

Transformational climate change education: A case study on using personalized assessment methods to support enduring engagement

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Abstract

Environmental sustainability has emerged as a global priority, requiring both individual and collective action to foster meaningful change. This case study describes a partnership between an academic and sustainability practitioners to advance climate education through an online course that integrates principles of change leadership, personalized learning, and versatile assessment. The course design and implementation aimed to support learners in critically examining their positionality within the climate space while navigating intersections of policy, community, and daily life. Lessons learned underscore how educational programming can link community engagement, assessment practices, and public outreach to encourage socially conscious, active citizens. The findings offer practical insights for practitioners seeking to design and implement learning and assessment approaches that cultivate collective action.

Résumé

La durabilité environnementale est devenue une priorité mondiale. Pour l'atteindre, des changements importants sont nécessaires et requièrent des actions autant individuelles que collectives. Cette étude de cas expose un partenariat entre une université et des spécialistes de la durabilité qui vise à faire progresser l'éducation sur le climat par la création d'un cours en ligne alliant leadership, apprentissage personnalisé et évaluation polyvalente. Le cours outille les apprenant·es pour examiner de manière critique leur positionnalité par rapport au climat et analyser les liens entre quotidien, communauté et politiques. Les résultats de l'étude montrent comment un programme pédagogique peut combiner engagement communautaire, pratiques d'évaluation et sensibilisation du public pour favoriser l'épanouissement de citoyennes et citoyens mobilisés et socialement responsables. L'article offre aussi des conseils pratiques aux spécialistes qui souhaitent concevoir et mettre en œuvre des approches d'apprentissage et d'évaluation qui encouragent l'action collective.

Keywords: Change leadership; educational programming; sustainable education; environmental stewardship; personalized learning; assessment for learning; collective action; community engagement; knowledge mobilization; climate change education

Introduction & Context

1.1 Mobilizing Alberta

Mobilizing Alberta (MA) is a five-year project focused on cultivating climate awareness and action in Southern Alberta. MA was developed by the former Office of Sustainability at the University of Calgary and undertaken with the financial support of the Government of Canada. MA had two main objectives: 1) supporting local climate action and experiential learning through a granting program that provided C\$720,000 in Climate Action Grants to projects that advanced community climate action and awareness; and 2) knowledge dissemination through a Climate Conversations speaker series, a suite of videos, a website, blogs, and an online course entitled “Preparing Albertans for Climate Change.”

This free, online course was developed through a partnership between the University of Calgary’s Office of Sustainability, Re.Climate (a climate communications research institute at Carleton University), and the Prairie Climate Centre at the University of Winnipeg. The initial framework for the course design (Figure 1) was created by a working group of staff from Re.Climate, Prairie Climate Centre, and University of Calgary’s Office of Sustainability based on existing research, best practices, and their experience and expertise. It was then shared with the Mobilizing Alberta Circle of Advisors for feedback. The Circle of Advisors was an expert forum established to advise on the development and execution of Mobilizing Alberta and included representatives from the academy, Treaty 7 region, external organizations with climate change expertise, and undergraduate and graduate students. The working group then used feedback from the Circle of Advisors to refine and finalize the framework.

The course was designed for secondary, post-secondary, and adult learners (outside of formal educational settings) who are interested in, and want to learn more about, climate change in southern Alberta. A primary aim of the course was to make it easy and efficient for these learners to discover more about climate change in Southern Alberta. The design work for the course began with a review of public opinion on climate change in both Canada and Alberta. For developing the course content, the working group used the Climate Messaging Triangle (Bennett et al., 2021), which links challenges to benefits and opportunities. The working group designed the content to start at a socio-political level and move down to a personal level—from policy, to community contexts, to individual actions. The working group pulled content from existing resources, environmental scans, subject matter expert interviews, and working group expertise. The draft content was then vetted by subject matter experts.

The course features local voices including academics, entrepreneurs, and community leaders discussing climate impacts and exploring solutions that align with Canada’s climate goals. The evidence-based content dives deep into the impacts and choices that we will have to make as we work towards a net-zero carbon future.

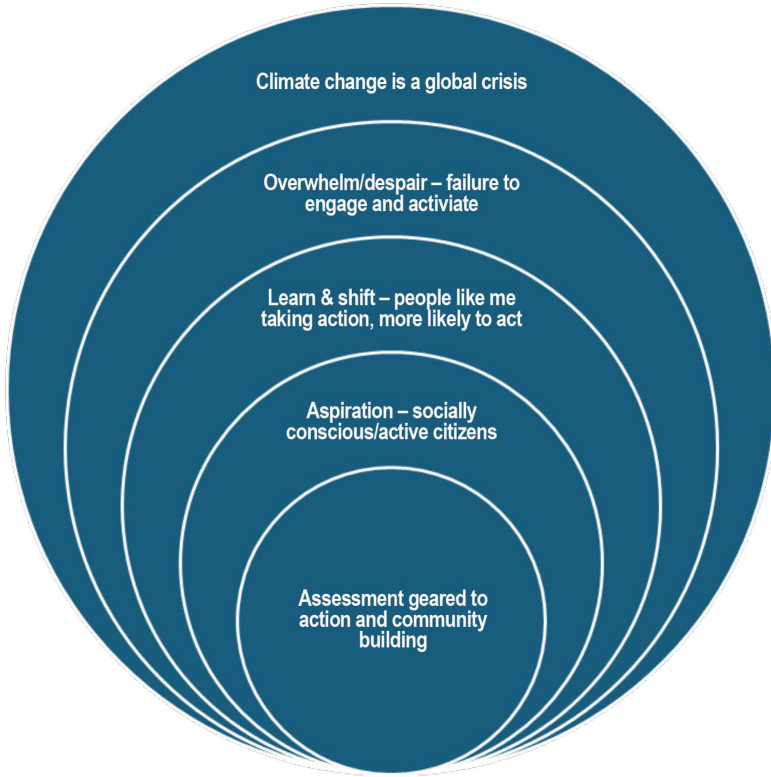


Figure 1. Framework for course design

The course modules include Climate Change in Alberta, Diversifying Energy, Resilient Communities, Transportation Choices, Efficient Homes, and Sustainable Food Systems. The working group crafted learning objectives for each of the modules. Each module provides insights on the policies that are driving climate action, examples of local projects and initiatives helping to create a more climate-resilient Alberta, and tangible actions individuals can take in day-to-day life.

The course is asynchronous and takes participants four to six hours to complete. The content is available in both French and English. Participants can access as little or as much of the content as they wish. For example, teachers may wish to only use one module of the course to supplement a unit that they are teaching. The course was made accessible through removing financial barriers by making the course free. Additionally, through its asynchronous nature, participants could engage with the course on their own time, in the comfort of their own home or office.

The first iteration of the course was launched in March 2024 as a series of PDF documents with accompanying videos. The working group created an amplification package to promote the course using a snowball approach by sharing the package with the working group's networks and asking individuals and organizations to share the course to their networks. The working group also hosted five information sessions that highlighted the course and how it could be used. During one of these sessions, the working group received feedback that it would be helpful if course participants could receive a certificate of completion and if the course included a robust assessment to engage learners. This feedback prompted the creation of the second iteration of the course that could issue a certificate of completion (which could be added to a resume and/or LinkedIn profile) and moved the existing course materials into an online learning management system (Articulate 360) capable of engaging participants in self-reflection and learning assessment.

Given that the course content had been created, the working group was reduced in size to a practitioner from the Office of Sustainability and a consultant skilled in using learning management systems (LMS). The smaller working group recognized that they lacked the subject matter expertise to create a robust assessment for the course, so they contacted the Werklund School of Education in hopes of partnering with an academic to develop the assessment. The course assessment was created through a partnership between a Faculty of Education professor and the smaller working group.

Once the second iteration of the course was ready to launch in November 2024, the course team worked with a communications consultant and the media relations team at the University to do a media release. Since that time, the course has been promoted through a series of climate awareness and action blogs that use search engine optimization to draw new audiences to the course. The course was also the focus of two conference presentations in Alberta (an environmental gathering and an environmental educator's workshop) which also enabled course promotion, and it was promoted at numerous Mobilizing Alberta public events.

As of the beginning of March 2026, over 600 participants had accessed the course, and 58 participants had completed the course with analytics indicating many are in progress to complete the course. Demographic information about the participants was not collected as per the ethics approval for this work. As of March 2026, the course is still available. It is uncertain what will happen to the course when project funding ends in May 2026. There is no budget available to update the content regularly to remain up-to-date and relevant.

The partnership between the professor and smaller working group on the course assessment is the focus of this case study. The "we" in this article includes Rachelle Haddock, one of the practitioner partners from the former Office of Sustainability, and Nadia Delanoy (PhD), a faculty member from the Werklund School of Education. The aim of our partnership was to answer the question: How can we support transformational education for climate change at different entry points for Albertans? For the purposes of this paper, we use

UNESCO's definition of transformative education as "teaching and learning that motivates and empowers learners to make informed decisions and actions at the individual, community, and global levels" (UNESCO, n.d.).

Additionally, this case study shares methods for creating an online learning assessment approach for a climate change course. We aim to demonstrate that through intentional assessment geared to action and community building, individuals can move from a place of despair and overwhelm about the climate crisis to becoming socially conscious, active citizens. We wish to share what we learned so that practitioners and academics can apply these learnings in their own course design and environmental education contexts. We will begin by sharing literature relevant to the case study to set the context, followed by an overview of the assessment approach and a selection of the participant results, and then we will close with implications for policy and practice.

1.2 Climate Change

Climate change is a critical issue on the scientific, social, and political agenda (Alves & Azeiteiro, 2018). Human activities, primarily through emissions of greenhouse gases, have undeniably caused global warming; these emissions have arisen from unsustainable fossil fuel use, land use and land-use change, and lifestyles and patterns of consumption and production (Core Writing Team, 2023; Stephens et al., 2008). Climate change has caused extensive adverse impacts, and related losses and damage, to nature and society that are unequally distributed across systems, regions, and sectors (Core Writing Team, 2023). From an economic perspective, damage has occurred in climate-exposed sectors (e.g., agriculture, forestry, fishery, energy, and tourism), while individual livelihoods have been affected through the destruction of homes and infrastructure, and loss of property and income as well as human health and food security with harmful effects on gender and social equity (Core Writing Team, 2023).

Governments across the globe have prioritized climate awareness and actively contribute to mitigating climate change as they aspire to meet international recommendations, such as the United Nations Sustainable Development Goals (United Nations, 2015). Lorenzoni et al. (2007) found that one of the most readily identifiable barriers to engagement on climate change is a lack of basic knowledge about causes, impacts, and solutions. For example, virtually no Americans understand the basic mechanism of global warming (Ranney & Clark, 2016). In a recent blog post, Zadorsky (2025) highlights data from the Consortium on Electoral Democracy indicating that the number of Canadians who believe climate change is caused by human activity has dropped from 57 % of Canadians in 2020 to 49 % in 2025. Another survey from Leger Learning for a Sustainable Future found that only 17 % of Canadians feel confident differentiating between real and fake climate information (Stevens et al., 2025).

One way to share information about climate change is through education, which can empower students and teachers to address climate issues (Ignacio et

al., 2023). Building on the Millennium Development Goals, established in 2000, 17 Sustainable Development Goals (SDGs) were formally adopted by all 193 United Nation member states in 2015 with a focus on ending extreme poverty, protecting the planet, and ensuring prosperity for all by 2030 (United Nations, 2015). SDG 4 calls for ensuring “inclusive and equitable quality education” and promoting “lifelong learning opportunities for all,” while SDG 13 calls for taking “urgent action to combat climate change and its impacts” (United Nations Department of Economic and Social Affairs, 2022). This case study focuses on the intersection of SDGs 4 and 13.

Advancing quality education is key to enhancing people’s lives and advancing sustainable development (UNESCO, 2014). Sachs et al. (2019) list education as the first key “transformation” for the achievement of the SDGs. Much work has focused on the transformative role of education in realizing a more sustainable future (e.g., Perkins et al., 2018; Žalėnienė & Pereira, 2021). Stephens et al. (2008) identified higher education as an essential change agent for sustainability. Kioupi and Voulvoulis (2019) created a framework that redefines education for sustainable development; this participatory framework allows education practitioners, interest holders, and communities of learners to decide on common visions for sustainability and to localise the SDGs in terms of educational outcomes that advance both a community vision and global priorities. As practitioners and academics working within higher education, we sought to realize climate action through climate education.

1.3 Climate Education

The education sector has unrealized potential to combat climate change (Anderson, 2012; Rushton et al., 2025). Education is critical, as awareness is a precondition to both creating policy preferences and advocating to policymakers to implement change (Otto et al., 2019). Shepherd (2008) suggests that a key element of sustainability education is the pursuit of affective learning outcomes—values, attitudes, and behaviours. Climate change education must be both a social and holistic learning process; the climate crisis calls for flexible learning and emergent curriculum approaches that weave learning and action within community contexts (Kagawa & Selby, 2010). According to Pandey and Kumar (2018), we need to do more than share knowledge:

The capacity building for climate change is not just the dissemination of structural knowledge. It is more about enhanced capacity to generate knowledge to address issues of climate change. The capacity-building exercise has to be done in a community setting, should build upon the existing knowledge base of the people and should be aimed at finding categorical solutions. (p. 203)

According to Perkins et al. (2018), for education to cultivate environmentally sustainable citizens, we need a pedagogy that requires students to think

“critically, interdisciplinarily, and globally about climate change” (p. 1051). In their systematic review of effective climate change education strategies, Monroe et al. (2019) found two common themes: 1) focusing on personally relevant and significant information, and 2) employing active and engaging teaching methods.

There has been a focus on the role of online learning to advance climate change education. E-learning makes it feasible to adapt education to individual needs and enables course users to learn at their own speed thanks to remote access to information and teaching resources (Němcová et al., 2011). E-learning leads, among other things, to socialization and, to a certain degree, democratization of the whole society, while enabling lifelong learning (Vávra et al., 2010). Dias et al. (2018) considered the conceptions and diverse forms of participation in e-learning contexts in higher education and its influences on climate change literacy. They state that learning communities need to foster innovative teaching approaches that develop interdisciplinary practices and new digital competencies to participate in, and transform, both informal and formal networks.

Seventy-eight percent of Canadian youth reported that climate change negatively impacts their mental health (Galway & Field, 2023). Within Alberta, 69% of high school students are worried about their future as a result of climate change (Leger Marketing Alberta, Inc., 2020). Given the impact of climate-related emotions on young people, Reilly et al. (2024) convened over 21 focus groups with young people to explore key themes of youth experiences of climate change education and their recommendations; one recommendation focused on education becoming solution-orientated, as the current approach to climate change education typically fails to offer a way forward or opportunities for action.

Although the course was not solely for secondary students, the status of climate education in Canada, and Alberta specifically, was an important consideration. Across Canada, there is an uneven inclusion of climate change topics, themes, and units within curricula between grades seven through twelve; within Alberta, most climate change expectations across the curriculum occur within science courses (Field et al., 2023). Bissell (2015) reported that science 10 teachers in Alberta tend to de-emphasize or omit the climate unit and that resources were outdated. In a recent survey, 29% of Alberta teachers indicated that they do not feel supported by their principal and board to teach climate change, with 62% of Alberta teachers reporting having limited or no professional development on teaching climate change (Stevens et al., 2025).

1.4 Talking About Climate is Climate Action

An issue related to climate education is that the public rarely discusses climate change. Speaking about climate communication and storytelling, De Meyer et al. (2020) state that a focus on the transfer of information, awareness, or concern is not having the desired outcomes of mobilizing climate action across society. Geiger et al. (2017) stress that interpersonal discussions about climate

change are critical for creating positive social change to address climate change. In a recent blog post, Re.Climate (2024) states it is important to “nurture more messengers”; given increasing trust in friends and family, and declining trust in government and institutions, it is critical to engage in conversations with friends and family that can aid with strengthening social norms.

While a majority of Albertans support the goal of reaching net-zero by 2050, support for action and policies to achieving them is low (Bennett & Granados, 2022). Despite the statistic that 64% of Albertans are concerned or very concerned about climate change (Abacus Data, 2023), people in Alberta are hesitant to engage in conversations given the perceived polarized nature of climate change in a province where the economy is heavily dependent on oil and gas. For example, Wesley et al. (2023) found that two out of three Albertans say they are proud of the province’s oil and gas industry, while just one in ten (10%) express any level of disagreement. The resulting hesitation to speak publicly is a barrier to taking climate action.

The United Nations (n.d.) has identified “speaking up” and getting others to join in taking action as one of the quickest and most effective ways to make a difference. Speaking in one of the videos created by Mobilizing Alberta (2025), Amber Bennett, the executive director of Re.Climate, shares that talking about climate change is one of the most important actions to take because it helps to address polarization. One of the central aims of the online course and its assessment was to enable learners to feel comfortable to engage in conversations about climate change with their friends, family members, and the broader community.

2.0 Assessment Approach & Results

The smaller working group developing the assessment approach was comprised of a faculty member, a sustainability practitioner, and an LMS consultant. The group set a goal to have participants make a connection between the following guiding questions (factored into each of the six module assessments): 1) What solutions are being proposed at a federal/provincial level that are driving climate action/what policies are at play? and 2) What does this mean for me in my life/ what choices can I make?

We wanted learners to 1) start the course acknowledging their own positionality; 2) move through the content and internalize how the information relates to their identity and lived experience; and 3) reflect on their ability to impact change in their own context. Regarding the first goal, in a charged political environment like Alberta’s with multiple interest holders and motivations, acknowledging positionality is important given the focus of the course on transformative education which is grounded in human rights, social justice, human dignity, and cultural diversity (UNESCO, n.d.). Learners need the space and time to consider their identity and positionality in relation to climate change.

The learning assessment was designed through a series of working meetings between the faculty member and the LMS consultant that focused on content review and iterating the assessment approach. The assessment was designed to serve as a change mechanism throughout the learning process (Table 1). It was incorporated into Articulate 360, and the assessment questions were dispersed throughout each of the modules. The types of assessment questions within Articulate 360 are provided in Table 1.

Module	Learning ¹ Objective	Assessment	Rationale
[Course Warm-Up – Pre-Assessment]		Pre-assessment question (select appropriate answer): Where do I stand? Based on what I know, this is how I perceive my current understanding and position on climate change. Pre-assessment (rating scale): How often do you currently talk about climate change with friends, family, or peers?	Surfaces learners' existing beliefs, knowledge, and engagement with climate change. Establishes a reflective baseline, supporting self-awareness as a foundation for perspective transformation.
Climate Change in Alberta – This module introduces climate change in Alberta	Learners will identify the major causes of climate change, the major impacts of climate change in Alberta, and the major solution pathways to address climate change in Alberta.	“Thought Stop” question (rating scale): On a scale from one to ten, how concerned are you about climate change? “Knowledge Check” questions (multiple choice, select correct answers, drag and drop) to test understanding of causes, impacts, and solutions pathways.	Grounds climate learning in local context to increase relevance and emotional engagement. Combines knowledge acquisition with affective reflection to support critical awareness and informed concern.
Diversifying Energy – This module introduces current trends and energy solutions in southern Alberta to reach net-zero	Learners will be able to reflect on how personal actions can contribute to diversifying energy.	“Knowledge Check” question (select correct answers) to assess understanding of approaches being used to diversify energy sources and move towards a net-zero future. “Thought Stop” question: Rank the following actions based on how likely you are to take each one to support net-zero emissions in your home or community.	Connects systemic energy transitions to personal agency. Encourages learners to reflect on their role within broader energy systems and consider realistic action pathways.

Resilient Communities – This module explores how communities can become more resilient in the face of climate change by exploring the trends and actions underway in southern Alberta that will help communities reach net-zero and adapt to a changing climate	Learners will be able to describe at least one way that communities can be more resilient in the face of climate change.	“Thought Stop” question (open-ended): Based on these examples, can you think of any similar projects happening in your community? How might they contribute to building resilience, and where might there still be gaps and opportunities? “Thought Stop” (open-ended) question: Based on what you have learned so far and using your own experiences, what are some ways you’ve seen communities try to balance human needs with protecting the environment? “Knowledge Check” questions (match concepts together and select correct answers) about ways municipalities can build resilience.	Promotes systems thinking and community awareness by linking climate adaptation to local experiences. Open-ended reflection fosters critical evaluation and future-oriented thinking.
Transportation Choices – This module explores changes that are being made to the transportation system and trends as they relate to climate mitigation and adaptation frameworks	Learners will be able to list examples of transportation solutions that are available to them in their daily lives and describe how personal actions contribute to systemic changes.	“Knowledge Check” question (select correct answers) on actions to reduce transportation-related emissions.	Highlights the relationship between everyday behaviors and structural systems. Supports understanding of how individual choices contribute to collective climate mitigation efforts.
Efficient Homes – This module provides an overview of the trends and solutions that are being implemented to help homes reach net-zero	Learners will be able to describe at least one climate change impact and solution for their home.	“Thought Stop” question (open-ended): Based on what you know now, why do you think it is important to prioritize moving our homes towards net-zero as a way to take action on climate change? “Knowledge Check” question (select correct answers) on measures to make homes more energy efficient. “Thought Stop” question (open-ended): What jobs and economic opportunities do you think could be available to your community as they relate to climate and resilient homes?	Anchors climate action in learners’ lived environments. Encourages reflection on ecological responsibility while considering economic and workforce implications.

Sustainable Food – This module provides an overview of the relationship between our food systems and climate change and shares insights on the trends and solutions being implemented at different scales that create sustainable food systems [Course Reflection – Post-Assessment]	Learners will be able to describe at least one connection between our food system and climate change and at least one solution to create more sustainable food systems.	“Thought Stop” question (rating question): Reflecting on your own life, please rate how likely you are to take each of the following actions to support sustainable food systems on a scale from one to five. “Knowledge Check” question (select correct answers) on the impacts of climate change on agriculture. “Thought Stop” question (open-ended): Given the challenges with Alberta’s food systems, name three actions that you can take to support a sustainable food system. Post-assessment question (select appropriate answer): Where do I stand? Based on what I know, this is how I perceive my current understanding and position on climate change. Post-assessment question (rating scale): How likely are you to talk about climate change with friends, family, or peers? Post-assessment question (yes/no): Having experts share their research and perspectives about climate change provides more credibility to the content of this course.	Reveals the interconnectedness of food systems and climate impacts. Encourages reflective evaluation of personal habits and practical actions toward sustainability. Makes learning shifts visible by comparing initial and final perspectives. Reinforces metacognition, agency, and ongoing engagement with climate dialogue.
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Table 1 *Summary of the Assessment Approach Created for the Course*

We now provide participant results (Tables 2 – 7) from a selection of assessment questions. These tables are shared to give the reader a snapshot of the type of assessment questions that were asked and a sample of how participants responded. The number of participants is not consistent throughout the assessment questions, which reflects participant attrition throughout the course and limits the validity of our research findings. Given that the intent of the case study is to share what we learned from the assessment approach so that practitioners and academics can apply learnings in their own course design and environmental education contexts, the information in the tables is primarily

shared to give the reader a more detailed look at the types of assessment questions that were used and a sense of how some participants responded.

Tables 2 and 3 shows the results for the pre- and post-assessment question: “Where do I stand? Based on what I know, this is how I perceive my current understanding and position on climate change.” Table 4 shows the results for the post-assessment question: “On a scale from zero (not concerned) to ten (very concerned), how concerned are you about climate change?” Tables 5 and 6 show the results for the pre- and post-assessment question: “On a scale from zero (never) to five (very frequently), how often do you currently talk about climate change with friends, family, or peers?” Finally, Table 7 shows the results for the post-assessment question: “Having experts share their research and perspectives about climate change provides more credibility to the content of this course.”

Response	n	%
I have started exploring how climate change impacts me and my community and I want to be more active by learning about solutions.	78	34
I am trying to do something to address climate change by engaging in action.	70	31
I am very informed and actively work in the climate space and/or advocate for change.	48	21
I have heard about climate change and am curious to learn more about the issue to inform my stance.	27	12
I have never heard about climate change.	5	2
I know about climate change but am curious to see what this course is all about.	1	< 1

Table 2. Results for pre-assessment question: “Where do I stand? Based on what I know, this is how I perceive my current understanding and position on climate change.” (n = 229)

Response	n	%
I am trying to do something to address climate change by engaging in action.	21	38
I am very informed and actively work in the climate space and/or advocate for change.	20	36
I have started exploring how climate change impacts me and my community and I want to be more active by learning about solutions.	13	24
I have heard about climate change and am curious to learn more about the issue to inform my stance.	1	2
I have never heard about climate change.	0	0
I know about climate change but am curious to see what this course is all about.	0	0

Table 3 Results for post-assessment question: “Where do I stand? Based on what I know, this is how I perceive my current understanding and position on climate change.” (n = 55)

Response	n	%
0 (not concerned)	1	< 1
1	0	0
2	1	1
3	3	2
4	1	< 1
5	8	5
6	4	3
7	21	14
8	22	15
9	26	17
10 (very concerned)	60	40
No response	2	> 1

Table 4. Results for post-assessment question: “On a scale from zero (not concerned) to ten (very concerned), how concerned are you about climate change?” (n = 149)

Response	n	%
0 (never)	3	> 1
1	17	7
2	46	20
3	69	30
4	59	26
5 (very frequently)	28	12
No response	7	3

Table 5. Results for pre-assessment question: “On a scale from zero (never) to five (very frequently), how often do you currently talk about climate change with friends, family, or peers?” (n = 229)

Response	n	%
0 (never)	0	0
1	0	0
2 (sometimes)	2	4
3	7	13
4	16	29
5 (very frequently)	29	53
No response	1	< 2

Table 6. Results for post-assessment question: “On a scale from zero (never) to five (very frequently), how frequently do you talk about climate change with friends, family, or peers?” (n = 55)

Response	n	%
Yes	51	98
No	1	2

Table 7 Results for post-assessment question: “Having experts share their research and perspectives about climate change provides more credibility to the content of this course.” (n = 52)

3.0 Reflections & Conclusion

The findings from this interdisciplinary climate education initiative demonstrate the value of integrating personalized learning, reflective assessment, and

community-oriented climate knowledge into public-facing online programming. The assessment model, designed to allow learners to situate themselves within broader climate narratives, can play an important role in fostering increased engagement, self-efficacy, and readiness for climate conversations. Consistent with research on climate communication (Geiger et al., 2017; Swim et al., 2014), participants' increased willingness to discuss climate change with peers and family members represents a meaningful behavioural shift. In a province where climate issues are often politicized and intertwined with economic identity (Marshall et al., 2018), creating structured, non-judgmental spaces for learning and reflection is critical. The course's assessment prompts encouraged learners to name their positionality, reflect on local impacts, and identify personally meaningful actions, thereby reducing psychological distance and strengthening motivation to engage.

Our results suggest that participants not only developed greater confidence but also moved towards more active stances regarding climate action. While the descriptive data do not allow causal inference, the patterns indicate that the course's reflective and action-oriented structure supported transformation in how learners perceived their role within climate change mitigation and adaptation. For example, the data show that many participants were highly concerned about climate change and the majority of respondents are wanting to learn how to act on, or learn how to impact in a positive way, the issues that underpin climate change. This aligns with transformational change theories within the context of learning, building educational programming, and change leadership including mindset-oriented climate education, all of which emphasize the importance of helping learners connect systemic information (e.g., policy or technological pathways) with personal and community-level action.

The collaboration between sustainability practitioners and education researchers also contributed to a design that balanced scientific expertise, local relevance, and pedagogical rigour—an approach supported by scholarship highlighting the value of interdisciplinary models for climate learning (Abbott, 2012). For example, the course could have been more audit-based where participants read and respond to factual recall-oriented questions. In this course, the designers weaved in case studies and reflective and responsive assessment mechanisms and linked content to experts in the field.

The high level of credibility learners attributed to expert contributions (Table 7) further underscores the importance of trusted voices in climate education. Expertise, when embedded into an accessible and personalized learning design, can help reduce misinformation, increase confidence, and foster constructive dialogue (UNESCO, 2014). Ultimately, our findings suggest that assessments that blend knowledge checks with reflective prompts can catalyze transformational education, especially when rooted in local context and community priorities. As in the transformational learning framework, opportunities to slowly process content that is sensitive and potentially divisive in nature, while being provided

opportunities to apply reflection in an identity- and action-orientation, can support individual development beyond factual recall and advance information transfer.

3.1 Implications for Practice

This initiative highlights the potential of assessment-driven climate education to support community engagement and transformative education—teaching and learning that motivates and empowers learners to make informed decisions and actions from individual to global levels. By intentionally designing assessments that foreground learner identity, positionality, and agency, educators can enable participants to move beyond simple knowledge acquisition and towards meaningful action. The course “Preparing Albertans for Climate Change” demonstrates that when learners are encouraged to reflect on how policy intersects with personal experience, they are more likely to perceive themselves as part of the climate solution and engage in conversations that contribute to collective action.

Several recommendations for practice emerge from this work:

1. Integrate positionality as a core component of climate education. Asking learners to situate themselves relative to climate change fosters ownership, promotes internal motivation, and encourages deeper engagement with content. Positionality reflections can be used as both formative assessments and tools for transformation (UNESCO, 2014).
2. Use assessment as a mechanism for behavioural and mindset change. Assessment should not be limited to knowledge verification. Thoughtful prompts that connect systemic concepts to personal decisions can support shifts in attitudes, confidence, and willingness to act (Black & Wiliam, 1998).
3. Pair expert knowledge with accessible, community-relevant examples. Participants valued hearing from researchers and practitioners whose work aligned with their lived context. This suggests a need for models that embed credible expertise into localized, action-oriented programming (Bandura, 2001).
4. Support climate conversations as a key educational outcome. Given the strong relationship between interpersonal dialogue and climate action (Geiger et al., 2017), educators should intentionally scaffold learners’ abilities to discuss climate issues with others. Reflection prompts, role-playing, and scenario-based tasks can help normalize these conversations (UNESCO, 2014).
5. Foster interdisciplinary and cross-sector collaboration. The success of this initiative stemmed from the partnership between education scholars and sustainability practitioners. Similar collaborations can enrich curriculum design, enhance credibility, and ensure that climate education responds to both local realities and global priorities (Jensen & Schnack, 1997).

Collectively, these recommendations reinforce the critical role of education in advancing climate action. By embedding reflective, personalized climate

learning into policy frameworks, and by supporting partnerships that make climate education accessible, credible, and locally relevant, policymakers can help foster an informed, engaged public capable of contributing to long-term sustainability goals.

3.2 Implications for Policy

Our findings from this interdisciplinary climate education initiative offer several important implications for policy development in Alberta and beyond. First, the results underscore the need for policies that explicitly support climate literacy as a foundational competency across the lifespan (i.e., the process of learning and understanding climate change to the point of action). While Alberta's current climate and energy landscape is often characterized by political polarization, the demonstrated gains in participants' self-reported confidence and willingness to engage in climate conversations suggest that accessible, community-relevant educational programming can help reduce misinformation and support informed public dialogue. Policies that embed climate literacy within provincial education frameworks, from K–12 curricula to postsecondary programming, could therefore strengthen public readiness for adaptation and mitigation efforts.

Second, the assessment-driven approach used in our course highlights the value of policies that promote reflective, action-oriented learning. Traditional assessment models often emphasize content recall rather than application, agency, or community relevance (Black & Wiliam, 1998). Climate policy frameworks should encourage educational institutions to adopt assessment practices that foster personal relevance, critical reflection, and local action planning—elements shown in this study to empower learners to see themselves as contributors to climate solutions. This personal leveled framing is particularly relevant for provincial strategies aimed at promoting grassroots resilience and community-based energy transition initiatives.

Third, our findings demonstrate the importance of cross-sector collaboration in climate education. The partnership between the Faculty of Education and sustainability practitioners illustrates how university–community collaborations can produce pedagogical models that are scientifically grounded, contextually relevant, and socially responsive. Policymakers should consider mechanisms, such as funding streams, partnership grants, or formalized networks, which incentivize collaboration between academic institutions, municipalities, and community organizations. Such partnerships can strengthen public trust, enhance content credibility, and improve the uptake of climate initiatives.

Fourth, participants overwhelmingly agreed that hearing from experts increased the credibility of the course content. This highlights an opportunity for policymakers to integrate credible scientific expertise into public communication and education strategies. Policies that prioritize transparent, evidence-based climate communication, delivered by trusted academic and community experts, can reinforce public confidence and counteract misinformation.

Finally, our study suggests that climate education policy must account for both collective and personal dimensions of climate action (Lehtonen et al., 2019). Learners benefited from understanding how provincial and federal policies intersect with their daily lives and local communities. Therefore, effective climate policy should align high-level climate commitments (e.g., emissions targets, net-zero pathways, adaptation strategies, etc.) with community-level engagement and educational support. This alignment can help Albertans understand not only *what* policies exist but *how* they can participate in achieving them.

Collectively, these implications reinforce the critical role of education in advancing climate action (e.g., Ignacio et al., 2023; Pandey & Kumar, 2018). By embedding reflective, personalized climate learning into policy frameworks, and by supporting partnerships that make climate education accessible, credible, and locally relevant, policymakers can help foster an informed, engaged public, capable of contributing to long-term sustainability goals.

3.3 Limitations and Future Research

Although this initiative offers important insights into climate education and assessment-driven approaches to fostering transformational education, several limitations must be acknowledged. First, the course relied primarily on self-reported measures, which may be subject to social desirability bias, particularly in a context where climate issues are politically charged. Participants may have overestimated their willingness to engage in climate conversations or their perceived level of climate knowledge. Future studies would benefit from integrating behavioural measures or follow-up assessments that track whether shifts in attitudes translate into sustained action over time.

Second, participation in the post-assessment was substantially lower than in the pre-assessment ($n = 55$ compared to $n = 229$). This attrition is common in open, asynchronous online learning environments (Carr, 2000), but limits the ability to generalize conclusions about learner transformation. Further research should examine engagement patterns across the full duration of climate education courses, including reasons for attrition and strategies to retain diverse learners.

Finally, we examined a single publicly available course developed within a specific regional and political context. While this specificity is a strength for grounded practice, it limits broader applicability. Future research could compare similar climate education models across provinces or countries to determine how assessment design, positionality, and action-oriented learning translate across social, economic, and cultural contexts. Longitudinal research could also explore how sustained educational interventions contribute to community resilience, policy engagement, and collective climate action over time.

Together, these limitations highlight opportunities for further inquiry into how climate education can be designed, assessed, and scaled to support diverse learners. By integrating richer data sources, examining equity considerations,

and exploring long-term behavioural outcomes, future research can strengthen the evidence base needed to advance effective and socially responsive climate education initiatives.

Ethics

This project was reviewed by the University of Calgary Conjoint Faculties Research Ethics Board, which confirmed that the work met the criteria for a *program practice* study and was therefore exempt from full ethics review. Approval was granted to collect and analyze de-identified assessment data generated as part of routine course participation. No personal identifiers were collected or reported, and all data were aggregated to protect participant confidentiality. Participation in the course was voluntary, and learners were informed that their de-identified responses may be used for program evaluation and scholarly dissemination. All procedures adhered to institutional guidelines for ethical conduct in educational program research.

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