

## REIMAGINING CLIMATE CHANGE EDUCATION AS A PANACEA TO CLIMATE EMERGENCIES

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### Abstract:

Climate change education refers to educating people about the causes, effects, and solutions to climate change. It is a critical component of efforts to address the global climate crisis, as it helps individuals understand the need for action and empowers them to make informed decisions in their personal and professional lives. The paper argued that drastic measures are required to reduce climate change threats, a visible adversary that demands the same emergency reaction as the COVID-19 pandemic. Education is a response to rising worldwide environmental concerns in the twenty-first century. The world's environmental issues necessitate immediate attention to climate change education. This paper is based on the Diffusion of Innovation (DOI) theory lensed with a transformative paradigm. It explores the inherent global risk to human health and environmental well-being and its implications for future natural disasters. As a result, this paper contends that an innovative approach to addressing the climate change threat through education is necessary. The paper proposed, among other things, a speedy response to climate change challenges through coordinated worldwide support for climate change education for sustainable development and the inclusion of climate change education in all sectors, integrating climate change education across all disciplines, focusing on social justice and equity, engaging with diverse perspectives, and encouraging action and advocacy.

**Keywords:** Climate Change Education, Climate Emergencies, Climate Change Crisis, Emergency Response, Sustainable Development.

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## INTRODUCTION

Climate change education refers to teaching and learning about the causes, impacts, and solutions to the global climate crisis. It aims to equip individuals with the knowledge, skills, and attitudes needed to take action to mitigate and adapt to climate change. Climate change education can take place at all levels, from primary school to university, and can be integrated into various subjects such as science, social studies, and geography. It can also be delivered through informal education, such as community workshops and public awareness campaigns.

Climate change education typically covers topics such as the science of climate change, the impacts on ecosystems and human societies, the policies and actions needed to address the crisis, and the roles of individuals and communities in addressing climate change (Hung, 2022).

Molthan-Hill et al. (2022) contend that Climate change education (CCE) is important for several reasons. Firstly, it helps to raise awareness and understanding of the urgent need to address climate change. It also provides individuals with the tools to take action to reduce their carbon footprint, advocate for policy change, and support community-based solutions. Climate change education can also promote a more sustainable and equitable society by emphasizing the interconnectedness of social, economic, and environmental systems. Climate change education is

essential for building a more sustainable and resilient future for all, and it is a key component of global efforts to address the climate crisis.

The prevalence of the Covid- 19 pandemic in 2020 dominated the global conversation, which relegated climate change issues. The climate change emergencies confronting the world today, including heatwaves, droughts, tropical cyclones, desertification, deforestation, flooding, and the depletion of the ozone layers because of human activities, have necessitated the call for rethinking how CCE could be employed in the formal education and informal system (Sharma, 2017). The recent Climate emergencies, which include the heatwaves across European countries, have rekindled the need to address climate change issues head-on. Over 15000 have been killed in Europe because of a heatwave (García-León et al., 2021). Cyclone Freddy ravaged towns and cities of Malawi in March 2023, the worst natural disaster the country has seen since 1991; floods killed over 1,000 people (New York Times, 2023).

The West Coast, which has experienced two decades of drought, was pounded by a wet season, creating havoc on roads and endangering blufftop homes along the coast in southern California's Orange County. The governor declared a state of emergency in 43 of California's 58 counties. This disastrous flooding affected over 130,000 homes and businesses (Reuters, 2023). The recent heavy rains and storms in KwaZulu-Natal and Eastern Cape provinces wreaked havoc on homes and infrastructures, which claimed over 459 lives. It has exacerbated the pain of many impoverished South African homes. Much must be done to educate the populace on their attitude toward the environment (Ndlovu et al., 2021).

Human Activities cannot be ruled out as one of the causal agents of climate change crises. Attitudinal change is required to minimize the trend of climate change crises (Botzen et al., 2021). It could be done through CCE in both formal and informal sectors, which will equip the citizenry with the needed skills, values, attitudes, and principles to remedy environmental problems (Kembara et al., 2020). Social media digital platforms and the school curriculum could be used to educate citizens on climate change issues (Vasconcelos & Vasconcelos, 2022).

The intensity and high incidence of storms, floods, droughts, and other predicted phenomena imply the likelihood of enormous disasters that may exceed present local and provincial response capacities in Sub-Saharan. In 2013, Intergovernmental Panel on Climate Change (IPCC) was established with the help of the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP). The IPCC provided relevant and scientific data on climate change issues. The numerous reports issued by IPCC have yet to gain any attention from a global perspective which has downplayed the seriousness of climate change. Our environment is under severe threat, and human life is at stake, which requires much to be done to avert further destruction to humanity (Stocker, 2014).

The Agenda 2030 framework, which supports the realization of SDGs, places a premium on global education, particularly SDG 4: "Quality Education. The significance of this goal is to ensure accessibility and equity of quality education and encourage opportunities for lifelong learning for all global citizens." SDG 4 involves seven targets and three mechanisms for implementation. The action plan to attain these SDGs seeks to bring global cohesion to improve national educational policies geared toward sustainable growth (UNESCO, 2015). The enforcement and implementation of SDG 4 principles will reinforce positive attitudes and values in global citizens to ensure sustainable development (Do et al., 2020).

World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) provide an objective source of scientific information on climate change (Canton, 2021). Using the crisis response viewpoint, we can end pointless discussions over whether climate change

is real and whether it calls for policy changes. There may be many topics for discussion or logical disagreement, but this fundamental reality is different. It entails concentrating on the facts supported by science that the climate is changing. It entails enhancing our understanding of the effects of climate change and continually enhancing attempts to monitor a changing climate precisely. It entails focusing assessment efforts on threats and hazards that can be logically determined using the strongest available scientific approach (Schneider, 2011).

As a result, organizations, communities, the media, and other interested parties must revitalize the need for CCE at all scales. Like the Covid-19 outbreak, which sent shivers down the spine of the world economy, climate change emergencies should be tackled as an urgent concern. This paper explores current climate change emergencies using this premise as its foundation. This conceptual paper addressed certain climate change challenges that made it urgent for global leaders to take decisive action for mitigation, adaptation, and resilience.

## METHODS

This paper contains concepts to help grasp climate change discourse and its consequences. In order to understand CCE and new strategies for addressing Climate Change, we need to look at the Diffusion of Innovation theory. The background of the theory was examined, followed by the assumptions from which the case for successful climate change management was built. This article's meaning is derived from the element of innovation dissemination, which is backed by relevant literature. It is convenient since the transformative paradigm is the paper's driving principle. This viewpoint is also used as a guiding strategy in this argument. It is vital since the paper aims to discover how CCE may transform climate change situations. According to Jackson et al. (2018), the Transformative Paradigm (TP) encompasses examining solutions to the transformation of the climate change narrative by adopting CCE in all sectors of society.

## RESULT AND DISCUSSION

**Theoretical Framework: The Diffusion of Innovation (DOI) Theory.** The DOI theory is appropriate for this paper because it tackles how an invention or a new way of doing things, such as employing CCE, to ameliorate climate change crises. Rogers defines diffusion as conveying innovations through certain channels within a social system over time. Diffusion of innovation is a theory that explains how new ideas, products, and technologies spread through a population or social system over time. The theory was proposed by Everett Rogers in 1962 and has since been widely used in educational research. Rogers advanced this theory in 2003 (Nazari et al., 2013).

According to the theory, adopting an innovation (i.e., a new idea, product, or technology) occurs in stages, and different groups of people within a population are more or less likely to adopt the innovation depending on various factors.

The five stages of the diffusion process are:

1. Knowledge: Individuals become aware of the existence of the innovation.
2. Persuasion: Individuals seek information about the innovation to evaluate its potential benefits and drawbacks.
3. Decision: Individuals decide whether or not to adopt the innovation.
4. Implementation: Individuals begin to use the innovation.
5. Confirmation: Individuals evaluate their decision to adopt the innovation and decide whether or not to continue using it.

The theory also identifies five key factors that influence the rate of adoption of an innovation:

1. Relative advantage: The degree to which an innovation is perceived as better than the existing alternative.
2. Compatibility: The degree to which an innovation is perceived as consistent with existing values, experiences, and needs of potential adopters.
3. Complexity: The degree to which an innovation is perceived as difficult to understand or use.
4. Trialability: The degree to which an innovation can be tested or experimented before adoption.
5. Observability: The degree to which the results of an innovation are visible to others.

By understanding these stages and factors, innovators can better understand how to introduce and promote their ideas, products, or technologies to increase their chances of widespread adoption.

Climate Change Education implementation in communities and institutions is a case of dissemination and significant innovation in education (Buc & Divjak, 2015). Adopting innovative knowledge to address societal challenges is one of the key variables of DOI. Individuals are exposed to new environmental knowledge because of climate change education. CCE is believed to be an innovative approach to dealing with global climate change crises. In this paper, institutions are viewed as social systems whose members contribute significantly to preventing new climatic calamities by adopting CCE as an innovation in education. Stakeholders, namely the government, civil society organizations, and school, plays a critical role in shaping environmental consciousness (Damoah & Adu, 2022). The approach towards innovatively tackling climate change emergencies would greatly contribute to climate change mitigation, adaptation, and resilience, as Rogers's DOI theory mentioned. Climate change education would be a better platform to educate the populace on climate crises instead of the usual generalization of environmental issues. Education undeniably imparts knowledge that makes people informed, which makes people take decisive action on climate change, then implement innovative ideas in their daily lives, which could be measured by individuals' environmental attitude towards nature. All these factors fit into Rogers's DOI, which supports CCE. The paper then discussed how CCE has been instrumental in the formal education system.

### **Climate Change Education in the School Curriculum for Sustainable Development.**

Education for Sustainable Development (ESD) and CCE originated primarily from Environmental Education (EE), which tries to instill in individuals the necessary information, skills, values, attitudes, and behaviors for environmental stewardship. While environmental concerns dominate ESD, the idea has been expanded to include social and economic development. Education is critical for long-term growth to occur. The United Nations emphasizes the importance of quality education in achieving a more sustainable world. (Woo et al., 2012). EE has gained significance due to current global environmental concerns and the 2015 adoption of the 2030 SDGs (Saab, 2019).

Incorporating environmental, social, and economic issues into all decision-making processes is a critical element of ESD. Sustainability is deeply founded on integration, distinguishing sustainability from other policy types (Stoddart, 2011). ESD, in practice, according to Emas (2015), demands the integration of economic, environmental, and social goals across sectors, geographies, and generations. Thus, to achieve genuine ESD, fragmentation must be eliminated; environmental, social, and economic issues must be integrated into decision-making processes.

According to Wals (2014), as ESD concepts have advanced, the relationship between school and the environment has become a necessity rather than a luxury, necessitating the creation of a complete strategy based on sustainability principles. This technique incorporates a variety of values, knowledge, talents, and attitudes into activities and programs for all students, families, and school workers, both within and outside the classroom. Because it is based on resource conservation and consumption pattern rationalization, it delivers many benefits, from physical and psychological

well-being to environmental protection. Please take it in its broadest sense, and EE and CCE are synonymous with ESD (Jickling & Wals, 2012).

Education for sustainability development (ESD) is critical to achieving SDG 4. It is critical to emphasize that the 2030 goals are backed up by robust policy support for ESD due to education stakeholders' active participation in their creation and concern for ESD and its integration into education. Through expert symposia and other interactions, UNESCO is actively involved in exploring and defining the future of ESD to ensure that it stays relevant to changing global, national, and local circumstances. ESD must, among other things, adapt to changing circumstances and emerging trends, such as adopting ESD as a lifestyle choice rather than a series of environmental or related problems by the younger generation (Leicht et al., 2018).

Above all, the 2030 sustainable development agenda provides an opportunity to accelerate ESD scaling and increase perceptions of its role as a cross-cutting instrument for all SDGs (Leicht et al., 2018). There are reasons to anticipate that ESD's future will be just as exciting as its past and present (Leicht et al., 2018). ESD can be used to help achieve all of the SDGs. To this end, the UN General Assembly's Second Committee adopted a resolution on ESD in the context of the SDGs during its 74th session, affirming ESD's role as an integral component of the SDG on quality education and a critical enabler of all other sustainable development objectives.

With the ratification of the SDGs, the importance of education as a tool in the global debate on sustainable development has been reaffirmed. The 2012 United Nations Conference on Sustainable Development emphasized governments' commitment to mainstreaming sustainable development through promoting ESD per the decade's goals (2005-2014). Education and learning at all levels and social circumstances can only affect this necessary transformation (Woo et al., 2012). Following that, the Rio+20 result document, *The Future We Want*, included firm commitments to education as critical for a green economy, employment and social protection, and overall sustainability (Leicht et al., 2018).

The growing policy support for ESD is partly a result of an increased focus on challenges in education by stakeholders. It is consistent with a broader trend toward educational materials that tackle contemporary concerns rather than a narrow concentration on access to education and basic skills. The Incheon Declaration on Education 2030's main objective is to transform lives through education, recognizing education's critical role as a primary driver of development and accomplishing the other proposed SDGs (The Incheon Declaration, 2015).

Besides the 2030 Agenda, African countries have pledged to adopt Agenda 2063, the African Union's vision and action plan for a more prosperous Africa in the next 50 years. The importance of the AU Agenda 2063 is recognized in the 2030 Agenda for Sustainable Development, which incorporates it as a component. Africa has made significant progress on the Millennium Development Goals, which include expanding primary school enrolment, particularly among girls, increasing women's representation in national legislatures, and lowering infant and maternal mortality and HIV prevalence. In conjunction with the UN Country Teams, UNDP has helped South Africa to raise awareness of the SDGs among government officials, members of parliament, civil society, and corporate sector actors (UNDP, 2021). Though many deliberations have been done on education for sustainable development, more needs to be noticed in developing environmental literacy among the citizenries. Climate change education remains the conduit to sensitize our communities and schools on climate change crises. This paper then examines the impact of climate change emergencies.

**The Impact of Climate Change.** Climate change is a significant global issue caused by increased greenhouse gases, primarily carbon dioxide, in the Earth's atmosphere. The consequences

of climate change are far-reaching and affect both the environment and human society. Environmental impacts of climate change include rising sea levels, more frequent and intense natural disasters, changes in precipitation patterns, ocean acidification, and loss of biodiversity. These changes affect the balance of ecosystems and lead to the extinction of various species.

Human impacts of climate change are equally significant and include increased health risks, displacement of people due to sea-level rise or natural disasters, economic losses due to reduced crop yields or loss of tourism, and conflicts over resources. Low-lying regions and developing countries are especially vulnerable to these impacts.

Efforts to mitigate the effects of climate change involve reducing greenhouse gas emissions through increased use of renewable energy sources, energy efficiency, and sustainable agriculture and forestry practices. Adaptation measures include building sea walls and other infrastructure to protect against rising sea levels and natural disasters and developing climate-resilient crops and livelihoods.

The impacts of climate change are likely to become more severe in the coming decades, especially if global emissions continue to rise. Therefore, individuals, governments, and businesses must take action to reduce emissions and increase resilience to climate change.

Extreme weather events such as heatwaves, droughts, flooding, winter storms, hurricanes, and wildfires are becoming more severe as the temperature rises by 1.1 degrees Celsius. According to the World Meteorological Organization, the worldwide average temperature in 2019 was 1.1 degrees Celsius, higher than in the pre-industrial period. 2019 marked the end of a decade of extraordinary global temperatures, receding ice, and record sea levels caused by greenhouse gases emitted by human activity. For over 20 days each year, 30% of the world's population is subjected to lethal heat waves. Average temperatures for the five-year (2015-2019) and ten-year (2010-2019) periods are the highest on record. The year 2019 was the second warmest on record. The climate emergency events recorded in European, the Americas, Asian countries, and other parts of the world in 2022 have superseded what was witnessed in 2019. Total greenhouse gas emissions, including land-use change, totaled 59.1 gigatonnes of carbon dioxide equivalent (GtCO<sub>2</sub>e) in 2019. Based on today's insufficient worldwide promises to cut climate-polluting emissions, a rebound in greenhouse gases from a return to high-carbon civilizations following the pandemic might drive 2030 emissions even higher - perhaps up to 60 GtCO<sub>2</sub>e (UNEP, 2020).

**Action Required to Limit Climate Emergencies.** Limiting climate emergencies requires immediate and sustained action on multiple fronts, including:

1. Reducing greenhouse gas emissions is the most critical step to limit climate emergencies. Governments, businesses, and individuals must take concrete actions to reduce their carbon footprint. It can be achieved by transitioning to renewable energy sources, implementing energy efficiency measures, promoting sustainable transportation, and reducing food waste.
2. Conserving and restoring ecosystems: Ecosystems such as forests, wetlands, and oceans are critical in mitigating climate change. Protecting and restoring these ecosystems can help absorb carbon dioxide and limit the effects of climate change.
3. Investing in clean technology: Developing and deploying clean energy technologies such as solar and wind power, energy storage, and electric vehicles can help reduce greenhouse gas emissions and promote sustainable development.
4. Adapting to the impacts of climate change: Even with significant efforts to reduce greenhouse gas emissions, climate change impacts will continue to be felt. Therefore, it is crucial to develop adaptive measures to mitigate these impacts, such as improving infrastructure and developing early warning systems for extreme weather events.

5. Encouraging international cooperation: Climate change is a global challenge that requires coordinated efforts from all countries. Encouraging international cooperation and partnerships can help share knowledge, resources, and technology to tackle the issue effectively.

Ultimately, limiting climate emergencies will require sustained efforts and commitment from all sectors of society, from individuals to governments to businesses.

To keep global warming at 1.5°C, we must cut emissions by 7.6 percent annually until 2030. If countries had acted on this research twelve years ago, they would have been required to decrease emissions by 3.3 percent yearly. Every year we fail to act, the complexity and cost of reducing emissions increase (Christensen & Olhoff, 2019). According to the IPCC, significant methane reductions will be required to help limit global warming to 1.5°C or 2°C. According to the International Energy Agency, existing technology may reduce over 75% of methane emissions, and up to 40% could be reduced at no net cost. Conserving and restoring natural places on land and water is critical for reducing carbon emissions, accounting for one-third of the mitigation effort required over the next decade. Because nature accounts for more than half of the global GDP, investing in nature-based solutions would reduce global warming and generate over \$4 trillion in income for businesses and over 100 million new employment annually by 2030 (UNEP, 2020).

A green COVID-19 rebound might save countries 25% on emissions in 2030, putting the world on track to reach the 2°C targets (UNEP, 2020). Nations committed in Paris to a legally enforceable commitment to limit global temperature rise to no more than 2°C beyond pre-industrial levels. However, they also gave national promises to reduce or limit greenhouse gas emissions by 2030. It is referred to as the Paris Agreement. The initial 2015 commitments were inadequate to reach the aim, and countries evaluated and strengthened these pledges as a major goal in 2021. The amended Paris Agreement pledges were evaluated during the COP 26 climate change summit in Glasgow, UK, in November 2021. It was the most significant intergovernmental gathering on the climate catastrophe since the Paris Agreement was signed in 2015 (Bloomfield & Steward, 2022).

The success or failure of the Glasgow summit declarations will have far-reaching ramifications for the whole planet. If nations cannot implement the required emissions reduction, it will rise to a near-impossible 15.5 percent each year in the next five years. Because attaining this much faster decarbonization is unlikely, the world risks a global temperature increase of more than 1.5°C. Any extra warming above 1.5°C will exacerbate the effects, endangering lives, food supply, livelihoods, and economies worldwide. Countries are not on pace to keep their commitments. Increased pledges can take various shapes, but they must all contribute to putting governments and economies onto a decarbonization path by setting net-zero carbon objectives and deadlines for achieving those ambitions (Bloomfield & Steward, 2022).

**Climate Change Education for Social Transformation.** Climate change education is an essential tool for social transformation, as it empowers individuals and communities with the knowledge and skills to take action to address the climate crisis. Here are some ways in which climate change education can contribute to social transformation:

1. Raising awareness: Climate change education can help raise awareness about the impacts of climate change and the urgency of taking action. It can mobilize individuals and communities to demand action from their governments and to take action themselves.
2. Fostering critical thinking: Climate change education can help individuals develop critical thinking skills to understand climate change's complex causes and impacts. It can help individuals challenge misinformation and make informed decisions about their actions and policies.

3. Encouraging participation and action: Climate change education can inspire individuals and communities to reduce their carbon footprint, advocate for sustainability policies, and support community-based solutions to climate change.
4. Building community resilience: Climate change education can help communities to develop resilience to climate impacts by building knowledge and skills in disaster preparedness, sustainable agriculture, and ecosystem restoration.
5. Promoting sustainable development: Climate change education can help individuals and communities understand the importance of sustainable development and the interconnectedness of social, economic, and environmental systems. It can help to promote a more sustainable and equitable future.

The United Nations Educational, Scientific and Cultural Organization (UNESCO) alluded to the following facts as the merits of climate change education.

- a) It assists individuals in understanding and responding to the effects of climate catastrophe by equipping them with the information, skills, values, and attitudes required to engage as change agents (UNESCO, 2022).
- b) The world community understands the need for education and training to combat climate change. The United Nations Framework Convention on Climate Change, the Paris Agreement, and the related Action for Climate Empowerment (ACE) agenda call on governments to educate, empower, and engage all stakeholders and significant groups on climate change policies and activities (UNESCO, 2022).
- c) Climate action is a primary thematic objective of ESD for 2030, the worldwide framework for Education for Sustainable Development during the next eight years. Through its Education for Sustainable Development initiative, UNESCO aims to make education a more fundamental and visible aspect of the worldwide response to climate change (UNESCO, 2022).

Climate change education is an essential tool for social transformation and can help to build a more sustainable and equitable future for all.

## CONCLUSION

While climate change education is important in addressing climate emergencies, it is important to recognize that it is not a panacea or a single solution to the problem. However, reimagining climate change education in a more holistic and integrated way can help make a significant difference in mitigating and adapting to the impacts of climate change.

Here are some ways in which climate change education can be reimagined to have a greater impact:

1. Integrating climate change education across all disciplines: Climate change is a complex issue that requires an interdisciplinary approach. Integrating climate change education into all school subjects can help students to understand how climate change affects different aspects of their lives, from health to economics to social justice.
2. Promoting experiential learning: Hands-on and experiential learning opportunities can help students to understand the real-world impacts of climate change and to develop practical solutions to mitigate and adapt to those impacts.
3. Focusing on social justice and equity: Climate change disproportionately affects marginalized communities and exacerbates existing social inequalities. Climate change education can help to promote social justice and equity by empowering students to understand and address the root causes of these disparities.

4. Engaging with diverse perspectives: Climate change education should engage with diverse perspectives and knowledge systems, including Indigenous and local knowledge. It can help to promote a more holistic and culturally sensitive understanding of climate change.
5. Encouraging action and advocacy: Climate change education should empower students to take action and advocate for policies and practices that promote sustainability and address climate change.

**Recommendation.** In order to tackle the ongoing climate crisis, policymakers should consider implementing a comprehensive CCE program. Climate change is a pressing issue that affects everyone on the planet. Environmental issues negatively impact people worldwide and all forms of biodiversity. Environmental awareness may make it easier to live a sustainable life and develop conservation consciousness. It is common knowledge that effective environmental conservation and restoration depend on different levels, methods, and approaches practitioners use to interact with stakeholders. Considering the impact of climate emergencies, it is recommended that the CCE program be expanded to reach everyone. Reimagining climate change education as a panacea to climate emergencies requires a transformative and collaborative effort involving all societal sectors. By promoting a holistic, engaging, and action-oriented approach, climate change education can contribute to building a more sustainable and resilient future for all.

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