Pakistan Journal of Life and Social Sciences
www.pjlss.edu.pk

https://doi.org/10.57239/PJLSS-2024-22.2.000863

RESEARCH ARTICLE

High School Student's Climate Change Literacy: Evidence from Bogor, Indonesia

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ARTICLE INFO

Received: Jul 16, 2024

Accepted: Sep 10, 2024

Keywords

Adaptation
Global Warming
Mitigation
Social Media
Teenagers

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ABSTRACT

Climate change and global warming pose significant challenges to humanity now and in the future. Young people, in particular, are heavily impacted by these issues. It is crucial that they fully understand the impact of these challenges. To evaluate the level of climate change literacy among high school students in Bogor City, we conducted a study utilizing a Likert scale to measure their knowledge, perception, and behavior and then analyze it with descriptive statistics. Our research revealed that students possess a moderate level of climate change literacy, with the internet and social media serving as their primary sources of information. Furthermore, we noted that school activities significantly influenced their adaptation and mitigation behaviors, with slight variations in climate change literacy based on gender, school grade level, and major. These findings emphasize the significance of climate change education (CCE) for adolescents, which is a shared responsibility among educators, families, and society.

INTRODUCTION

Climate change and global warming significantly threaten the planet, influencing ecosystems, economies, and societies worldwide (Lee et al., 2021). Our planet has reached a tipping point that puts it in an emergency (Lenton et al., 2019). The climate crisis places a heavy psychological challenge on children and young people who experience climate-related disasters (Sanson and Bellemo, 2021). This reality underlines the need for climate change literacy, a combination of knowledge, skills, and attitudes that enables individuals to understand climate change and participate in mitigation and adaptation efforts.

Knowledge, awareness, mitigation, and adaptation to climate change are interrelated and influence each other. Understanding all of this is known as climate change literacy, introduced by NOAA in its booklet "The Essential Principles of Climate Science" as "understanding your influence on the climate and how it affects you and society" (USGCRP, 2009). Another term used by UNESCO is Climate Change Education, which aims to thoroughly understand climate change, its causes, driving forces, and impacts, and options for mitigating and adapting to climate change (Oziewicz, 2023). In this study, both terms are used.

Adolescents, particularly teenagers, are at a critical age where educational interventions can profoundly influence their understanding and behavior toward climate issues (Nongqayi et al., 2022). Knowledge and literacy about climate change are vital initial drivers for youth to take pro-environmental action and their willingness to act (Kolenatý et al., 2022). As future decision-makers, empowering youth with climate change education is essential for sustainable development and effective climate action.

Several studies have been conducted on young people's perceptions and awareness of climate change; K. Lee et al. (2020) have compiled a systematic literature review outlining reported levels of belief and concern about climate change and perceptions of its causes and consequences. The research also revealed that knowledge of climate change generally increases with age, although misconceptions persist across the age range. Some studies also found that younger children showed more significant concern and were more willing to take action than older adolescents. Using a questionnaire, Cartwright et al. (2021) evaluated middle-level students' climate learning, finding that students need help to retain climate understanding for the long term. Ratinen (2021) also investigated perceptions of mitigation and adaptation among primary and secondary school students in Finland to predict their constructive expectations regarding climate change. However, a significant gap exists between young people and their relationship with climate literacy, so more research is needed.

As a top 20 carbon emitter, Indonesia faces long-term economic and health problems due to excessive CO2 emissions (Sohail et al., 2023). However, young Indonesians' understanding of climate change and its impact on health still needs to be improved and consistent (Sulistyawati et al., 2018). Although Indonesian students have some level of awareness about climate change, many need a clearer understanding of the direct impact of their actions on the environment and their contribution to climate change (Perwithosuci et al., 2023; Al-Khresheh et al., 2023). Some young people have been involved in climate change campaigns through various capacity-building activities and climate awareness campaigns, but the numbers are insignificant (Bassar et al., 2018). Another study showed that Indonesian students' climate mitigation actions still need to be improved within campuses due to a lack of funding, information, engagement, lack of time, and seriousness towards climate change mitigation (Prasad, 2022). The participation of young Indonesians in pro-environmental activities is still lacking due to the social values and role models that shape their behavior, and they are not yet aware of the impacts of climate change (Ratriyana, 2023; Al-Khresheh et al., 2022). Research in Kalimantan revealed a fascinating finding: while students' climate literacy in terms of basic knowledge was only categorized as moderate, their literacy in terms of attitude and behavior was rated high (Hakim et al., 2023). In addition, a previous study of junior high school students in Bogor showed that more than half of the respondents had a good level of knowledge about the health impacts of climate change related to family income and mother's education (Puspita et al., 2020). However, studies related to climate literacy in Indonesia still need to be conducted.

Bogor is exposed to various types of natural disasters, dominated by hydrometeorological disasters. According to the Bogor Disaster Management Agency, 64.3% of the total area is moderately vulnerable to landslides, while 24.81% is very vulnerable (Alkaesi F et al., 2021). As one of the most common disasters in Bogor, the National Disaster Management Agency also stated that between 2013–2018, 44 landslides occurred in Bogor (Wicaksono YS et al., 2020). Whereas based on previous studies that climate change causes hydrometeorological disasters to occur more frequently. Besides that, Bogor City is a buffer to the capital city (Jakarta). Bogor has an urban climate influenced by manufactured emissions from urban areas. Bogor City has higher CO_2 emissions than the surrounding areas (Nishihashi et al., 2019). On the other hand, Bogor is one of the five cities in Indonesia most aware of climate change, according to ITB's Centre for Urban Innovation and Smart Communities (Bambani, 2022). Therefore, Our research aims to assess the climate literacy of high school students in Bogor, Indonesia. By examining their comprehension of climate change, including its causes, effects, and mitigation behaviors, we hope to gain valuable insights. To achieve this goal, we administer surveys in various schools throughout Bogor City. This study builds upon prior research in the field and seeks to comprehensively understand young people's climate literacy in the region. Additionally, we conduct a detailed analysis of students' attitudes and practices towards climate change adaptation and mitigation. The results of our research will be a crucial resource for enhancing climate change education for high school students in Bogor City.

MATERIALS AND METHODS

Our research involved the administration of a questionnaire to gather data, drawing from literature on climate change education across multiple regions such as Croatia, Africa, and Indonesia (Akrofi et al., 2019; Nefat and Benazić, 2019). Before finalizing the questionnaire, we conducted a pilot study with 15 participants and used this feedback to refine questions related to understanding climate change and concepts of mitigation and adaptation. While the first sub-variable was deemed valid, it was unreliable.

On the other hand, the second sub-variable proved to be problematic and inconsistent. It was because the questions presented the possibility of multiple interpretations, which could need clarification for the respondents. As a result, adjustments were necessary.

Sampling Method

A purposive approach was used for the survey's sampling method, and respondents completed the questionnaire according to the research objectives. To determine the minimum number of samples needed for this study, the Slovin formula was utilized, as outlined by Satyawan and Baskara (2023):

$$n = \frac{N}{1 + N.e^2}$$

Where :

n = Number of Samples

N = Total number of high school students in the city of Bogor

e = Margin of Error

with a margin of error of 5%, N = 59135, resulting in the n = 397.3 respondents. Considering the non-response of 20% of the total respondents, the number of respondents to be surveyed in this study was added to 478.

Data Collecting

The data was collected through online surveys utilizing Google Forms and offline surveys conducted from June to July 2022. Respondents who completed the survey gave their consent for their data to be used in the research. The survey was administered to 628 grades 10-12 high school students. The respondents completed the questionnaire independently, and the survey announcement was made through social media platforms such as Facebook, Instagram, and WhatsApp messages.

Analytics

This research data used a Likert scale of 1 to 3 to measure knowledge and a Likert scale of 1 to 4 to measure perceptions and behavior. The research data were processed using Microsoft Excel software and Jeffreys's Amazing Statistics Program (JASP) to obtain descriptive analysis.

RESULTS

Demographics

This research survey was conducted in Bogor City, Indonesia. A total of 628 respondents from 25 senior high schools in six sub-districts in Bogor City participated in the survey. The survey participants were a diverse group, including 283 males (45%) and 345 females (55%) of various grade levels. Specifically, the study sought input from 243 Grade 10 students (38%), 309 Grade 11 students (49%), and 76 Grade 12 students (12%). The students came from a mix of private and public schools, with 501 from private schools and 127 from public schools. The survey was open to science majors (316 students), social studies majors (174 students), and other majors such as vocational and religious studies (138 students).

Knowledge and perception of climate change

Based on the survey data, almost all high school students (95.4%) recognized climate change, but only 87.3% claimed to know its definition.

Our research revealed that 81.4% of respondents agreed with scientists about the impact of human activities on climate change. However, only 42.4% identified it as the primary source, with 20.4% attributing it to natural changes, and the rest still need to be informed. 80.6% of respondents feel the need to get more information about climate change.

Sources of Climate Change Information

We asked students which sources they use to obtain information about climate change. The most cited sources were the internet (87.7%) and social media (80.3%). Television and radio (50.8%), teachers and school lessons (46.8%), scientific articles (40.4%), and talking to parents (30.6%) were also mentioned. In comparison, newspapers and magazines (22.3%) and campaigns by NGOs and government agencies (19.9%) were less frequently cited.

Table 1. Climate Change Impacts and Contributors Perceptions.

Impacts of Climate Change	Valid	Median	Mean	Std. Dev
Rising sea levels	628	4	3.304	0.929
Drought Disaster	628	4	3.245	0.985
The loss of biodiversity	628	3	3.217	0.939
Increased risks of death and disease due to extreme heat and air pollution	628	3	3.158	0.956
Declining crop yields and food scarcity	628	3	3.118	0.974
Adversely affecting rainfall	628	3	3.104	0.955
Floods	628	3	3.057	0.998
Contributors of Climate Change	Valid	Median	Mean	Std. Dev
Forest fires	628	4	3.28	0.935
Factory or Industrial pollution	628	4	3.256	0.935
Motor vehicle pollution	628	3	3.175	0.951
Garbage and waste	628	3	3.014	1
Deforestation	628	3	2.994	1.017
Wasting electricity	628	3	2.779	1.039
Using imported goods	628	3	2.705	1.004
Mixed organic and non-organic waste	628	2	2.452	0.98
Meat consumption	628	2	2.465	1.021
Consumptive culture	628	2	1.885	0.953

Impacts of Climate Change

A vast number of students are acutely aware of the sweeping effects of climate change on human existence. They comprehend that climate change has the potential to instigate a range of natural events, such as heightened sea levels, drought, diminished biodiversity, augmented risk of illness and fatalities from air pollution and extreme heat, and reduced crop harvests and food scarcities (Table 1).

Contributors of Climate Change

The Students have identified various human activities that significantly impact climate change. These include forest fires, industrial and factory pollution, motor vehicle emissions, high volumes

of waste and garbage, and deforestation (Table 1). Based on students' beliefs, engaging in activities such as consuming meat from livestock animals, being wasteful with electricity, and inadequate disposal of organic and non-organic waste are perceived to have a moderate impact on climate change. Conversely, consumptive cultural practices are considered to have a minimal effect on climate change.

Climate Change Anxiety

According to our findings, most students, with 49.5% strongly agreeing and 33.3% agreeing, believe climate change poses a severe threat to humanity. Additionally, 45.1% report feeling very anxious, while 36% are anxious about the current trajectory of climate change. Students widely acknowledge that climate change poses a significant threat to our existence, causing unease. Interestingly, the level of anxiety experienced can vary depending on factors such as gender, education level, and academic focus (Table 2).

The survey facilitated an exploration of the variances in anxiety levels among students. Female students have higher levels of anxiety and concern than male students. Furthermore, students majoring in social sciences displayed the most minor worry regarding climate change compared to their peers in other fields (Table 2).

Table 2. Climate Change Anxiety

Climate Change is a serious threat to human					
Category		**Valid**	**Median**	**Mean**	**Std. Dev**
Gender	Male	283	3	3.201	0.886
	Female	345	4	3.330	0.843
Grade	10th	243	3	3.156	0.936
	11th	309	4	3.317	0.820
	12th	76	4	3.461	0.756
Majors	Science	316	4	3.370	0.804
	Social	174	3	3.023	0.967
	Others	138	4	3.362	0.801
You're anxious about climate change					
Category		Valid	Median	Mean	Std. Dev
Gender	Male	283	3	3.117	0.849
	Female	345	4	3.304	0.837
Grade	10th	243	3	3.091	0.900
	11th	309	3	3.275	0.813
	12th	76	4	3.408	0.751

Majors	Science	316	3	3.297	0.793
	Social	174	3	3.011	0.900
	Others	138	4	3.304	0.860

Adaptation and Mitigation Behaviors

95.4% of respondents agreed that they need to take action to combat global warming. Concerning adaptation behaviors, 56.7% of students considered climate change adaptation actions to be very important, while 34.9% viewed them as important. 45.4% of respondents feel they understand how to adapt to climate change, and 16.2% strongly understand.

Regarding mitigation behavior, 49.8% of respondents believe it is very important, and 37.4% believe it is important to mitigate climate change. However, only 11.3% strongly understand, and 42% understand that climate mitigation behavior can reduce the impact of global warming.

The students have made significant efforts to spread awareness about climate change. Many have invited their immediate community to participate in adaptation and mitigation activities (64.5%), shared climate change information on social media (53.7%), attended climate change-related training (51%), and participated in climate change competitions (36.5%). However, there are some areas where student involvement is relatively low, such as volunteering to assist in vulnerable areas affected by climate change (21.8%), promoting low-emission products and programs (21.7%), and participating in climate campaigns on the street (5.7%). Notably, 8% of students have yet to take any action related to environmental preservation.

Climate Change Actions in School

Climate Change Education is an essential component of students' climate change literacy. Most respondents agreed that schools have integrated learning activities related to adaptation (62.3%) and mitigation behaviors (61.2%). A significant percentage of students believe that adaptation and mitigation activities should be prioritized in school learning, with 26.5% strongly agreeing, 46.1% agreeing on adaptation, 24.4% strongly agreeing, and 45.2% agreeing on mitigation.

The students mentioned that they had participated in a variety of climate adaptation activities at school, including saving water use (69.4%), cleaning water sources and channels (67.5%), opening windows instead of using electronic devices such as air conditioners or fans (69.1%), adjusting daily activities to climate conditions (31.8%), following the directions of authorities related to extreme weather warnings (28.8%), collecting rainwater or planting water storage plants such as banyan, bamboo, and others (25.5%). Some of the adaptation behaviors of students outside of school included implementing clean living habits (81.4%), planting rainwater storage plants such as banyan and bamboo (26.9%), and making water absorption wells and water absorption holes (19.1%). Notably, 7% of students have not taken any adaptation actions at or outside school.

The students have taken several climate mitigation actions while at school, including using tumblers for drinking and eating (65.4%), properly separating and recycling waste (61.3%), conserving electricity by turning off electronic devices when not in use (61%), cultivating a garden (58.6%), refraining from burning waste (54.3%), and substituting plastic bags with reusable ones (43.9%). Outside of school, they continue to make a difference by bringing their shopping bags (34.7%), conserving electricity by powering off unused electronics (19.3%), using public transportation (18.8%), and separating and recycling waste (11.6%).

Climate Change Literacy Level

Our survey was divided into two categories: assessing students' awareness and knowledge of climate change events and evaluating their adaptation and mitigation behaviors at school. Overall, the results showed that the climate literacy level of students in Bogor City is moderate, with a

mean score of 76.0 for climate change awareness and 76.3 for adaptation and mitigation behavior (Table 3).

Table 3. Climate Change Literacy

Climate Change Awareness							
Category		**Valid**	**Median**	**Mean**	**Std. Deviation**	**Minimum**	**Maximum**
General		628	78	76.075	13.88	26	100
Gender	Male	283	76	74.276	13.841	26	100
	Female	345	80	77.551	13.756	31	100
Grade	10th	243	76	74.42	14.888	26	100
	11th	309	79	77.01	13.52	31	100
	12th	76	78.5	77.566	11.397	47	98
Majors	Science	316	79	77.728	12.956	33	100
	Social	174	74	71.621	15.566	26	100
	Others	138	79	77.906	12.444	37	100
Adaptation and Mitigation Behaviors							
Category		Valid	Median	Mean	Std. Deviation	Minimum	Maximum
General		628	78	76.369	11.916	43	100
Gender	Male	283	76	74.495	11.845	43	100
	Female	345	78	77.907	11.769	43	100
Grade	10th	243	76	74.329	12.349	43	100
	11th	309	78	77.738	11.578	46	100
	12th	76	78	77.329	11.062	43	95
Majors	Science	316	78	76.408	11.828	43	100
	Social	174	73	73.621	11.78	43	100
	Others	138	79.5	79.746	11.482	46	100

Interestingly, there were slight differences in scores between male and female students, with female students scoring higher (77.5 and 77.9) than male students (74.2 and 74.4). Additionally, 12th-grade students scored slightly higher than 11th and 10th-grade students on climate change awareness but not on adaptation and mitigation behaviors. We also noted that students from other majors, like vocational and religious studies, had higher scores than science and social studies majors.

DISCUSSION

The topic of climate change is widely acknowledged by young people, especially those living in urban areas. Although many have a basic understanding of the matter, not all are well-versed in its complexities, with only half of respondents attributing human activities as the primary cause. These results align with a UNICEF report in the United Nations Framework Convention on Climate Change (UNFCCC), which disclosed that 85% of individuals aged 15-24 in 55 countries were aware of climate change. However, only half could define it accurately (Unicef, 2023).

Interestingly, the survey revealed that students in Bogor City primarily rely on the internet and social media for information on climate change, a departure from previous studies. While the impact of social media on students' perception of climate change is not significant, it presents an opportunity and a challenge to provide accurate information on climate change across these

platforms. This finding contrasts with previous studies highlighting TV and radio (Baldwin et al., 2023; Chelule et al., 2023) or family members as the primary sources (Sulistyawati et al., 2018). Some young people may initially encounter information elsewhere before delving deeper into social media (Charbonnier, 2023). The power of social media to facilitate communication and raise awareness about topics such as climate change cannot be denied, and on platforms like Twitter (now X), this issue has gained significant attention (Pearce et al., 2019). However, a study found that social media has a less significant impact on climate change perceptions among Gen-Z in Bogor City (Calista and Yenni, 2023). Nevertheless, it is critical to remain aware of the potential for misinformation on social media to fuel climate change denial (Treen et al., 2020).

According to a recent survey, high school students in Bogor City possess moderate climate change literacy. While their knowledge of the impacts of climate change is commendable, there are several causes of climate change that students need to recognize, such as consuming livestock meat, mixing organic and non-organic waste, and using imported goods. The government, educators, and parents are responsible for conveying the latest facts related to the causes and impacts of climate change and global warming. The survey results suggest that students have become more aware of the impact of climate change beyond just its contributing factors. The trend is likely due to an increased realization of climate change's tangible and intangible effects on their daily lives. It is theorized that personal experiences with climate change may influence individuals' attitudes and beliefs about it, though not necessarily in a predetermined way (Brügger et al., 2021). Besides that, this survey suggests that students' awareness and knowledge of the impacts and causes of climate change are closely related to their adaptation and mitigation behaviors, which are comparable in level. This result contradicts previous studies indicating that knowledge alone does not necessarily lead to pro-climate behavior among adolescents (Colombo et al., 2023).

According to recent research, personal experiences with climate change play a crucial role in shaping beliefs about it - connecting traditional media, social media, and interpersonal communication (Rosenthal, 2022). Many students have likely witnessed the effects of climate change through first-hand experiences, news coverage, or social media exposure. However, not all students actively seek out additional information beyond these sources. In Indonesia, both online and print media tend to focus on the impacts of climate change rather than its causes, often needing to address accountability for those causes (Rochyadi-Reetz and Wolling, 2022).

The impacts of climate change are evident to most people, especially those living in Jakarta and its surrounding areas. For instance, the rising sea levels in Indonesia pose a significant threat to the country's islands and coastal areas, including Jakarta (Liliansa, 2023; Sutrisno, 2020). Projections indicate that Jakarta's coastal regions could be underwater by 2047 (Triana and Wahyudi, 2020). Additionally, Java has experienced more frequent droughts since 1960, which are expected to worsen due to climate change, posing a threat to future food security (Mulyanti et al., 2023). This pattern will likely be replicated in other Indonesian cities (Ikhwali et al., 2023). Lastly, the high levels of pollutants in Jakarta and its environs pose a significant health risk to residents, resulting in substantial financial burdens (Syuhada et al., 2023).

Regarding the factors contributing to climate change awareness, the survey reveals that students predominantly focus on forest fires, industrial pollution, motor vehicle emissions, inadequate waste management practices, and deforestation. The forest fires of 2019 in Indonesia profoundly impacted the health and economic well-being of the society (Kombara et al., 2023). Furthermore, Indonesia has been grappling with deforestation for decades (Tsujino et al., 2016). From 2002 to 2017, Indonesia lost 10.2 Mha of wet primary forest and 29.4 Mha of tree cover (Turubanova et al., 2018). The rapid industrialization of Jakarta and its neighboring cities, coupled with the reliance on motor vehicles and coal power plants, has escalated air pollution levels (Soemarko et al., 2023). The waste management systems are characterized by a lack of organization and cohesion, as evidenced by the daily disposal of approximately 482,181 kg of organic waste by the residents of Bogor City (Budiyanto, 2021).

Unfortunately, many factors driving climate change are largely beyond the control of students, which can be concerning. While students may believe that personal actions such as conserving electricity, reducing meat consumption, and proper waste disposal can make a difference, they perceive these efforts to have little impact. However, their perception contradicts reality; it is essential to recognize that large-scale livestock farming can produce methane, a greenhouse gas contributing greatly to global warming (Cheng et al., 2022). Similarly, food waste is a significant contributor to global warming, with over 1.3 billion tonnes generated annually, resulting in environmental impacts estimated at 3.3 Gigatonnes of CO2 equivalent per year (Amicarelli et al., 2021). Additionally, relying on imported goods and a consumptive culture leads to increased use of fossil fuels to transport goods, thereby increasing CO2 emissions as commodities are sourced from distant locations (Nudrat et al., 2023).

Female students reported higher degrees of anxiety and concern than their male counterparts, which is consistent with earlier studies (Leonhardt et al., 2022; Turcotte-Tremblay et al., 2023).

The escalating anxiety levels among young individuals, stemming from a sense of overwhelm by the challenges posed by climate change, are a source of concern. While it is imperative to enhance awareness of climate change and its impacts, it is disconcerting to witness the feelings of helplessness, anger, and sadness among young people, exacerbated by the government's perceived inadequate response (Hickman et al., 2021). Elevated worry levels can precipitate negative thought patterns, impair daily functioning, and engender feelings of betrayal, complicating the quest for reassurance in governmental initiatives (Mahudin and Hakim, 2023).

Establishing effective communication channels between students, schools, and families is essential to promote their engagement in climate change adaptation and mitigation initiatives. It will help alleviate students' concerns regarding climate change. Empowering young individuals to effect positive changes makes them more likely to take action and reduce behaviors that harm the environment (Turcotte-Tremblay et al., 2023). Thus, by fostering robust relationships between students, schools, and families, we can alleviate anxiety levels and inspire impactful action toward a more sustainable future.

Our study found that adaptation and mitigation actions at school were associated with students' adaptation and mitigation activities outside school. Students were likelier to engage in these behaviors within the school environment, such as bringing food boxes and water tumblers, cleaning waterways, and saving electricity. However, these behaviors were less frequently observed outside school. For example, only 19% of students switched off electronic devices they do not use at home, compared to 61% at school. Despite this, the diversity and frequency of adaptation and mitigation behaviors at school were more significant than those outside school. This finding suggests that school-based activities positively influence students' adaptation and mitigation behaviors within and outside school. However, other factors may also be influencing these behaviors outside school.

An exciting discovery was made during our research - students from non-science majors performed better in adaptation and mitigation. Further investigation revealed that Wikrama Vocational High School, a school in the tourism and hospitality department, scored well in these areas. With 25 students as respondents, Wikrama Vocational High School scored a mean of 82.8 for climate change awareness and 85.6 for mitigation and adaptation behaviors. The school actively participates in The Unesco Associated School Network (ASPnet), established in 1953 to promote international understanding among nations and advance peace through education. ASPnet is recognized by UNESCO as a valuable contributor to achieving SDG 4, specifically Target 4.7 on Global Citizenship Education (GCED) and Education for Sustainable Development (ESD), as well as Target 13.3 on climate action (Schugurensky & Wolhuter, 2020). SMK Wikrama is involved in the Getting Climate Ready project and takes a "whole institution" approach to climate change education (CCE) as directed by UNESCO (Gibb N, 2016). The school has successfully integrated climate change awareness and pro-environmental behavior into its educational environment, resulting in students with above-average climate change literacy. These findings

strongly support the effectiveness of the "whole institution" approach in climate change education (CCE) to encourage mitigation and adaptation behaviors among students (Hargis et al., 2021).

Improving climate change literacy among students is essential, and schools have a crucial role. A "whole institution" or "whole school" approach is necessary for Climate Change Education to ensure students comprehend climate change and global warming and develop pro-environmental behavior to mitigate and adapt to climate change. The exemplary efforts of Wikrama Vocational High School in fostering pro-environmental habits amidst the challenges of climate change and global warming ought to serve as a model for other educational institutions. By highlighting the urgency of climate change and empowering students to adapt and mitigate its impact, we can ensure that tomorrow's leaders are equipped to tackle this pressing issue head-on.

Limitation

Our research on climate change literacy among young people in Bogor City is a crucial area that needs further exploration. While our study provides a comprehensive overview of the situation in the Bogor city area, we acknowledge that there is still much to be explored on this topic. It is important to note that our survey was limited to students' general perceptions and behavior within and outside of school, and we could not test their overall knowledge of climate change due to time and opportunity constraints.

It is essential to note that this research only offers a descriptive analysis and does not test the relationship between variables in the level of climate change literacy among students. However, we plan to explore this relationship further in our following research.

Due to some constraints in preparing this research, we understand the data was collected in advance, specifically in June-July 2022. Nevertheless, we assure that our findings are still up-to-date and relevant, and we have referred to the latest research to compile this paper.

Authors' Contribution

FYR: Conceptualization, Writing, Analyzing; RS: Conceptualization, Analyzing, Writing; AR: Methodology, Software; PER: Supervision, Editing; DUI: Software, Editing; ASA: Writing, Editing, Analyzing

Acknowledgments

The article is a work of the " Penelitian Dosen Muda Tahun 2022" project funded by research institutions and community service at IPB University.

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