



# Climate Change Education: Inspiring Engagement & Action

Climate Pedagogy Symposium Proceedings

May 15, 2024 - Balsillie School of International Affairs

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## EXECUTIVE SUMMARY

The Climate Pedagogy Symposium held at the Balsillie School of International Affairs in Waterloo, Ontario, brought together educators from higher education institutions across the Waterloo region to share innovative approaches to climate change education (CCE). Hosted collaboratively by the Waterloo Climate Institute at the University of Waterloo, Conestoga College, and Wilfrid Laurier University, the event facilitated discussions on decolonizing CCE, active learning strategies, reflective and reflexive teaching, interdisciplinarity, and addressing climate emotions.

The symposium served as a platform for educators to explore and exchange innovative teaching strategies for CCE. It also underscored the critical role of education in addressing climate change and the need for ongoing collaboration and dialogue among post-secondary educators to enhance climate pedagogy across disciplines.

Over 70 participants attended the event, which commenced with an opening plenary session featuring introductions from the collaborating institutions and discussions focused on decolonizing CCE. Subsequently, faculty and educators participated in the six interactive sessions where they shared personal experiences and pedagogical strategies. These sessions provided valuable insights into various aspects of CCE:

- **Decolonizing CCE:** Discussions focused on integrating Indigenous Knowledge and perspectives into climate education with Indigenous Knowledge Keepers, fostering a more inclusive and holistic approach.
- **Active Learning Strategies:** Educators explored methods to engage students actively, making learning more dynamic and impactful.
- **Reflective and Reflexive Teaching:** Sessions emphasized the importance of self-awareness and adaptability in teaching, encouraging educators to continuously reflect on and improve their methods.
- **Interdisciplinarity:** Participants discussed the benefits of integrating multiple disciplines in climate education to provide a comprehensive understanding of climate issues.
- **Addressing Climate Emotions:** Strategies were shared for helping students navigate the emotional challenges associated with learning about climate change.

By fostering a community of practice, the event highlighted the importance of collaboration and shared learning in advancing climate change education. Recommendations from the event included:

- **Recommendations for incorporating climate pedagogies into higher education courses, adjustable according to academic disciplines and teaching contexts:**
  - Bring **diverse knowledges** and multiple **epistemological lenses** into the classroom
  - Find ways to **decolonize CCE** and incorporate **Indigenous knowledges**
  - Identify and understand the way that **culture shapes CCE**
  - Encourage students to **give thanks** as a way of **reconnecting** with the world
  - Incorporate **outdoor learning** to reconnect students with the outside world

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- Incorporate **active learning** strategies into the classroom to engage students in the learning process
  - Normalize the wide range of **climate emotions** that students might experience and create opportunities to discuss and validate these emotions
  - Incorporate **transformative learning** (such as The Work That Reconnects) as a method of addressing climate emotions
  - Incorporate students' **passions** into discussions about climate change
  - Facilitate **community-based learning** by using spaces in the community as classroom spaces and organizing field trips
  - Connect with **external partners** and create new partnerships for community-based and hands-on learning about climate change
  - Reflect** on teaching to identify areas for change and become more **reflexive**
  - Be **flexible** and willing to change pedagogical approaches to suit the needs of students
  - Prioritize **emotional reflection** and build **support networks**
  - Build **CCE communities** to share resources and provide support
- Recommendations for broader changes on an institutional level**
    - Make space for instructors and staff to find hope amid the many conflicting emotions that can arise from teaching about climate change.
    - Instructors and staff need to continue to identify and critique the **systems of power** that shape institutional approaches to climate change and work to transform these and engage with perspectives outside of our own
    - Create opportunities for **interdisciplinary connections**, because through this exposure to other approaches our own curriculums will become fuller.
    - Continue to create opportunities for **community building, networking, connecting** with other educators, learning from other **perspectives and collaboration**
- Recommendations for next steps**
    - Establish a Waterloo Region Climate Pedagogy Network / use social media channels for CCE resources/collaboration, newsletters with teaching tips
    - “Bootcamps” or opportunities for professional development on selected topics such as climate science, communication, pedagogy, local/community green initiatives, case studies from courses, climate politics, student experiences
    - Yearly CCE symposiums/conferences and possibility of 2 day event

# 1. INTRODUCTION

On May 15, 2024, the **Climate Pedagogy Symposium** provided an opportunity for educators working at higher education institutions to engage with **pedagogical approaches and tools** related to **climate change education (CCE)**. Facilitators led sessions on topics such as decolonizing CCE, active learning strategies, reflective and reflexive teaching, interdisciplinarity, and addressing climate emotions. Participants were encouraged to interact by sharing their own stories, experiences, and perspectives. The goal was for educators to participate in **interactive sessions** to discuss climate pedagogies and teaching strategies, and to engage in **networking opportunities** to build their own CCE community. In the following sections, the discussions that took place during the symposium are documented. Facilitators and participants generously shared pedagogical tools, strategies, and tips for engaging students in CCE. These symposium proceedings are intended to provide a useful starting point for tertiary level educators who are interested in incorporating new approaches to CCE into their own courses.

**Table 1. Symposium Program**

8am	Registration and networking / breakfast
8:30	Opening plenary: welcome, introductions, and land acknowledgment Speakers: Elder Norma Jacobs, Elder Myeengun Henry, Tim Leduc: Decolonizing climate change education in post-secondary institutions
9:50	Tea break and networking
10:10-11:30	Breakout sessions A – 2 options: A1 - Introduction to Climate Pedagogy A2 - Addressing Climate Emotions in the Classroom - the Work that Reconnects
11:35-12:55	Breakout sessions B – 2 options B1 - Active Learning Strategies for Climate Change Education B2 - Culture and Justice in Holistic Climate Change Education
12:55-1:55	Lunch and networking
2:00-3:20	Breakout sessions C – 2 options C1- Teaching climate science in Arts classes C2 - Reflexive practices in teaching climate change
3:25-4:15	Final plenary– key findings/messages and way forward

The Climate Pedagogy Symposium was a joint initiative planned by a working group of faculty members from the University of Waterloo, Conestoga College, and Wilfrid Laurier University. The symposium was sponsored by the Waterloo Climate Institute, Balsillie School of International Affairs, Conestoga College, University of Waterloo’s Sustainability Action Fund and Centre for Teaching Excellence’s LITE grant program, and Wilfrid Laurier University.

We would like to thank the members of the Climate Pedagogy Symposium Working Group, the session facilitators, and the session notetakers for their work in making the symposium a success. We would also like to thank everyone who participated in the symposium for generously sharing their ideas, experiences, and perspectives.



## 2. OVERVIEW OF SYMPOSIUM

The symposium welcomed members of the University of Waterloo, Conestoga College, and Wilfrid Laurier communities.

**Table 2.** Number of symposium participants from each institution.

Institution	Number of Participants
University of Waterloo	31
Conestoga College	25
Wilfrid Laurier University	15
<b>TOTAL</b>	<b>71</b>

The symposium began with an opening plenary that included introductions to the three institutions that collaborated to organize the event. Juan Moreno-Cruz, the Acting Executive Director of the Waterloo Climate Institute and Professor, introduced the institute and its role in facilitating interdisciplinary climate change research at the University of Waterloo. Debora VanNijnatten, the Academic Director of Teaching Excellence and Innovation and Associate Director (Laurier) of the Balsillie School of International Affairs and Professor, discussed Wilfrid Laurier University and the Balsillie School of



International Affairs. Then Laura Matheson, Sustainability Consultant and Professor and Program Coordinator at Conestoga College, introduced Conestoga College and provided an overview for the day. After the opening plenary, there were three blocks, each with two concurrent sessions (Table 1). During each of the three blocks, participants were able to choose between two options for which session to attend.

**Photo 1.** Throughout the symposium, participants had opportunities to interact with other educators and share their ideas and experiences. Photo credit: Waterloo Climate Institute.

## 3. CONTEXT: WHY WE NEED CLIMATE CHANGE EDUCATION

Throughout the symposium, participants and facilitators highlighted the urgent need for innovative approaches to CCE. During Debora Van Nijnatten’s opening remarks, she noted that climate pedagogy is emerging in a **unique cultural moment**. Because of a combination of **eco-anxiety** caused by climate

change and **skepticism** caused by misinformation, students are disengaging and becoming less and less trusting of leaders and information sources. Additional challenges arise from the fact that students' academic lives are increasingly defined by **political polarization**, and that there is less connection to the land as fewer people go outside.

In Session A1, facilitators Michèle Martin and Laura Matheson provided additional contexts for why CCE is increasingly important in higher education. As Martin and Matheson noted, we are living in a **climate emergency**. We are not meeting important climate goals, and young people are calling for meaningful action. They are looking for recognition of the way that climate change disproportionately impacts marginalized groups and for ways to integrate **climate justice** into our approach to climate change.

The facilitators highlighted how the lack of meaningful action in higher education institutions is leading to **mental health impacts**, as students are left feeling like they do not have agency. In a 2021 global survey by Hickman et al. (2021), young people reported feeling very or extremely worried about climate change (59%) and that they found the future frightening (75%). As the facilitators noted, this is consistent with studies that have surveyed young Canadians, such as Galway and Fields (2023), who found that young Canadians (ages 16-25) have reported feeling like climate change is impacting their daily lives (40%) and feeling like humanity is doomed (almost 50%). Despite this widespread experience of **climate anxiety** among young people, there is also hope. Young people are incredibly resilient, and 71% believe that we can work together to enact change, while 50% of young Canadians believe they can contribute (Galway and Fields 2023). It is therefore critical to establish **pedagogical strategies for CCE**.

During the opening plenary, Van Nijnatten noted that there has been a “collective bursting forth” in the field of CCE as educators are finding innovative ways to engage students. Educators can use this moment of innovation to build CCE communities, learn about new pedagogical strategies, engage their students, and foster hope for the future. In the following sections, multifaceted and inventive ways that educators are engaging with CCE will be outlined.

## 4. PEDAGOGICAL STRATEGIES FOR TEACHING CLIMATE CHANGE EDUCATION

**Active learning** was discussed in Session B1 as a core strategy for CCE. Session facilitators Michèle Martin, Warren Dodd, and Laura Matheson described how active learning prioritizes **student engagement** in the learning process, and shared a study on active learning by Hargis and McKenzie (2020) that identified four learning dimensions in active learning:

- Cognitive
- Socio-emotional
- Action-oriented
- Justice-focused



**Photo 2. Participants in Session B1 - active learning strategies.** Photo: Burgess Langshaw Power.

Engaging with each of these dimensions is essential in fostering student engagement. The **socio-emotional dimension** is particularly important for considering the impacts of **climate emotions** in the classroom. The facilitators discussed **The Hope Wheel** developed by Finnegan and d’Abreu (2024) as a method of using active learning methods to address climate anxiety and prioritize hope-based pedagogy.

**Transformative learning** was highlighted as a key approach to CCE. Both Session A1 and Session A2 discussed the benefits of transformative learning. In Session A1, Martin and Matheson discussed some of the benefits of transformative learning, which can include

- Incorporating students’ perspectives and experiences
- Having educators act as facilitators
- Bringing in-class learning into real-world contexts
- Developing important skills

Transformative practices can include **active learning** and **student-centred learning**, bringing in real-world connections and using the community as a venue, and encouraging multiple approaches to learning. Martin and Matheson introduced the **6Cs** and **The Pathway to Learning** as two frameworks for transformative learning. However, as the facilitators noted, transformative learning is not always easy, especially in **large classes** and in **online contexts**. An important consideration for transformative learning outside the classroom is that there might be **accessibility considerations** that need to be considered when planning field trips to ensure all students can participate. Another concern is how incorporating **transformative learning** about climate change will impact the rest of the curriculum. Educators might need to make decisions about which content will be removed if a climate focus is added to a course. Factors like the technical requirements of a program, the differing levels of knowledge among students, and the need to establish a baseline could all influence educators’ abilities to bring transformative learning about climate change into their courses.

**Outdoor learning** was identified as a method for re-engaging students in learning about climate change by bringing them outdoors. In Session B1, Martin, Dodd, and Matheson discussed ways to bring students outside to learn about climate change on their campuses and in their communities. The facilitators cited



a study by Mann et al. (2021) that identified benefits of outdoor, nature-based learning. In contrast, the facilitators described the Indigenous pedagogies of **land-based learning**, which focuses on learning from the land as a teacher, and they referenced Bowra et al. (2021) as a resource for Indigenous learning and land-based learning.

During Session B1, facilitators modelled their own approach to **outdoor learning** by asking participants to go outside into the Balsillie courtyard and identify areas where they observed causes and solutions to climate change, as well as opportunities for project-based learning, hands-on learning, and creativity. Many participants noted that the outdoor learning experience highlighted how **disconnected** we often are from the outdoors in higher education. Other participants noted opportunities for outdoor learning in **urban spaces**. This activity gave participants the opportunity to identify benefits of incorporating outdoor learning and consider opportunities for their own approach to outdoor learning in CCE.



**Photo 3.** During the outdoor activity in Session B1, participants discussed areas in the courtyard where they observed climate change. Photo: Jerika Sanderson.

**Community engaged learning** was discussed in Session B1 as a strategy for engaging students in hands-on learning in their communities. In community engaged learning, students work alongside **community partners** on climate change projects, which could include examples such as policy briefs or adaptation strategy recommendations. The concept of the **Campus as a Living Lab** was discussed, specifically focusing on the Bloom Restaurant at Conestoga College. In this initiative, students gained hands-on experience by consulting on how to reduce food and packaging waste. As the facilitators described, there are many benefits of incorporating community engaged

learning, but there can be challenges as well, particularly in the time commitment involved for educators to maintain partnerships and support students.

## 4.1 SUGGESTIONS FOR CLIMATE PEDAGOGY STRATEGIES

Given the **barriers and challenges** that might exist for implementing active learning and transformative learning, Session A1 participants were given an opportunity to brainstorm how they can incorporate these practices into their teaching.

- 1 **Learning Locally/Getting Outside:** Participants suggested a range of approaches to engage students. For example, **local climate data** could be incorporated into teaching by connecting abstract climate science concepts with students’ own experiences. **Field trips** were identified as a potential strategy, with options including visits to local sustainable projects, and/or classes taking place in **public spaces** to engage students more with the local community. **Partnerships** with local organizations can provide meaningful connections for capstone projects. Educators can also find ways to connect their campuses with CCE. For example, **living labs on campus** can give students hands-on experience, while investigating buildings on campus (e.g., a “Lost Rivers” walk on the University of Waterloo campus) can help students to identify connections with their institutions. Additionally, educators can reframe **climate action** as a daily activity by encouraging students to clean street garbage on *all* days, not only on Earth Day.
- 2 **Interdisciplinary Learning:** Participants came up with several ideas for how interdisciplinary learning can be incorporated into CCE. One of the suggestions was to bring an **interdisciplinary approach** to understanding why climate change is occurring. Possible strategies to encourage interdisciplinary thinking include to hold classes jointly, to incorporate interdisciplinary teams into the course projects in elective courses, and to discuss the differences in **disciplinary, multidisciplinary, interdisciplinary, and transdisciplinary collaboration**. Specific strategies were discussed, such as learning about sustainable cities and incorporating disability studies and accessibility into CCE across health, business, and design courses. **Two-Row learning** was identified as an important strategy to foster cross-cultural learning.



**Photo 4.** Session A1 included opportunities to brainstorm and share ideas. Photo: Sarah Greene.

- 3 **Action and Activism:** Several methods for incorporating action and activism were discussed. These included bringing **community and business leaders** into the classroom to engage with educators and students, as well as turning campuses into living labs that could provide a connection between academia and on-campus impacts of GHG reductions and zero waste initiatives. Other forms of action and activism focus more on encouraging students to analyze and/or adjust their own behaviours, through activities such as waste audits, garbage management, purchase tracking, and

environmental justice journeys. **Decolonization** was also identified as a key component of facilitating action and activism.

- 4 **Connecting to the Real World:** Strategies for connecting CCE to the world outside the classroom were discussed. Participants suggested having students write letters to the editor based on current news, facilitating workshops on creating home gardens, and having real city challenges. Some of the strategies involve partnering with **community members or organizations**. **Co-creation with the community**, convening classes with both students and community members, and hosting **guest speaker** panels were all suggestions. Some of the strategies overlapped with those discussed for “Learning Locally,” such as using public spaces like parks and libraries for class and going on field trips to observe local examples of climate change. Additionally, **addressing colonization** was suggested as another strategy.
- 5 **Inquiry/Applied Research:** To bring **applied research** into CCE, participants suggested a few approaches. Having students work with **community stakeholders** to co-design and define problem areas was suggested, along with surveying/polling students to ask them what sustains them. **Community service learning**, podcasting, predictive analytics, and case-writings were all suggested as methods of engaging students in the research and knowledge dissemination process. Mapping the system was also suggested, which could identify additional ways for students to become involved in inquiry and applied research.
- 6 **Co-Designing Learning with Students:** Co-designing learning with students can be done in many ways. Participants suggested **peer-based learning**, **capstone projects**, and **student-led events** (e.g., carbon literacy events). Engaging students in course design, such as by designing outcomes and assessments with student input and having students identify project problem spaces, was suggested as another strategy. Other specific examples include incorporating social innovation lab processes, visualizing interactive climate data, and developing sustainable development concept maps for courses. Participants also highlighted the need to incorporate accommodations and accessibility requests.
- 7 **Games/Play:** Participants identified many ways of incorporating **games** into CCE to engage students in learning about climate change. Participants discussed the different types of modalities of these games, including **boardgames**, building **models**, and **simulations**. Students can be engaged at various stages of game development, including generating ideas through creative ideation, storyboarding, and developing prototypes. Some specific possibilities included using Lego to imagine the design of sustainable cities, simulating COP and global negotiations, creating boardgames on circular economy, incorporating live actor role-play activities, and thinking about flood resilience through games.
- 8 **Two-Row Learning:** Participants also discussed **Two-Row learning**. One of the strategies suggested was **Two-Eyed seeing** by using the **medicine wheel** in class design. Another strategy was to incorporate **competencies of the spirit** (Stone and Barlow 2009) to focus on reverence, kinship, sense of wonder, appreciation of place, and ability to invoke that feeling in others. Two-Row learning was discussed in relation to **interdisciplinary learning**.



## 4.2 SUGGESTIONS FOR DISCIPLINE-SPECIFIC STRATEGIES

During Session A1, participants brainstormed pedagogical strategies for specific disciplines.

**Education:** For the group working on strategies in Education, they identified competency of spirit, intercultural dialogue, and Indigenization and decolonization as pedagogical strategies.

**Arts:** For the group working on Arts, some of the strategies they identified to engage students included working on climate change scenarios, informal personal reflection, human connection, calculating carbon footprints, and developing community partnerships in sustainability.

**Social Sciences:** Participants identified planetary health and sustainability, language, definition of sustainability and its historical background, Indigenous perspectives on colonization and capitalism, and environmental justice as key strategies for CCE in social sciences.

**Business:** The group working on CCE in business programs identified videos, multimedia, photography, and simulations as important strategies, along with reflective learning and collaboration with interdisciplinary teams and external stakeholders.

**STEM:** The groups working on CCE in STEM discussed how students could engage with climate change by thinking across different disciplines in STEM. Other strategies included guest speakers, problem scoping/framing, case studies, climate services, and experiential learning.

## 4.3 REFLECTIVE AND REFLEXIVE TEACHING

Along with learning about new pedagogical approaches, participants contemplated their own approach to teaching. In Session C2, facilitators Lauren Spring and Nadine Ibrahim introduced participants to strategies for **reflective** and **reflexive teaching**. They used **Gibbs Reflective Cycle** (Gibbs 1988) to demonstrate the steps involved in reflecting, which include Feeling, Evaluation, Analysis, Conclusion, Action Plan, and Description. As a cycle, there is no specific starting point, which means that educators can reflect at any stage of teaching.

The facilitators differentiated between **reflective teaching** and **reflexive teaching**, noting that **reflective teaching** takes place when educators reflect on their teaching practices. On the other hand, **reflexive teaching** occurs when educators use reflection as a method for guiding their pedagogical approach. The facilitators referred to an article by Feucht et al. (2017), which discussed how reflection leads to reflexivity when educators intentionally reflect on their pedagogical approach with the goal of enacting change.





**Photo 5.** In Session C2, participants designed and received feedback on lesson plans to engage in reflective and reflexive teaching. Photo: Juley-Anne McKenny.

Participants discussed some of the **challenges** that arise in **reflective** and **reflexive teaching**. One of the barriers to engaging in reflective and reflexive teaching is that educators are sometimes hesitant to reflect when things go poorly. As participants noted, the reasons for this include that it can be upsetting to reflect on things that do not go according to plan in the classroom, reflection can make educators feel vulnerable, and the prospect of having to change can be intimidating. To address this challenge, educators should be aware of the **range of emotions** that might be elicited by reflecting on

their teaching practices. Educators can engage in **emotional reflection** by asking themselves why they have a specific reaction to a situation, and what could be done differently in the future.

As participants noted, reflection takes work. Lesson planning often takes a lot of time and effort, so if things do not go according to plan, acknowledging the need for reflection and change can be difficult because it increases educators' workloads. However, the benefit is that reflective and reflexive teaching practices can model how to **learn from mistakes** and **incorporate feedback** for students. The result can be that students learn to be reflexive themselves.



**Photo 6.** In Session C1, Debora Van Nijnatten discusses her own approach to teaching climate science in interdisciplinary courses. Photo: Waterloo Climate Institute.

Another challenge to incorporating **reflective** and **reflexive teaching** is that it can feel

unnecessary to engage in these practices, especially when things are already going well. As participants discussed, this can lead educators to feel that there is no need to change. However, it is essential to realize that success is dependent on the **course context and audience**. While one approach may work for one course, it might not work in another. Reflecting on why an approach was successful can help educators to adjust or update their approach when needed.

## 4.4 INTERDISCIPLINARY PRACTICES

The role of **interdisciplinarity in CCE** was discussed throughout the symposium, with many participants expressing their interest in **interdisciplinary** and **multidisciplinary** collaboration and pedagogies.

Bringing **climate science** into **non-STEM fields** can address gaps in student knowledge and understanding. In Session C1, the facilitators and participants identified several challenges in teaching students about climate change, including navigating **inaccurate information** and **knowledge limits**. For example, students might believe there are higher levels of non-consensus among climate scientists than is accurate, or they may lack scientific understanding of the role that fossil fuels and the greenhouse effect play in climate change.

Debora VanNijnatten and Derek Hall shared their approaches to bringing **climate science** into Arts courses. Hall described how educators can **explicitly centre** climate science, and shared an example from political science courses where climate change statistics and scientific evidence is incorporated to facilitate student learning. This provides a direct route for educators to encourage students to see climate science as central to course material.

A common theme that emerged was that many educators find it useful to focus on **implicit segue opportunities** to discuss climate science. This allows educators who are teaching courses that are not explicitly focused on climate science to find opportunities to bring in data or other scientific evidence at relevant moments, where knowledge of climate science can enhance students' understanding of course material. Whether an implicit or explicit focus on climate science is appropriate will depend on factors such as the course, the educators' experience and comfort level, and the background knowledge of the students.

One of the challenges that arises from **interdisciplinary approaches** to CCE is that educators might not have a background in **climate science**. This could result in educators feeling uncomfortable due to the uncertainty about how students will engage with the content and/or educators' concerns about their own competency teaching climate science. As one participant noted, this can result in educators feeling like they are in over their heads.

To address this barrier, educators should acknowledge that they will progressively become more comfortable with climate science as they teach it. Educators can consult resources such as the **Changing Climate Report** and the **IPCC** for on-the-ground reporting on climate change. Educators can also take steps to structure their course so that the **climate science materials** and the level of engagement planned is appropriate for their own knowledge of climate science. As VanNijnatten discussed in Session C1, educators can also write and share **positionality statements** in their courses that highlight their experiential knowledge, lived experience, and limitations. By sharing this information about educators' experience and knowledge, positionality statements can help educators to establish **credibility and trust**.

## 5. DECOLONIZING CCE AND INCORPORATING CLIMATE JUSTICE

Strategies for **decolonizing CCE** and incorporating **climate justice** were a key focus of the symposium. Bringing **Indigenous perspectives and knowledges** into CCE is incredibly important. As Van Nijnatten noted, students increasingly distrust political and academic leaders, but do have trust in Indigenous leaders. During Session A1, Martin and Matheson discussed how students want to see Indigenous traditional knowledge and an understanding of climate change and social, racial, and gender inequality integrated into CCE (Schwartzberg, Stevens, & Acton, 2022). Throughout the sessions, strategies for how to decolonize CCE and incorporate Indigenous traditional knowledge were discussed.



**Photo 7.** Tim Leduc discussed his own approach to climate change education. Photo: Jonathan Hui.

One strategy for decolonizing CCE is by first recognizing the role that **culture** plays in higher education. In Session B2, facilitator Tim LeDuc discussed culture in CCE and noted that **cultural framings** of climate change are important because it can help us to avoid status quo forms of knowledge and navigate more complex responses to climate change. After LeDuc shared his approach to CCE in the field of Social Work, participants

were given the opportunity to engage in group discussions based on prompts about the **cultural contexts** and challenges in their own pedagogical contexts. As part of these discussions, participants reflected on how the Global North and West need to reflect more on their own cultural practices and histories, particularly how European **settlement, colonialism, and anthropocentric individualism** influence academia in North America. Therefore, a greater accountability for colonial histories is needed among North American climate change educators.

Another approach is bringing **multiple epistemological lenses** into courses. Van Nijnatten described how her courses have incorporated Western scientific political ecology as well as First Nations climate lenses. Identifying the ways that knowledge about climate change and climate science is produced and transmitted can help students to understand the **limitations of Western science** and how other knowledge systems might provide different perspectives. Educators can discuss how **Indigenous knowledge** and Western science have worked together (e.g., the Climate Atlas in the Changing Climate Report). By bringing in multiple epistemological lenses, educators can assess the ways that **different knowledge systems** engage students in learning about climate change and climate science.





**Photo 8.** Participants in session B2 discussing culture and justice in small groups. Photo: Jonathan Hui.

During the opening plenary, Elder Myeengun Henry, Indigenous Knowledge Keeper and member of the Faculty of Health at the University of Waterloo, spoke about the importance of using stories to **connect generations, inspire**

**care** for the environment, and **foster hope** for future generations. Elder Myeengun Henry shared the **Seven Fires Prophecy**, a story his grandfather had told him, and discussed how the story shapes the way he interacts with the surrounding world. As he described, the story calls attention to the importance of **finding balance** between achieving technological development and caring for the earth, but this balance has been lost because of the way that some people have assumed superiority over plants and animals. He notes that the story emphasizes the way that we need to look at the land *not* as a commodity, but as a place of love and respect. Elder Myeengun Henry ended by discussing how stories can create connections across generations and continents by inspiring awareness of what is happening in the world around us.

As students are increasingly disconnected from the outside world, it is essential that educators find opportunities to encourage students to **reconnect with nature**, which can facilitate the recognition of the interconnections between humans and the environment. During the opening plenary, Tim Leduc introduced a recorded Thanksgiving Address that was given by Elder Norma Jacobs, Longhouse Faith-Keeper and advisor, teacher, and author. Elder Norma Jacobs emphasized the importance of **giving thanks** for the life that we have, for other people, and for Mother Earth. Following the Thanksgiving Address, Leduc encouraged participants to take a moment to reflect on their own experiences with nature, and to give thanks for particular moments that were meaningful for them. Participants shared a range of experiences ranging from moments they experienced in their own backyards to moments experienced while traveling. Leduc discussed how these **moments of reflection** are important, since giving thanks creates **reciprocity** and can function as a form of encouragement.

## 6. ADDRESSING CLIMATE EMOTIONS IN THE CLASSROOM

Based on the responses from participants throughout the symposium, it is clear that educators care deeply about their ability to support students as they process **climate emotions**. In Session A2, facilitators Steffanie Scott and Jennifer Chestnut introduced participants to **climate emotions** and participants were given opportunities to engage in **transformative learning** by sharing and validating their own climate emotions.

Scott and Chestnut framed the session in the context of current studies about young people and climate change emotions. As they noted, a study by Hickman et al. (2021) found that young people (ages 16-25)



reported feeling sad (68%), afraid (68%), anxious (63%), angry (58%), powerless (57%), guilty (51%), optimistic (32%), and indifferent (30%). This wide range of responses indicates that there is a **spectrum of climate emotions**. Scott and Chestnut also shared a study by Galway and Field (2023) that surveyed young Canadians (ages 16-25) on their emotions about climate change and found that 60% of young Canadians believe that more needs to be done by the education system to teach them about climate change. It is critical for educators to develop strategies that will allow them to address climate emotions.

**Climate emotions** can be challenging for educators to address, since students might be uncomfortable with openly sharing their **emotional responses** to climate change. Several pedagogical approaches to address this were recommended during Session A2. First, it is essential to identify the broad range of emotions that students might experience in higher education classrooms, especially since these emotions can be counterintuitive and difficult to articulate. Scott and Chestnut pointed out that some young people might feel **optimism, hope, and inspiration**, but these feelings can be experienced alongside **anxiety, grief, and fear**. Other emotional responses to climate change that often go unrecognized and unacknowledged could also include **denial, disengagement, and indifference**. Therefore, normalizing this broad range of emotions is one of the most important steps that an educator can take.

**Normalizing climate emotions** can be done in several ways, including by discussing different types of climate emotions with students, sharing educators' own emotional responses to climate change, and giving students opportunities to articulate their emotions without judgment.



**Photo 9.** Session A2 introduced participants to a wide range of climate emotions. Photo: Jerika Sanderson.

Some educators may rely on the **Information Deficit Model** to teach students about climate change. As Scott and Chestnut described during the session, the Information Deficit

Model is a method of communicating that prioritizes sharing information. In CCE, the Information Deficit Model is used to share **scientific information** about climate change with the goal of inspiring climate action. However, instead of inspiring action, Scott and Chestnut noted that this approach can be detrimental since it can overwhelm students without providing an outlet for the emotions that arise while learning about climate change, which can result in students feeling powerless.

To anticipate and avoid the potential problems that can arise from the Information Deficit Model, Scott and Chestnut suggest that educators instead incorporate **transformative learning**. As a pedagogical strategy that shifts one's **frame of reference**, transformative learning can **reconnect students** with themselves and the surrounding world. Bringing transformative learning into the classroom can help

students to regain agency, engage in classroom activities, and feel comfortable sharing their experiences with climate change emotions. Other possible benefits could include higher academic performance.

**The Work That Reconnects** was introduced as a framework for interactive and transformative learning environments, based on four steps:

1. Gratitude
2. Honouring Our Pain
3. Seeing With New Eyes
4. Going Forth

Throughout the session, participants practiced each of these steps. **Gratitude** was practiced as participants identified places in nature that they loved. A paired conversation activity allowed participants to practice **Honouring Our Pain** and **Seeing with New Eyes** by sharing their own climate emotions, which provided validation for the range of emotions that were experienced. The session ended by encouraging participants to think about **Going Forth** through a “milling exercise” where participants engaged in brief conversations about climate action. As these activities demonstrate, The Work That Reconnects can be incorporated into a variety of interactive activities to encourage students to identify and validate their climate emotions.

Throughout Session A2, the facilitators and participants identified several barriers that can hinder educators’ ability to address climate emotions. First, Scott and Chestnut described how there are three stories that dominate climate change stories in the media. These stories include 1. **Business as usual** approach, 2. **Great unravelling** approach, and 3. **Great turning** approach. Because students are used to climate change being described in these contexts, it can be difficult to shift perspectives and find more empowering and engaging narratives.

Additionally, as became apparent during paired conversations, many educators experience a range of **climate emotions** themselves, and might not always have a **support system** to help them process these emotions. Additionally, educators may feel responsible for managing the emotions experienced by their students. It is important that educators recognize that they need to prioritize their own wellbeing. While experiencing climate emotions can create a barrier for educators, they can practice **transformative learning** themselves by reflecting on how they respond to climate change, identifying and normalizing the emotions that they experience, and **building support networks** with their colleagues.

## 8. OPPORTUNITIES FOR INSTITUTIONAL SUPPORT

As Martin and Matheson discussed in Session A1, higher education institutions are not currently prioritizing their role as CCE leaders (Alexander, 2023, Leal Filho et al., 2023; McCowan, 2019; McKenzie & Chopin, 2022; Stein, 2024). As Martin and Matheson described, there are many opportunities for higher education institutions to do more to embrace CCE, and prioritizing CCE can allow higher education institutions to address **labour market demand** since both the World Economic Forum Future of Work Report and Canada’s Sustainable Jobs Plan indicate a need for graduates with **competencies in sustainability** and **green skills**. Higher education institutions should therefore embrace the opportunity to lead by example by facilitating **green skill development** through CCE.

Molthan-Hill et al.'s (2019) framework for embedding CCE in higher education curricula was presented as a useful starting point for higher education institutions. The four approaches described include:

- **Piggybacking** on existing courses
- **Mainstreaming** by using existing structures
- **Specializing** through developing new courses or curricula
- **Connecting** disciplines through interdisciplinary course design

Across the sessions, it became clear that one of the ways that institutions can support CCE is by facilitating the development of **external partnerships**. Facilitators and participants discussed their experience with **community-based learning** and **external partnerships**, highlighting the benefits of this approach for student engagement in CCE. However, there are challenges in building and maintaining these partnerships. The time commitment to build relationships can be significant and may involve resources that educators do not have. The turnover of staff (both in academia and in the partner organizations) can disrupt these relationships. Having institutions formalize these partnerships can ensure that partnerships are ongoing.



**Photo 10.** Participants discussed opportunities for external partnerships and hands-on learning in session B1. Photo: Waterloo Climate Institute.

In Session B2, participants discussed feeling disconnected within their institutions and that there was resistance to changing pedagogical approaches from an institutional standpoint. Tim LeDuc discussed the importance of identifying and strategizing around **institutional and organizational barriers**. While identifying potential pedagogical approaches for CCE is essential, it is also important for educators to be able to navigate their own institutional or organization contexts, since institutional constraints can limit educators' ability to incorporate CCE pedagogies. Therefore, understanding the **cultures within institutions and organizations** can help educators to identify strategies that will work for them.

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**Insularity** and **disconnection** are major barriers that educators might experience in CCE. During a group activity in Session B2, participants called attention to the barriers created by the **silos** that exist in higher education, including the disconnections between campus services and academic faculties. Another challenge identified by participants in Session B2 is that students are often overwhelmed with heavy workloads. This makes it difficult to implement climate change pedagogies when it seems to be adding to students' existing stressors. While educators can attempt to address this within their own courses, this is also an institution-level challenge.

## 9. RECOMMENDATIONS FOR IMPLEMENTING CLIMATE PEDAGOGIES

Across the sessions, **recommendations** were made for incorporating **climate pedagogies** into higher education courses. The relevance and applicability of these recommendations will differ across academic disciplines and teaching contexts, but they provide a starting point for educators who are seeking to incorporate a range of climate pedagogies.

### Recommendations:

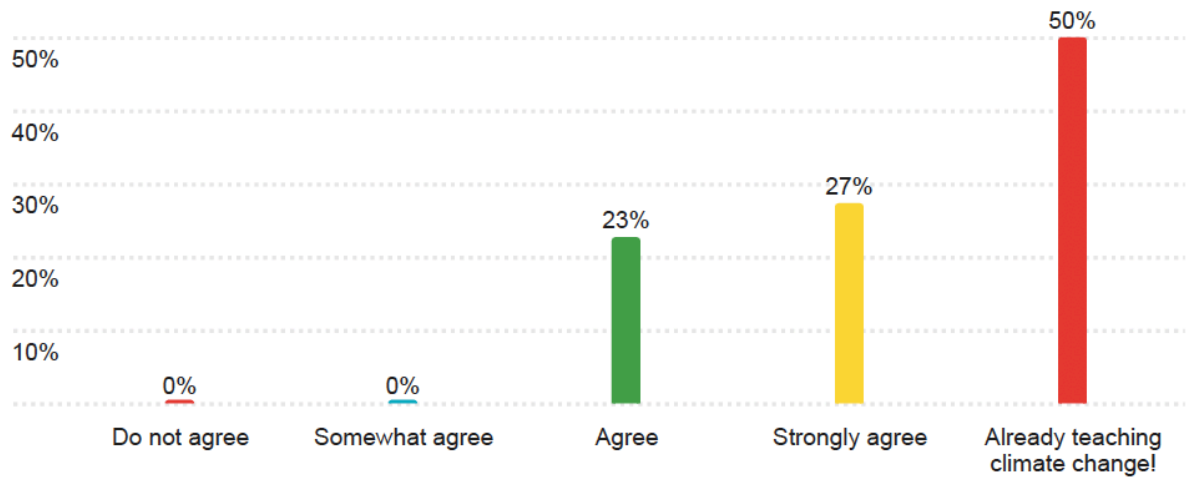
- Bring **diverse knowledges** and multiple **epistemological lenses** into the classroom
- Find ways to **decolonize CCE** and incorporate **Indigenous knowledges**
- Identify and understand the way that **culture shapes CCE**
- Encourage students to **give thanks** as a way of **reconnecting** with the world
- Incorporate **outdoor learning** to reconnect students with the outside world
- Incorporate **active learning** strategies into the classroom to engage students in the learning process
- Normalize the wide range of **climate emotions** that students might experience and create opportunities to discuss and validate these emotions
- Incorporate **transformative learning** (such as The Work That Reconnects) as a method of addressing climate emotions
- Incorporate students' **passions** into discussions about climate change
- Facilitate **community-based learning** by using spaces in the community as classroom spaces and organizing field trips
- Connect with **external partners** and create new partnerships for community-based and hands-on learning about climate change
- **Reflect** on teaching to identify areas for change and become more **reflexive**
- Be **flexible** and willing to change pedagogical approaches to suit the needs of students
- Prioritize **emotional reflection** and build **support networks**
- Build **CCE communities** to share resources and provide support



## 9.1 PARTICIPANT FEEDBACK

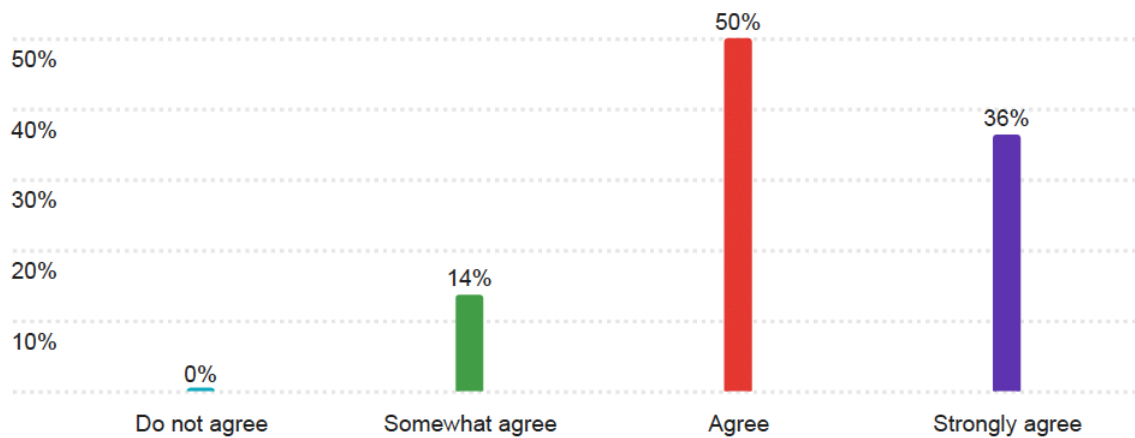
After the symposium, the Waterloo Climate Institute collected feedback from participants through an online survey.

Q3 - 3. After today's event, I feel inspired and motivated to integrate climate change into my teaching



**Figure 1.** Participants were asked to agree or disagree with the statement "After today's event, I feel inspired and motivated to integrate climate change into my teaching."

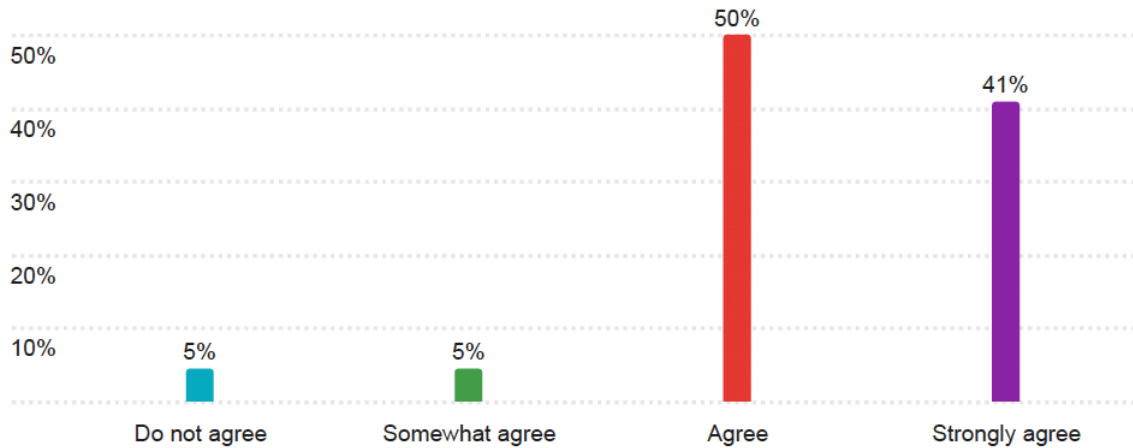
Q4 - 4. After today's event, I feel more confident in my ability to engage my students in climate change learning and action



**Figure 2.** Participants were asked to agree or disagree with the statement "After today's event, I feel more confident in my ability to engage my students in climate change learning and action."

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Q5 - 5. After today's event, I have more tools and resources to integrate climate change into my teaching



**Figure 3.** Participants were asked to agree or disagree with the statement “After today’s event, I have more tools and resources to integrate climate change into my teaching.”

The survey asked participants to reflect on the **barriers or challenges** that they face in integrating climate pedagogies, as well as what they envision as **possible solutions**, and what type of **support** is needed to enact these solutions. In Table 3, a summary is provided of some of the barriers, possible solutions, and support needed to integrate climate pedagogies that were identified in the responses. Additionally, participants were asked to share which **actions** they plan to take following the symposium. An overview of some of the responses received are shared in Table 4.

**Table 3.** Barriers, possible solutions, and support needed in CCE.

Barriers	Possible Solutions	Support Needed
<ul style="list-style-type: none"> <li><input type="checkbox"/> Lack of expertise or background knowledge</li> <li><input type="checkbox"/> Uncertainty about trustworthy information sources</li> <li><input type="checkbox"/> Navigating rapidly changing fields</li> <li><input type="checkbox"/> Lack of time, managing other priorities, and exhaustion</li> <li><input type="checkbox"/> Lack of confidence</li> <li><input type="checkbox"/> Uncertainty about which pedagogies to use</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Bootcamps or micro credentials</li> <li><input type="checkbox"/> Professional development opportunities</li> <li><input type="checkbox"/> Guest lectures to cover technical material</li> <li><input type="checkbox"/> Identifying and sharing trustworthy resources</li> <li><input type="checkbox"/> Sharing tools and examples (e.g., course outlines)</li> <li><input type="checkbox"/> Climate pedagogy guide (sample syllabi, approaches, etc.)</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Access to bootcamps, professional development events, and micro credentials</li> <li><input type="checkbox"/> Regular updates on climate facts, policies, and agreements</li> <li><input type="checkbox"/> Online space to share examples of syllabi and course outlines</li> <li><input type="checkbox"/> Building a community of likeminded educators</li> <li><input type="checkbox"/> Sharing knowledge of what has and hasn’t worked</li> </ul>

<ul style="list-style-type: none"> <li><input type="checkbox"/> Lack of institutional support and lack of curricular freedom</li> <li><input type="checkbox"/> Difficulty bringing climate science into non-climate courses</li> <li><input type="checkbox"/> Navigating a neoliberal paradigm</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Climate pedagogy groups/communities</li> <li><input type="checkbox"/> Guest lecture exchanges across disciplines</li> <li><input type="checkbox"/> Resources about teaching tools and tips</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Support from other educators</li> <li><input type="checkbox"/> Online space to share resources</li> <li><input type="checkbox"/> Support from administration to take concrete actions</li> <li><input type="checkbox"/> Support to teach critically about systems such as capitalism</li> </ul>
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**Table 4.** Actions that educators plan to take following the Climate Pedagogy Symposium.

Type of Action	Examples
Pedagogical approach	<ul style="list-style-type: none"> <li><input type="checkbox"/> Incorporate reflexivity and other strategies into class for transformational learning</li> <li><input type="checkbox"/> Incorporate active teaching and learning approaches</li> <li><input type="checkbox"/> Increasing knowledge of Indigenous approaches to climate change</li> <li><input type="checkbox"/> Less doom and gloom and more positivity when teaching climate change</li> <li><input type="checkbox"/> Include climate change in course subject matter</li> <li><input type="checkbox"/> Recommit to teaching climate change</li> <li><input type="checkbox"/> Incorporate social and human aspects of climate change into teaching</li> </ul>
Networking and collaboration	<ul style="list-style-type: none"> <li><input type="checkbox"/> Follow up with new connections</li> <li><input type="checkbox"/> Reach out for collaboration opportunities</li> <li><input type="checkbox"/> Strengthen local collaboration and partnerships</li> </ul>
Resource development and sharing	<ul style="list-style-type: none"> <li><input type="checkbox"/> Writing up ideas to share from presentation</li> <li><input type="checkbox"/> Share conference proceedings within their institution</li> <li><input type="checkbox"/> Develop climate change Spotify playlist</li> </ul>

## 10. CONCLUSIONS AND GOING FORWARD: FUTURE OPPORTUNITIES IN CCE

During the closing remarks of the symposium, participants were given a platform to share their experiences and perspectives from the day. Participants shared resoundingly positive responses about having the opportunity to engage with **climate change pedagogies**, interact with other **educators**, and form **interdisciplinary connections**.

Many participants shared that they had a wide range of **emotional responses** throughout the symposium. Some participants shared feelings of **excitement and gratitude**, while others experienced **frustration and grief**. One participant noted that having the space to experience the overwhelming emotions that often arise in the course of CCE was a major benefit during the day's sessions. Another participant expressed gratitude for how openly and generously the participants shared during the day's sessions. A key takeaway from these responses was that in addition to providing hope for our students,

we need to be able to find hope for ourselves amid the many conflicting emotions that can arise from teaching about climate change.

Several participants commented on the way that we need to continue to identify and critique the **systems of power** that shape institutional approaches to climate change. As participants asked, when we teach climate change, how do we reinscribe certain discourses? How are higher education institutions' responses to climate change shaped by **greenwashing, colonialism, and white privilege**? Importantly, how can we as climate change educators respond to these issues in our teaching? While **critical pedagogy** can help us to understand and take apart systems of power and to recognize the gaps in CCE, this relies on us being willing to engage with perspectives outside our own.

A common theme across the participants' responses to the symposium was that they were energized by having the opportunity for **interdisciplinary and multidisciplinary connections**. One participant described how inspiring it was to hear from people working on CCE across different fields, while another noted that often, we can become siloed in our own disciplines without having opportunities for collaboration. Another participant was excited by the **cross-institutional scope** of the symposium. As one participant noted, we need to create opportunities for **interdisciplinary connections**, because through this exposure to other approaches our own curriculums will become fuller.

It is clear that there is **widespread interest in CCE across institutions** in the Waterloo region, and that educators are looking not only for new pedagogical tools, but for opportunities to **connect and collaborate**. This was reflected in the results of the feedback survey as well. When participants were asked to describe what they gained from the symposium, a common response was the opportunity for **community building, networking, connecting** with other educators, and learning from other **perspectives**. This indicates that there is a strong interest in **future collaborations in CCE**.

Many participants asked, "what's next?" During the closing plenary, the possibilities that participants proposed included email **newsletters** to share teaching tips, **social media channels** to interact with other educators, **workshops** to create educational infographics, and **events** to explore pedagogical tools and approaches. In particular, there was interest in establishing a **Waterloo Region Climate Pedagogy Network** with regular meetings (either in person or online). One participant suggested that these meetings could include **bootcamps** for educators to develop their skills for bringing climate science into the classroom, and effectively communicating about climate change with their students. The list below includes examples from participants during the closing plenary as well as in the feedback survey.

#### **Potential Future Opportunities:**

- Waterloo Region Climate Pedagogy Network
- Climate science 101 bootcamp
- Climate pedagogy bootcamp
- Climate change communication bootcamp
- 2-day CCE events (for more in-depth content)
- Presentations on local green initiatives (e.g., local businesses)
- Yearly CCE symposiums/conferences
- Mini symposiums presenting case studies from courses
- Interactive workshops
- Social media channels for CCE resources/collaboration

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- Workshops on creating educational infographics
- Events focusing on climate politics
- Events focusing on climate action/inaction
- Events showcasing student experiences with and perspectives on CCE
- Email newsletters with teaching tips

As many participants expressed, teaching about climate change can at times be **challenging and frustrating**, but it can also be **rewarding and empowering**. It is essential that we continue to develop pedagogical tools and approaches to bring climate change into the classroom, and that we support one another as we do so.

## 11. ACKNOWLEDGEMENTS

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