

READ-ALOUDS AS A PATHWAY TO CLIMATE LITERACY: CO-CONSTRUCTING MEANING IN TEACHER EDUCATION

DEAN KURTIS-POMEROY

Niagara University Ontario, Vaughan, Ontario, Canada

GARDENIA GRANT

Niagara University Ontario, Vaughan, Ontario, Canada

ASMA AHMED

Niagara University Ontario, Vaughan, Ontario, Canada

COURTNEY HAY

Niagara University Ontario, Vaughan, Ontario, Canada

PHILIP DONOGHUE-STANFORD

Niagara University Ontario, Vaughan, Ontario, Canada

CAROL DOYLE-JONES

Niagara University Ontario, Vaughan, Ontario, Canada

Abstract

A documented systemic challenge for K–12 schools is the lack of teachers' comfort and preparedness to help elevate learners' environmental consciousness. Climate change underscores the urgency for research to advance teaching and learning approaches that provide learners with the knowledge, skills, and attitudes necessary to care for and act toward a greener society. While meaningful work is underway in several Faculties of Education, much more needs to be done to prepare educators to teach climate literacy. This study explores how one urban Ontario teacher education program co-constructs meaning-making among teacher candidates (TCs) during read-aloud discussions centred around climate-related picture books. The study assesses TCs' preparedness and comfort in discussing climate-related issues and explores co-created meanings during read-aloud discussions to foster efferent and aesthetic transactions (Rosenblatt, 1978) and climate literacy engagement (Oziewicz, 2023b). The primary data analysis source was video recording footage of the read-aloud sessions, with field memos and participant response surveys serving as supplementary data. Findings demonstrate that read-alouds are an effective and accessible method to help TCs feel confident about raising awareness of climate issues. The study highlights that promoting climate literacy requires intentionally embedding it in the curriculum and may improve climate literacy practices in Ontario, Canada, and beyond.

Keywords: climate literacy, teacher education, read-aloud, sustainability, climate justice

Introduction

A documented systemic challenge for K–12 schools is the lack of teachers' comfort and preparedness to support the development of learners' environmental consciousness (Beach, 2023; Mitchell, 2023; Pizmony-Levy et al., 2025; Will & Prothero, 2023). The increase in climate change disasters necessitates the importance of empirical research to support approaches to teaching and learning that provide learners with the knowledge, skills, and attitudes required to care for and act toward a greener society.

While excellent work is underway in several faculties of education, including Lakehead University's national e-course and curriculum grants, UBC's faculty-wide climate education roundtables, and Wilfrid Laurier's sustainability-focused teaching innovation initiatives (Accelerating Climate Change Education in Teacher Education Project, 2023; UBC Faculty of Education Roundtable, 2023; Laurier Teaching Excellence and Innovation, 2024), much more needs to be done to help educators teach climate literacy. To gain a deeper understanding of how to effectively address insecurities and challenges that may arise when teaching these topics, more in-depth research is needed on integrating climate literacy into the classroom. Read-alouds—the activity of reading books aloud together with individuals, usually in a classroom setting or by a parent or caregiver to their child—can help educators feel better prepared to facilitate and lead conversations about climate change with learners (Martineau, 2022).

This research focuses on choosing climate-focused read-alouds for their peers in their Methods of Early Learning class to increase their climate consciousness. Specifically, it explores the unique experiences of teacher candidates (TCs) facilitating discussions surrounding environmental issues. Employing Reader Response Theory (Rosenblatt, 1978), which highlights that readers are constructing meaning through their personal and emotional connection with a text. This study examines TCs' baseline comfort when approaching climate change topics, as well as their ability to make personal and curricular connections during climate literacy read-alouds, and compares it to their comfort and conscious level afterwards. Few studies and academic resources have focused on similar components regarding the benefits of read-alouds (Fletcher & Holyoke, 2025; Vlach, 2022; Woodard & Schutz, 2023). Despite the in-depth focus such works provide, regarding the natural integration of environmental awareness in the classroom through climate literacy, most lack a Canadian perspective. As such, one of the primary focal points of this study is to gain a Canadian perspective on TCs' overall confidence in utilizing such methods in their practice.

This study seeks to understand Canadian TCs' views on climate literacy to better understand how teacher programs can support future educators in creating nuanced learning opportunities that critically engage with such issues. In a time when the climate crisis is rampant both locally and globally, Canadian educators need to approach these issues with specific insights that connect global shifts to local impact. Teachers can help their students develop critical skills in climate literacy, thereby better understanding the challenges and responding to them meaningfully. This matters because the students these educators teach, who are the potential future decision-makers, are already experiencing the effects of climate change, and many are concerned about the planet's future. The authors posit that it is the responsibility of educators to help build awareness, care, and a readiness to act. It is anticipated that supporting teachers in a certain field by providing resources could enhance K–12 students' literacy in that

field (Kang & Tolppanen, 2024; Jerrim, 2024) The authors used read-alouds as tools and resources to support climate consciousness. This can allow students, regardless of age, to develop critical skills in climate literacy to better understand the growing challenges and respond to them effectively.

Literature Review

Climate Literacy in Education

Climate literacy refers to an understanding of climate, human actions, and their impacts on people and the Earth (U.S. Global Change Research Program, 2024). Educators define climate literacy in more practical terms, focusing not only on understanding climate emergencies but also connecting them to the language used in the curriculum. They specifically focus on knowledge, skills, and the development of “values, attitudes, and behavioural change” (Oziewicz, 2023b, p. 34) to live in a way for the future generations to flourish in it. On a wider level, climate literacy also includes activities at the individual, local, national, and international levels (Gibson, 2021; UNESCO, 2024), with the shared goal of ensuring the well-being of both humans and nonhuman species who co-inhabit this planet.

Education is believed to be one of the significant factors in shifting mindsets and practices. There has been a dedicated effort in Ontario to support teacher education programs with their climate education objectives. For example, the University of Toronto’s Faculty of Education (OISE), Lakehead University, and Environment and Climate Change Canada have been active in providing regular training and webinars for both in-service and preservice teachers through the Accelerating Climate Change Education in Teacher Education (ACCE-TE) initiative (Field & Inwood, 2024). Additionally, empirical studies continue to be conducted, such as the two-year study by Dr. Ellen Field (2022) at Lakehead University, specifically focused on the teacher education program in Canada. Some pathways of this project included a national e-course, webinars, and securing seed grants to support the curriculum in the faculties of Education. Other notable organizations have also participated in training preservice (e.g., ESE-TE: Environmental & Sustainability Education In Teacher Education) and in-service teachers (e.g., Eco-schools). However, many teacher education programs lack a systemic approach to integrating climate education into their curriculum. It typically falls on individual instructors and chairs of departments to enhance the climate consciousness of their TCs (Pizmony-Levy et al., 2025; Learning for a Sustainable Future, n.d.). Similarly, in classrooms, in-service teachers often do not prioritize the importance of integrating climate change education, and it is often regarded as an add-on (Field et al., 2022). Even though education is identified as a key component of *Sustainable Development Goal (SDG) 13: Climate Action* and emphasized in the Paris Agreement, to which Canada is a signatory (United Nations, 2015), it remains unprepared to teach climate literacy. This highlights a gap between Canada’s national commitments, its educational practices (e.g., curriculum implementation, teacher training), and the realities on the ground.

A study conducted by Beach (2023) provides seven challenges in supporting teachers to facilitate a climate education. The challenges include the inconsistent standards provided by different states, as well as issues related to positive attitudes and self-efficacy in teaching climate change. This study examines the attitudes of TCs towards climate and the environment. The

extant literature globally demonstrates that TC attitudes, knowledge, and anxieties toward teaching climate issues impact their self-efficacy and confidence (Al-Rabaani, 2023; Boon, 2016; Littledyke, 2008; Sahin et al., 2012; Särkkä et al., 2021). Exploring how to support TCs' mindsets and attitudes is more challenging than building their knowledge on climate topics. This is particularly true regarding climate anxiety and high-stakes risks, such as the ongoing climate crisis, including the increasing problem of wildfires every summer, along with feelings of helplessness, loss of agency, and the low impact of individual efforts.

The Effectiveness of Climate-related Read-Alouds

Environmental and climate-related issues create new challenges, influencing how we interact with the natural world. Students must be aware of these issues in order to practice environmental stewardship and build on their knowledge to make positive future changes. Despite the topic being critical, it can be challenging to create meaningful lessons that align with students' understanding of such topics while encouraging critical thinking. Such challenges are also difficult to fully contextualize due to the limited number of studies that focus on educators' overall comfort levels in leading such discussions, especially within a Canadian context. A powerful pedagogical tool that has been used frequently in teacher education, particularly in early learning, is the read-aloud (Martinez & Roser, 1985; Sipe, 2008). Read-alouds are a dynamic tool, due to the approach being flexible enough to discuss various topics in a non-threatening, friendly manner (Bensel, 2023), and are especially useful for discussing complex topics, such as climate change. Since a wide variety of picture books, including fiction and non-fiction, narrative and non-narrative, communicate experiences in nuanced ways, one can easily select a book that connects to this topic and use it as a starting point for interactive learning. Thus, it invites individuals to engage in challenging experiences in an age-appropriate manner.

Read-alouds have demonstrated a pedagogical approach that offers new ways of processing information, addressing misunderstandings about a topic and equipping educators and students to engage more meaningfully with a variety of issues (Vlach, 2022). They nurture a sense of understanding in students by helping students to make personal connections before and after the initial reading, thereby supporting comprehension through personal engagement (Williams et al., 2024). Therefore, read-alouds are significant as they further develop learners' technical and critical understanding of a given subject while supporting educators through such initiatives (Ghosn, 2002; Oziewicz, 2023a).

Each read-aloud is typically selected with overarching themes in mind. In this context, whether focusing on positive interactions with the environment, the impact of human activity on the land, or the interconnectedness of the earth in shaping one's lived experiences, these read-alouds were chosen to prompt TCs to recognize and respond to the many nuances in learning that emerge when selecting such books for read-alouds (Nurkaeti et al, 2019).

Theoretical Framework

This study employs reader response theory, as formulated by Louise Rosenblatt (1978), viewing reading as a transaction between the book and the reader. The focus shifts from the text to the readers and explores the co-created meanings during read-aloud discussions to create efferent and aesthetic transactions (Rosenblatt, 1978). In this process, the focus is not only on the

text but also on how participants engage with and interpret it. When employed in a teacher training program, this approach helps TCs build confidence and competence in a given subject, in this study, climate education (Rosenblatt, 1978). TCs make meaning and build on their understandings while making connections to books with climate-related themes. The efferent aspect of reading focuses more on information, while the aesthetic aspect explores the reader's experience during the reading activity (Rosenblatt, 1993).

Beyond the barriers at the personal level described above, supporting climate literacy and awareness is difficult at the institutional level (Oziewicz, 2023a). In other words, discussing climate-related issues is not only emotionally demanding, but systemic barriers also reduce one's ability to access information. One way to address this is to focus on the efferent aspects of reading and read-aloud by providing clear, actionable information. At the same time, the aesthetic aspect explores the reader's experience, emotions, and reflections during the activity (Rosenblatt, 1993), thereby increasing TC comfort with the subject matter. In teacher education, picture book read-alouds can help candidates to explore both of the above dimensions. It helps them understand climate information while also processing their own and their students' emotional responses. Using efferent and aesthetic read-alouds of children's picture books provides an entry point to greater climate literacy and encourages TCs' comfort with exploring climate-related topics (Rosenblatt, 1978). Oziewicz suggests (2023b) that stories are "the primary means by which we navigate reality" (p. 35). Narrative fiction picture books, rather than non-fiction, are effective pedagogical tools that invite readers to discuss uncomfortable or unfamiliar topics by offering multiple entry points and connections to self, text, and the world, thus facilitating meaningful engagement and understanding of the subject.

During read-alouds, the reader and the audience engage in a co-constructivist and dialogic pedagogy of meaning-making — that is, they collaboratively discuss the text by sharing questions, connections, and perspectives. TCs prepare strategies to engage the audience in a dialogue during their read-aloud. For example, they might pause to invite participants to reflect on how the illustrations are related to climate education, helping facilitate discussion and providing opportunities for a variety of ideas and interpretations. This exchange naturally leads into discussion-based pedagogies, where dialogue becomes the primary approach to learning rather than the simple transmission of information. Few studies have examined TCs' confidence and competence in addressing critical topics, such as climate education, through the use of efferent and aesthetic readings of picture books as a theoretical framework that provides a foundation for exploring the research objectives.

Methodology

This research employs a qualitative, descriptive case-study design (Merriam, 1998; Yin, 2014). According to Stake (2005), case studies are used to emphasize context and depth, allowing for emerging complexity and knowledge building, as well as awareness during the read-aloud discussions.

Two professors assisted in conducting the research, and four TCs led the project as researchers. Read-aloud sessions were conducted in a teacher education setting during the authors' classes at a university. Over four weeks, the TC researchers conducted read-alouds for

the participating TCs and then led discussions on each book. The books included: *Berry Song* (Goade, 2022), *Here We Are* (Jeffers, 2017), *We Are Water Protectors* (Lindstrom, 2022), and *Up in the Garden and Down in the Dirt* (Messner, 2015). Surveys were designed to collect further data on the significance of read-alouds in preparing TCs to teach climate literacy in the classroom.

Each read-aloud was selected with overarching themes in mind. In this context, whether focusing on positive interactions with the environment, the impact of human activity on the land, or the interconnectedness of the earth in shaping one's lived experiences, these texts were chosen to prompt TCs to recognize and respond to the many nuances in learning that emerge when selecting books for read-alouds (Nurkaeti et al., 2019).

Participants

This study occurred at an urban university in Ontario, where the respondents and researchers were part of a teacher education program. Twenty-three TCs participated, including the researcher-participants. Out of the twenty-three participants, only three identified as male, resulting in a primarily female perspective in the study. Notably, the participants were of a moderately wide age range - from their early 20s to late 40s. This provided a range of generational perspectives on environmental and climate-related issues throughout the study. Additionally, the participants and researchers lived in various areas across Ontario, both urban and rural. This resulted in a diverse range of environmental experiences. Collecting demographic and contextual participant data is essential in qualitative research to support interpretations and understand different perspectives (Merriam, 1998; Yin, 2014).

Data Collection

Read-aloud sessions were conducted in the authors' *Methods in Early Learning* class for four weeks. Two TCs performed the read-aloud session and led the discussion each week, while the other two TCs took notes. Each session lasted approximately 10 minutes and was followed by a discussion. Each session was also recorded to ensure accuracy for data analysis.

Participants answered two surveys: a baseline survey before experiencing the read-alouds, and an endline perception survey after completing all the read-alouds. These surveys were intended to better understand participant experiences and opinions before and after the experience.

Four researcher TCs were responsible for presenting a different children's book each week. One researcher from the group would lead the read-aloud, reading their selected book and making three meaningful connections. The other researchers would present their connections to the book afterward, modelling what a connection could be like with students. Finally, the discussion would be opened to the class of TCs who were listening to the read-aloud and the connections made by the researchers, providing an opportunity for other TCs in the class to share their own connections. Each session focused on a different book, framed by a group discussion. The first week, the read-aloud was *Berry Song* written and illustrated by Michaela Goade (2022). The second book, *Here We Are*, was written and illustrated by Oliver Jeffers (2017). The third was *We Are Water Protectors* by Carole Lindstrom and illustrated by Michaela Goade (2022). The final reading was *Up in the Garden and Down in the Dirt* by Kate Messner and illustrated by Christophe Silas Neal (2015). These picture books were selected based on their portrayal of

different aspects of the environment, along with the narrative ability to reflect the nuanced interactions that listeners can have with the natural world.

The choice to select works of fiction rather than non-fiction was made because this medium allows for better engagement, as listeners can clearly see a reflection of themselves through the characters, underlying themes, and social or environmental issues presented. Often, the difficulty of a text is not only based on structural or literary devices, but also on one's familiarity and understanding of the genre or topic (Sierschynski et al., 2014, p. 280). In general, everyone has a differing level of understanding and comfort surrounding environmental issues. In a classroom setting, it is hard to gauge the overall understanding that students have of such topics and to encourage them to feel comfortable in discussing them, based on the perceived idea of needing to be well-informed to fully participate. But the ability of fictional works to incorporate the familiar while exploring complex topics makes those topics more approachable by removing some of the perceived difficulty. Thus, utilizing fiction makes this an ideal method for encouraging connections, no matter the audience.

Read-aloud Recording

The read-alouds were recorded through a web camera on a laptop positioned at the front of the room. It filmed four of the researchers presenting. A second camera was set up to film the audience (made up of fellow TCs), allowing researchers to refer to and analyze their responses later. There were four separate recording sessions, each featuring the reading and related connections made. The recordings allowed for accuracy as they were referred back to in order to ensure that connections made or those which related to an overarching theme were identified and analyzed to gain an understanding of the participants' perspectives. Direct quotes from participants were taken from the recording and analyzed to better understand the conclusions made during each session of the read-aloud.

Baseline Survey

The primary research method featured throughout the study was qualitative, performed using a baseline and endline perception survey. The baseline survey featured questions relating to how much each TC knew about environmental issues, how confident they felt about teaching such topics in the classroom, and the overall importance of these topics to them. The survey featured multiple-choice and short-answer questions, allowing for a more in-depth understanding of each participant's views and knowledge surrounding the topic before the read-alouds.

An example of quantitative questions within the survey is the multiple-choice questions, where participants are asked to rate their responses using a corresponding number. Creswell and Creswell (2018) explain that qualitative research can help generate hypotheses and insights that may later be examined through quantitative approaches. The survey combines both qualitative and quantitative methods. Thus, it employs this philosophy. The first question, "What do you know about environmental issues, climate change or climate literacy?" is a qualitative research method that allows participants to share their prior understanding. It helps the researchers better contextualize the rest of the survey through this first response. Therefore, it helps provide further evidence and context for the quantitative research throughout the survey.

Survey Questions

The baseline and endline perception surveys contained the same questions to better analyze the participants' overall understanding of environmental issues before and after the read-alouds (Appendix A). The survey had five questions in total. Questions 1-4 focused on individual knowledge of climate-related issues and on general understanding before and after the read-alouds. Questions 2- 3a used a Likert scale for participants to rate their general knowledge of climate issues. If they rated their understanding as a 3 or higher, they had the option to answer two additional questions to further elaborate. The remaining questions, 1 and 4, asked for one's opinion. Question 1 inquired about one's personal understanding of environmental issues. Question 4 focused on how respondents viewed the importance of discussing environmental issues in the classroom. This allowed for a more in-depth analysis and enabled researchers to conclude the data collected, based on learning more about the participants.

Below are the questions used for the survey:

- 1. Knowledge:** What do you know about environmental issues, climate change, or climate literacy?
- 2. Baseline Comfort (General):** On a Likert scale, how comfortable are you speaking about climate-related issues in your day-to-day life?
- 3. Classroom Comfort:** How comfortable are you speaking about climate-related issues in your classroom?
- 4. Perceived Importance:** How important do you believe it is for educators to address climate change and environmental issues in the classroom?

Data Analysis

After the endline perception survey, the data collected were analyzed for further understanding. First, a transcript was made of each of the four read-aloud sessions. Accuracy was upheld through watching the recordings to create a clear transcript for reference. The information gathered from the read-aloud transcripts was first organized through a chart where connections made were grouped together based on similar themes. This allowed for an in-depth overview of each read-aloud session through the contextualizing of these responses. The data from the two surveys - the baseline and endline perception - was organized into Google Sheets, with each researcher dividing the findings into different columns to identify a common theme that best categorized responses. Each column was assigned a letter (A to I), representing a common theme derived from the participants' responses to the survey. As stated previously, it is important to note that not all respondents answered every survey question. Other visual means were used to understand the results, such as organizing results into bar graphs and tables to process the data better.

Findings

The following section will present the qualitative and quantitative findings of this study. We first focus on how TCs co-created meanings through the read-alouds conducted in this study, presenting the resultant discussions in which both participating TCs and researcher-participating TCs co-constructed meanings. The themes that emerged from the discussions regarding the two

questions in this study will be highlighted. Following this will be the presentation of data collected through the baseline and endline surveys. This data includes quantitative measurements of TCs' comfort with climate-related topics in their personal and professional lives, as well as qualitative data on the particular themes known to those who indicated higher comfort levels.

The two key questions of the study are:

- (1) How do TCs co-construct meanings during read-aloud discussions centred around climate-related picture books?
- (2) How did the read-aloud experience change the climate literacy comfort level of TCs, including their preparedness to help elevate the environmental consciousness of learners?

Throughout and following the reading of each of the four children's books utilized in this study, researcher-participants shared with the class text-to-life connections they had made. After the readings, the TCs were invited to share their text-to-life connections. In many cases, the ensuing discussions flowed from the text-to-life connections presented by the researcher-participant TCs. Several themes emerged during the discussions, some of which were common across multiple books in the study. We will focus on the most commonly occurring themes of the discussions, which are as follows: consequences of the disconnect between humans and the natural world; reconnecting with land; environmental consciousness through inquiry and action; and amplifying TC voice and community connection.

Theme 1: Consequences of the Disconnect between Humans and the Natural World

Based on where one lives, one may identify more or less with certain issues, since one's environment shapes certain perspectives. For example, during the read-aloud of *We Are Water Protectors* (Lindstrom, 2020), several participants drew on their own experiences when engaging with the themes of environmental damage due to development. Some participants made personal connections between these changes and their relationship to the land and sense of belonging. Other participants described being less directly connected to such issues, as their experiences with the natural environment were more occasional or limited to temporary moments in natural spaces. Thus, these issues were not always part of their everyday experiences, which appeared to influence the ways in which they identified with the text.

Discussions of Michaela Goade's *Berry Song* (2022), a book that highlights the connection of Indigenous heritage to natural food sources, included a comparison suggesting that the disconnect between our (settler) food and its source(s) mirrors the disconnect between pollution and action. One TC stated:

When you grow your own produce, or when you gather your own ... the experience is different, because like you see the process and you're like, you're aware, or like you feel connected suddenly to the land ... rather than the disconnect you feel when we kind of talk about them really separately. It's like ... I guess pollution ... we kind of see it like, as a bit of disconnect, you know, like, it's happening, but it's happening kind of away from me.

Here we see that this disconnect can lead to inaction. Reestablishing our connections to the natural world, particularly through something as essential as food sources, can lead to a greater awareness of our positive or negative impact.

In the second read-aloud experience, Oliver Jeffers' *Here We Are* (2017), the theme of disconnect was again present. While much of the discussion focused on the interconnectedness of all living things, the contrasting view was also presented, with one TC stating:

[The] disbelief, of that simple fact that everything has a place on earth, everything is able all animals are communicating and participating, can kind of like bring about like, the disconnect, and like the reason why people tend to like, like disregard, or kind of like force the idea that it's okay to like, take what benefits us not really think about the land and the animals that inhabit it.

The idea that humans can take from the environment without concern for the ecosystems present exemplifies the idea of disconnect, when in reality, we are inextricably connected to our environment.

The theme of perceived human disconnect with our environment continued in the discussions of the third read-aloud, *We Are Water Protectors* by Carole Lindstrom (2020). In this case, it is perhaps less surprising, given the content of the book itself, which starkly contrasts Indigenous ways of living with the land, and the settler approach of commodifying natural resources. In this instance, two TCs made text-to-life connections with their own experiences of environmental change in their areas. In the first case, a TC brings to light a lack of awareness of the consequences of our actions, specifically the overuse of the land. "[J]ust go to the water and now it's just so much different. With the erosion of the [Scarborough] bluff, it's taken a lot of the land away even from the park that's beside it." Another TC shared a similar experience, saying that "we always used to see deer ... I can't remember the last time I have really seen any wildlife. And it's like-okay yes we need new places for people to live, but I don't think they're thinking of the consequences of this." Both cases highlight the commonly held Canadian settler point of view in which the land is a commodity only to provide humans with resources, rather than the Indigenous concept of living in harmony with the land, taking only what is needed, and recognizing the part we play in this ecosystem. This discussion directly reflects the ideas presented in Lindstrom's (2020) book, particularly the depiction of settler land use (in this case, oil pipelines) as "the black snake", which is contrasted with the statement "We are all related," which presents the Indigenous perspective. Furthermore, Lindstrom highlights the power of collective action, and its importance in addressing the climate crisis. This was alluded to during the discussions when a TC suggested, "even if we do try-if not enough of us try, maybe you know if-there's that thing with all of them in unison. That's the important part. That we all-if we feel that way we say something about it." We are better able to effect change through group effort, than as individuals (though individuals can often act as the catalyst for collective action).

By drawing connections between the presented picture books and the lived experiences of TCs through read-alouds and discussions, a deeper understanding of the consequences of our perceived disconnection from the natural environment can be fostered, thereby increasing TC comfort with addressing these issues in their practice.

Theme 2: Reconnecting with Land Through Food and Generational Knowledge

While discussions arising from the read-alouds highlighted the consequences of a perceived disconnect between humans and the natural environment, they also led to TCs making connections with ways in which they have been able to reconnect with the land in their own lives.

In response to Goade's *Berry Song* (2022), the leading researcher-participant shared the following text-to-life connection with the class: "Catching the fish, bring it home, only taking what you need and then cooking it as a family - just how much more connected you were to what you ate, and with each other as a family." The themes contained within this connection, specifically the personal connection to land through food and generational knowledge, were repeated and further explored during the class discussion. One TC mentioned an elderly neighbour, who shared their raspberries, and allowed the TC "to pick them and then we made the pie together as well," while another stated "when you grow your own produce, or when you gather your own... the experience is different, because like you see the process and... you feel connected suddenly to the land." In both of these comments, food provides a strong source of connection to the land, due to its communal aspects, connection to personal and family traditions, and, of course, the essential nature of it to our survival. It is perhaps through food that we can most easily repair our sense of disconnect from our environment.

This theme played a significant part in the discussions relating to the read-aloud of Messner's *Up in the Garden and Down in the Dirt* (2015), in which the garden acts as an entry point to a deeper appreciation and understanding of the natural world and the ecosystems around us. Reflecting the generational knowledge passed on from the "Nana" in the story to the child, TCs made text-to-life connections with the gardening knowledge shared by their own grandmothers and mothers, offering comments such as "she's kind of taught me all the basic things I know about gardening," or "they used to teach about the different animals that live out in the gardens, as well as, the cycle of the plants." This shared knowledge and experience left a lasting impression on the TCs, which is rekindled by the text, helping to increase their awareness of their connection to the land, climate issues, and their comfort with discussing these issues.

Theme 3: Environmental Consciousness through Inquiry and Action

Throughout each of the discussions which followed the read-alouds, TCs shared ideas about developing environmental consciousness through inquiry and action, particularly as related to their recent practice teaching experiences or as goals for their future teaching practices.

In response to Goade's *Berry Song* (2022), a TC offered, "I was in [a school] that actually had like the entire top part of their school was like a garden, like a greenhouse...there was a period each day that the different classes would take turns, they'd go up, they would have to like, plant some plants." These hands-on, inquiry-based approaches provide not only students with the opportunity to increase their environmental consciousness, but TCs as well. Through actions such as these, students at all levels can develop a sense of agency in the face of what may seem insurmountable challenges. The idea of creating a school garden was also discussed in relation to Messner's *Up in the Garden and Down in the Dirt* (2015).

Both the reading of *Here We Are* by Oliver Jeffers (2017) and *We Are Water Protectors* by Carole Lindstrom (2020) resulted in discussions that included suggestions for student inquiry and action-based projects tied to the natural environment of the school community. While making connections to *Here We Are*, a TC suggested using art (in this case, a poster contest) as a means for students to explore their inquiries into climate-related problems, thus amplifying student voice and perspective. The same TC went on to discuss a placement experience in which they "brought an activity forward of students, like [TC] said, bringing forward an environmental issue that really resonated with them." After reading *We Are Water Protectors*, it was suggested

that students should explore their own community for examples of problematic land use (i.e. new housing developments), conducting research and taking notes on the ecosystems that were being displaced.

Theme 4: Amplifying TC Voice and Community Connection

As discussed in the previous thematic section, discussions resulting from the read-aloud of Jeffers' *Here We Are* (2017) and Lindstrom's *We Are Water Protectors* (2020) led to suggestions of student projects tied to community environments. In both cases, it was suggested that the resulting artifacts could be utilized to further connect with the community to effect change. That the TCs were inspired to such goals through these read-alouds speaks to the effectiveness of this approach.

Community connection was also a part of the discussion of reconnecting with the land (theme 2), as community connections are often formed or strengthened over food. Similar to the previous example of sharing produce from a neighbour's garden, given during the discussion of Goade's *Berry Song* (2022), another TC shared the following connection: "our one neighbour...[t]hey're like the grandparents of the street basically, like they're everyone's grandparents. My guys go over, and every time they're there, they come home with something." These examples demonstrate how both small-scale and large-scale community connections can be established through environmental consciousness, stewardship, and action.

By providing TCs with the opportunity to make text-to-life connections through carefully curated read-alouds of children's picture books that contain climate-related themes, and by modelling the process of making these connections for them, TCs are encouraged to find significance and relevance in their funds of knowledge, thus having their voice amplified.

To guide the analysis, the following research questions were examined:

- (1) How do TCs co-construct meanings during read-aloud discussions centred around climate-related picture books?
- (2) How did the read-aloud experience change the climate literacy comfort level of TCs, including their preparedness to help elevate the environmental consciousness of learners?

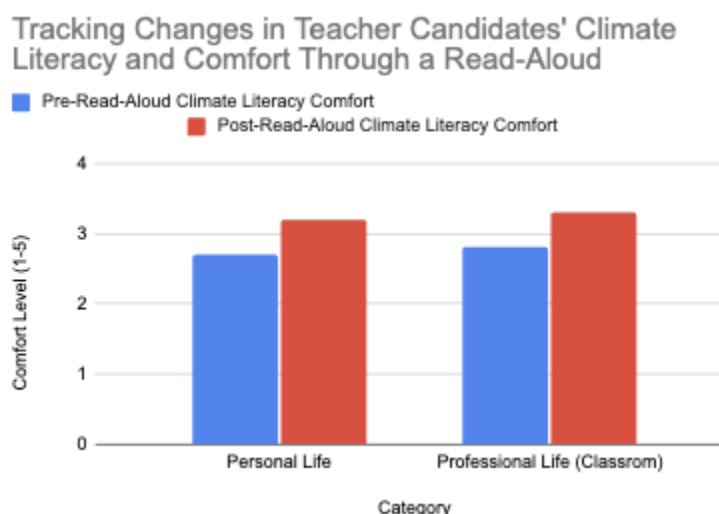
As discussed previously, the process of having TC peers conduct read-alouds and model text-to-self and text-to-world connections helped to make climate literacy and climate content more accessible. By then providing participating TCs with the opportunity to share their own connections following the read-aloud, this accessibility and comfort were further deepened. The participating TCs now had an entry point into discussions of subject matter that had previously been challenging or uncomfortable. By leveraging the pedagogical tools of read-aloud and modelling, TC participants were able to realize that their own lived experiences and reflections are sufficient for the task of building climate literacy in learners, and that further specialization is not required.

This TCs' confidence in environmental consciousness formed the focus of the baseline and endline surveys. Participants who indicated a comfort level of 3 or above on a scale of 5 were invited to provide examples of topics they felt comfortable discussing in both their private and professional lives.

Of the 23 TCs in the class, 9 reported a comfort level of 3 or greater regarding climate-related topics in their personal lives at baseline. This number increased to 16 TCs at the endline. Among the 23 TCs, 12 indicated a comfort level of 3 or greater concerning climate-related topics in their teaching practice at baseline, rising to 17 at endline.

Overall, the average increase in comfort level was documented at 0.5/5 (10%) across all participants between the baseline and endline surveys. This data is reflected in Figure 1 below.

Figure 1. *Tracking Changes in TCs' Climate Literacy and Comfort through Read-Aloud*



In addition to the above quantitative data, the provided examples of climate-related topics which TCs felt comfortable discussing were analyzed and synthesized. Below, we will present and discuss four key themes that emerged from the provided examples: environmental knowledge sharing and dialogue; environmental responsibility and stewardship; human-nature relationships (food, trees, land); and systems thinking and broader climate awareness.

Theme 1. Environmental Knowledge Sharing and Dialogue

In the baseline survey, half (5/10) of respondents included direct or indirect examples of environmental knowledge sharing and dialogue. One such example given was, “I do my part and explain to my friends, family, and students about recycling and choosing better choices for the earth and themselves”. This example demonstrates an understanding of the importance of engaging our communities through open dialogue, thereby creating a broader knowledge base through the sharing of information and ideas.

By the endline survey, there was a small increase (7 of 16) in the number of respondents who included examples of environmental knowledge sharing and dialogue. A direct example offered was: “I’m quite comfortable talking about climate-related issues, whether it’s discussing recent news on environmental policies with friends, or sharing tips on sustainable living on social media.” This response reflects the overall increase in the comfort level of the class. The suggestion of utilizing social media to share environmental knowledge suggests a significant

level of comfort, showing a willingness to go beyond the TC's immediate community to share their knowledge.

While many responses focused on the TCs' sharing of environmental knowledge, others discussed the importance of generational knowledge and the role of elders. As is the case with the following response, this concept is often associated with Indigenous cultures; however, it can be equally important in any culture: "My grandmother is Indigenous and she has been very influential in teaching my sister and I that we have to look after the environment in order for the environment to look after us, and we can do this in many ways." Both this comment and the two Indigenous-authored picture books utilized in the study (among many others) suggest that much can be learned from Indigenous intergenerational knowledge and ways of knowing, particularly as they pertain to environmental justice and climate literacy.

Theme 2: Environmental Responsibility and Stewardship

TCs offered examples of environmental responsibility and stewardship as concepts they felt comfortable sharing. However, this theme was not as prevalent as theme 1, showing up in only 2 of 13 responses in the baseline survey as pertaining to professional life, and 5 of 16 responses in the endline survey as pertaining to professional life. At baseline, this was primarily represented as TCs, indicating a comfort with having "discussions about littering and pollution".

However, by the endline, more actionable responses were provided, in which TCs suggested that "we can make sure that we take part in environmental stewardship", with one respondent going so far as to say, "I keep myself and others accountable when I see ignorant actions, such as littering." These responses provide qualitative evidence of increased confidence in TC's environmental awareness.

Theme 3: Human-Nature Relationships (Food, Trees, Land)

As was evidenced in the discussions and meaning-making connected to the read-alouds and discussed in the section related to key question 1, the relationship between humans and our natural environment was a key theme reported by TCs, particularly by the endline survey. Similar to the theme of environmental responsibility and stewardship, the increased reporting at the endline suggests growth in TC confidence regarding their climate literacy.

In the baseline survey, 4 of 13 respondents offered human impact on the environment and the consequences of this impact as something they felt comfortable discussing in their professional lives, providing examples such as "I have taught lessons on the consequences of land use to a class during one of my placements".

By contrast, the endline survey produced responses of a more optimistic, and again, actionable nature, such as "the importance of planting trees" (mentioned by 5 of 16 respondents at endline, relating to personal life), growing one's own food, and teaching methods of diverting waste, as evidenced in the following response: "I would love to teach things like proper recycling and compost, as well as gardening, and how planting fruits and vegetables is better for our climate." Growing one's own food and planting were the most commonly provided responses to the professional life question at endline, with 7 of 15 respondents directly or indirectly mentioning it.

Theme 4: Systems Thinking and Broader Climate Awareness

Significantly, respondents provided examples showing an understanding of systems thinking and a broader climate awareness, particularly in the baseline survey. Here, TCs directly connected human actions, industries, and materials to the climate and climate change. As an example, a TC stated that in their personal life, they “know the basics such as that planes and cars, and the use of plastics, contribute to climate-related issues.” Plastics specifically came up in multiple responses.

By the endline survey, TCs provided more specific examples of human actions impacting climate, providing responses that mention “how climate change has affected our seasons” or that “Rising sea levels because of ice caps melting is due to pollution.” Impacts on other communities were also mentioned, as in the example “how climate change is related to the [I]ndigenous community.” One third (5 of 15) of respondents directly or indirectly mentioned the concept of climate change in their response to the question of comfort with discussing climate in their professional lives.

From these responses, we see that there has been a shift from a focus on topics relating to negative climate impacts and specific, nameable issues at the baseline, to a broader understanding of climate and a greater focus on constructive ways forward. It is noteworthy that themes discussed during the read-aloud sessions also make an appearance in the endline survey data, most significantly that of human connection to the land through food.

Conclusion and Discussion

Through the discussions held following each read-aloud, TCs were able to co-construct meanings, making strong connections between the texts and their own lived experiences. As a result, the data collected throughout this study point to a clear increase in TC’s comfort with climate-related topics, both in their personal and professional lives, as seen through the quantitative indicators of the baseline and endline surveys, and through the greater breadth and depth of topics, ideas, and concepts TCs indicated that they feel comfortable discussing. This quantitative increase highlights the effectiveness of the practices described. A continuum of understanding has emerged within the data, beginning with a focus on specific, nameable climate-related issues at baseline, followed by an ability of TCs to connect climate issues to their own lived experiences, and concluding with a refocus on ways in which we as individuals, and specifically as future teachers, can effect change in our communities and the world at large. With these findings in mind and given the ever-increasing urgency of the climate crisis (Gills & Morgan, 2019), teacher education programs may be encouraged to include similar methods within their programs.

While this study provides evidence of the benefits of using read-alouds to foster discussions (Hoppe, 2022), co-created meaning-making, and climate literacy engagement, there remain additional directions for study that are necessary to realize the full benefit of these practices. This study’s focus on the comfort levels of TCs when discussing climate-related topics in their personal and professional lives implies an assumption that greater teacher comfort will result in greater student comfort. However, further research is needed to understand how teacher comfort influences student comfort and understanding - that is, when these TCs become practicing teachers, what will be the effect of using such practices in their classrooms?

Additionally, many key themes emerged from this study that have only been touched upon. How might these key themes be used to inform pedagogies and curricula for future TCs as well as classroom students? For example, human connection to the environment through food was a common theme. In what specific ways can we utilize this knowledge as an entry point to teaching climate literacy and increasing comfort with discussing climate change and its effects? Responses to the baseline and endline questions predominantly described individual understandings and behaviours. However, as Oziewicz (2023a) emphasizes, the current climate crisis “demands embracing our responsibility, both individual and collective”, requiring us to “mobilize action.”

Finally, given the significant number of TCs indicating a lack of comfort with climate literacy, even at the completion of this study, there are many ways teacher education programs can design and implement climate literacy strategies that reach a greater number of TCs. It is anticipated that these practices may enhance K–12 students’ comfort levels in discussing climate literacy (Kang, Lee, & Kim, 2025; Jerrim, 2025; Duncan, 2022; Guo, Zhang, & Li, 2025; Ruzek, Jones, & Cook, 2016).

While existing initiatives in teacher education programs focus on curriculum resources and institutional elements, this study contributes specifically at a classroom-level, looking at a pedagogical model (e.g., read-aloud) that can be easily adopted. Therefore, it is a starting point, highlighting both the need for TC training in climate literacy and the effectiveness of co-creating meaning through the efferent and aesthetic reading-aloud of children’s picture books as a means of fostering greater comfort with climate literacy.

References

- Abd-El-Aal, W. M. M., & Evans, N. (Snowy). (2025). Omani pre-service teachers, climate change anxiety, and self-efficacy to teach climate change education. *Journal of Science Teacher Education*, 36(5), 687–711. <https://doi.org/10.1080/1046560X.2024.2442839>
- Accelerating Climate Change Education in Teacher Education Project. (2023). *Accelerating Climate Change Education in Teacher Education Project*. <https://accelerating-cce.ca/>
- Beach, R. (2023). Addressing the challenges of preparing teachers to teach about the climate crisis. *Teacher Educator*, 58(4), 507–522. <https://doi.org/10.1080/08878730.2023.2175401>
- Bensel, L. (2023). Interdisciplinary read-alouds: Building background knowledge to support learning across science and social studies. *Michigan Reading Journal*, 55(3), 7, 20–26.
- Birks, M., Chapman, Y., & Francis, K. (2008). Memoing in qualitative research: Probing data and processes. *Journal of Research in Nursing*, 13(1), 68–75. <https://doi.org/10.1177/1744987107081254>
- Boon, H. J. (2016). Pre-service teachers and climate change: A stalemate? *Australian Journal of Teacher Education*, 41(4), 39–63. <https://doi.org/10.14221/ajte.2016v41n4.3>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage.
- Duncan, A. (2022, April). *Teacher comfort and preparedness for teaching diverse students: Setting the foundation for equitable classroom practices* [Conference presentation]. American Educational Research Association Annual Meeting, San Diego, CA, United States. <https://eric.ed.gov/?id=ED618549>
- education: National initiatives and professional learning.*
- Field, C. R., Schwartzberg, E., Berger, M., & Gawron, L. M. (2022). Climate change education in the Canadian classroom. *Canadian Journal of Environmental Education*, 25(1), 57–75.
- Field, E., & Inwood, H. (2024). *Accelerating climate change education in Canadian teacher*. <https://www.lakeheadu.ca/about/news-and-events/news/archive/2025/node/256248>
- Fletcher, L., & Holyoke, E. (2025). Storytelling and climate education: Empowering preservice teachers as readers and leaders through literacy education. *Literacy*, 59(3), 347–359. <https://doi.org/10.1111/lit.70003>
- Ghosn, I. K. (2002). Four good reasons to use literature in the primary school ELT. *ELT Journal*, 56(2), 172–179. <https://doi.org/10.1093/elt/56.2.172>
- Gibson, M. (2021). *Climate literacy in education: Concepts and practice*. Routledge.
- Gills, B., & Morgan, J. (2019). Global climate emergency: After COP24, climate science, urgency, and the threat to humanity. *Globalizations*, 17(6), 885–902. <https://doi.org/10.1080/14747731.2019.1669915>
- Global Education Monitoring Report Team, Monitoring and Evaluating Climate Communication

- and Education Project, & University of Saskatchewan (2024). *Education and climate change: learning to act for people and planet*. UNESCO.
<https://doi.org/10.54676/GVXA4765>
- Goade, M. (2022). *Berry song* (M. Goade, Illus.). Little, Brown Books for Young Readers.
- Guo, L., Zhang, X., & Li, Y. (2025). Teacher emotional support and student engagement: The mediating role of academic self-efficacy and resilience. *Scientific Reports*, 15(1), 12345.
<https://www.nature.com/articles/s41598-025-88187-x>
- Hoppe, K. (2022). Teacher read-alouds: More than just story time. *Kansas English*, 103(1), 7–14.
<https://doi.org/10.62704/1g54e810>
- Jeffers, O. (2017). *Here we are: Notes for living on planet Earth*. Penguin.
- Jerrim, J. (2024). Learning about climate change in school: The role of teachers, curriculum, and assessment. *School Leadership & Management*.
<https://doi.org/10.1080/13632434.2024.2338821>
- Kang, J., & Tolppanen, S. (2024). Exploring the role of science education as a catalyst for students' willingness to take climate action. *International Journal of Science Education*, 47(2), 1–19. <https://doi.org/10.1080/09500693.2024.2393461>
- Laurier Teaching Excellence and Innovation. (2024). *Teaching excellence and innovation initiatives*. Wilfrid Laurier University.
<https://www.wlu.ca/news/spotlights/2023/sept/nominations-open-for-2024-teaching-excellence-awards.html>
- Learning for a Sustainable Future. (n.d.). *Canada, climate change and education: Opportunities for public and formal education*. Learning for a Sustainable Future. Retrieved May 13, 2026, from <https://lsf-lst.ca>
- Lindstrom, C. (2020). *We are water protectors*. Roaring Brook Press.
- Littledyke, M. (2008). Science education for environmental awareness: Approaches to integrating cognitive and affective domains. *Environmental Education Research*, 14(1), 1–17. <https://doi.org/10.1080/13504620701843301>
- Martineau, A. (2022, September 15). *Picture books can help us talk to children about climate change*. Hitchcock Center for the Environment. <https://www.hitchcockcenter.org/earth-matters/picture-books-can-help-us-talk-to-children-about-climate-change/>
- Martinez, M. G., & Roser, N. L. (1985). Role of the adult in children's storybook reading. In J. A. Niles & R. V. Lalik (Eds.), *Issues in literacy: A research perspective* (pp. 489–494). Thirty-Fourth Yearbook of the National Reading Conference.
- Merriam, S. B. (1998). *Qualitative research and case study applications in education*. Jossey-Bass.
- Messner, K. (2015). *Up in the garden and down in the dirt* (C.S. Neal, Illus.). Chronicle Books.
- Mitchell, K. (2023). Wicked from the start: Educational impediments to teaching about climate change. *Education Sciences*, 13(12), 1174. <https://doi.org/10.3390/educsci13121174>

- Nurkaeti, N., Aryanto, S., & Gumala, Y. (2019). Read-aloud: A literacy activity in elementary school. *PrimaryEdu: Journal of Primary Education*, 3(2), 55–61. <https://doi.org/10.22460/pej.v3i2.1377>
- Oziewicz, M. (2023a). The climate literacy revolution. *The Ecological Citizen*, 7(1), 16–24.
- Oziewicz, M. (2023b). What is climate literacy? *Climate Literacy in Education*, 1(1), 34–38. <https://doi.org/10.24926/cle.v1i1.5240>
- Pizmony-Levy, O., Yalov, E., Smith, J., & Zhao, L. (2025). *Bridging the knowledge–practice gap: Findings from a global survey of educators on climate change education*. Center for Sustainable Futures, Teachers College, Columbia University. <https://www.tc.columbia.edu/d/newsroom/new-findings-on-climate-education-affirm-need-for-educator-support>
- Ravitch, S. M., & Carl, N. M. (2015). *Qualitative research: Bridging the conceptual, theoretical, and methodological*. Sage.
- Rosenblatt, L. (1978). *The reader, the text, the poem*. Southern Illinois University Press.
- Rosenblatt, L. M. (1993). The transactional theory of reading and writing. In R. B. Ruddell, M. R. Ruddell, & H. Singer (Eds.), *Theoretical models and processes of reading* (4th ed., pp. 1057–1092). International Reading Association.
- Särkkä, J., Aksela, M., & Haatainen, O. (2021). Pre-service teachers' knowledge and perceptions of the impact of mitigative climate change actions and their willingness to act. *International Journal of Science and Mathematics Education*, 19(6), 1187–1205. <https://doi.org/10.1007/s11165-020-09921-1>
- Sierschynski, J., Louie, B., & Pughe, B. (2014). Complexity in picture books. *The Reading Teacher*, 68(4), 287–295. <https://doi.org/10.1002/trtr.1293>
- Sipe, L. R. (2008). *Storytime: Young children's literary understanding in the classroom*. Teachers College Press.
- Stake, R. E. (2005). Qualitative case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (3rd ed., pp. 443–466). Sage.
- U.S. Global Change Research Program. (2024). *Climate literacy: Essential principles for understanding and addressing climate change*. <https://councilonstrategicrisks.org/wp-content/uploads/2025/02/USGCRP-Climate-Literacy-Guide-2024.pdf>
- UNESCO. (2024). *Education and climate change: Learning to act for people and planet*. UNESCO. <https://doi.org/10.54676/GVXA4765>
- United Nations. (2015, December 12). *Paris agreement*. United Nations Framework Convention on Climate Change. <https://www.un.org/en/climatechange/paris-agreement>
- University of British Columbia Faculty of Education Roundtable on Climate, Sustainability, and Education. (2023). *Roundtable on climate, sustainability, and education*. University of British Columbia Faculty of Education. <https://educ.ubc.ca/climate-roundtable-april25/>

- Vlach, S. K. (2022). Elementary literacy teachers change the underlying story through transformative read-aloud curricula. *Journal of Children's Literature*, 48(1), 33–44.
- Will, M., & Prothero, A. (2023, January 31). Students want climate change education. Most teachers don't get enough training. *Education Week*. <https://www.edweek.org/teaching-learning/students-want-climate-change-education-most-teachers-dont-get-enough-training/2023/01>
- Williams, S. J., Portus, R., Roberston, S., & Alston, A. (2025). Reading slowly together: climate literature book clubs and their potential for engaging young people with climate crisis. *Environmental Education Research*, 31(11), 2177–2195. <https://doi.org/10.1080/13504622.2024.2397593>
- Woodard, R., & Schutz, K. (2023). Climate justice now: Picture books that support learning about relationality as part of climate education. *Illinois Reading Council Journal*, 51(2), 45–51. <https://doi.org/10.33600/ircJ.51.2.2023.44>