

Climate Change Education and the Manitoba K-12 Curriculum: A Content-Analysis

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This study offers a deep dive into the specific learning outcomes (SLOs) for the K-12 Manitoba curriculum detailing the frequency and depth of links to the goals of climate change education (CCE). This project explicitly builds on the work of Bieler et al. (2017) and Field et al. (2023) who undertook pan-Canadian studies on curriculum documents to identify the presence of curriculum outcomes and policies from provincial governments that aligned with CCE in K-12 schools. The aim of this study is twofold: firstly, highlighting pathways for climate conscious educators to link classroom teaching to climate change; secondly, directing areas that the province of Manitoba needs to address through curriculum reform.

This paper will begin with a brief introduction to Education for Sustainable Development (ESD) which currently operates as the guiding framework for including teaching and learning on the intersection of the economy, environment, and human health and well-being in Manitoba curriculum documents. ESD will then be compared and contrasted with CCE, which is advocated as a preferred framework as it is one more commensurate with the climate emergency. Results of a content analysis of specific learning outcomes in the Manitoba K-12 curriculum documents for science, social studies and physical/health education will be detailed. The discussion section outlines changes to Manitoba curriculum in order to provide support for K-12 educators to develop learning experiences for youth that are commensurate with the current and future realities of climate change.

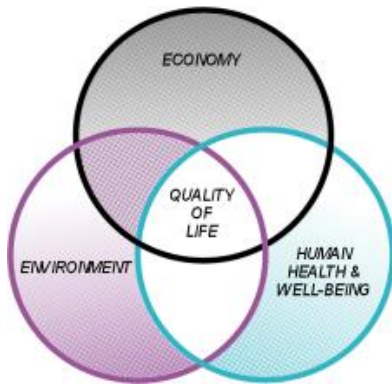
What is Education for Sustainable Development (ESD) and How Does it Differ From Climate Change Education (CCE)?

Education for sustainable development is an approach to learning that emerged in the late 20th century as a result of concerted efforts by the United Nations to address unsustainable human practices on earth, which were leading to species loss and extinction, consumption of natural resources that outpaced their renewal, and pollution (including soil, water, air, and plants), all of which ultimately impacted human well-being across the planet. ESD evolved out of environmental education as an interdisciplinary method which drew together the economy and human well-being with the environment, most often represented as a Venn diagram of each element intersecting (Figure 1).

Zhang (2019) outlined the following aims of ESD as a teaching practice: 1) to establish sustainable development values; 2) learn scientific knowledge of sustainable development; 3) cultivate sustainable learning abilities; 4) practice sustainable lifestyles; and 5) to pay attention to and participate in solving practical problems of sustainable development. Teachers shifting away from a traditional approach to teaching (with siloed disciplines and an emphasis on direct instruction and standardized examinations) to an ESD framework emphasize interdisciplinary approaches that incorporate science and social studies and actively engage youth in decision making, and provide hands-on learning which connects with the community (Alampei et al., 2013). Since the early 2000's ESD has been used by Manitoba Education as the framework through which curriculum, professional development, and resources have been organized.

Figure 1

Education for Sustainable Development (Manitoba Education)



But ESD was, and remains, plagued by criticism. Firstly, ESD remains uncritical on the extent of “development” driven by capitalism and reliant on resource extraction for energy and products (Babiuk & Falkenberg, 2011; Hickman, 2012; Jickling 1994; Kahn, 2010; Pepper, 1996). Secondly, ESD is largely silent on settler-colonialism as a central force in unsustainable human practices (Huckle & Wals, 2015; Stein et al., 2022). Homer-Dixon (2020) questioned the central premise of ESD—sustainable growth—as “at best a fantasy and at worst a bald-faced lie—a pernicious source of false hope” (p. 193). This is, at least in part, a result of the focus on personal choice particularly in consumption, over a critique of systems and the overwhelming evidence of government, business, and industry as being responsible for climate change and ecological devastation (Klein, 2014; Kunkel & Seaton, 2023; Malm, 2021). Given that development has continued unabated, leading to escalating ecological crises, one might rightly question whether ESD led to meaningful change, or whether it merely enabled development to greenwash and proceed unabated at the cost of the environment and human health and well-being. It is these silences that CCE seeks to address.

What is Climate Change Education (CCE)?

Public education has been accused of reproducing habits of mind that have harmed the natural world (Bowers, 1993; Kahn, 2010). As one branch amongst the array of approaches to teaching and learning on and in the natural world, CCE prioritizes knowledge, skills, and attitudes specific to the climate crisis, broadly conceptualized around mitigating carbon emissions that drive climate change, and adapting to warming and more precarious weather (Government of Canada, 2024). A warming planet and the recognition by the Intergovernmental Panel on Climate Change (IPCC) and United Nations of the necessity of public education as part of the fight against climate change, has led to CCE becoming increasingly prominent in educational scholarship (Brumann, Ohl & Schackert, 2019; Feldman, Nation & Laux, 2022; Field, et al., 2023; Galway & Field, 2023; Grewal, Field & Berger, 2022; Hargis McKenzie, & Le Vert-Chiasson, 2021; Kelsey, 2020; Long & Henderson, 2023; Mejia-Carceres, Rieckmann, & Foleña Araújo, 2023; Monroe et al., 2010; Newberry & Trujillo, 2018; Stevenson, Nicholls & Whitehouse, 2017).

There are notable shifts between an ESD and CCE approach to teaching and learning. This includes a critical and decolonial stance (Grewal, Field & Berger, 2022; Newberry & Trujilio, 2018) where CCE has embraced critiques of development and situates Indigenous and anti-colonial practices at the center of its approach to K-12 knowledge, values, and skill development (Datta, Starlight & Mistaken, 2024; Iyer & Brett, 2024; McKenzie, Henderson & Nxumalo, 2023). CCE also incorporates increased recognition of the health and well-being aspects that climate change is having on youth, particularly in areas such as eco/climate-anxiety (Galway & Field, 2023). This area of research has documented how the increasing precarity of life on earth has changed how youth think about their future, and proposes “climate aware” policy and practice in education (Galway & Field, 2023; Wray, 2022).

Tackling climate change itself will continue to demand an interdisciplinary approach (Incropera, 2016) and CCE is no exception, advocating for content knowledge from multiple educational disciplines, including English, social studies, science, Indigenous studies and physical/health education, while also recognizing the important contributions of mathematics and career vocational education. Like ESD, CCE learning should be locally and personally relevant, driven by student inquiry, and actively engage learning in, with, and for the community.

Method

In Canada, provinces hold jurisdiction over education. Consequently, in Manitoba, curriculum documents are produced and published by the Government of Manitoba through Manitoba Education and Training. Osborne (1999) argued that curriculum documents convert the goals of education—as determined by a government—into written form, and therefore are a representation of what a government values (or does not value). As such, curriculum development can be a highly contentious process; most recently Ontario’s review of the physical/health education curriculum, and Alberta’s review of the social studies curriculum, have both led to significant debate about what is taught in schools, to which grade, and to what ends (Aukerman, 2024; Bialystok, 2019).

Document analysis of provincial curriculum documents is a common way for researchers to understand broadly what is expected by a provincial government to be taught in schools and therefore what is likely to be taught in schools (Chin, et al., 2007; Jamil, et al., 2020; Kilborn, Lorusso, & Francis, 2016). Aside from analyzing each classroom in the Manitoba K-12 system, reading and interpreting curriculum documents is the best way to understand what can be expected to be taught in Manitoba K-12 classrooms. In short, unless content is outlined in the Manitoba curriculum, it is unlikely to be present in K-12 classrooms save for a teacher deciding to teach beyond the boundaries of the curriculum.

This research applied a content analysis method to identify and code CCE in Manitoba curriculum SLOs for K-12 in science, social studies, and physical/health education. Content analysis, wrote Cohen, Manion and Morrison (2005), is a research method developed “specifically for a broad spectrum of problems in which the content of communication serves as a basis of inference” (p. 164). I selected content analysis to locate, interpret and discuss the quality and quantity of SLOs that had direct or indirect content which could connect to climate change.

To date, policy and curriculum documents from Manitoba Education have been designed to reflect some of the principles of ESD, including the curriculum documents in science (Manitoba Education & Youth, 1999, 2000a), social studies (Manitoba Education & Youth,

2003, 2005), and physical/health education (Manitoba Education & Youth, 2000b), as well as *The Guide for Sustainable Schools in Manitoba* (Manitoba Education & Youth, 2011). But to what extent are current curriculum documents in key disciplines, namely science, social studies, physical/health education and related electives presenting components of CCE? Further, what current opportunities exist within current documents for transitioning to CCE as a framework for teaching? Based on these findings, what next steps could the Manitoba Education system enact to transition away from ESD towards CCE?

To understand the extent of CCE in the Manitoba curriculum a four-stage process for content analysis was undertaken where SLOs were tabulated, coded and analyzed for the frequency of CCE content. Coding included evidence of explicit references to climate change (A+ for inquiry/open ended outcomes, An for SLOs) and climate change adjacent language (Bn). What follows are highlights of the findings and a discussion section which identifies four next steps for increasing the presence of CCE in the Manitoba K-12 system.

Findings

Overall, there are very few explicit references (A) to climate change in the compulsory K-12 curriculum, and those references are limited to grade 7 social studies (A2) and grade 10 science (A2). Grade 7 and 10 curricula include a significant number of specific learning outcomes (SLOs) that include climate change or climate change adjacent language. Grade 7 social studies is the course that holds the most potential for climate change education in compulsory curriculum (A2, B17). Here there is explicit mention of climate change in two SLOs, with 17 SLOs that have potential outcomes which could be interpreted as having connections to climate change. These outcomes in the grade 7 social studies curriculum are overwhelmingly “personally relevant” and also by far are written in ways that allow for students to be critical of systems that create and perpetuate climate change. The grade 7 social studies curriculum is written with the construct of “global citizenship” in mind; that is, that curriculum learning outcomes seek to link students’ personal actions to the welfare of citizens around the world.

There is no alignment between the grade 7 social studies and science curriculum, which means instruction on the science of climate change would need to go beyond the bounds of curriculum SLOs. Even if students were in a grade 7/8 multi-age classroom, the grade 8 science curriculum only has a single SLO that has potential connections to climate change. Furthermore, there are no SLOs that incorporate an Indigenous perspective, nor SLOs in the physical/health education curriculum which would support students working through mental health issues that may arise as a result of this learning.

The grade 10 social studies and science curriculum does offer much better alignment for teaching climate change. In the grade 10 science curriculum, two SLOs explicitly include climate change, with 12 SLOs between the two courses offering possible avenues for teachers to organize learning around climate change. These SLOs are written to allow for critical engagement with content (2), locally relevant (4) and personally relevant (4), and a single outcome that connects to Indigenous knowledges. However, as grade 10 science and social studies are taught in high school, often with students taking the course with different teachers at different times, there is inconsistency across Manitoba of alignment between learning in these courses.

As has been written elsewhere (Bieler et al., 2018; Burton, 2019; Field et al., 2023), the Grade 12 Global Issues course offers an exemplary opportunity to design and facilitate learning

that directly aligns with high quality climate change education (A+). This course is designed for student inquiry and action projects, with optional SLOs that could be oriented towards climate change education. To a lesser extent is the Grade 11 Current Topics in Science (A1, B5), which is also an inquiry course. Both of these curriculum documents include climate change education as optional content, to which an educator could teach or organize field experiences that align with climate change. Both the aforementioned grade 11 and grade 12 courses are electives; Manitoba Education does not make available data on individual course enrollment (Burton, 2019).

Similarly, the Cinema as a Witness to History (B5) and Current Topics in First Nations, Metis and Inuit Culture (B2) courses could be designed towards CCE. While there is no explicit SLOs that include social-emotional learning, critical learning, or Indigenous knowledge, there is flexibility for this content to be incorporated, as well as opportunity for learning through an inquiry lens to allow content to be personally and locally relevant. Indeed, many of the SLOs across the K-12 curriculum documents are explicit in making the content personally and locally relevant. Only on rare occasions was a SLO only personally or locally relevant but not both.

There is a glaring lack of SLOs which reference explicit or implicit connections to Indigenous knowledges in the science and social studies curriculum, and no SLOs in the physical/health education curriculum included any content for these two criteria. Grade 7 offers the most SLOs that allow for students to take a critical stance towards who and why specific people and organizations are responsible for climate change (7); to a lesser extent SLOs with a critical stance are present in grade 9 (3) and 10 (2), with possibilities for critical learning in grades 2, 4, 6, 11 and 12. Aside from grade 6, no SLOs are written that come close to allowing students to explore the social-emotional side of climate change.

Conclusion

Education for sustainable development was a step away from teaching individualized and disconnected content separate from the community and wider environment in which humans lived. As this study has shown, Manitoba curriculum documents and their specific learning outcomes still represent this conceptualization, and are in need of modernization, specifically in the frequency of climate change explicit SLOs, and climate-change adjacent content, such as social-emotional learning, Indigenous knowledge, and criticality of the role of government and business in escalating carbon emissions. I contend that CCE is the next evolution for education in Manitoba.

The findings of this study point to four shifts across the K-12 system. First, is the need for school administration to allow for greater time and support to integrate courses. This is particularly evident in grade 7 and grade 10 where social studies and science are uniquely placed to complement each into a single dual-credit course with a CCE focus. By design, grade 12 Global Issues requires time for learners to engage in inquiry and ideally community action; a 60-minute school period prevents such deeper learning. Second, is for Manitoba Education to understand how and where to effectively integrate climate change content into curriculum documents when they redevelop the curriculum. Curriculum reform needs to include greater explicit reference to climate change, particularly in K-12 science and physical/health education. While maintaining the space for making learning locally and personally relevant, SLOs also need more explicit inclusion of Indigenous ways of knowing. Third, is the need for policy reform at the provincial level; specifically, this includes a shift from ESD to CCE as the framework for

learning. To effectively manage this transition, the reappointment of a director of CCE at the provincial level (similar to the ESD consultant of the early 2000s) is needed. Fourth, this position at the provincial level would ideally liaise with school divisions and leaders in CCE from across Manitoba to design and facilitate professional development on CCE. These aforementioned four shifts are feasible and possible given past practices and minor adjustments within the Manitoba Education system. If these changes are addressed, they would collectively provide a more robust integration of CCE for all Manitoban youth and their teachers.

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