

Knowledge, perspectives, and decision making on climate change in science classrooms

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Systematic Literature Review

Challenges and Difficulties in Climate Change Education

Student related challenges:

-Prior knowledge impacts understanding (You et al., 2018) -Confusion between related concepts such as global warming, climate change [CC] and greenhouse effect (Dijkstra & Goedhart, 2011) -Disbelief in the reality CC (Littrell et al., 2020)

Teacher related challenges:

-Lack of teacher training (Bush et al., 2019) -Difficulties in making CC relevant to students (da Rocha et al., 2020) -Disbelief in the reality CC (Namdar, 2018)

Other challenges:

-Lack of curricular support (Bush et al., 2019); inadequate resources (Littrell et al., 2020); not taught in a cross-curricular manner (Bush et al., 2019)





change and how the world are affected by climate change. https://regenerationinternational.org/2020/07/03/perspecti -from-chad-africa-covid-19-climate-change-and-indigenou

s-knowledge/

connection map to demonstrate the unique relationships between the various factors, thus, develop a holistic understanding of climate

change. wbankofcanadamuseum.ca/2022/04/teaching-the-green-economy

Social/Environmental Justice



Working with Indigenous Communities

te change threatens First Nations, Inuit, and Métis silience, cultural cohesion, and opportunities for the passing on of Indigenous knowledge and land skills, particularly among youth.

CLIMATE IMPACTS			
EXAMPLE Rising DESCRIPTION Sea ice and permafrost loss Disrupted safe travel and livelihoods Changes to food sources, culture	 Sudden, Heavy precipitation Rain on snow events have severe consequences to communities, infrastructure, and wildlife that is culturally significant Evacuations from traditional territories and a greater risk of injury and death 	Control of the systems and supplies	 Food insecurity, mental health issues Disruptions to livelihood, family, and community; cultural identity and language

This infographic emphasizes the need to work with Indigenous communities and utilize their own forms of science knowledge. Students can discuss how climate change impacts Indigenous communities and Indigenous knowledge can be utilized for combating climate change.

Socio-Cultural Aspects



This diagram shows how religion/culture can impact views on whether climate change is a crisis; data comparing 2014 to 2023. Students can discuss why the graph appears the way it is and reflect on how their own religious or cultural backgrounds have impacted their view of climate change. https://www.prri.org/research/the-faith-factor-in-climate-change-how-religion-impacts-americ

an-attitudes-on-climate-and-environmental-policy/

More political leaders are directly linking fossil fuels to climate change

Fossil fuel companies under fire in year of climate chaos and record profits



Politics

Climate Change

Education and

Perspective Taking

Canadian News Article regarding political leaders' views on climate change and its link to fossil fuels. Teachers can present the various causes of climate change, and have students think about why climate change is progressively getting worse despite the overwhelming evidence of climate change. This can present a discussion on how politicians talk about climate change. Students can investigate and research climate change initiatives taking place in different parts of Canada. Teachers can have students present their findings through various means: class discussion, project, etc. Students can relate the scientific reasons for needing these climate change initiatives to the economic costs and government roles involved: curricular connection between social and science.

https://www.cbc.ca/news/climate/fossil-fuel-companies-climate-change-political-leaders-1.6977578

CHILDREN'S UNDERSTANDING OF CLIMATE CHANGE A small-scale case study with Grade 3-4 students

Participants: 7 Grade 3 - 4 students from the local Alberta community.

Context: 2-month, 5-sessions engagement on climate change topics.

Purpose: to investigate children's perspectives and understanding of climate change.

Findings: (a) Children exhibit awareness and concerns about climate changes.





Misconceptions & alternative conceptions Collective knowledge construction

Critical understanding of 3R and environmental inequity

A PILOT STUDY on Student's Perspectives

Purpose: This study aims to find out Grade 5-6th students' perspectives and decision making on complex socioscientific issues in the context of land use and development during their learning on *Trees & Forests* in science classrooms (n=22).

Process: Inspired by everyday environmental problems, a scenario-based survey, Land development in Alfa region was developed. Students were asked to share their ideas on the scope of politicians, scientists, environmentalists, sociologists and parent perspectives. After the first survey, focus group discussions on diverse perspectives were conducted.

Throughout the unit, students learned various knowledge of trees and forests such as tree types, use and benefits of trees, conservations, human interactions with/in forests, etc.

Based on the students' perspective taking and discussions, the original survey was revised. Students took the revised survey and participated in focus group discussions and interviews to explain their perspective taking and decision making. In one of these discussion sessions, students were given some situations involving diverse perspectives on *Trees & Forests* and land development and asked to rank them, justify their ideas and explain what influenced their decision making.

Students' perspectives on forests, land development, and climate issues were analyzed and thematized.

Results: Based on data analysis, we found the following themes.

Students prioritized the importance of environmental issues such as climate change in their decision making.

"climate change happens" every year, it can start from warm to cold, and then [cold to] warm again.





'... the best is to reduce what we use ... then the last is to recycle. ... Recycling is bad, because the only way to recycle is to use a machine, emitting CO2 ... Maybe in North America, you have to ship it to Asia ... which is bad ... "

As educators, we must acknowledge the intricate interplay of students' experiences, emotions, and understandings when addressing climate change in the classroom.

If it affects climate change, the area should not be disturb such as cutting trees. (Logan)

Students demonstrated empathy for others in their perspective taking and decision making. 2.

Why do we need it for us? What about people in Alfa Land? (Sonia)

It will destroy animal habitats ... They [mentioning animals] had to move to another home. (Tom)

While students do not trust what politicians say, they fully trust what environmentalists say for 3 their decision making.

If this was said by environmentalists instead of politicians, then I would accept this idea. (Jay) They (environmentalists) ... make better decisions with the natural resources. (Tuba)

4. Students emphasize Indigenous peoples' perspectives for their decisions.

... I think that climate change will affect the Indigenous peoples' lives more... (Olive)

We need to be educated with that kind of stuff is really important, and in our school, we talk about all this...I think it's really important to them. (Lisa)

References:

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