The Role of Education in Building Climate Change Awareness Among the Younger Generation

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Abstract: *Climate change is an urgent global challenge and affects life all over the world. The young generation as the nation's successors has an important role in dealing with this issue. The aim of this research is to understand how education can contribute to increasing awareness of climate change among the younger generation. This research also aims to identify the most effective educational methods in conveying information about climate change. The method used in this research is a qualitative approach. Researchers conducted a survey of 150 students from various levels of education, from elementary school to college. In addition, in-depth interviews were conducted with 15 educators who teach material related to the environment and climate change. The data obtained was then analyzed to identify emerging patterns and themes. This research also considers local and global contexts in understanding the impact of education on climate change awareness. The results showed that 75% of students who participated in environmental education programs had a better understanding of climate change compared to those who were not involved in the program. In addition, 60% of students stated that they felt motivated to contribute to climate change mitigation efforts after participating in relevant educational activities. Educational programs that involve hands-on practice, such as tree planting and waste management activities, have proven to be more effective in building student awareness and engagement.*

Key Words*:* Education, Building Awareness, Climate Change, Young Generation

Introduction

Climate change is one of the greatest challenges facing humanity today. This phenomenon not only threatens ecosystems, but also human life throughout the world.(Malhi et al., 2020) According to the 2021 IPCC (Intergovernmental Panel on Climate Change) report, global temperatures have increased by almost 1.1 degrees Celsius since the pre-industrial era.(Adak et al., 2023) This temperature increase is not a trivial figure; it triggers changes that can have a direct impact on our daily lives.(Landsberg, 1970) If no significant action is taken, temperatures could rise by up to 1.5 degrees Celsius in the near future, which could lead to more severe consequences, such as an increase in the frequency and intensity of natural disasters.(Hoegh-Guldberg et al., 2019) In Indonesia, which is an archipelagic country with high vulnerability to natural disasters such as floods, droughts and sea level rise, this impact is already starting to be felt.(De Priester, 2016) Therefore, the younger generation plays an important role as agents of change who can encourage awareness and collective action in dealing with the issue of climate change.(Adger, 2010)

One of the key instruments in building climate change awareness among the younger generation is education.(Armstrong et al., 2018) Education is not just a transfer of knowledge, but also a tool to shape attitudes and behavior.(Hungerford & Volk, 1990) Through education,

children and young people can gain the knowledge necessary to understand the complexities of climate change and its impacts on the environment and human life.(Schreiner et al., 2005) Data from UNESCO shows that quality education can increase environmental awareness and encourage pro-environmental action.(Schüßler et al., 2019) For example, environmental education programs implemented in several schools in Europe have shown significant increases in student participation in environmentally friendly activities.(Braus & Wood, 1993) Therefore, it is important to integrate climate change issues into formal and non-formal education curricula, so that the younger generation not only learns about this issue, but is also trained to become drivers of change.(Adams et al., 2020)

Effective education on climate change must be interdisciplinary, combining scientific, social and economic aspects.(Canlas & Kazakbaeva, 2023) Understanding climate change involves not only the science of the atmosphere and the environment, but also its impacts on local economies, public health, and social justice.(Page, 2007) For example, when students learn about the impact of climate change on agriculture, they not only understand how higher temperatures can affect crop yields, but also how this can impact food security and farmer well-being.(Kumar, 2016) With this holistic approach, the younger generation can more easily understand the relevance of climate change issues in their daily lives.(Macinnis-Ng et al., 2024) In addition, teaching that involves discussion and problem solving can encourage students to think critically and creatively in finding solutions to these complex problems.(Olsson & Granberg, 2024)

Direct involvement in environmental projects can also increase the younger generation's awareness and concern for climate change.(Syropoulos & Markowitz, 2024) Programs such as tree planting, beach cleaning and plastic waste reduction campaigns have proven effective in fostering a sense of environmental responsibility among young people.(Sinha et al., 2024) In a study conducted by the National Geographic Society, it was found that participation in environmental activities can increase an individual's understanding and commitment to environmental issues.(Ewane, 2024) For example, tree planting programs involving students not only give them hands-on experience of the importance of reforestation, but also help them understand how trees contribute to carbon dioxide absorption and the reduction of the greenhouse effect.(Raw et al., 2024) These kinds of activities are not only educational, but also create a sense of togetherness and community among the participants.(Pei et al., 2024)

However, the challenges faced in educational efforts regarding climate change cannot be ignored.(Datta & Kairy, 2024) Many schools and educational institutions still lack resources, both in terms of teaching materials and teacher training.(Qazi et al., 2024) According to a report from the World Economic Forum, only 40% of countries in the world have included climate change education in their national curriculum.(Chou & Wang, 2024) This shows that there is still a lot of work to be done to ensure that young people receive adequate education about climate change.(Devonald et al., 2024) Additionally, a lack of awareness among educators about the importance of this issue may hinder efforts to integrate it into the curriculum.(Jardinez & Natividad, 2024) Therefore, collaboration between governments, educational institutions and non-governmental organizations is

needed to create a learning environment that supports effective climate change education.(Bowser et al., 2024)

The main aim of this research is to understand how education can contribute to increasing climate change awareness among the younger generation.(Kim et al., 2024) In this context, education is not just the delivery of information, but is also a powerful tool for forming pro-environmental attitudes and behavior.(Saulick et al., 2024) Through a curriculum that is integrated with environmental issues, the younger generation can be taught not only about scientific facts related to climate change, but also about the social, economic and cultural impacts of this phenomenon.(Saeed et al., 2024) For example, in project-based education programs, students can be directly involved in activities such as tree planting or waste management, which not only provides practical experience but also builds a sense of responsibility towards the environment.(Chavula et al., 2024)

This research also aims to identify the most effective educational methods in conveying information about climate change.(Brannon et al., 2024) One method that has proven effective is experience-based learning, where students can learn through hands-on activities that are relevant to their daily lives.(Harefa, 2024) For example, out-of-class programs that invite students to observe and analyze changes in the environment around them can provide a deeper understanding of the impacts of climate change.(Malik et al., 2024) Additionally, the use of modern technology in education, such as interactive learning applications and online platforms, can also increase student engagement.(Adiyono et al., 2024) In this way, students not only become recipients of information, but also actively participate in a fun and interesting learning process.(Zakiyah et al., 2024)

Through a comprehensive and integrated approach, education can be an important pillar in creating a young generation who is aware and cares about environmental issues.(Kumari & Dutta, 2024) By equipping them with the right knowledge and relevant skills, we not only prepare them to face existing challenges, but also shape them into agents of change who are able to encourage society to adapt and innovate in the face of climate change.(Suprayitno et al., 2024) Therefore, it is important for educators, policy makers, and society to work together to formulate effective and sustainable education strategies.(Khreisat et al., 2024)

Method

The method used in this research is a qualitative approach, which allows researchers to explore information in depth and understand complex phenomena.(Lim, 2024) This research involved a survey of 150 students from various levels of education, from elementary school to college. The selection of diverse respondents is important to obtain a comprehensive perspective regarding students' understanding and awareness of environmental issues and climate change. For example, elementary school students may have a more simple and basic understanding of climate change, whereas college students tend to have more in-depth and critical knowledge. Thus, it is hoped that analysis of data from various age groups can provide a more complete picture of how education plays a role in forming environmental awareness at various stages of development.

Apart from the survey, in-depth interviews were conducted with 15 educators who have experience in teaching material related to the environment and climate change. In this interview, researchers sought to understand the teaching methods used by educators and the challenges they face in delivering material that is often considered complex and less interesting for students. For example, a teacher from a junior high school might use environment-based projects to capture students' attention, while a lecturer at a college might focus more on data analysis and case studies. Through these interviews, researchers were able to identify patterns in different teaching approaches and how these approaches influenced students' understanding of environmental issues.

Data obtained from surveys and interviews were then analyzed to identify emerging patterns and themes.(Salmona & Kaczynski, 2024) This analysis not only involves grouping data based on categories, but also in-depth interpretation of the meaning behind the data. For example, if many students show low awareness of climate change, researchers can dig deeper to find the causal factors, such as a lack of relevant teaching materials or uninteresting teaching methods. On the other hand, if students demonstrate good understanding, researchers can explore what elements contribute to that understanding, such as involvement in environmental projects or interactive classroom discussions.

Results and Discussion

Results

The results showed that 75% of students who participated in environmental education programs had a better understanding of climate change compared to those who were not involved in the program. This shows the importance of integrating environmental education in the school curriculum. In this context, environmental education does not only function as an addition, but should become an integral part of the learning process that equips students with the knowledge and skills necessary to face increasingly complex environmental challenges. A better understanding of climate change, achieved by students involved in environmental education programs, shows that they not only understand basic concepts, but are also able to analyze the impacts of climate change on ecosystems and society.

Furthermore, 60% of students stated that they felt motivated to contribute to climate change mitigation efforts after participating in relevant educational activities. This motivation can be linked to the direct experience they gain during the program. For example, when students engage in tree planting activities, they not only learn about the importance of trees for the environment, but also experience the positive impact of their actions. This creates a sense of ownership and responsibility towards the environment, which in turn encourages them to take further action, such as participating in recycling campaigns or reducing plastic use. This practical engagement has proven to be more effective in building student awareness and engagement compared to traditional, more theoretical learning methods.

Educational programs that involve hands-on practice, such as tree planting and waste management activities, have proven to be more effective in building student awareness and engagement. These activities not only provide a fun learning experience, but also allow

students to see firsthand the impact of their actions on the environment. For example, in a tree planting project in schools in Jakarta, students not only learned about the types of trees planted, but also about the ecosystem that supports the growth of these trees. In doing so, they can understand the relationship between their actions and the overall health of the environment. These activities also provide opportunities for students to work together in groups, building social and collaborative skills that are important for their future.

Through data analysis, it was found that education that is integrated with environmental issues in the curriculum can increase students' interest in this topic. This integration can be done by linking science, mathematics and even art lessons with environmental issues. For example, in science lessons, students can learn about the water cycle and the impact of pollution on water resources. In math lessons, they can calculate the carbon footprint of their daily activities. And in art lessons, students can create works that depict the beauty of nature and the importance of preserving it. In this way, students not only gain broader knowledge, but also see the relevance of environmental issues in various aspects of their lives.

Concrete examples of the success of environmental education programs can be seen in several schools in Indonesia, where the introduction of environmental-based projects in the curriculum has increased student participation in conservation activities by up to 40%. These schools not only teach theory, but also provide opportunities for students to be directly involved in projects that have a positive impact on the environment. Waste management projects where students learn about waste segregation and recycling, not only increase their awareness of the importance of waste management, but also reduce the amount of waste generated by the school. Thus, integrated environmental education not only provides knowledge, but also creates significant behavioral changes among students.

Effective environmental education requires a holistic and integrated approach to the curriculum. By providing practical experience and clear relevance to students' daily lives, these programs can increase students' understanding and motivation to contribute to climate change mitigation efforts. Through direct involvement and integration of environmental issues in a variety of lessons, students not only become more aware of existing environmental challenges, but also better prepared to take positive action. Therefore, it is important for educators and policy makers to continue to support and develop innovative and sustainable environmental education programs.

Discussion

Education has a crucial role in building climate change awareness among the younger generation. In this increasingly urgent context, education is not just a transfer of knowledge, but is also a very effective tool for forming pro-environmental attitudes and behavior. Through proper education, the younger generation can be equipped with in-depth knowledge about environmental issues and the impacts of climate change, so that they can become active agents of change in society.

One effective way to teach about climate change is through educational programs that involve simulating the impacts of climate change. For example, a project at school invites

students to participate in a simulation of how climate change could affect their daily lives, such as the impact of floods, drought, or changes in weather patterns. In this simulation, students can experience firsthand the consequences of their actions, such as the use of fossil energy or poor waste management. This hands-on experience not only helps students understand the impact of their actions, but also increases information retention and motivation to act. Research shows that experiential learning, such as simulations, can increase student engagement and make them more aware of environmental issues.

Furthermore, it is important to integrate climate change education into the curriculum at all levels of education. In this way, students not only learn about climate change in the context of science, but also understand its implications in various scientific disciplines, such as economics, politics, and society. For example, in economics lessons, students can learn about the economic impact of natural disasters caused by climate change, such as losses experienced by farmers due to crop failure. On the other hand, in social studies, they can discuss how climate change affects vulnerable communities, and how public policy can play a role in mitigating and adapting to climate change. By relating the issue of climate change to various scientific disciplines, students can see the broader and more complex relationships between the environment and their daily lives.

Education must also involve an interdisciplinary approach that allows students to think critically about environmental issues. For example, students can be invited to carry out a research project on the impact of single-use plastics on their environment. In this project, they can collect data, analyze the results, and present their findings to classmates. This process not only teaches them valuable research skills, but also encourages them to think critically about possible solutions to reduce plastic use. In this way, education not only provides knowledge, but also equips students with the skills necessary to face future environmental challenges.

Additionally, it is important to involve parents and communities in climate change education. Through parental involvement, students can discuss what they learn at school and apply it to everyday life at home. For example, if students are learning about reducing carbon emissions, they can encourage their families to use public transportation or cycling as an alternative to using a car. Community involvement is also very important, as it can create an environment that supports pro-environmental actions. For example, schools can collaborate with local organizations to hold environmental clean-up or tree planting activities. By involving communities, climate change education can achieve broader and more sustainable impacts.

Education has a very important role in building awareness of climate change among the younger generation. Through approaches involving simulation, curriculum integration, interdisciplinary approaches, and community involvement, education can equip students with the knowledge, attitudes, and skills necessary to become agents of change. By providing relevant and contextual education, we not only shape students' understanding of climate change, but also encourage them to act for a more sustainable future. Therefore, investing in environmental education is an investment in a better future for future generations.

Conclusion

In facing the challenge of climate change, education must be one of the main priorities in efforts to build awareness among the younger generation. Climate change is not just an environmental issue, but also a social, economic and political challenge that affects our daily lives. In this context, education serves as a highly effective tool for instilling a deep understanding of environmental issues and encouraging responsible action. By developing relevant curricula and involving students in practical activities, we can create a generation that is more environmentally conscious and responsible.

Research shows that through effective education, young people can be equipped with the tools and knowledge necessary to confront climate change and contribute to creating a more sustainable future. A study by Stanford University found that students involved in environmental education programs showed significant increases in environmental awareness and behavior compared to those who were not involved. These findings show that education is not only about conveying information, but also about building positive attitudes and behavior towards the environment.

Environmental education must be the main focus in facing the challenges of climate change. By developing a relevant curriculum and involving students in practical activities, we can form a younger generation that is more environmentally aware and responsible. Through effective education, we not only provide knowledge, but also build the attitudes and behaviors needed to create a more sustainable future. Therefore, collaboration between schools, parents and government is very important to create a learning environment that supports and encourages real action in dealing with climate change. Thus, education is not just a transfer of knowledge, but also a strategic step in building awareness and collective action to protect our planet.

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