real changes in way of life.

## Results and Discussion

### *Early Knowledge About Climate Change*

A salient characteristic of the students that the researcher studied compared to the people studied in the two studies using the questionnaire that the researcher used (Leiserowitz, et al., 2012; Tobler, et al. 2012), was that most of the respondents in the sample admitted that they did not know correct answers on the questionnaire.

As a result, according to the report, 13.57 percent of respondents had never heard of climate change, while 65.86 percent had. According to research conducted globally, 40% of adults have never heard of climate change (Chryst, et al., 2018; Leiserowitz, et al., 2014; Leiserowitz, et al., 2014). This can happen because the learning process in schools may not provide clear information about climate change. Whereas systematic instruction given by teachers in schools on climate change is very important for the construction of knowledge and beliefs of young people in this area (Dupigny-Girox, 2010; Ojala, 2015).

The findings also revealed that 34.27 percent of students did not realize that the current increase in greenhouse gases was the primary cause of human activities. The results of this study are less than those of a study on student knowledge in America, which found that 43 percent of adolescents did not understand that human activities were the primary cause of global warming (Leiserowitz, et al., 2014), but 77 percent of students in America understood that the greenhouse effect refers to gas in the atmosphere that traps the sun's heat and is the primary cause of current climate change (Chryst, et al., 2018).

These findings reveal that Palembang City pupils had far more prior understanding of climate change than students in the United States. However, this result does not outperform that of a study of students in Austria and Denmark, which found that just 21.00% of students did not grasp that the increase in greenhouse gases was the primary cause of climate change, which is now the primary cause of human activity (Harker-Schuch and Bugge, 2013).

As many as 10.20% of respondents stated that they do not know and do not understand that global warming has exacerbated the risk of forest fires, clean water crisis, increasing the intensity of overflowing rivers, increasing storm intensity, even major floods that occur in various countries are a direct effect of climate change. Meanwhile, around 68.40% said they know that climate change is really worsening the risk of forest fires, clean water crisis, increasing the intensity of overflowing rivers, increasing storm intensity, and even

major floods that occur every year in many parts of the world. This result is almost the same as research on international students in Austria and Denmark which showed that 68.00% of students thought that climate change was a big threat (Harker-Schuch and Bugge-Henriksen, 2013) survival of the next generation of human beings.

#### Confidence in Climate Change

In contrast to a survey of young residents in the United States (Chryst, et al., 2018), roughly 28 pupils in Palembang City in this study said there was no climate change. When asked, "How sure are you that climate change is happening?" 75 percent of students said "very confident," 21.2 percent said "sure," and 3.8 percent said, "not sure." 72 percent feel "most scientists believe climate change is happening," 25.00% believe "there is a lot of dispute among scientists over climate change," and 2.00% believe, "most scientists think climate change is changing." According to surveys in the United States (Chryst, et al., 2018; Leiserowitz, et al., 2019), over 60.00% of people believe climate change is real. The data in this study sample suggests that the scientific community agrees on climate change's existence. Palembang City's students are far more formidable than the general assumption in the United States.

Another finding showed that 92 percent of Austrian and Danish students believe climate change is occurring now. In North Carolina, 364 kids were in the same boat. The findings revealed that the majority of students (92.10%) believed global warming was happening, but that it was influenced by a mix of natural and human factors (88.00%). (Stevenson, et al., 2016). As a result, just 12.00% of students linked their view on climate change causes to the scientific agreement that human activities are the primary cause of global warming

Although a smaller percentage of students (81.80%) believe that global warming is occurring, a bigger percentage (30.20%) believe that climate change is mostly human-caused (Stevenson, et al., 2016). Based on the data above, the confidence level of students in Austria, Denmark, and North Carolina did not have a significant difference with the confidence level of students in Palembang City, which was 96.20%. The results of a statistical investigation using logistic regression reveal that students' fundamental understanding, school type, or gender have little effect on their perception that climate change is occurring now (Harker-Schuch and Bugge-Henriksen, 2013). This result is the same as research data obtained from a survey of students from public and private schools, Prior knowledge, student gender, and parental workers did not affect students' climate change beliefs.

The number of students who think that scientists are unsure about the existence of climate change (72.60%) is still no less than the number of students who do not believe that climate change (75.00%) is happening, indicating that students in Palembang City are aware of the general controversy regarding the understanding of climate change but most students take the same side in this issue as they are not too sure of scientists' understanding of climate change. Regarding the anthropogenic origin of climate change (Table 1.), Students' responses show a lack of consistency, which could be due to a lack of understanding of the prior knowledge of greenhouse gases in the atmosphere as well as the implications of climate change. Media influences that convey knowledge about the implications and consequences of climate change can also influence this.

**Table 1.** Student Beliefs About Anthropogenic Origins of Climate Change

| Items | Statement   | Agree (%) | Do not agree (%) | Do not know (%) |
|-------|---|-----------|------------------|-----------------|
| Q1    | Do you believe that climate change is occurring and will continue to occur?   | 96.00     | 3.80             | 0.20            |
| Q2    | Do you believe the increase in greenhouse gas emissions that is the main cause of change is due to human activities?                                      | 65.50     | 8.20             | 26.20           |
| Q3    | How sure are you that global warming has exacerbated the risk of forest fires, water crises, rivers overflowing, storm intensity, flooding has increased? | 68.40     | 10.30            | 21.20           |
| Q4    | Do you think climate change is to blame for the recent flooding in several countries?   | 73.50     | 16.80            | 9.40            |
| Q5    | Do you believe that industrial pollution is the primary cause of climate change?  | 68.40     | 17.70            | 13.90           |
| Q6    | It's time to declare climate change a major issue for humanity. Do you think climate change is a major issue for humanity?                                | 54.30     | 6.50             | 21.40           |
| Q7    | Climate change is a serious and ongoing issue, according to experts. Do you trust the advice of these experts?  | 72.60     | 24.50            | 3.00            |
| Q8    | Do you believe that the information widely circulated in various electronic and social media about climate change is relevant and accurate to you?        | 34.50     | 61.00            | 5.60            |

According to research, junior high school students in Palembang City believe that climate change is real but not always caused by humans, which could significantly impact pupils. Although the majority of students (96.00% in our sample) believe that global warming is occurring, only 65.50 percent believe that the main cause of climate change is the impact of rising greenhouse gas levels, while 26.2 percent say they are unaware that rising greenhouse gas levels cause climate change.

The results of this study are the same as research conducted on students in America. A smaller percentage of students think that global warming is happening (81.80%), but a larger percentage (30.20%) think that climate change is mostly caused by humans (Stevenson, et al., 2016). The scientific consensus shows that students in this research sample have almost twice the belief that students in America believe that climate change is caused by human activities. But students in America have a belief of (88.00%) that climate change is caused by a mixture of natural and human causes, while students in the research sample showed 26.20% they could not determine the main cause of climate change that is happening today.

Based on table 3, of the eight items used to determine the level of student confidence in climate change, seven items have a medium category or the average student has more than 50.00% belief in climate change. However, on the eighth item students have low confidence in the statement "Do you believe, if the information widely circulated in various electronic media and social media about climate change is relevant and accurate to you?" which happened but only 34.50% or as many as 257 high school students believed the information circulating in electronic media or social media about climate change, as many as 61.00% of students chose not to believe in the information, and the remaining 5.60% they don't know about that information.

It is very feasible if pupils solely trust information from sources, they believe to be true, one of which is the teacher. Students may be able to screen for anthropogenic causes even if professors do not believe in anthropogenic causes if teachers are excellent broadcasters of the facts of climate change (Plutzer, et al., 2016).

**Table 4.** Awareness and Readiness to Act Against Global Warming

| Items | Statement  | Very important (%) | Neutral (%) | Not important (%) |
|-------|--|--------------------|-------------|-------------------|
| P1    | How important is global warming to you as an individual?   | 25.30              | 67.60       | 6.70              |
| P2    | Climate change is something that scares me?  | 44.00              | 41.10       | 14.90             |
| P3    | Do you feel emotional, worried, and sad when you think about the issue of climate change?                      | 38.20              | 32.50       | 29.30             |
| P4    | Do you feel that by taking certain activities, you can help to solve environmental problems?                   | 47.40              | 43.80       | 8.70              |
| P5    | Do you believe that using recyclable and reusable products is one way to reduce the effects of global warming? | 69.50              | 23.00       | 7.40              |

According to a national science teacher survey, many scientists believe climate change is caused by humans, while others believe it is caused by natural causes. Future research should look into whether this trend holds among teachers who send a "mixed message" that many scientists believe climate change is caused by humans while others believe it is caused by natural causes. The procedure of categorizing data into five groups, namely very low, low, medium, high, and very high, is described below. The criteria from Azwar (2019) in Table 2 below were used to organize the data results.

**Table 2.** Guidelines for Categorizing Data Results Based on (Azwar, 2019)

| Category  | Criteria                    |
|-----------|-----------------------------|
| Very low  | $X - M - 1.5SD$             |
| Low       | $M - 1.5SD < X < M - 0.5SD$ |
| Currently | $M - 0.5SD < X < M + 0.5SD$ |
| High      | $M + 0.5SD < X < M + 1.5SD$ |
| Very high | $X > M + 1.5SD$             |

**Table 3.** Categories of Student Beliefs on Climate Change

| Items | Average | Standard Deviation | Category  |
|-------|---------|--------------------|-----------|
| Q1    | 3.174   | 0.4689             | Currently |
| Q2    | 2.970   | 1.4253             | Currently |
| Q3    | 3.107   | 0.5634             | Currently |
| Q4    | 3.069   | 0.5169             | Currently |
| Q5    | 3.031   | 0.5866             | Currently |
| Q6    | 3.100   | 0.4944             | Currently |
| Q7    | 3.428   | 0.9502             | Currently |
| Q8    | 2,377   | 0.7055             | Low       |

#### Attitudes To Climate Change

Concern about climate change (Table 4) was found to be widespread: 38.20 percent of students were very concerned, 32.5 percent were moderately concerned, and 29.3 percent were unconcerned about the effects of climate change. In the absence of studies examining this concern among students, the results of these studies were compared to percentages measured among American students (Wachholz, et al., 2014) (17 percent and 48 percent, respectively) or the general population (Feldman, et al., 2012; Leiserowitz, et al., 2019).

This study sample was also more willing to take steps to slow climate change than other samples examined (Wachholz, et al., 2027). Students' readiness and belief in the statement that their actions can contribute to the solution of environmental problems have a higher percentage of 47.4 percent than students' concerns about climate change, but this result differs from the research conducted by as well as all other reported results. According to (Ambusaidi, et al., 2012), the readiness to act is lower than the level of concern about climate change.

Readiness to make real changes in the way of life, to slow down climate change also has a fairly large percentage among junior high school students, namely 69.5%, students have the attitude of believing that using products that can be recycled and can be reused is one way to reduce the effects of global warming so that global warming decreases, this can support the process slowing climate change (Green, et al., 2002; Intergovernmental Panel on Climate Change (IPCC) 2007; Masson-Delmotte, et al. 2018; Schleussner, et al., 2017). But about 7.4% of students feel their actions do not affect climate change. The same was also done in international research conducted by Yale University, which showed that around 56% of global citizens are concerned about preventing climate change (Nanni, et al., 2021; Spence, et al., 2011). In this study as well, as many as 25.3% consider climate change very important personally, and the largest percentage state that they are neutral on the issue of global warming. To reduce this number one way that can be done is by increasing basic education, climate literacy and public understanding of the local dimensions of climate change are very important for public engagement and support for action to reduce the pace of climate change (Delbeke, et al., 2019; Hamilton and Margot, 2019; Ratinen, 2021).

## Conclusion

According to the findings of the survey, the majority of junior high school pupils in Palembang City believe that climate change is occurring and that these changes pose a threat to humanity's safety. Students also believe that climate change has increased the likelihood of forest fires, water shortages, overflowing rivers, storm intensity, and floods. Students' knowledge of climate change is 72.6 percent, indicating that the main cause of global warming and climate change is an increase in greenhouse gas emissions, which also occurs as a result of human activities. Students have a 69.5 percent positive attitude toward coping with climate change, indicating that they want to use things that can be recycled and reused.

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