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# Facing Eco-Anxiety in Education: Empowering Educators with Collective Action, Emotionality, and Transformative Pedagogical Practices

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# Facing Eco-Anxiety in Education:

# Empowering Educators with Collective Action, Emotionality, and Transformative Pedagogical Practices

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# Dedication

This thesis is dedicated to my students—past, present, and future. You are worth all the work and more.

## Acknowledgements

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## Abstract

With the ever-present pressure of the climate crisis intensifying, the mental health impacts of climate change are becoming much more prevalent and severe. Eco-anxiety, the anxiety and fear people feel about climate change, is a rising issue in educational spaces, adding another concern to the overflowing responsibilities of educators. In this thesis I examine how educators can utilize collective action, emotionality, ecopedagogy, place-based education, and Indigenous Knowledge to face eco-anxiety in their classrooms and help students feel more hopeful and empowered. I analyze how the history of public perception of climate change leads teachers to shy away from emotionality in science, and how the military-industrial-academic complex has contributed to standardization of education for profit in a neoliberal system. I contextualize eco-anxiety within the current literature surrounding it, elaborate upon critical pedagogical practices for teachers to use to combat it, and analyze the hidden role social media has in cultivating eco-anxiety. To address eco-anxiety in education, I propose a workshop series within a context of Critical Action Research designed to empower educators with transformative pedagogical practices that will help them face their own eco-anxiety, support their students, and make their classrooms hopeful, transformative spaces for combating the climate crisis.

Table of Contents

# Chapter One

## Introduction

In his book, *The Alchemist*, Paulo Coelho (1993) shows the journey of the main character, Santiago, pursuing his "Personal Legend." According to Coelho, your Personal Legend is your life's greatest purpose, your deepest desire, your destiny. For as long as I can remember, my Personal Legend has been to help others as much as I can. I care deeply about other people and always have—it is one of my most defining characteristics. It is this drive that led me to become a teacher, but also led me to become disillusioned with teaching within our education system as it stands today. I have found that to truly care for my students, to truly pursue my Personal Legend, I have to expand my reach from interacting with them as individuals, to changing the systems that we inhabit together. The beginning of this journey for me starts in middle school.

### The Beginning

When I was in 7th grade I took a class on human geography. The class covered the main issues facing humanity: famine, disease, overpopulation, water scarcity, climate change, and more, over many months of the school year. We learned about each issue in depth, but did not take the same time to examine possible solutions, positive news, or impactful people and movements making change. Because I had such a strong compulsion to help from such a young age, hearing about these issues weighed heavily on my emotions. Unfortunately, this examination of humanity's problems came at the same time my family was battling Lyme Disease. My sister, brother, and father all had the illness at the same time. My sister had the most severe case, leading her to lose her ability to read and essentially be temporarily bedridden as a 9th grader. The combination of recognizing the magnitude of human suffering

across the world coupled with the weight of my problems from home lead me to depression. I had a difficult time finding my motivation and optimism about the world again.

It was a conversation with my mother that helped me reconcile my Personal Legend to help others with the problems I saw within the world and my family. I asked her one day how I could possibly expect to help everyone, and she assured me that I could not. Our responsibility, in her eyes, is to help those in our little corner of the world. This way, everyone helps their corner, and all corners of the world are covered. But more than that, the people that I helped in my corner would help those in their corner, and on and on, until we were all working in community together, even if we didn't know it. It was this perspective that helped me to move forward, to identify my corner and how I would help. This ultimately led me to teaching.

**The Moment**

I began teaching in August of 2018 at a troubled school in North Philadelphia. I was the first middle school science teacher in this position who did not quit early or mid-year for the four years preceding my time there. The students at this school faced so much—violence, abuse, food insecurity, drugs, scattered families—and these problems hung in the air and impacted the entire community. Each day when students walked into my classroom, they walked in with the challenges they faced living in their emotions, their physical health, their minds, and their souls. I was woefully unprepared to teach in an environment like this, but I did my best and relied on my innate desire to care deeply and to help entirely. I tried each day to make my classroom a safe place for students to learn, to process their emotions, to feel seen, and to progress as people. I believed that the science I was teaching them would help

them find clarity in their world and mobility later in their lives, leading them to good high schools, colleges, jobs, and beyond.

As the year progressed, I built relationships with my students and saw them struggle to survive each day. So many of my students faced emotional and mental health issues like depression, anxiety, and intense anger outbursts. I soon realized that the subject of climate change was coming up in my pre-prescribed curriculum, and I was terrified. I did my best each day to help my students manage their emotions and feel heard and safe, and now I was about to have to tell them that their world was burning?

I am very well-versed in the science of climate change. I can explain it in detail to people with multiple levels of understanding and feel very confident in my ability to teach this subject clearly and impactfully. But, I was entirely unprepared to teach this group of students about climate change. Not for my ability as a teacher, but for my responsibility as an adult that cares for the wellbeing of the children in my class. How could I bear to present these students with the reality that the world they are inhabiting is being destroyed? My mind went back to my younger self and I recognized the similarities in my situation. The problems I faced at home as a child were already a heavy burden, but the issues I learned about at school pushed my burden over the edge. Now as an educator, in the role I chose to help young people and to better my corner of the world, I was in the position of perpetuating the same pain I experienced.

On the other hand, how could I justify not educating my students about their world? These young people are inheriting the climate crisis and will be charged with cultivating a sustainable existence for humanity. They need to be empowered with the creativity, ingenuity, knowledge, and confidence that this issue demands. And even more so,

the students in front of me were statistically much more likely to be directly impacted by the climate crisis because of their socioeconomic status and race (Washington, 2019). With all this in mind, how could I stand to sweep this information under the rug when I have a responsibility to help my students prepare for the future?

**Thematic Concern**

The dichotomy I faced in my first year teaching is the same that science educators across the world face when they go to talk about climate. Our students are struggling. Mental health issues in young people are on the rise, and eco-anxiety—the panic, anxiety, fear, and depression that comes with awareness of climate change—is becoming increasingly common. Yet at the same time, global temperatures rise too. The climate crisis is not going anywhere, and as educators, we are charged with helping to prepare our students for their lives. Their lives will undoubtedly be impacted by climate change. So how can we empower students with the skills, knowledge, and experience they need, while also being mindful and caring of their emotions and wellbeing?

This is the focus of my thesis. I want to meet teachers where they are, with their eco-anxiety, fear, stress, and frustration, and work with them to imagine a better way of teaching. I want to help them face their own eco-anxiety, and to empower them with the most current research around collective action, emotionality, ecopedagogy, mindfulness, and other pedagogical practices. I want to help teachers cultivate an atmosphere of caring, passion, and empowerment in their classrooms by helping them experience these emotions in context of the climate crisis for themselves.

Throughout this thesis I will examine how eco-anxiety shows up in our classrooms. I will explore how compassionate educators can help their students tackle climate change and

find empowerment along the way. I aim to help educators face their own eco-anxiety and find a healthier relationship with climate change so that they can help their students do the same. Emerging research shows that collective action is an incredibly powerful tool for alleviating eco-anxiety and improving mental health outcomes (Ojala, 2015; Stanley et al., 2021; Schwarz et al., 2022). Research also shows that expressing emotions and having them validated has similar effects (Pihkala, 2020b; Ojala, 2022), as well as mindfulness practices (Koger & Scott, 2016) and discussion (Ojala, 2016). I will use these resources and more to build a program that empowers teachers and gives them a roadmap for empowering their students as well.

**Who Am I?**

My approach to this topic has been sculpted largely by the narrative explained above, but also by many other parts of my life and my identity. I am a passionate science educator in my 5th year teaching middle school students after having graduated from West Chester University in 2018. It was there that I received Bachelor's degrees in Earth and Space Science Education, the degree that helped me get my teaching certificate, and in Geoscience, with a concentration in Geology. Both of these fields of study encouraged me to approach the world with the lens of a scientist. For many years my default mode of interacting with the world was one of my perceived objectivity—I did my best to support all my opinions with facts backed by the scientific method and strayed far away from opinions and products and ways of thinking I perceived as non-scientific. Being a woman in STEM can feel like a precarious position, so rigid adherence to the social norms of the science world served me and helped me affirm to myself that I belonged there.

The mindset cultivated in science spaces helps me to understand climate science and feel confident in my ability to guide students to understanding difficult, complex topics. But as incredibly helpful as science is, in my personal and professional journeys I have come to realize how much is missing from life and education if the norms of the science world are the only lens through which you allow yourself to experience. This revelation shapes much of my approach to eco-anxiety. Eco-anxiety is rooted in science, with awareness of climate change, yet it is caused by much more than that. It is caused by the existential fear of an uncertain future and the philosophical dread that comes with understanding the large-scale exploitation of humans and the environment that got us to this crisis. As a science teacher, I came to see that my science-only approach to teaching climate change was severely lacking. My awareness of this came from the story described above, but also other experiences in my life that opened my eyes to how science without emotionality or context was impacting me.

In late 2019 I was diagnosed with endometriosis, an incredibly common but poorly understood disease that predominantly affects women. Perhaps because this disease affects female reproductive organs, the research supporting doctors in this field is slim and rarely kept up with. Because of my scientific background, I was thankfully able to read and understand the latest scientific journals about care for my condition and notice that the advice I received from many of my doctors was not concurrent with current research. It was this ability to pour through scientific jargon and learn about my own health that helped me find a doctor who knew the gold standard of care and helped me find relief. The power in scientific literacy is one of the many reasons I feel called to teach science.

It was after this period of help, however, that I realized the limitations of my strict adherence to science. The discipline itself has only been around since the 17th century, and it is only in more recent years that women and people of color have been included in its reach. There are ample topics that science has not yet begun to scratch the surface of, and many subjects that perhaps science will never be able to touch. I realized these shortcomings as I struggled to find answers for the other health issues that endometriosis caused. Doctors and research did not have the answers I needed, because the answers do not yet exist in that space. It was only in turning to other sources of wisdom that come from long lasting human traditions, like mindfulness, yoga, and herbal medicine, that I finally found ways to heal.

This journey with my health helped me to recognize that science does not and cannot have all the answers, and I need to account for this in my teaching. It helped me to realize that in my teaching, I need to open space for the unknown, for emotionality and uncertainty, and shy away from the dogma of science while also empowering my students with its best qualities. These revelations led me to a desire to explore traditions of Indigenous wisdom in the United States and the Traditional Ecological Knowledge that Indigenous cultures gathered, learned, and lived for thousands of years. The influence of Robin Wall Kimmerer's book *Braiding Sweetgrass* (2013) helped me begin the process of learning about a healthy relationship between humans and the earth, a process I will continue on indefinitely and whose influence shows in my work in this thesis.

*Braiding Sweetgrass* also helped me continue to cultivate another important part of my positionality: my deep love for nature. I spent most of my childhood in a small neighborhood outside of Wilmington, Delaware and lavished in any nature around me. I cherish my memories of the apple trees in our backyard, of crawling through the chain-link

fence to explore the water tower field on the other side, of riding bikes to the back of the neighborhood to collect clay from the small patch of woods that separated our neighborhood from the church parking lot and then gliding through puddles left by a summer rain. This love for nature continues into my adulthood and holds a protective and steadying quality for me to this day—I find deep comfort in nature. It is this love and mutual feeling of being protected and needing to protect that contributes to my passion for stopping and reversing climate change.

The experiences of my life have helped me to love and value science while also placing science in the context of history. They have taught me to expand my worldview and embrace other sources of knowledge. They have taught me to love nature in its complexity, for its ability to calm and nurture me, and for its fragility. It is this tapestry of experiences and more that color my understanding of and approach to tackling eco-anxiety in education today.

**Preview of Thesis**

Throughout this thesis I will examine eco-anxiety in education and my proposed intervention to begin to address it. In this chapter I introduced my thematic concern, told the story of how I came to care about it, and shared about the pieces of my identity that inform my approach. In Chapter Two I will lay out the intellectual framework for my thematic concern by explaining my critical lexicon, a bank of terms specific to this thesis and their meaning, and explaining my philosophy of education.

In Chapter Three I will examine the history of my concern, the current literature surrounding it, and relevant frame factors that are necessary to understanding eco-anxiety in education. In the history section I focus on two themes that have led to the development of

eco-anxiety in classrooms today. The first theme is shown in the history of public perceptions of climate change. This analysis shows how delayed information on climate change, coupled with intentional disinformation from fossil fuel companies, has left teachers and classrooms in a contentious place. The second theme is shown in the history of the military-industrial complex's influence on education. This perspective in history shows how the influence of the military-industrial complex on STEM education has led to decreased acceptance of emotionality in classrooms, increased standardization of science curriculums, and science classes that serve the needs of a neoliberal society.

The next section of Chapter Three is a literature review, where I will explain the research foundations that my intervention is built on. In this section I will show that current literature surrounding eco-anxiety argues for use of collective action, emotionality, mindfulness, and other interventions to improve education and mental health outcomes.

In the final section of Chapter Three I explain relevant frame factors that are important to addressing eco-anxiety as well. The first is ecopedagogy, a pedagogy that melds critical pedagogy with education for sustainability. The second is place-based education, a tradition in education that brings learning back to place, emphasizing the importance of the local environment. The next factor is social media, a landscape students inhabit that both cultivates and assuages eco-anxiety and impacts students in ways that teachers may not be fully aware of. The last factor in this section introduces Indigenous Knowledge and provides insight as to how science teachers can benefit from a deeper understanding of Traditional Ecological Knowledge.

In Chapter Four I will explain my proposed intervention for helping educators address eco-anxiety in their environments: a workshop series. This workshop series is designed to

help educators learn about eco-anxiety and best practices for addressing it according to the background described in Chapter Three. Finally, in Chapter Five I will describe how the workshop series should be implemented and evaluated.

# Chapter Two

## Theoretical Frameworks

In this chapter I will outline the important theoretical frameworks which help to build context around my thematic concern. First, I will define the key terms that are vital to the clarity of this thesis in my critical lexicon. Then, to provide a foundation for my thematic concern, I will elaborate upon my philosophy of education as a whole. This section will help the reader understand the terminology I use as well as my philosophical starting point within education.

## Critical Lexicon

The ideas and opinions of many educators, theorists, and climate scientists have contributed to the discussion around eco-anxiety in education, and the language among them contains many important terms and concepts. I will explain these key terms in this critical lexicon, taking care to explain what each term means and provide relevant context when necessary.

| Term | Explanation |
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| Eco-anxiety or Climate Anxiety | Eco-anxiety and climate anxiety are two terms that can be used interchangeably. They refer to the anxiety, fear, and other emotions that are brought up when thinking about the impacts of climate change. The American Psychological Association (2017) defined eco-anxiety as "a chronic fear of environmental doom" (p. 29).<br><br>Much of the literature in the eco-emotion research space distinguishes between eco-anxiety, eco-anger, and eco-depression. These eco- |

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| | emotions are to be understood as the emotion, but with the root cause as climate change.<br><br>Eco-anxiety is the focus of this thesis. Its presence in educational spaces, from students to teachers and beyond, can be felt and must be addressed. |
| Collective Action | Collective action refers to activism that takes place in the context of a community or group, instead of action solely on the shoulders of an individual.<br><br>In popular culture messaging around climate change, corporations often push narratives of individual actions and consumer purchasing power. People are encouraged to recycle, turn off the water when they brush their teeth, unplug appliances, and buy green products. The climate crisis cannot and will not be solved by these actions, so pushing the narrative of individual action only serves to disenfranchise and discourage people when it comes to our climate future.<br><br>Collective action has been shown to be more successful in terms of both climate outcomes and emotional outcomes in individuals (Ojala, 2015; Stanley et al., 2021). |
| Emotionality | Emotionality is referred to in two ways throughout literature. In some psychological contexts it is used to describe only the expression of emotion, or how emotions appear to others. For other sources, and for the purposes of this paper, emotionality refers to the experience, expression, and awareness of emotion. In the words of Boylan (2009), “emotionality includes the experience of emotions themselves, the expression and willingness to express emotion, |

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| | emotional introspection and self-awareness, emotional range, and the ability and willingness to engage in reflection and discussion about emotion" (p. 428).<br><br>Research shows that awareness, acceptance, and expression of emotion is vital to improving the mental health outcomes and sustainable actions of young people (Ojala, 2015; Ojala, 2018; Ojala, 2021; Stanley et al., 2021). Open emotionality in educational spaces is vital to reducing eco-anxiety. |
| Critical Pedagogy | Critical pedagogy is an educational philosophy that originates in Paulo Freire's *Pedagogy of the Oppressed* (2018), originally published in 1970. It emphasizes the development of critical consciousness in people that will help them become active participants in their lives, shaping the world around them, instead of passive objects that accept the world that has been shaped for their domination. It also asserts that all learning and teaching is political by nature of the learning taking place within a political society. In addition, it centers the role that love plays in pedagogy and in liberating all people from systems of domination.<br><br>The development of critical consciousness, cultivated by critical pedagogy, is necessary for understanding the mechanisms of the climate crisis and where to look to fight it. We cannot fight climate change directly, so we must look to the systemic causes. |
| Critical Consciousness | Critical consciousness is a way of thinking that helps people recognize how systems of power function in the world and the forces that are used to sustain them. In the words of El-Amin et al. (2017), it is "the ability to recognize and analyze systems of inequality and the commitment to take action against these systems" (p. 18). |

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| Ecopedagogy | Ecopedagogy combines the ideals of a Freirean critical pedagogy with education for sustainability. In the words of Richard Khan (2008), it "attempts to generate conscientization upon the concept of sustainable development proper and thereby uncloak it of the sort of ambiguity that presently allows neoliberal economic planners… to autocratically modernize the world despite the well-known consequential socio-cultural and ecological costs" (p. 8).<br><br>Ecopedagogy encourages students to identify the structures that have caused climate change and address it as a holistic issue. The empowerment, critical thinking, and action encouraged by critical pedagogy are united with scientific systems thinking and climate literacy in ecopedagogy, and it is this philosophy that is needed to take on eco-anxiety in education. |
| Capitalism | Capitalism is an economic system that emphasizes the private ownership of the means of production and celebrates the accumulation of wealth.<br><br>Capitalism prioritizes the accumulation of wealth above all else and depends on wealth being created through devaluing resources for profit, whether those resources are natural or human. Human life and labor are devalued, leaving people facing poverty wages, slavery, and unsafe working conditions. Natural resources and ecosystems are also devalued, causing the climate crisis and other ecological disasters.<br><br>In large part, the climate crisis has been caused by capitalist forces and enterprises. Due to this, reckoning with the climate crisis and the emotions it brings up requires an awareness of the exploitation of humans and the environment in the name of profit and capitalism. |

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| Neoliberalism | Neoliberalism is a political belief system that prioritizes privatization of public services and goods, deregulation of industry, and reduction in government spending.<br><br>Neoliberal forces have also contributed to the climate crisis through breaking down and blocking environmental regulations. They have also drastically changed the landscape of education, as more institutions of learning are being privatized, piece by piece. As stated by Picower and Mayorga (2015) "Neoliberal school reforms share several trends: they increase privatization, slash public services, increase competition, and place both blame and success on individuals rather than systems" (p. 5). |
| Cultural Hegemony | Cultural hegemony is the power that the ruling class enforces over all other groups of people by means of setting cultural norms through ideology, practice, values, and beliefs. The concept was originally created by Antonio Gramsci but has been expanded upon and adapted by numerous critical theorists.<br><br>Hegemony functions in surreptitious ways that critical consciousness can help make clear. Hegemonic forces have contributed both to the climate crisis and the current state of education in the United States. It is important to face hegemony to truly understand both. |
| BIPOC | BIPOC is an acronym that stands for Black, Indigenous, and People of Color. It first emerged in 2016 but gained much wider use in the summer of 2020 in conjunction with the Black Lives Matter protests sparked by the murder of George Floyd. In the words of The BIPOC Project (2016), it was created "to highlight the unique relationship to whiteness that Indigenous and Black (African Americans) people |

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| | have, which shapes the experiences of and relationship to white supremacy for all people of color within a U.S. context" (p. 1).<br><br>The United States education system is rooted in racism that stems back to colonialism, slavery, and anti-Indigenous indoctrination programs like the Carlisle Indian School. A discussion on education that is conducted without centering the experiences of BIPOC is fundamentally incomplete.<br><br>As I will explain with the next entry in this critical lexicon, BIPOC are unfortunately targeted by climate change's most deadly impacts because of systemic racism. |
| Climate Justice | Climate justice is a social justice movement centered around the reality that climate change most directly and severely impacts BIPOC. Due to racist policies like redlining mortgages, sharecropping, Jim Crow, and The Indian Removal Act, among others, BIPOC more often live in areas that are touched both more dramatically and more quickly by climate change.<br><br>We cannot examine the emotional impact of the climate crisis without identifying how it impacts groups of people differently. |
| Intersectionality | Intersectionality is a critical theory that examines how peoples' multiple identities interact with each other. It was created by Kimberle Crenshaw (2017), who describes it as "a lens through which you can see where power comes and collides, where it interlocks and intersects" (p. 1).<br><br>The intersections of our identities inform our relationship with the climate crisis differently. It is important to respond with knowledge |

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| | of the intricacies brought by intersectional identities to properly meet eco-anxiety in each individual and group. |
| Indigenous Knowledge | Indigenous Knowledge refers to the robust and multifaceted knowledge gathered and cultivated by Indigenous cultures across the globe. As cited by Jessen et al. (2022), "Indigenous Knowledge (IK) is the collective term to represent the many place-based knowledges accumulated across generations within myriad specific cultural contexts" (p. 93). |
| Native Science | In the words of Gregory Cajete (Nelson & Shilling, 2021), "Native Science is a metaphor for a wide range of tribal processes of perceiving, thinking, acting, and 'coming to know' that have evolved over millennia of human experience with the natural world" (p. 16). Cajete also explains that Native Science evolved through "authentic and holistic experience of nature as a direct participatory act" (p. 16).<br><br>Humans' relationship with nature has become increasingly strained as technologies have developed that shield and isolate us from the natural world, and science has followed the same path. Study and embodiment of Native Science may help us begin to bridge the gap. |
| Traditional Ecological Knowledge | In the words of Robin Wall Kimmerer, Traditional Ecological Knowledge (TEK) is "the evolving knowledge acquired by indigenous and local peoples over hundreds or thousands of years through direct contact with the environment" (Tonino, 2016, p. 1).<br><br>Traditional Ecological Knowledge has helped Indigenous cultures live in harmony with the earth for thousands of years. If we are to imagine a sustainable future for humanity, we need to see that it is possible for humans to do so. |

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| | Traditional Ecological Knowledge also fills in gaps in Western science because of the drastically different way of gathering data. Western science isolates subjects and conducts studies to learn about the world. TEK develops in relationship with the earth over generations of observation and involvement. The conclusions from both ways of knowing are different, and both are valid and necessary. |

## Educational Philosophy

When we speak of "education," countless images may enter the mind. For many of us, the first thought is of rows of students sitting in rows of desks in a classroom headed by a teacher who does most of the speaking. We may also think of a more democratic setup, with students in a round and the teacher as one of the members. Thinking more deeply, we might picture students outside, exploring nature with the guidance of a teacher or guardian. As we continue to examine our education, the places where we truly learned and changed, we may realize that the concept of education is much more varied than we often consider.

It is for this reason that I want to situate my thesis within a strong philosophy of education that examines both what I perceive the purpose of education to be, and the purposes education serves in the United States today. These are, unfortunately, drastically different. Because the ideal purposes of education and the purposes of education in the context of our society are so different, I will elaborate upon both in tandem. For each facet of the purpose of education, I will first explain what it looks like ideally. But after explaining the ideal, I will reveal the reality—what this facet looks like in our system today. I will start with the potential education has to help learners more fully embrace and live the qualities of being human.

**Education and Inquiry as Joyful Humanity**

> Apart from inquiry, apart from the praxis, individuals cannot be truly human. Knowledge emerges only through invention and re-invention, through the restless, impatient, continuing, hopeful inquiry human beings pursue in the world, with the world, and with each other. (Freire, 2018, p. 72)

To start, let us call forth the image of a young child, anywhere from 6 months to 6 years old. Picture them in your mind's eye; what are they doing? Chances are, they are doing some form of exploration. This may look like deeply examining their hands or feet, putting things in their mouth, observing others, older or younger, any number of investigations, all to make sense of their world. This is our earliest form of education. Experiencing the world, learning from it, and finding joy in it. When a child is allowed to live freely, they choose to learn. As we observe children, we can remember that learning, and thus, education, is one of the great joys of being human.

Throughout our history, generation after generation, we learn from the earth, from each other, from nature, and from the skies. This learning fills our spirits and enriches our lives. This is the first facet of the purpose of education: to provide people with a space to pursue the human endeavor of learning. It is one of the characteristics that most distinguishes us from the other species we share this earth with; as said beautifully by Carl Sagan (1980), "We are the universe experiencing itself."

Though learning is one of the great joys of being human and is our greatest inclination starting in early childhood, education often looks deeply different. In a great number of educational contexts today, we see inquiry deemphasized. Many classrooms are filled with teachers positioned as the authority on what counts as knowledge and what is

worth knowing, with students expected to learn what they say. This is what Freire (2018) refers to as the "banking model" of education—students begin as empty vessels and are filled with knowledge from teachers. The banking model devalues student agency and inquiry, and in the process, often removes students from their desire to learn. As stated in *Teaching as If Life Matters*:

> This is the result of adhering to the mistaken belief that significant and worthwhile learning is best accomplished by transferring information from teacher to student. This belief separates, to a significant extent, children from their own capacity to be self-motivated, independent learners. (Uhl, 2011, p. 9)

This systematic removal from the desire to learn often follows students from one life phase to the next.

Increasing and pervasive standardization of education also saps many students of their joy for learning. In an effort to police schools and teachers under the guise of increasing student achievement, *A Nation at Risk* (Gardner et al., 1983) encouraged increased standardization of subjects and concepts covered in school. This report and subsequent reforms in education mandated that students learn what was prescribed for them to learn. When the knowledge students are required to learn is far separated from their lives, students often struggle to find any motivation to learn. There can also be a large gap between students' prior experiences and the standards they are covering in school, making them feel like they are deficient before a unit even begins. Because of the struggle they face to care about subjects that do not speak to them and understand subjects that are far removed from their lives, students often start to believe that they are not passionate or capable. They notice

that they are not motivated, and they notice that they are not doing well, and these false lessons they learn about themselves in a contrived context stick with them in life.

On the other hand, students who do well conforming to the expectations placed on them in school are rewarded for their behavior. Because of this they learn that the way to succeed in life is to stifle their own curiosity, desires, and needs, and instead, listen to the demands others place on them. As articulated by Uhl (2011),

> Caught in the spell of *school*, I learned that to be a successful student, the best path was to be: (1) obedient–to follow the rules; (2) quiet–to sit docilely and avoid asking probing questions; and (3) dependent–to wait to be told what to do, rather than charting my own learning path. Unknowingly, I was accumulating school *wounds*. (p. 6)

The control school exerts on people extends not only to what they learn but also to how they are allowed to act, when they can go to the bathroom, when they wake up, and even what they are supposed to do in their time at home.

This rigidly controlled curriculum of knowledge, actions, and behaviors steals our innate quality of finding joy in learning. As a prime example of this sentiment, examine Pink Floyd's statements in "The Wall"—education is referred to as "thought control" creating students that serve as merely bricks in a wall. Mistrust of teachers has led to standardization of education, mandating all students learn the same thing. This standardization does not allow for individual student exploration, and if it does, it is strained at best. Exploration of specific topics is seen as "extra" or "extension" and is often only offered to gifted students in affluent schools. Education should serve as a place to allow the inquisitive nature of humans to flourish.

**Science Education as Joyful Humanity**

As a science educator, I also see a particular purpose in a holistic, intentional science education. A more rigorous study of science can help students recognize the wonder and beauty of the world they inhabit. For example, when looking at a tree, it is possible to just see a tree. But science education can allow us to see not only that tree, but also the billions of cells that make it—billions of tiny organisms working together to serve one collective purpose. It allows us to see the DNA those cells have, the same molecule as in all our cells, linking us to every living thing on this planet through the incredible mystery and improbability of life in a cold and increasingly chaotic universe. It allows us to recognize that we see the tree because radiation bounces off of special receptors in our eyes, sending electrical signals into a lump of tissues that calls itself a brain that processes those signals into an image our consciousness can comprehend. And it allows us to recognize that we and the tree exist in a cycle of give and take, inhale and exhale, that keeps both of us alive on a rock hurtling at well over 500,000 miles per hour through a vacuum that will eventually end in a complete absence of energy, but for now, we are energy as matter as impossible life.

A true science education should help people recognize the beauty of their very existence, and with that, help them use the time they have on this planet in an intentional and fulfilling way. Despite this rosy potential, science education is regularly removed from romanticism through rigid adherence to science as dogma. It is important for science educators to remember that science is not separate from humans but emerges from a long and, at times, gruesome history. Though science helps us divine knowledge of the universe, it also comes with hidden prejudices that are difficult to identify. When educators present science as the only way of knowing something, the only important source of information,

they place science on a pedestal and discount other important ways of understanding the universe.

The history of science, as popularly reported, also centers the contributions of affluent white men through the generations. By only reporting on the contributions of these men, and by consciously ignoring the social history that made it more possible for white men to contribute to science and systematically silence the voices of women and people of color, the popular understanding of the history of science can send the message to students that the only voices worth hearing are those of wealthy white men. It can also send students the message that people with other identities are not good enough and not smart enough to have contributed anything throughout history. Separating science from the discussion of history shows students a bleak picture of humanity indeed.

Science education is also manipulated away from fascinating exploration of the world to, essentially, memorizing a set of facts. Science has been broken down into disparate branches over time. These branches—chemistry, biology, earth science, astronomy, et cetera—are interrelated and connected in inseparable ways, yet we teach them in separate classes and separate years of study. Our overreliance on separating the disciplines makes science impersonal and, often, more difficult than fascinating. In the words of Palmer (1998) "When we distance ourselves from something, it becomes an object; when it becomes an object, it no longer has life; when it is lifeless, it can no longer touch or transform us, so our knowledge of the thing remains pure" (pp. 51-52). Many science curriculums have managed to make the study of our universe, our world, and our lives feel sterile and unimpactful.

**Education for Critical Consciousness**

Education inherently holds transformative power. It has the power to liberate and oppress, to reform and conform, to expand and repress the minds of those with access. When education is pushed as apolitical and neutral, when it is not examined through a lens of criticality, it always serves to reinforce the hegemonic power of the ruling class. As Richard Shaull emphasizes in his preface to *Pedagogy of the Oppressed* (2018),

> There is no such thing as a neutral educational process. Education either functions as an instrument that is used to facilitate the integration of the younger generation into the logic of the present system and bring about conformity to it, or it becomes 'the practice of freedom,' the means by which men and women deal critically and creatively with reality and discover how to participate in the transformation of their world. (p. 34)

Education should help to encourage the development of critical consciousness in learners and help them become active participants in shaping the landscape of our society and history.

Critical consciousness, also called *conscientização*, is a term that originates with critical theorist Paulo Freire. In *Pedagogy of the Oppressed* (2018), it is defined as "learning to perceive social, political, and economic contradictions, and to take action against the oppressive elements of reality" (p. 35). Though this definition is helpful, it does not capture the whole of critical consciousness. Freire was against defining it or translating *conscientização* for that express purpose. Developing critical consciousness is an ongoing process that helps people recognize that they are subjects, not objects, of history, that they have unquestioned assumptions and wheels in their heads (Stirner, 1995), and that their liberation, and the liberation of all, relies on rising up and toppling systems of

power. Donaldo Macedo (as cited by Freire, 2018) defined this process well in stating that conscientization is "a process to acquire the necessary critical thinking tools so that students, instead of internalizing their oppression, understand how institutions of power work to deny them equality of treatment, access, and justice" (as cited by Freire, 2018, p. 17). The many outcomes and goals of critical consciousness are other important facets to the purpose of education.

As previously stated, one of the aims of conscientization is to help people recognize that they are subjects, not objects, in the world. According to Freire, people who feel like objects in the world feel that their conditions, and the conditions of those around them, are decided and unchangeable. They do not recognize that the conditions of their lives have been shaped by others in service of maintaining cultural hegemony. In contrast, critically conscious people recognize that they are subjects of history. They recognize the power they have to shape their reality and make changes to systems of power.

Education rooted in critical pedagogy should also help students identify and remove their assumptions and the "wheels in their head" (Stirner, 1884). Every individual has assumptions that they carry with them, often without identification or acknowledgement. These assumptions are built into our ways of thinking because of the culture we inhabit. They can range anywhere in severity from the idea that blue is a color for boys and pink is a color for girls, to the idea that men are superior to women. Again, these assumptions often enter our consciousness without notice and can stay in our minds without argument. Harvard's Implicit Association Tests assess assumptions about race, gender, ethnicity, body type, disability, and more. Without identification, these assumptions colonize

every facet of our consciousness and spin tendrils of influence that change the way we think and act in each moment.

For example, let's imagine a woman living in the United States. Without naming or identifying it, this woman has internalized the assumption that white, young, thin, and curvy is part of the ideal beauty standard. Because of this assumption, this woman will subconsciously and consciously compare other women, and herself, to this beauty standard. She will find herself thinking that she is not thin enough, not curvy enough, not this, not that, and reinforcing the narrative that she is wrong the way she is.

Conscientization will help this woman identify and break down this assumption, which is the first step in removing it from the way she lives in the world. It will help her to identify the unquestioned assumption, raising questions like: Why do I believe that lighter skin is more beautiful than darker skin? Why do I believe that wrinkles are ugly? Why do I think that my body should be small? With this identification, critical pedagogy allows us to shed our assumptions, but then take this examination one step further. Criticality demands that we identify and analyze how power functions to oppress. In this example, critical consciousness opens questions like: Who profits off of my perceptions of beauty? Where did this perception of beauty start, why did it start, and what were the beauty standards in other time periods? What are my perceptions of beauty doing to me and to those around me? With this examination, the woman will identify that scores of people profit from her damaged self-esteem, that entire industries have grown to cultivate it, that sexist assumptions in others fuel the fire of regulating women's bodies through the guise of beauty. This process of questioning assumptions allows us to break free of these patterns of thought that keep us subservient to hegemony.

Emily Nagoski (2021) offers a different image of these assumptions in her book *Come As You Are*. She describes the mind as a garden. As we progress through our early lives, others tend our garden for us, planting ideas that they think will be helpful for us or helpful for them. School plants many ideas in students' gardens, like the idea that being quiet and following orders makes you a good person, while being loud and following what you want makes you a bad person. Examining assumptions through critical pedagogy can be thought of as taking control of your garden, weeding out the ideas that no longer serve you and planting ones that do. And even further, it helps us to identify why the soil is lacking nutrients and why water is scarce.

Some assumptions root much deeper in our minds, intertwining themselves with our identities. Max Stirner (1884) refers to these assumptions as wheels in the head. The wheels in the head are assumptions that we have gained through outside forces (school, government, marketing, workplace, et cetera) that have taken such a firm hold that we feel they cannot be released without losing a large part of who we are. "The thought is my own only when I have no misgiving about bringing it in danger of death every moment, when I do not have to fear its loss as a loss for me, a loss of me" (Spring, 2006, p. 39). These wheels in the head are a form of dogma and are much harder to question.

We see many examples of this, but a particularly pertinent example is the wheel that states that 'capitalism is born of human nature.' Many people internalize this belief because of the society they live in, that shows one flawed example of humanity's existence, while systematically exterminating and colonizing those who live differently. Critical pedagogy allows us to examine the wheels in our heads as well, asking questions like: How did humanity come to develop capitalism? Who benefits from neoliberal capitalism? What

structures in our society have been lost to capitalism, and how can we reclaim them to serve humanity again? This questioning cultivated in critical pedagogy allows us to cultivate our freedom as individuals, imagine other, better ways of being, and work together to make them reality. This is the kind of change that education should bring about.

As I will elaborate upon more later in this thesis, critical consciousness is a vital component to galvanizing people to stand up to systems of power and change their world for the better. "The conviction of the oppressed that they must fight for their liberation is not a gift bestowed by the revolutionary leadership, but the result of their own conscientização" (Freire, 2018, p. 67). Education is one of the most powerful mediums we have for social change.

Despite the massive potential education has for developing critical consciousness, this is often not the outcome. Schools function as a structure that reinforces cultural hegemony. In public schools across the United States, students stand up every morning of the week, face the American flag, put their right hands over their hearts, and recite the Pledge of Allegiance. Children are taught to do this starting in elementary school. In the Pledge they chant that they are subordinate and loyal (assumed within the word allegiance) to the flag and the Republic, that the Nation is united "under God," and that liberty and justice are given to all in this country. These claims are powerful and provocative, but how often are they identified? For many it takes years of recitation to recognize what they are saying. We are seeing a surge of young people refusing to stand and recite the Pledge, and at the same time, a surge of schools cracking down on the perceived insubordination and disrespect (Holpuch, 2023). This is one of many examples of how school pushes back against the development of critical consciousness in its students and teachers.

**Education for Democracy**

> As a teacher I want to be an agent of transformation, with my classroom as a center of equality and democracy–an ongoing, if small, critique of the repressive social relations of the larger society. That does not mean holding a plebiscite on every homework assignment, or pretending I do not have any expertise, but I hope my classroom can become part of a protracted argument for the viability of a critical and participatory democracy. (Bigelow, 1990, p. 437)

Critical pedagogy is a medium for liberating ourselves and others from the oppressive state of being objects to acting as subjects by helping us question our assumptions and connect them with the systems of power that cultivate them. A core tenet of critical pedagogy is giving power back to students and empowering them to make decisions about their education. After all, "No pedagogy which is truly liberating can remain distant from the oppressed by treating them as unfortunates and by presenting for their emulation models from among the oppressors. The oppressed must be their own example in the struggle for their redemption" (Freire, 2018, p. 52). It is impossible to encourage students to be subjects in the world while simultaneously treating them like objects. This power shift also prepares students to take an active part in a thriving democracy.

Critical pedagogy is necessary for the functioning of a true democracy. Democracy— government by the people and for the people—relies on the ability of critically conscious people to make informed decisions for the good of the nation. Democratic citizens need to be able to understand the intricacies involved in seemingly simple policies and to identify hidden motives of competing groups. All of these examinations are cultivated in the questioning borne of critical pedagogy.

Without the development of critical consciousness, democracy is doomed to drop into fascism. In February of 2023, The College Board announced that it had made changes to the framework of the new AP Black History course they were creating. The framework had originally covered concepts like intersectionality, Critical Race Theory, and Black Queer Theory, and included readings from bell hooks, Angela Davis, and Kimberle Crenshaw, but those have been removed to placate far-right leaders, namely Ron DeSantis (NPR, 2023). The forcible suppression of dialogue around the mechanisms of power and oppression of Black people in the U.S. is a blatant play for consolidating more power and keeping people in the dark about the struggles that have shaped our society.

**Education for Success, Security, and Mobility**

In a more practical sense, education must also help prepare students to thrive in their world by helping them refine their critical thinking skills, as elaborated upon above, but also their ability to read, write, communicate, work with others, perform equations, and more. Students will need many skills as they navigate their lives and school should help them prepare. In giving them these skills, education should also open doors for people. It should allow them to pursue what makes them happy and helps them live a life that is comfortable for them. It should help people determine the life they want to lead, regardless of the situation they may have grown up in and achieve it.

Education is often spoken about as the "great equalizer," the ultimate tool for social and economic mobility, but when we examine the reality of our world, this is not the case. If anything, education is the great repeater. It plays a massive part in enforcing social hierarchies and economic divides between race, class, gender, and ability, among other marginalized identities. This is clearly evidenced by the racial makeup of many of the

schools in the United States; Black children are more than twice as likely than White children to attend high-poverty schools and are five times as likely as White children to attend schools that are highly segregated by race and ethnicity (Garcia, 2020). Disturbingly enough, the role of education in repeating social structures can be communicated using wisdom from Plato's *Republic*, as summarized by Joel Spring (2006): "Education is used as a method for determining a person's place in society and teaching people to accept those places" (p. 3).

**Education for Self-Knowledge and Community**

Young people in the United States are in school from age 6 through age 18, and often with more years tacked on at either end for preschool and higher education. These years are vital to a young person's personal development and relationship with self and others. In this perspective, the school has the responsibility to help young people cultivate their identity and enter into a deeper relationship with self. In a similar vein, the school has a responsibility to cultivate a space for young people to thrive in, and to expand that space to the community.

We are social creatures by nature, so early experiences of community are a foundation with which we will build the rest of our social lives. Young people need the space to figure out how to interact with others, who they are in relationships, and what being a part of a community means to them. This community will also serve to expand students' worlds from the one of their families.

In many schools, students learn about themselves by navigating the difficult landscape of standardized education and fabricated social hierarchies. This sends students faulty messages about who they are and how they show up in the world. Schools are also rarely utilized as community spaces, except for those family members who have time to give to the school community.

## Conclusion

Education has the potential to cultivate critical consciousness, encourage a love for learning, support democracy, bolster social mobility, foster the development of self-knowledge, and create community cohesion. In looking at our public education system today, and in talking to others about their experiences with education, it is clear to see that these lofty goals are not consistently achieved. Throughout the rest of this thesis I will use the theoretical frameworks explained in this chapter to situate my thematic concern within the larger context of education in the United States. I will also use them to show how rising to meet the challenge of eco-anxiety in education with emotionality, collective action, and ecopedagogy can contribute to reconciling these missed opportunities for progress.

# Chapter Three

## History, Literature Review, and Relevant Frame Factors

Each issue present in education today emerges from a long history and an intricate societal context. In order to understand and address eco-anxiety in education, it is important to understand the reasons for its existence and the current research surrounding its causes and solutions. In this chapter I will explore the intellectual background of my thematic concern to place it within a larger context. First, I will explain the relevant historical context around eco-anxiety in education. I will delineate how public perceptions of climate change have shifted over time and explore how the landscape and policy around STEM education has evolved in the United States in relationship to the military-industrial complex. Both subjects will illuminate why science classrooms today shy away from emotionality and why they may breed eco-anxiety. After exploring the history of my concern, I will review current literature surrounding and shaping this issue. The findings in this literature inform the intervention I will propose in Chapter 4.

Finally, I will end this chapter by exploring other relevant frame factors in eco-anxiety education. I will start by explaining exploring how ecopedagogy and place-based education could play vital roles in reducing eco-anxiety. I will then explain the impact that social media has on students' eco-emotions and how educators can be more conscious of this impact. Finally, I will examine the incredible value of Indigenous knowledge in helping educators and students face eco-anxiety and the climate crisis.

## Historical Context

In this section I want to focus on what I see as the two main facets of history that inform how eco-anxiety has become such a pillar of society today. The first lies with the

climate crisis as a whole: how it developed, why it progressed so rapidly, and how people's awareness of the climate crisis has informed public discourse and feelings. In this analysis we will see how scientific discoveries trailed technological advancements, leading to rapidly increasing greenhouse gas emissions with little awareness of their impact. We will see how increasing experiences of climate change started to cultivate a sense of fear and existential dread within society. We will also see how prominent fossil fuel companies funneled money into rhetoric around climate change, politicizing it and burying accurate climate science, to buy themselves time to continue exploiting the earth for profit. Much of the research in this section comes from Alice Bell's book titled *Our Biggest Experiment* (2021). In this book, Bell analyzed the events that shaped the climate crisis throughout history.

The second facet of this historical analysis lies in the way STEM (Science, Technology, Engineering, Math) education has been utilized for advancing an imperialist, neoliberal agenda. Increasing standardization and privatization of education, starting with *A Nation at Risk* (Gardner, 1983), has left teachers with little room to spend meaningful time on climate change. This lack of time contributes to eco-anxiety as students may feel that their emotions around the climate crisis are not being heard (Ojala, 2015). Neoliberal and imperialist forces, exerting power through the military-industrial complex, have seen STEM education as a funnel to increasing our competitiveness internationally and providing for the economic wellbeing of hegemonic systems. There is much more to the history of eco-anxiety that could be addressed, but for this thesis, I want to focus on how science classrooms, and the eco-anxiety within them, came to look the way they look today.

**History of Climate Awareness**

The story of the climate crisis begins with the Industrial Revolution. In the late 1700s into the early 1800s, technological advancements powered by the burning of fossil fuels changed the landscape of society across the world. When fossil fuels burn, they release greenhouse gases into the atmosphere, trapping more heat and changing the climate. Despite the changes happening in the atmosphere at this time, people were not aware of the scale of their impact. Yes, coal dust was choking cities and becoming an increasingly visible and impactful part of industrialized life, but the thought that burning fossil fuels could impact climate was largely unexamined. As greenhouse gases continued to accumulate and fossil fuels continued to be burned, scientists worked to understand what was happening because of our actions. It is this backlog of understanding behind action that caused people to refer to this practice of burning without knowledge as a large-scale "experiment" on the earth itself (Bell, 2021).

The first documented revelation about the impact of greenhouse gases came from Eunice Newton Foote, a scientist, inventor, and women's rights activist. She published a paper in 1856 that demonstrated the ways different atmospheric conditions held heat (Bell, 2021). She ran a series of experiments that involved glass cylinders with thermometers placed by a window. In this experiment she observed that humid air held heat much more than the regular atmospheric composition, but more so, she demonstrated that carbon dioxide held vastly more heat and held it for longer than any other composition she tested. Her experiment was presented in a scientific conference but largely overlooked due to her gender. Her research was referenced in a Scientific American write up of the conference

under the heading of ‘Scientific Ladies.’ People did not think much, or perhaps at all, about Foote’s research.

In 1859, scientist John Tyndall ran experiments that demonstrated how infrared radiation traveled through different gases. He was able to observe that infrared radiation traveled quickly through oxygen and nitrogen gas, the two most abundant gases in our atmosphere, but noticed that the radiation seemed to get stuck in the gas that was produced from burning coal (Bell, 2021). It is this discovery that has solidified Tyndall as one of the founding fathers of climate science, but the awareness of the importance of Tyndall’s research is a recent development. His discovery was not thought much of at the time.

Bell (2021) explains how through the years, many different scientists discovered more of the fundamental mechanisms of climate change without recognizing what they had found. In 1895, scientist Svante Arrhenius calculated that doubling the amount of carbon dioxide in the atmosphere would be enough to raise the temperature of the Earth by 5 or 6 degrees Celsius. Arrhenius did not connect the amount of carbon dioxide with anthropogenic forces. It wasn’t until 1899 that Nils Ekholm observed that the current rate of coal burning would double the amount of carbon dioxide in the atmosphere in a few hundred years. Despite the emerging research, many scientists pushed back against this arguing that the global climate system was much more complex than small scale experiments and calculations could express. This discussion between scientists was largely insular and did not reach public consciousness.

Our understanding of climate science continued to evolve as technologies were advancing. But our understanding of the science was always a few too many steps behind our rapidly increasing greenhouse gas emissions. Moving into the early 1900s, people

started to express memories of colder winters contrasting with the warmer winters they saw at the time (Bell, 2021). These anecdotal memories, paired with a flurry of severe weather induced natural disasters, started to raise public awareness of a changing climate. Scattered articles and books from this time started to link new weather patterns with the scientific discoveries of the 1800s, particularly the research Arrhenius published about the impacts of increased carbon dioxide on temperature. Despite this connection being made, the articles were largely optimistic. They often linked the idea of a changing climate with the idea of a more temperate, enjoyable climate in the future that would ultimately benefit crops.

The shifting tides between optimism and blind faith in technological progress versus skepticism and worry for environmental impacts continued to ebb and flow through the decades. Advancements in science in the early 1900s led to discoveries about shrinking glaciers and changing weather patterns, but these discoveries were largely overshadowed (Bell, 2021). The International Year of Geophysics (IGY) brought climate science leagues ahead as well. The IGY was a period of international scientific collaboration that ran from the end of 1957 into 1958 designed to gather and analyze simultaneous data about the Earth and its functioning. The beginning of this event was televised in many countries and its progression received media attention and praise by politicians. Its visibility brought climate study closer into the spotlight of science and the public eye.

Many attribute the origins of the environmental movement in the public eye to Rachel Carson's *Silent Spring*, first published in 1962. In this book, Carson details the environmental impact of DDT, an insecticide widely used at the time. Carson painted a picture of ecosystems and communities damaged by DDT and sparked a deeper understanding of the increasingly precarious nature of humanity's relationship with the

natural world (Paull, 2013). Her book led to the banning of DDT in the United States, and its impacts are still felt today in the progression of the environmental movement.

The emergence of *Silent Spring* brought on a wave of public participation in rallying against DDT, as newspapers, legislators, and the White House received thousands of letters from concerned citizens. This force of the people against insecticide use threatened the economic interests of large petrochemical companies as well as the U.S. Department of Agriculture and the research institutes that supported them. As thoroughly documented, Smith (2001, p. 734) points out that together these organizations "mounted a frantic public relations campaign to denounce Carson and her collaborators, bringing to bear all the nefarious machinery of the public relations industry." This pressure and manipulation from large companies targeted largely at the American public was designed to discredit Carson's research and advocate for continued use of insecticides and against what they labeled as fearmongering. This theme of companies with financial interest in the exploitation of the environment trying to discredit science and sow dissent within the public is seen throughout the troubled history of our country's relationship with climate change.

In the decades preceding today we have seen the forces of science, capitalism, politics, and public opinion push and pull against each other. The scientific arena continued to develop after the IGY, which, in tandem with increasingly visible effects of climate change, led to the development of the Intergovernmental Panel on Climate Change (IPCC) in 1988. Yearly IPCC reports led to the Kyoto Protocol of 1997 and the Paris Agreement of 2016, both of which were international efforts to protect the Earth. Despite this apparent progress, large oil companies were leading a campaign of their own to discredit the scientific advances made. ExxonMobil, one of the largest oil companies on the planet, exerted its

power to shape a narrative around fossil fuels that (1) downplayed the known effects of fossil fuels and climate change, (2) shifted the blame to individual consumers, and (3) sowed doubt and suppressed research of the true effects of fossil fuels (Supran & Oreskes, 2019). ExxonMobil did this despite knowing the severity of the impacts of climate change, according to their own internal research. Geoffrey Supran and Naomi Oreskes (2019) are two of the foremost researchers that uncovered ExxonMobil's public disinformation campaigns, and other investigations have found similar efforts from other organizations (Pierre & Neuman, 2021).

Further sewing doubts were climate skeptics and the impact they had on journalism from the 1980s forward. Many climate skeptics who found great public attention have been linked to the fossil fuel industry (Boykoff & Rajan, 2007), but their impact has been lasting nonetheless. Their presence is said to have pushed journalists to try to present both sides of climate research, even if the side rallying against the existence of climate change is only held by a small minority, likely influenced by those profiting off of the worsening of climate change. In the words of Boykoff and Rajan (2007), "for the reader or viewer, this creates the impression that the skeptics have a valid point, and that the topic at hand remains disputed and therefore unproven. Indeed, inserting scientific uncertainty into the discourse raises the perception of debate" (p. 210).

Many link the emergence of a partisan debate around climate change in the 1980s to the Reagan administration (Dunlap & McCright, 2008). Reagan thought of environmental protection as a burden on the economy, which further linked climate in with the conservative, capitalist drive to preserve profit. The divide between the opinions of legislators continued to worsen over time. Dunlap & McCright (2008) emphasize that the difference between

party “pro-environmental voting in Congress since 1970 has grown over time, especially after the Republican takeover of the U.S. House of Representatives in 1994.” A more recent Gallup study has shown that as of 2018, 89% of Democrats believe global warming is caused by human activities, compared to only 35% of Republicans (Brenan & Saad, 2021).

Climate skepticism, confusion, and partisan positioning of the climate crisis placed teachers in the crosshairs as they decided what to teach and how. But despite widespread disinformation campaigns, public concern and debate was roused by burgeoning climate science. People were also moved to believe in the climate crisis because of climate events and environmental catastrophes caused by the fossil fuel industry, like the Deepwater Horizon oil spill of 2010 (Safford et al., 2012). Pieces of media like *An Inconvenient Truth* (Gore, 2006) raised public awareness of climate change and rates of eco-anxiety, yet the discourse within society around climate change largely placed the responsibility for change upon the shoulders of individuals. This rhetoric in individual responsibility is evidenced with books like *How to live a low-carbon life: The individual's guide to tackling climate change* (Goodall, 2010). This book covers everything from home improvements in heating in cooling to transportation and clothing fabric choices. This three-hundred-page book is packed with enough advice and rules to cripple the decision-making abilities of any well-intentioned individual. Individual-focused rhetoric like this sets impossible standards of living for people and ignores individually inescapable contributors to climate change. This focus on individual responsibility, coupled with fossil fuel companies evading culpability, caused increased eco-anxiety as well.

The global climate movement has been building momentum for decades but has entered a new era in recent years. In August of 2018, Greta Thunberg skipped school to

protest for climate action. Her message spread and built a movement of young people demanding climate action under the name Fridays for Future (Friberg, 2022). In a similar vein, the Sunrise Movement emerged in the United States in 2017. This youth-led organization is fighting for passage of the Green New Deal, a congressional plan to shift the U.S. to 100% renewable energy, provide living-wage jobs, and implement even more sustainability initiatives ("About the Sunrise Movement," 2020). Another organization called the Extinction Rebellion, based in the United Kingdom, was started in 2018. This organization utilizes non-violent civil disobedience to call for government action on climate change, biodiversity loss, and other ecological issues ("About Us – Extinction Rebellion," 2022). Each of these movements relies more on collective action than many past movements, reflecting Thunberg's ideas that "it is the people protesting at the gates of institutional politics who make politicians act" (de Moor et al., 2020).

Today, we see the shifting narrative of climate change reflected in generational views on climate change. In response to the statement "Climate should be the top priority to ensure a sustainable planet for future generations," 67% of Gen Z and 71% of Millennials agree. Only 57% of Baby Boomers and older generations agreed (Pew Research, 2021). The politicization, history, and monetization of the climate crisis leaves teachers with a contentious foundation on which to educate. Each person in a school building, whether student, teacher, administrator, or parent, will have their own relationship with the climate crisis and their own opinions and awareness. It is this history that may leave teachers fearful of teaching about climate change meaningfully, or at all. In combination with the forces that have shaped STEM education to serve the needs of the military-industrial complex and the

capitalist economy, teachers find themselves in a hostile environment for cultivating meaningful climate education in their classrooms.

**History of STEM Education**

In his farewell address to the nation in 1961, President Dwight Eisenhower warned of two main threats to the country. Despite commanding Allied forces in World War II, leading NATO forces in 1951, and navigating the Cold War as president, Eisenhower chose to warn of the massive and dangerous power of the military-industrial complex. "In the councils of government, we must guard against the acquisition of unwarranted influence, whether sought or unsought, by the military-industrial complex. The potential for the disastrous rise of misplaced power exists and will persist" (Eisenhower, 1961). This relationship between the military, industry, and government extends its reach far into the education system, most evidently in higher education, but with tendrils of influence in K-12 education as well.

During World War II, many universities saw their funding multiply immensely, ending the wartime period with significantly higher research budgets than they started with. In some cases, university research budgets multiplied fifteen times over. According to Stapleton (1993), "Both industry and government contributed to the rise [in budgets], but government contracts for the development of wartime technologies accounted for the lion's share." Though many of these universities expected their budgets to shrink after the war, as they had in the past, research funding for military advancements continued to find its way to universities. This consistent funding can be attributed in part to the significance of the atomic bomb. Its use to end the war changed the value of science and technology in warfare.

The influence of the military-industrial complex in education was further intensified during the Cold War with the launch of Sputnik in 1957. In response to this show of

scientific and technological progress, lawmakers in the United States pushed more funding to STEM education, resulting in the National Defense Education Act (NDEA) of 1958. NDEA provided, among other supports, additional funding for science, engineering, and math programs in schools, as well as funding for higher education loans and scholarships for those in STEM (Flattau et al., 2006). With this increased funding came increased influence, exerted to shape the direction that science as a whole and science classrooms went in. In the words of Owens (1993), "federal support for new fields, training programs, authoritative textbooks, and vastly expensive new instruments and laboratories—all helped determine which kinds of knowledge were worth pursuing at the cost of others" (p. 336). The worthy kinds of knowledge worth pursuing were those that could benefit the hegemonic system in its current state—one fueled by fossil fuels.

This tradition of funding STEM for the purposes of bolstering the military has continued and evolved, especially due to its link with the economy. There is a prevailing belief "that the economic well-being of a nation is related to its educational success, especially in technical fields" (DeBoer, 2011). This sentiment extends its reach from industry to education to government, as evidenced clearly in a speech given by President Obama (2010) during his presidency:

> We're here for a simple reason: Everybody in this room understands that our nation's success depends on strengthening America's role as the world's engine of discovery and innovation. And all the CEOs who are here today understand that their company's future depends on their ability to harness the creativity and dynamism and insight of a new generation. And that leadership tomorrow depends on how we educate our students today—especially in science, technology, engineering and math.

> We know how important this is for our health. It's important for our security. It's important for our environment. And we know how important it is for our economy.

It is no surprise, then, that as a battleground for the nation's economic and military safety, STEM education has been increasingly policed and standardized. The time spent in STEM classes is claimed in the name of the military-industrial complex and the economy, leaving little time for the needs of the students or the climate.

The lack of climate-centered education in the U.S. due to the influence of the military-industrial complex can be seen in the standards adopted by each state. According to the New York Times, "Florida does not include the topic and Texas dedicates three bullet points to climate change in its 27 pages of standards. More than 40 states have adopted standards that include just one explicit reference to climate change" (Choi-Schagrin, 2022). When so much time in science classrooms is spent on other topics, climate change does not get the space to be taught in intentional, impactful ways that are mindful of students' emotions. In classrooms dominated by the interests of an increasingly militarized nation over the needs of students and climate, time for emotionality around climate change is hard to come by.

Science standards across the country spend very little time on climate change. These standards and the history delineated above have led to little freedom for teachers to teach how their students and communities need them to teach, and has led teachers to feel less confident in their ability to do so. Perhaps this is why 25% of science teachers do not teach climate change (Plutzer et al., 2016a). Of the teachers that do, many only spend one to two hours of the year doing so (Plutzer et al., 2016b), despite 75% of teachers agreeing that "climate change will have an enormous impact on students' futures, and it is irresponsible

not to address the problem and solutions in school" (North American Association for Environmental Education, 2022).

The standardization of STEM education has also been enforced by the history of legislation around education in the United States, starting with *A Nation at Risk* (Gardner et al., 1983). This report used faulty data still debated to this day (Stedman, 1994) to assert that the public education system was failing, test scores were dropping, and teachers were to blame. It started a consistent worry and fear about the state of education in the United States compared to other nations that lead to more standardized testing, standardization of education, and less teacher autonomy (Kamenetz, 2018). As teachers lost more and more control over what they taught, their ability to take enough time to cover difficult, complex, and emotional subjects was slashed. The changes to education that followed *A Nation at Risk* were accelerated by *No Child Left Behind Act* (NCLB) of 2001. NCLB increased punitive measures on schools designed to link their funding to standardized test scores. If schools fared worse on standardized tests year after year, they would be penalized and could eventually be shut down. This tradition of penalizing schools based on their standardized test scores continues in educational policy to this day.

In his farewell address, Eisenhower (1961) also warned of the increasing exploitation of the earth. "As we peer into society's future, we–you and I, and our government–must avoid the impulse to live only for today, plundering, for our own ease and convenience, the precious resources of tomorrow." Today we find ourselves facing the same battles–fighting the influence of the military-industrial complex and fighting for the wellbeing of the environment. It is my hope that the resources within this thesis will help us do so.

## Literature Review

Though the study of eco-anxiety is relatively new, many scholars have contributed to the knowledge around eco-anxiety and its relationship to emotionality and activism in the classroom. In this section of my thesis I will explain the major research findings around these and other relevant themes. Throughout my research I used a few guiding questions to direct my inquiry:

1. What is eco-anxiety and what does it look like?
2. What effect does emotionality have on eco-anxiety and sustainable action?
3. What effect does collective action have on eco-anxiety?

I want to begin my literature review by examining the first definition of eco-anxiety from the American Psychological Association (2017), found in their report titled *Mental Health and Our Changing Climate*. This paper is a large report designed to add mental health concerns into the conversation about the impacts of climate change, instead of just physical health concerns. It examined the overarching mental health concerns of the people most directly affected by climate change, like climate refugees, those who live through natural disasters, those affected by pollution and food shortage, and many other groups. It also addressed mental health concerns of wider groups of people that are not as directly impacted by climate change. In this paper, eco-anxiety was defined as a "chronic fear of environmental doom" (p. 29) brought on by feelings of helplessness in the face of climate tragedy. Feelings of loss and frustration are also encompassed within eco-anxiety.

The APA's report suggested a few psychological techniques to help people deal with eco-anxiety. Among these techniques is building resilience individually through developing coping skills, strong self-regulation, and building community networks that provide

support. It also encouraged the use of mindfulness as a medium for building that resilience. This report was the first formal recognition that eco-anxiety received from the American Psychological Association, but the literature has evolved significantly since then.

With increased awareness of climate anxiety came a larger focus on quantifying the amount of people struggling with it. According to Blue Shield of California (2021), 83% of Gen Z in the U.S. report feeling concerned about the health of the planet, and 75% of Gen Z report experiencing a mental health issue related to negative climate news. Negative emotions around climate change are also linked to dissatisfaction with the actions (or inactions) of governments across the globe (Hickman et al., 2021).

Panu Pihkala (2020b), an environmental education researcher, analyzed the current literature specifically related to eco-anxiety. Pihkala found that, as mentioned in the American Psychological Association report, eco-anxiety finds its roots in the unpredictability of the effects of climate change. The uncertainty people feel as they learn and think about climate change causes these severe feelings of anxiety. Pihkala also highlighted that climate change itself is an existential threat. People generally experience few existential threats throughout their lives, but climate change is constant, unyielding, and again, uncertain, so the existential anxiety does not have to diminish, as it does in the face of many other threats. Because of this, and other factors, there is not yet an accepted standard for what is considered a normal, healthy amount of eco-anxiety compared to a pathological level. This makes it hard for healthcare professionals to decide when and how to treat people with eco-anxiety.

This difficulty mental health professionals have addressing eco-anxiety is elaborated upon by Whitcomb (2021), who explains that traditional methods therapists use to help their

clients fall short in the context of a chronic, existential threat. I highlight these shortcomings in the upcoming section on ecopedagogy.

Maria Ojala, a researcher at Uppsala University in Sweden, has done significant research on student emotions related to climate change. Her research spans nearly 20 years and covers many angles related to eco-anxiety. Because of the wealth of knowledge she and her colleagues have cultivated, I will elaborate on a few of her studies throughout this review. In one study, Ojala (2015) examined the relationship between the type of hope students exhibit, their perceptions of their teachers' acceptance of their emotions, and their likelihood of taking sustainable action.

Ojala identified two types of hope in this study—constructive hope and hope based on denial. Students with constructive hope are hopeful about humanity's future on Earth because they believe work can be done to stop and reverse climate change. They acknowledge the reality of climate change's effects and believe there are things they can do to contribute to a solution. On the other hand, students who show hope based on denial are only hopeful for humanity's future on Earth because they deny the realities of climate change. They do not acknowledge the true severity of the climate crisis, so they only experience hope for the future because of their denial.

Ojala found that there is a significant relationship between both types of hope, eco-friendly behavior, and perceptions of teachers. The more constructive hope students showed, the more likely they were to act sustainably, and were more likely to believe that their teachers heard and understood their negative emotions about climate change. On the other hand, students that showed more hope based on denial had the exact opposite results. These students were less likely to act in eco-friendly ways and more likely to feel like their teachers

had ignored or dismissed their negative feelings about climate-related societal issues. Ojala's study shows that students' feelings and perceptions can and will impact their actions.

This relationship between eco-emotions and action is mirrored again by Stanley et al. (2021). Instead of focusing on different types of hope, Stanley et al. (2021) focused on eco-anxiety, eco-depression, and eco-anger. Through analyzing survey data, these researchers identified the relationship between these eco-emotions, mental health outcomes, and sustainable action. Participants who felt more eco-anxiety and eco-depression had poorer mental health outcomes and were less likely to take action in sustainable ways. However, participants who exhibited more eco-anger had better mental health outcomes and were much more likely to take action. The researchers identified that eco-anxiety and eco-depression can be debilitating emotions to experience, whereas eco-anger is much more adaptive and provokes both individual and community action.

This point is echoed by Koger and Scott (2016). In their work they emphasized the importance of integrating the psychology of sustainability into secondary studies of psychology and environmental science programs. The authors argued that the psychology of sustainability is necessary in these programs for many reasons, including that psychologists will have to help increasingly more clients navigate feelings of eco-anxiety, and reiterating that eco-emotions impact sustainable action. Koger and Scott (2016) highlighted the importance of action in healthily processing eco-anxiety, adding that "making change at any level is empowering and enhances feelings of self-efficacy, which creates a positive feedback loop (the more empowered one feels, the more action one is willing to take)" (p. 219). In addition, mindfulness was addressed in this article as a way to possibly increase resilience and self-efficacy in the face of climate change and eco-anxiety.

In another piece, Ojala (2018) compiled much of the personal research she has done on young people, coping strategies, and community action, stating that "collective engagement on environmental issues is related to hope and wellbeing, perhaps because feelings of efficacy increase when a community is involved" (p. 13). In this article she expanded upon the importance of collective community action. Individual action is empowering, but community action is more impactful.

The link between collective action and positive mental health outcomes is echoed in many other studies. Schwartz et al. (2022), for example, demonstrated that engaging in collective action can help break the association between climate anxiety and diagnosed Major Depressive Disorder. They note that individual action does not have the same ameliorating effects, emphasizing the importance of acting in community. This link is shown in other fields of activism as well. For example, Fine and Torre (2019) highlighted how taking action helps young people within the queer community and BIPOC who have faced discrimination. In their analysis of their critical participatory action research project, they stated that:

> For a significant segment of respondents, the more discrimination they experienced, the more activism they engaged in. And the more activism they engaged in, the better their mental health outcomes and the more diminished their rates of suicidality. (p. 440)

This finding may suggest that the more impacted young people feel by the climate crisis, the more likely they will be to engage in activism. However, more research is needed in this area before that assertion can be made.

Pihkala (2020a) also provided a literature review that examined the role of eco-anxiety in the classroom, and using the content delineated in the review, argued for concrete action in schools. Pihkala emphasized the need for teachers to have support for their own feelings of eco-anxiety, both among their peers and within their entire organization. If teachers are to accept and acknowledge students' emotions in the classroom, they need organizational spaces where they can feel the same acknowledgement. These spaces for teachers will help them develop their resilience and self-efficacy, important skills mentioned in both Koger and Scott's work (2016) and the report from the American Psychological Association (2017). This article also mentioned that allowing teachers and students space to build emotional awareness through mindfulness is helpful in processing eco-anxiety.

Ojala addressed this need for teachers to cultivate their own emotional resilience and efficacy through the concept of critical emotional awareness (Ojala, 2022). Ojala argued for teachers to be empowered with research-based strategies founded in psychological and social sciences to help validate students' emotions, challenge unhealthy perceptions of emotions, and help students cope. This emotional literacy should be critical in nature as well, linked in with understanding of how emotions are developed often as healthy responses to the societal struggles involved in climate change.

Ojala (2016) further supported the importance of emotional processing and the societal context of climate change in another of her published works. In this paper, Ojala argued for critical emotional awareness, but specifically in the context of transformative educational spaces. Ojala leans, in part, on Amsler's work (2011) that analyzes the downfalls of a coddling, therapeutic pedagogy versus the power that comes with a critical affective pedagogy. She emphasized the need to face and critically discuss the negative

emotions that arise in discussions of climate change. She also argued that in order to feel hopeful about the future, students need to see that change is possible. They need to be exposed to changemakers in their communities who are doing transformative work, and even participate in that work themselves. She argued for many different ways of encouraging hope in students, like discussing possible and realistic futures and opening space for critical discussions of all emotions within their societal context.

Finally, Caroline Hickman (2020) addressed more student needs in relation to eco-anxiety. Hickman reviewed much of the other literature in the field and used it to add upon her own studies with children reflecting on their experience of eco-anxiety. Hickman's work reiterated that students need to feel that their emotions about climate change are recognized and accepted by their teachers and other important adults in their lives. As reiterated in Pihkala's (2020b) work above, Hickman (2020) states "Perhaps to support children and young people's mental health in the face of these crises means first addressing and facing our own feelings, then ask what we can do to support them" (p. 422). Again, the importance of teacher and leader emotional support is emphasized.

The current literature surrounding eco-anxiety in the classroom illuminates many important points of my thematic concern. It shows that eco-anxiety is becoming increasingly common and is a threat to students' mental health that needs to be addressed. Students' feelings related to climate change, especially their feelings in the classroom (in other words, emotionality), will impact the way students interact with their world. Feelings of empowerment and constructive hope are linked to sustainable action, while feelings of eco-anxiety and eco-anger are linked to unsustainable action. Teachers need to be equipped to handle their own emotions related to eco-anxiety so that they can help students build

resilience to do the same. The research also emphasizes that taking action is a very effective way to process eco-anxiety. There is some evidence that individual action can be helpful, but a larger body of research suggests that individual action places too much burden on the individual which is detrimental for young people's mental health. Collective action is an even more powerful way of allowing students to channel emotions into productive action.

## Relevant Frame Factors

In this section I will address other relevant frame factors for my thematic concern. I will begin by explaining the roles that ecopedagogy and place-based education can have in empowering teachers and students to face climate change. I will then examine how social media has impacted eco-anxiety in young people and the need for teachers to be aware of this force in their students. I will end this section by addressing the need for Indigenous Knowledge in science education, placing emphasis on the particular value it has to help people conceptualize of different ways of being and acting sustainably in relationship with the earth.

### Ecopedagogy

Eco-anxiety is the emotional manifestation of the existential dread that comes with living on a planet cascading into climate catastrophe. It encompasses the anxiety about an uncertain future, the dread, the guilt, the shame, the panic, the depression, and the anger. Rates of eco-anxiety are skyrocketing as we become more aware of the climate crisis, especially among young people. Oftentimes, young people have not yet developed a reliable skillset of emotional regulation and self-care skills, so eco-anxiety can grab a much more powerful hold of young people's psyches (Wu et al., 2020).

As teachers look to face eco-anxiety in their classrooms, they may find themselves looking to the mental health profession for guidance and best practices. Eco-anxiety as a mental health concern stands at odds with traditional forms of treatment for mental health professionals. Generally, mental health conditions are treated on the individual level, often with drugs that target an individual's chemistry (Whitcomb, 2021). Some people will be led to address conditions of their environment that they can readily control, like diet and exercise. Others still may be directed to changing the larger circumstances contributing to their distress by changing jobs, relationships, or any other larger, harder to reach elements of their lives. Largely, our mental health practices address the individual and their immediate surroundings, but do not touch the systems in which the individual is situated.

But how does this individual emphasis on mental health translate to climate change, a systemic, global threat to life and humanity? So far, not well. Therapists are largely at a loss for how to address eco-anxiety (Whitcomb, 2021). Within this lens of focus on the individual, therapists find themselves falling back on techniques that may serve them well in other contexts, but fall short here. For example, imagine a person experiencing eco-anxiety confides their distress about sea level rise to their therapist. One practitioner may try to walk this person through the stages of grief, all the while implicitly asking the person to accept the death of the planet. Another practitioner might try to uncover the deeper meaning beneath their client's distress—perhaps a traumatic event in childhood is being voiced through fears of rising seas. What these, and other, approaches fail to address is that eco-anxiety is an individual experience cultivated by a systemic cause. Just like PTSD is caused by trauma, eco-anxiety is caused by the climate crisis (Sanders, 2020). Some researchers have also

referred to this phenomenon as pre-TSD, emphasizing the distress caused by apprehension of the impending trauma of climate change.

Though an argument can be made that many mental health conditions should be approached from a less individual, more systemic perspective, I argue that pathologizing eco-anxiety in an individual is particularly toxic. People experiencing eco-anxiety may be led to feel that they are overreacting or catastrophizing, pushing them into deeper distress or even denial of the climate crisis. These feelings may not only worsen the mental health of the individual, but also cause the individual to act in ways that are less sustainable, compounding the problem (Stanley et al., 2021).

The mental health profession is still grappling with how to approach eco-anxiety because of its focus on the individual. There is much that can be done to support the individual in a struggle with eco-anxiety, but in this section, I will examine the role that ecopedagogy has in situating the experience of the individual within the systemic once again, lessening eco-anxiety organically and providing open avenues for reducing eco-anxiety through collective action. As educators look to expand their toolkit in facing eco-anxiety, ecopedagogy plays a pivotal role.

Ecopedagogy combines the ideals of a Freirean critical pedagogy with education for sustainability. In the words of Richard Khan (2008), it “attempts to generate conscientization upon the concept of sustainable development proper and thereby uncloak it of the sort of ambiguity that presently allows neoliberal economic planners… to autocratically modernize the world despite the well-known consequential socio-cultural and ecological costs" (p. 8). Ecopedagogy encourages students to identify the structures that have caused climate

change and address it as a holistic issue. This pedagogy stands at odds with the way many teachers feel pressured, or even obligated, to teach climate change.

As addressed in the previous section on the history of public perception of climate change, the climate crisis has been deeply politicized for decades. Teachers are aware of the party divide on this issue and can be apprehensive to appear biased or emotional when teaching about climate change. To avoid criticism, teachers may attempt to teach about climate change similarly to how they address other, more benign subjects in their classes. However, learning about climate change, though necessary when developmentally appropriate, is deeply upsetting. Addressing life-threatening information without extra care in a school setting will develop eco-anxiety in many students. As Pihkala (2020b) points out, if students "are expected to just continue the school day as usual, trouble is bound to arise both in relation to educational goals and to well-being" (p. 25). The climate crisis demands a radically different way of teaching, not only to responsibly prepare our students for the future, but to care for their mental health as well.

This demand for use of ecopedagogy to alleviate eco-anxiety is further evidenced by the naturally transformative nature of climate change education. In the words of Graham et al. (2020),

> We are, after all, born into a world of unsustainability. It is what we come to know from birth. It is tacitly embedded in such mundane objects as the plastic toys we play with or the car seats that parents routinely strap their babies in from the moment that they leave the hospital. (p. 200)

Unsustainability is built into our society. Our cultures and actors have taxed the Earth's resources so much so that the Earth is beginning to reject us, like a body heating up to defeat

a virus. We believe that we have superiority and control over the planet in an anthropocentric culture, and that view has built our economy, our houses, our schools, our celebrations, and our way of life as at odds with the planet. A radical realization of this reality threatens our understanding of our way of life. Learning this "can be experienced as a disorienting dilemma triggering ontological adjustment and/or an induced form of eco-anxiety, where understandings of who we are and what our world is become open to transformation" (Graham et al., 2020, p. 192). We cannot divorce the transformative nature of climate knowledge from the process of learning it, so we need ecopedagogy to meet this challenge.

Though learning about climate change naturally produces eco-anxiety, utilizing ecopedagogy can help naturally alleviate this anxiety through multiple channels. First, ecopedagogy can help students identify the true causes of the climate crisis, despite cultural messaging to the contrary. Often, solutions to the climate crisis are individually targeted through a neoliberal lens. For example, questions of an individual's carbon footprint, "green" product consumption, and recycling habits are often discussed as solutions to global climate change. This individual culpability can cause people to feel shame about their role in causing the crisis, despite the fact that corporations and ideals of infinite economic growth are more to blame. Shame can lead to people feeling climate grief and climate depression, eco-emotions that are linked to poorer mental health and lower engagement in collective action (Stanley et al., 2021). Ecopedagogy can help to deprogram this guilt messaging and lead people to a different eco-emotion—eco-anger.

Eco-anger is often cultivated when people recognize the corruption, greed, environmental racism, and exploitation that is at the foundation of the climate crisis. Eco-

anger often provokes action and motivates people to do something about climate change. Collective action has been shown to greatly improve people's mental health outcomes by making them feel like there is hope for the future (Ojala, 2018). Action also makes people aware of their role in a community and the support they have from others in the fight for climate justice. By learning about climate change with ecopedagogy, students can be led to collective action through eco-anger, naturally avoiding destructive levels of unchecked eco-anxiety.

Ecopedagogy also places students' conscientization as the focus, leading to much more discussion than a traditional classroom might encourage. Opening space for emotionality in the classroom and allowing students to talk with their peers about issues that are important to them can help assuage and channel eco-anxiety naturally. As stated by Pihkala (2020a), "those that experience eco-anxiety often point out that they would wish for more understanding from the social groups and societies around them: they feel that their anxiety is made worse by socially constructed silence and social conflicts" (p. 5). Ecopedagogy utilizes student conversation and understanding as a medium for learning, again sidestepping another area where eco-anxiety could easily develop.

Ecopedagogy has massive potential to naturally reduce harmful amounts of eco-anxiety in students. Through critical analysis of the causes of climate change and an emphasis on discussion and collaboration, students can redefine their relationship to the climate crisis and shift eco-anxiety into action. Ecopedagogy may serve as the fabric that other resources for fighting eco-anxiety, like collective activism, mindfulness, emotionality, and resilience, can be woven within.

**Place-Based Education**

In classrooms across the United States, climate change is taught sporadically, and mostly from a standardized perspective. Many teachers cover climate change in only one to two hours per year (Plutzer et al., 2016b). In dedicating this little time to teaching climate change, teachers leave little space for students to process the magnitude of the climate crisis' impact on their lives, or even to understand the mechanisms of climate change. Despite the short coverage in classrooms, young people are aware of climate change (Pew Research, 2021) and often feel impactful eco-anxiety. This eco-anxiety can be channeled into productive action and pro-environmental behaviors, but it can also lead to detachment, pessimism, and anti-environmental behaviors (Ojala, 2015). Educators who address climate change need a better toolbox for meeting student needs in both (1) understanding the causes and mechanisms of the climate crisis and (2) facing and channeling eco-anxiety in healthy ways. Place-based education has massive potential to fight eco-anxiety by shrinking the issue and connecting students to their community.

Climate change is a global issue. Its causes are global—industry, agriculture, neoliberalism—as are its effects—sea level rise, increase in severe weather events and natural disasters, loss of biodiversity, the list goes on. Earth is a system, so one change to one part of the system spirals and impacts the rest. Understanding the ways our Earth is interconnected is key to understanding climate change—this understanding is part of good science literacy and should be cultivated in climate change education. However, seeing the systemic effects of global causes to climate change is overwhelming. It can make starting with any solution feel foolish, because hundreds of other problems continue to race seemingly out of our reach.

Despite this reality, climate change is also local. Even just in Chester County, Pennsylvania, a place largely protected from some of the worst impacts of climate change, we see more regular flooding, warmer winters, tornadoes becoming more common, and smoke from wildfires out West changing our skies. The local impacts of climate change vary from place to place, of course, but they are becoming more visible everywhere. Young people are seeing these changes and feeling the effects. According to a study from the Pew Research Center (2021), 63% of Gen Z state that climate change is affecting their local community. This is similar to Millennials at 64% who share their concerns, and much higher than the 56% of Gen X and 51% of Baby Boomers who feel the same way.

Despite the relevance of local climate issues, most classrooms that cover climate change address it at a universal, standardized level. For example, a middle school level standard addressing climate change from the Next Generation Science Standards is below:

> MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. [Clarification Statement: Examples of factors include human activities (such as fossil fuel combustion, cement production, and agricultural activity) and natural processes (such as changes in incoming solar radiation or volcanic activity). Examples of evidence can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gasses such as carbon dioxide and methane, and the rates of human activities. Emphasis is on the major role that human activities play in causing the rise in global temperatures.] (NGSS Lead States, 2013).

The standard focuses on the large-scale causes of climate change with an emphasis on human activity. It is of course important to note that understanding the mechanisms of climate

change is key to combating them. However, this leaves students in a difficult, eco-anxiety inducing place.

On one hand, students are learning about the global causes and effects of climate change. It is important to know, but can leave students feeling discouraged. On the other hand, students are witnessing and experiencing climate change affecting their community. Students learn globally but feel and experience locally. Their main mechanism for understanding climate change is global and detached, but the effects are showing up in their lives and the lives of those around them. This sends the message that untouchable, global problems are coming, and there is nothing they can do about it.

This is where place-based education can rise to meet students' needs. Place-based education bridges the gap between learning globally and feeling locally by bringing the learning back to place. In place-based education students are encouraged to learn about their place as a class community, using it as a medium for understanding the world. Not only can place-based education marry students' learning with their experiences, it can also make it far easier to take meaningful action.

Students learn about climate change from a global perspective, but global issues are hard to fix. Often when students learn about climate change on a global scale, and want to take action to help, the first option that arises is to go to a protest. Protests are impactful and needed in a comprehensive approach to climate activism, but are not the ideal experience for every class. First, they can be expensive to attend. They generally require travel which is difficult to organize and costly to obtain for a large group of students. Protests also place the true power outside of students' locus of control. Yes, by going to a protest students engage in the climate movement, have their voices heard, and build momentum for climate

causes. But the results of the protest still depend on others, namely lawmakers and business owners, hearing their concerns and taking action. Protesting is an excellent way to get involved, but it is not the right move for every school, and it should not be a stopping point.

If we switch the focus on global learning to a place-based approach to climate action, protesting is no longer the main option. Local communities are being impacted by climate change in many ways where students can make a difference. These impacts are visible to students because they live in them each day, and with deeper learning about their place, more impacts become visible. Instead of feeling like there is only one way to get involved as a group, students get to see the many different areas of their place that need help and can take action in ways that are meaningful for them and their community. Local climate issues need engaged people to become experts, which leaves a lot of space for young people to find agency and make change. Local issues are often more immediately actionable because of their scale—local issues can have local solutions.

Place-based education in climate also lends itself to making strong community relationships. There are countless organizations doing good work in sustainability, climate, community, and place, and connecting students with these organizations will help them accomplish more and build a stronger network of support. Often students are separated from their larger community outside of the school. This may make them feel isolated as they approach climate change, especially with the knowledge that it is older generations that have created the climate crisis to begin with. Linking students with community organizations can combat that isolation. Working with the community to make change on a local climate issue is impactful for all involved.

Adding to the benefits of climate focused place-based education, taking action for climate as a part of a community is shown to bolster mental health (Ojala, 2018). Place-based education places students firmly in the community of their class, the community of their school, and the community they live among. Each of these is a network of support for students, connecting them with others who face the issues alongside them. Students who take action on climate as a part of collective action are far more likely to report feeling positive climate emotions than students who feel like the burden is entirely on their shoulders.

The collective action cultivated in place-based education is incredibly different from the messaging students receive from much of society and marketing. A large majority of the mainstream story around combating climate change centers on individual voice via purchasing power. In other words, people are encouraged to act with their money, not their voice or their actions. Reusable totes, silicone sandwich bags, stainless steel straws, and countless other "green" products are advertised to individuals as the best action they can take to combat the climate crisis. As explained by Van den Berg (2016):

> Such campaigns seem to urge individuals to become sustainable and responsible actors in contributing to the well being of our 'Mother Earth', but only in a manner that seems to be tightly interwoven with neoliberal capitalist agendas. (p. 1)

Living in a more environmentally friendly way can be a helpful method for individuals to act more in line with their values, but it is far from the only thing, or even the most impactful thing, that people can do. It is also incredibly important to note that "green" products are often much more expensive than their traditional counterparts, which leaves those with less financial flexibility out of mainstream climate action. The inability to participate in "green"

purchasing can make people feel like they will inevitably contribute to the problem and feel they are at fault. Though guilt may be motivating for some, emerging research in climate emotions shows that guilt does not encourage people to engage in pro-environmental behaviors (Bissing-Olsen et al., 2016). Place-based education can help educators fight back against disenfranchising neoliberal narratives around climate change and empower their students to make real, lasting changes in their communities.

Joining the wisdom of ecopedagogy with critical pedagogy of place can encourage students to examine the history of the environment in which they live, how that environment has been impacted by policy, and how different groups have utilized and/or colonized that environment throughout time. Students could also be encouraged to examine environmental problems of their specific place, problems that fit within and contribute to the global climate crisis. In examining their place, identifying ways to address the problems it faces, and taking action, students can redefine their relationship to the climate crisis.

Often, issues related to climate change and sustainability are addressed on a global, generalized scale because of the standardization of curriculum. This presents students with massive, worldwide problems. An individual cannot address all the problems of an entire planet, so climate change can feel too overwhelming and nebulous to approach. It makes the climate crisis feel uncontrollable. Pihkala (2020a) points out that "uncontrollability generates helplessness and feelings of powerlessness; in other words, a diminished sense of efficacy and a diminished control belief (or changes in a felt 'locus of control')" (p. 11). This reinforces feelings of eco-anxiety, climate depression and climate grief, discouraging collective action. An emphasis on place, however, lessens the scale of the climate crisis that students feel expected to tackle. It can help to bring climate change back

into a student's perceived locus of control by showing them the areas where it shows up in their communities. By connecting climate back to place and community, eco-anxiety can be reduced.

**Social Media**

As I have continued to learn about eco-anxiety, I have increasingly realized the importance of understanding the messaging students receive about climate change from sources outside the classroom. The messages students get about climate from their families, their friends, the shows and videos they watch, and many other sources all contribute to their understanding of climate change, and heavily contribute to the emotional relationship students develop to this issue. Of all of these sources of information, social media is likely the least studied, yet plays a massive role in their understanding of what their emotional relationship to climate change should be. In this section I will examine the current research on the impact of social media on students' relationship to climate change.

I want to begin by addressing some of the significant positive impacts of social media. In many ways, social media has the power to give a voice to the voiceless, and young people have often found themselves as largely voiceless throughout history. In some ways, social media is a space to rectify this. Many young people today are acutely aware of the fact that they are not yet old enough to vote, but the lawmakers in power have made and are making climate decisions that will impact them more than any other generation. Young people are facing the climate crisis in their lifetimes because of the actions of people they did not choose to lead them. In many ways, social media has given young people the voice that our electoral system did not. Social media has become a place for young people to express

their eco-anxiety, to educate and learn from their peers, and to coordinate for collective action.

Twitter has been used very effectively as a tool for spreading climate information and initiating action. As explained by Boulianne et al. (2020), Twitter served an important role in magnifying the message of youth activist Greta Thunberg. The tweets connected to this movement spread information about how and why students across the world should care about the changing climate, while simultaneously providing a space for local action to connect to a global movement. Students across the world went on strike from school using the hashtag Fridays for Future. Twitter helped connect the students who chose to strike at individual schools together with each other to create a global movement. Without social media, this kind of connected, collective action would be close to a logistical impossibility, but with social media, it is an open invitation. In the words of Boulianne et al. (2020), "Social media can fill a gap in institutional processes which are not currently designed to engage citizens in global policy decisions" (p. 209).

Social media has also given a clear, accessible voice to NGOs working to stop and reverse climate change (Vu et al., 2021). Without social media, it can be difficult for NGOs to get their messaging out to the public consistently. But with social media, NGOs can cultivate a base of followers interested in what they have to say and can pay to have their messages shown to a broader audience that may be interested. They can also analyze data they receive from these social media platforms to determine what type of content helps to empower people, and what type of content provokes action in responsible ways.

Responsible messaging and responsible use of data is important to emphasize, as this process is not happening in many areas of social media. This is one of the largest negatives I

uncovered in the research on eco-anxiety and social media platforms. Take, for example, TikTok. It is important to remember that TikTok was not created as a tool to responsibly inform youth about climate change. It was created to hold attention. So when information about climate change is shared on this platform, it is not vetted for misinformation or for responsible messaging. Many of the videos easily accessible on TikTok contain incorrect, incomplete, or misleading information about climate change, leaving many users with misconceptions about the reality of the issue. These videos are also short, and with a short amount of time, the messages creators can express are often incomplete. This can leave viewers with one small piece of a large, complex puzzle.

Misleading TikTok videos can spread misinformation, but they can also play a more sinister role in cultivating the climate messages young people receive. To explain this, I will utilize two different studies that identify the role of hope in encouraging eco-friendly action. Maria Ojala (2015) examined the relationship between the type of hope students exhibit, their perceptions of their teachers' acceptance of their emotions, and their likelihood of taking sustainable action. As elaborated upon in the previous literature review, Ojala found that there is a significant relationship between the type of hope students exhibit, eco-friendly behavior, and perceptions of teachers. This study shows that students' feelings and perceptions can and will impact their actions.

Comparably, Marlon et al. (2019) found similar results in their study. These researchers identified the relationship between hope, doubt, and people's likelihood to engage in climate action. Through survey results they distinguished 4 categories of hope and doubt. Constructive hope is hope people feel about climate change because they see that collective awareness of climate issues is rising. False hope is hope people feel because they

believe that nature or God will solve the climate crisis. Constructive doubt is a concern that humanity will not be able to work together effectively enough to address climate issues in time, and fatalistic doubt is a belief that humanity cannot address climate change because it is controlled by God or nature, with no ability for humans to influence it.

These researchers found that a combination of constructive hope and constructive doubt was associated with increased political engagement and increased support for sustainable policy choices, whereas false hope and fatalistic doubt were associated with the opposite. These two studies show that peoples' emotional relationship to climate change will impact their actions.

I emphasize these two studies because it is important to connect them with the way climate messages reach the most people on social media. Heavily emotional messages are interacted with more, which tells the programming of many of these social media platforms to show the messages to more people. So the messages about climate change that may reach millions of people are not the ones that will responsibly inform people about the changing climate, they may be messages that will provoke eco-anxiety and cause action paralysis. TikTok and other social media platforms could be reducing climate action while simultaneously increasing eco-anxiety in their users.

The heavily emotional messaging students may receive online is something teachers need to be aware of when they begin to teach about climate change. Students need space to discuss these feelings openly, and when students see that their teacher accepts their feelings and understands them, they are more likely to act sustainably in the future and have more positive mental health outcomes (Ojala, 2020). It is possible for teachers to help mediate

some of these impactful and eco-anxiety inducing messages, but we must be aware of them and their risks first.

Though these heavily emotional messages can discourage sustainable action and increase eco-anxiety, the awareness-raising that is happening because of them is critical. One of the most important things teachers can encourage young people to do is to care, and emotional appeals for action on social media are very good at cultivating concern. This dichotomy was put perfectly by Hautea et al. (2021) who stated:

> [Non-expert content creators] might not clearly grasp the causes and impacts of rising global temperatures and might not offer concrete practical solutions, but they form a networked atmosphere of concern that is influencing at least one generation's orientation toward public affairs. Indeed, these expressions of climate change awareness may be better able to penetrate popular consciousness by attracting individuals to mimic similar sentiments with their own affective messages through riffing off someone else's.
>
> If we consider these posts as traces of what people are feeling in the moment, and how these feelings become more prominent and visible over time, we might view each video as a dot in the mosaic of larger social patterns that subtly transform climate indifference into a subject of social disapproval and direct action. In this way, harnessing affective publics, new media may galvanize momentum toward material forms of activism. (p. 12)

Social media can be a powerful tool for encouraging action and activism if used responsibly. It can also be argued that the effects of the emotional nature of messaging on social media are already being felt. Social media platforms make money through selling

advertisement space because of how well they know their users. Complex profiles of data are created for each user so that ads can be targeted to groups most likely to buy a particular product. Climate-focused messaging on social media is becoming a larger and larger focus, so concern about climate change shows up in this data. Companies are taking note of this and responding to demand for sustainable choices. Microsoft is working towards becoming carbon negative by 2030 (Smith, 2020), and many other companies have green initiatives of their own.

Of course, these decisions were not solely based on social media. The sustainability movement has been growing for decades now and many companies are evaluating their impact. However, supply and demand is a fundamental principle of economics, so we cannot ignore the demand for sustainable products that social media is uncovering.

Social media does not just encourage people to care through the original content created by users, it also creates an impactful social space that can show young people what they should care about. As uncovered by Lewandowsky et al. (2019), the comments sections of posts on social media send young people important messages about how they should feel and think. Perceived social consensus on issues addressed on social media shape the opinions of individuals who view these posts. When comments sections are largely in support of a message on climate, people who view those comments are more likely to agree with the message. When comments sections are mostly disagreeing with a message on climate, people are less likely to agree with that message. Perceived social consensus can also contribute to students' emotional relationship to climate change, which in turn, can impact their likelihood of acting sustainably.

Climate change information on social media is a multifaceted issue—each positive to this method of engaging with climate information has a negative side as well. Social media can be a powerful place to provoke climate action, but it can also disempower users by increasing eco-anxiety. It can increase and decrease sustainable actions through social consensus. It can provide a voice for NGOs, but it can also provide a place for climate skepticism to thrive and expand (Anderson, 2017). Social media is a powerful tool, but it is not used intentionally to cultivate responsible messaging about climate action.

Social media can spread valuable information about climate change through giving a voice to young people and NGOs. However, this information is not fact-checked before it can reach millions, so social media can spread misinformation and confusion about climate science. These messages can spur sustainable action and activism if cultivated in responsible ways, but they can also paralyze young people by increasing eco-anxiety. With these issues in mind, it is clear that it is important to help teachers learn about the messages their students receive from social media and how these messages can help and hurt them.

**Indigenous Knowledge**

I have to start this section by making it very clear that I am at the beginning of my journey of exploring Indigenous cultures in the United States and how Indigenous Knowledge and Traditional Ecological Knowledge can contribute to cultivating healthier relationships with climate change in all people. It is important to center the history that Indigenous people have faced, especially highlighting the systematic erasure of their practices, culture, history, and wisdom for hundreds of years. In bringing Indigenous Knowledge to the forefront in this paper, my intention is not to take the wisdom of these varied cultures as my own. My intent is to highlight the incredible value Indigenous

Knowledge can bring to classrooms if educators are able to share it intentionally, mindfully, and respectfully. In my discussion of Indigenous Knowledge, I will center the voices of prominent Indigenous authors, namely Robin Wall Kimmerer, Melissa K. Nelson, Dan Shilling, and Gregory Cajete.

Science is a thorough, rigorous, and incredibly helpful way of learning about the world. The scientific method and vast cooperation of scientists has given us modern medicine, greatly improved standards of living, increased lifespans—too many advancements to count. Yet science is not all-encompassing. There are things science cannot and will not know, and there are blind spots science has by nature of its design and its practitioners. Science is powerful but it cannot be our only lens through which to learn about the world—when it is, humanity turns up short. Native Science, on the other hand, is a holistic mode of learning of and knowing the earth. In the words of Gregory Cajete (Nelson & Shilling, 2021):

> Native science is a metaphor for a wide range of tribal processes of perceiving, thinking, acting, and 'coming to know' that have evolved over millennia of human experience with the natural world. Native science is born of a lived and storied participation with a natural landscape and reality… Native science is the collective heritage of human experience with the natural world and in its most essential form, a map of natural reality drawn from the experiences of thousands of human generations that have given rise to the diversity of human technologies and even to the advent of modern mechanistic science. (pp. 16-17)

Native Science is also referred to as Traditional Ecological Knowledge, or TEK (Tonino & Kimmerer, 2016).

From a Western scientific perspective, the scientist is perceived as an objective observer, identifying fundamental truths about the world. A scientist is separate from the subject they study—this is how they remain impartial and how they get reliable results. Yet from an Indigenous perspective of Traditional Ecological Knowledge, the observer is part of the system. They are a participant. It is this fundamental perspective, among many others, that distinguishes TEK from Western science. This perspective is missing from science, and countless insights lie in this fundamental difference. To quote Cajete (Nelson & Shilling, 2021), "the modern mind has lost its sensate bearings, its orientation to its roots, and to the natural world of process of which it is a part" (p. 17). Humans have become far separated from the natural world, and this disconnection deeply influences the way we think about ourselves, our society, and the environment.

It can be argued that it is this disconnection that has led to the ever-worsening nature of the climate crisis to begin with. Humans are earthlings. We are native to this planet. Yet we increasingly think of ourselves as separate—earth science units are titled 'humans *and* the environment,' food comes from the grocery store, not the earth, some people are 'outdoorsy,' and some are not—the distinctions continue. Indigenous cultures developed in relationship with the earth. It was over thousands of years of trust and respect in nature that their cultures grew and learned how to cultivate that relationship. This reciprocity is reflected in the Indigenous teaching of the Honorable Harvest. In the words of Robin Wall Kimmerer (2013):

> Collectively, the Indigenous canon of principles and practices that govern the exchange of life for life is known as the Honorable Harvest. They are rules of sorts that govern our taking, shape our relationships with the natural world, and rein in our

> tendency to consume—that the world might be as rich for the seventh generation as it is for our own. The details are highly specific to different cultures and ecosystems, but the fundamental principles are nearly universal among peoples who live close to the land. (p. 180)

Society has lost touch with the rules of the Honorable Harvest. It has lost the rules that "rein in our tendency to consume" so we find ourselves with the consequences of overconsumption run rampant.

The principles of reciprocity and relationship with the earth that Indigenous cultures developed helped them to live in harmony with natural systems on the earth for thousands of years. The society that dominant culture has cultivated since the Industrial Revolution, and arguably the Agricultural Revolution, is not sustainable on this planet. The only society that most of us have ever known is unsustainable. If we are to imagine a better future, a sustainable future, we need to learn from the example of Indigenous cultures who found balance. Indigenous Knowledge and pedagogy can help us do so.

The wisdom in Indigenous Knowledge can help to address eco-anxiety in young people. It is encouraging and liberating to learn that it is possible for humans to live differently on the planet. For most of the history of our species on this planet, *Homo sapiens* lived sustainably. The title of Kimmerer's book *Braiding Sweetgrass* (2013) is a reference to the mutualistic relationship between Indigenous peoples in the United States and sweetgrass. The ritual practice of harvesting and braiding sweetgrass has been practiced for thousands of years. With the genocide and forced migration of Indigenous peoples, native peoples were removed from the ecosystems they lived with and cultivated, and both the people and the ecosystems suffered. Using Western practices, scientists confirmed that the

harvesting of sweetgrass done by Indigenous people is beneficial for the plant species as a whole—their numbers drop drastically when ritual harvest is not done.

This story is an affirmation that humans can bring good to natural systems. We can be stewards and cultivate the earth, we can safeguard its flourishing and make sure its resources persist for generations to come. With increased levels of eco-anxiety and pessimism, many young people (and people of all ages) do not believe this message to be true. The wisdom in Indigenous Knowledge can help us cultivate constructive hope (Ojala, 2015). It can also help us repair our relationship with the earth by helping to recognize the importance of relationship with nature, and it is well documented that spending time in nature is important for mental health (White et al., 2019; Hartig & Kahn, 2016; Mitchell et al., 2015). Finally, TEK can expand the depth of the knowledge we teach in schools to teach students to think and learn holistically. In moving to address eco-anxiety in education, the wisdom of Indigenous Knowledge plays a vital role.

# Chapter Four

## Critical Action Research Project Proposal

The presence of eco-anxiety in education stems from countless sources. As shown in the previous history section, eco-anxiety has ties to political polarization, capitalism, neoliberalism, and racism, among other factors. At its core, eco-anxiety comes from climate change, and climate change stems from exploitation, overconsumption, and greed. Eco-anxiety cannot be addressed in isolation from these causes, it must be addressed within a holistic understanding of its context. Solving an issue this complex will take systemic, transformative change in the way we educate. And that kind of change needs transformative individuals.

In order to help teachers on the path to becoming transformative environmental educators in the face of eco-anxiety, I am proposing a workshop series for educators. This workshop series will address eco-anxiety in context of its root causes and in conjunction with research-based solutions and transformative modes of educating. I propose this workshop series as part of a Critical Action Research project to determine the efficacy of this intervention and build space for improving the workshop series as it moves forward.

I will begin this chapter by explaining what Critical Action Research (CAR) is and why I have chosen it for this project. I will then draw connections between my proposal and the literature and theoretical frameworks I elaborated upon earlier in this thesis to highlight the purpose of the decisions made about how the workshop series should be conducted. I will finish this chapter by detailing each step of the workshop series.

## Critical Action Research

As a science teacher with a solid educational background in science, I used to have a strict idea of what research was supposed to look like. Research was supposed to be objective, to be controlled, and supposed to end with clear conclusions and next steps. But upon entering my teaching practice, I became frustrated with the educational research I found. The intangible qualities of a good classroom dynamic fascinated me, and yet I of course could find no way to quantify them to better my practice. I also became frustrated with the way educational research was weaponized in classrooms. "Best practices" seemed to come down from on high, yet when they reached my classroom, they imploded. The research I found was both woefully inadequate and completely inaccessible.

It wasn't until I started in the Transformative Education and Social Change program that I learned of Critical Action Research (CAR). CAR is a research methodology that comes from the action research tradition, accompanied by participatory action research and youth participatory action research as well. These research practices bring power back to people from institutions, like universities, that are generally perceived to hold and produce knowledge. Action research allows practitioners to research their own contexts in a constantly unfolding practice, helping us to learn deeply about our own environments and share what we learn with others. In the words of Given (2008),

> Action research involves an emergent inquiry process that evolves throughout the research effort and focuses on generation of new knowledge and ways of thinking and seeing the world. In action research, scientific knowledge is combined with organizational knowledge in a collaborative effort designed to solve actual organizational problems. In addition, local knowledge held by the organizational

> stakeholders is considered to be equally as valid as, or more valid than, that held by the "professional" researchers. (p. 139)

Action research takes place in context through multiple cycles of inquiry, action, and reflection (Anderson et al., 2007).

I chose action research for this project to bring power back into the hands of concerned educators. Eco-anxiety has been an emerging focus in the field of psychology, as evidenced in the field of ecopsychology (Whitcomb, 2021), but the research conclusions and subsequent approach that mental health professionals researching in academia might recommend will be different than the approach needed by diverse educators in diverse contexts. Action research offers educators the opportunity to study what other educators need to face eco-anxiety in their lives and classrooms, and offers the possibility of adapting the intervention to suit their needs.

The main distinction between action research and critical action research is that within CAR the emphasis is on the word *critical*. In CAR the research is centered around studying and taking action upon systems of power in the research environment. I chose CAR for this project because of the emphasis on investigating systems of power that can be found within the workshop series. Throughout the workshops educators are asked to evaluate the systems of power that have contributed to climate change and how to teach differently in light of those revelations. The emphasis on critical analysis in CAR will help program facilitators to evaluate if the interventions in place serve the needs of developing critical educators.

## Theory to Practice

In designing this program I have made sure to link the theory covered in this thesis to the practices within each session. The content in chapters two and three of my thesis comes from years of research and study, so I have used that information as guiding principles for the design of this intervention. In each workshop session you will see an emphasis on dialogue between educators and dialogue with students, which comes from the emphasis on critical pedagogy included in my philosophy of education. You will also see active learning experiences for educators, again connecting back to critical pedagogy but also highlighting the value of education as a joyful experience that connects people with what it means to be human, elaborated upon in my philosophy of education.

Each session also centers around a central theme expanded upon in chapter three. Session three centers around ecopedagogy, session four centers Indigenous Knowledge and place-based education, and session five highlights the role of social media in student perceptions of climate change and experiences of eco-anxiety. Each session also contains research addressed in the literature review and focuses on the themes of collective action, emotionality, and mindfulness shown to be effective in helping assuage eco-anxiety.

## Intervention Proposal: Workshop Series

Educators find themselves in incredibly conflicting and difficult positions. They are expected to hold space for student emotions while facing their own, to care for themselves while being underpaid and overworked, to develop as professionals while being treated like babysitters. Countless schools are under-resourced while taking on more roles in students' lives, and educators bear the brunt of this burden. As eco-anxiety starts to take up more space in the minds of students and educators alike, educators need help to be able to face this

challenge. It is for this reason that I have designed a five-part workshop series for educators. It is important to note that as educators engage in this workshop series designed to help them address eco-anxiety, the knowledge and experiences they gather throughout will help them expand their pedagogy in all areas of their practice, which will support them in balancing the varied demands placed upon them.

This workshop series guides educators through an exploration of their own eco-anxiety, of research-based coping mechanisms, of pedagogical strategies, intellectual frameworks, and other sources of wisdom to help them build a toolbox for addressing eco-anxiety in their classrooms. The main goals of this program are twofold. First, the series aims to help educators face their own eco-anxiety and critically analyze where it shows up in their classrooms. Second, the program will lead teachers through an exploration of pedagogical practices that can help them minimize the eco-anxiety that their students experience.

**Understanding the Workshop Series Outline**

This workshop series is designed to be conducted as a week-long professional development experience. In the table below I have detailed the activities of each session. Each workshop session has multiple activities listed in the right column coded with a signifier to help the facilitator see what to do each day. A **Group Discussion** label signals a question that should be asked to all educators attending the session, with space for participants to discuss as a whole group. A **Group Learning** label signals that the entire group should be learning about the concepts together, mainly directed by the session facilitator. A **Facilitator Action** label tells the facilitator when a specific statement or action is needed from them, and example wording is listed to guide the facilitator. A **Small Group**

**Activity** label shows that the large group of participants should break apart into smaller groups to complete an activity. Finally, an **Activity** label signals an activity the group will be doing together that is led by the facilitator, like a nature walk or mindfulness exercise.

**Ideal Context and Potential Limitations**

Ideally this workshop series would be offered as a one-week-long professional development opportunity in the summer that offers Act 48 credits. Offering each session one after the other will help educators build upon the knowledge they learned each day, as each session is designed to expand upon the foundation set in the one preceding. The summer timeline is ideal because teachers will not have the demands and preoccupations that come with engaging in professional development during a weekend of the school year. This timeline and context will help them build a robust, multifaceted approach to addressing eco-anxiety and adapting their pedagogical practices.

With these ideals in mind, the workshop series is also designed to account for realistic conditions. The time educators have is limited, and a week-long summer intensive may not be feasible for all who want to participate. To accommodate this, each workshop can also be offered as a shortened weekend or afternoon session done weeks or months apart, and could even be adapted into standalone sessions depending on the needs of the educators. Each session focuses on a specific facet of addressing eco-anxiety in education, so the sessions offered to a particular population of teachers could be specifically selected for their specific place. For example, session two, titled Combating Eco-anxiety with Collective Action, could be an excellent standalone professional development session for a school with an understanding of eco-anxiety that is ready to start on a journey of introducing student-based

sustainability projects. If this option is taken, segments of each session can be moved around to fit the needs of a specific group of educators.

It is also important to note that session five centers around student voices and opens space for students to speak on their experiences and work together with their teachers. If undergoing this at a school level, students should be invited to join educators for the second half of this day. It may not be possible for students to attend in person. If this is the case, students could be asked the discussion questions during school hours and record themselves or write a response to share with their teachers. If undergoing this at a district level, or as an open professional development experience, invite teachers to ask their students during class time.

**Workshop Series Outline**

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| **Session 1:**<br>What is eco-anxiety and why does it matter?<br><br>This session is designed to build educators' awareness about eco-anxiety as an issue and eco-anxiety in themselves. | **Group Discussion** What comes to mind when you hear the phrase 'eco-anxiety'?<br>**Group Learning:** What is eco-anxiety and why does it matter? Facilitator should lead the group through the learning steps below:<br>• To see an example of eco-anxiety, watch the video from Good Morning America (2022) titled *Students open up about eco-anxiety* (See appendix A for link).<br>• Eco-anxiety has been defined many ways, but its most common definition is by the APA (2017, p. |

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| | 29), explained as “a chronic fear of environmental doom.”<br>o The article titled “'Eco-anxiety': Fear of environmental doom weighs on young people” (Gregory, 2021) is helpful reading for this section of the session (Appendix A).<br>• Mental health concerns in Gen Z are skyrocketing (Bethune, 2019) (Appendix A).<br>• Gen Z consistently report that climate is important to them, much more so than older generations (Funk, 2021) (Appendix A).<br>**Group Discussion:** Where are students getting information about climate change?<br>• During this discussion educators should recognize that students get information about climate from many sources (friends, social media, home, school) and recognize the pivotal role school has in building climate literacy and a healthy relationship with eco-anxiety.<br>**Group Learning:** Teacher actions in the classroom will impact student mental health outcomes and students’ likelihood of acting in pro-environmental ways. |

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| | • To address this important point, look at the research done by Ojala (2015, p. 133) and emphasize the quote below:<br>  ○ "Constructive hope was positively associated with engagement and a perception that teachers respect students' negative emotions concerning societal issues and have a future-oriented, positive, and solution-oriented communication style. Students who felt hope based on denial instead were less inclined to behave pro-environmentally and perceived their teachers as not taking their emotions seriously and as communicating in a pessimistic way."<br>**Facilitator Action:** Name that the workshop series is for educators to build a strong foundation they feel confident teaching from. Throughout the workshop series, educators will learn to:<br>• Build a healthy relationship with their own eco-anxiety.<br>• Learn research-based strategies for teaching.<br>**Group Discussion:** What is your relationship with eco-anxiety? What do you do to soothe your eco-anxiety? Are |

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| | your self-soothing techniques immediately helpful? Do you expect your self-soothing techniques to be helpful in the long-term?<br>**Facilitator Action:** Name that we will examine and experience many ways to help eco-anxiety. The first we will experience is mindfulness.<br>**Activity:** To close this session, end with the mindfulness activity detailed in the handout listed in Appendix B (Chungyalpa, 2021).<br>• This mindfulness activity centers around being in the body, feeling connection with the earth, and giving care and compassion to the earth. Educators should start to feel the power in stillness and mindfulness, while also recognizing the power in a reciprocal relationship with the earth. |
| **Session 2:**<br>Combating Eco-anxiety with Collective Action<br><br>This session is designed to help teachers acknowledge the role collective action has in addressing eco-anxiety. | **Group Discussion:** What comes to mind when you hear the phrase 'collective action'?<br>**Group Learning:** Examine large-scale, youth-led collective action movements:<br>• Watch *How young climate crisis activists changed the world* (NowThis News, 2019), a video on youth climate movements (link in appendix A). |

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| | • Watch *Welcome to Sunrise*, a video on the Sunrise Movement (2017) (link in appendix A).<br>• **Group Discussion:** How do these movements make you feel? How could learning about these movements help your students?<br>**Facilitator Action:** Name that these large-scale climate activism campaigns are often what comes to mind when we talk about collective action. However, collective action can look very different in a classroom.<br>**Small Group Activity:** Explore student-led sustainability projects:<br>• Break into small groups and work together to explore the Illinois Green Schools Project ("Illinois Green Schools Project," 2023) and the Environmental Justice Coalition of Sonoma County ("Environmental Justice Coalition," 2023) (links found in Appendix A).<br>  ○ Both of these sources detail many projects students have undertaken to make their schools and communities more sustainable.<br>**Group Learning:** Explore the research foundations of the impact of collective action:<br>• *From Anger to Action* (Stanley et al., 2021). |

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| | • *Hope in the Face of Climate Change* (Ojala, 2015).<br>• *Climate change anxiety and mental health: Environmental activism as buffer* (Schwartz et al., 2022).<br>**Group Discussion:** With the research around collective action in mind, and using these projects as inspiration, what could be done in your school? Your community? Your classroom?<br>• Break into small groups again and research local sustainability issues. Educators should use this time to learn about their local environment so they are prepared to help students choose a project. Helpful resources are:<br>o County and state sustainability pages.<br>o Local university sustainability groups.<br>o Community organization websites.<br>**Group Discussion:** What did you find? What ideas do you have for engaging your students in collective action? |
| **Session 3:**<br>Ecopedagogy for Eco-anxiety | **Group Discussion:** Many people feel anger when thinking about climate change. Where does that anger come from?<br>• In this discussion educators should come to the conclusion that anger around climate change stems |

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| This session is designed to help educators reckon with issues of power and environmental justice through ecopedagogy. | from inaction and harmful actions by governments, corporations, and other organizations that are impacting the climate crisis.<br>**Facilitator Action:** Name that climate change is political and intertwined with power. If educators do not feel confident speaking truth to power in discussions around climate, they might contribute to students feeling isolated and abandoned by older generations, exacerbating eco-anxiety. Today's session will be about examining the power dynamics in society that have shaped and been shaped by climate change and using ecopedagogy to meet that pedagogical challenge.<br>**Group Discussion:** Who benefits from burning greenhouse gases? Who benefits from climate change?<br>**Small Group Activity:** Explore the following resources:<br>• Carbon Majors Report (CDP, 2017): pay specific attention to the following pages and quotes:<br>o Page 8: "Over half of global industrial emissions since human-induced climate change was officially recognized can be traced to just 25 corporate and state producing entities." |

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| | ○ Page 8: “By 1988, fossil fuel companies knew, or should have known, of the destabilizing effects of their products on the environment. Nonetheless, most companies have expanded extraction activities significantly in the time since, while non-carbon primary energy sources, such as renewables, have seen relatively very little investment.”<br>○ Page 10: “Investors in fossil fuel companies carry influence over one fifth of industrial greenhouse gas emissions worldwide.”<br>• *Assessing ExxonMobil’s global warming projections* (Supran et al., 2023). Pay specific attention to the following page and quote:<br>○ Page 1: “In 2017, for instance, we demonstrated that Exxon’s internal documents, as well as peer-reviewed studies published by Exxon and ExxonMobil Corp scientists, overwhelmingly acknowledged that climate change is real and human-caused. By contrast, the majority of Mobil and ExxonMobil Corp’s public |

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| | communications promoted doubt on the matter."<br>• *Environmental Racism and Climate Change 101* (Whalen, 2023). Pay specific attention to the following page and quote:<br>  ○ Page 1: "Throughout history, BIPOC and low-income communities have been riddled with this form of systemic racism. However, it can be difficult to spot environmental racism because it is often hidden by zoning laws, innovation, and the idea of gentrification."<br>**Group Discussion:** What kind of education do students need in the context of these reports?<br>**Group Learning:** Explore ecopedagogy using the following sources. An excerpt from the section on ecopedagogy in Chapter Three of this thesis is below:<br>  • Ecopedagogy combines the ideals of a Freirean critical pedagogy with education for sustainability. In the words of Richard Khan (2008), it "attempts to generate conscientization upon the concept of sustainable development proper and thereby |

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| | uncloak it of the sort of ambiguity that presently allows neoliberal economic planners… to autocratically modernize the world despite the well-known consequential socio-cultural and ecological costs" (p. 8). Ecopedagogy encourages students to identify the structures that have caused climate change and address it as a holistic issue. This pedagogy stands at odds with the way many teachers feel pressured, or even obligated, to teach climate change.<br>• *Seeds of resistance: Towards a revolutionary critical ecopedagogy* (McLaren, 2013). Pay specific attention to the following page and quote:<br>o Page 84: "As the global power complex reduces human life and mother earth to mere production and consumption, critical revolutionary ecopedagogy is developing new, unalienated forms of self-presence. Ecopedagogy is inspired by and inspires a new social arc, rooted in practices of ecological struggles by the working classes |

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| | and the poor – an unabashedly utopian dreaming of a post-capitalist future."<br>**Group Discussion:** What does ecopedagogy mean to you? What would it mean to teach with ecopedagogy?<br>**Small Group Activity:** Reflect on ecopedagogy and curriculum.<br>• Discuss the following questions:<br>o How can we do a better job acknowledging the roles of power in climate change so students don't feel so alone and disenfranchised?<br>o Reflect on your curriculum. How might you change the way you teach climate with ecopedagogy?<br>**Group Discussion:** What did you discover in your small group discussions?<br>**Activity:** To close this session, end with the mindfulness activity below. Pause between each new line of text and feel free to adapt as necessary. This meditation should take five to ten minutes.<br>• *Find a comfortable seated position and bring your attention to your breath. Feel the air flowing in and out, in and out.* |

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| | • *Notice the sensations of your body with open awareness and curiosity. Feel your body making contact with the chair, the floor, the table, the air.*<br>• *Take time to allow the emotions you experienced today to surface in your body. You may notice that you feel uneasy, or impassioned, or frustrated, or joyful.*<br>• *Where in your body do you feel each emotion?*<br>• *Acknowledge the feelings that were brought up today. Thank them for helping you navigate life, protecting you, moving you.*<br>• *Thank your emotions again and bring your awareness back to your breath.* |
| **Session 4:**<br>Indigenous Perspectives and Place-Based Education<br><br>This session is designed to help educators think differently about their | **Group Activity:** Pick one object in the room and try to name every single resource involved in its existence here today.<br>• For example, an apple requires the land it was grown on, the water to grow it, the pesticides, the worker hours, the farm equipment, the fossil fuels to power the equipment. It also requires the fossil fuels |

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| pedagogical practices with the help of Indigenous Knowledge and place-based education. | involved in its transportation, the land the grocery store is on, the fossil fuels powering the grocery store, and more.<br>• In this discussion the massive impact of a single object should become clear.<br>**Facilitator Action:** Note that each object in the room has a similar history and a similar relationship with natural resources. Our current way of life is unsustainable. Eco-anxiety may be fed by the ever-present awareness of this fact. Part of addressing eco-anxiety is being able to imagine other ways of being on the earth.<br>***Important note:*** I highly encourage any facilitator to reach out to your members of the Indigenous community in your area to ask for their input and ask them to speak to your group of educators. Centering the voices of Indigenous people is vital.<br>**Small Group Activity:** Explore Indigenous Knowledge in small groups using the essays below from the book *Traditional Ecological Knowledge: Learning from Indigenous Practices for Environmental Sustainability* (Nelson & Shilling, 2021). This book is available for purchase online. |

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| | • Chapter 3: "*Mishkos Kenomagwen*, the lessons of grass: restoring reciprocity with the Earth" by Robin Wall Kimmerer (Nelson & Shilling, pp. 27-41).<br>  ○ In this excerpt educators will learn about the Indigenous principles of the Honorable Harvest, which dictate how humans should take from the earth. The emphasis in the Honorable Harvest is to only take from the earth if the population can handle being harvested, and never take more than fifty percent. Educators will also see how humans have evolved together with natural systems. Recognizing that we have once been vital to the health of natural systems can encourage educators to realize that humans can have a vital role as stewards of the earth.<br>• Chapter 2: "Native Science and sustaining Indigenous communities" written by Gregory Cajete (Nelson & Shilling, pp. 15-26).<br>  ○ In this essay educators will read about Native Science. They will have the opportunity to |

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| | reflect upon what is missing from traditional science classrooms.<br>**Group Discussion:** What revelations did you have? How might this impact your teaching practices? How might learning about Indigenous Knowledge help your students with eco-anxiety?<br>**Activity:** Mindful Nature Walk<br>• Lead educators on a walk outside.<br>• Find a place to sit and do a mindful listening activity.<br>• Ask educators to draw or take pictures of at least 20 different species. How many can you name?<br>**Group Discussion:** What did it feel like to be outside? How many of your species neighbors could you greet by name?<br>**Group Discussion:** Where and how have you experienced climate change?<br>• On what scale do you teach about climate change?<br>o In discussing these two questions it should be clear that we experience climate change in our local environments, but we mostly teach about climate change in global terms. |

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| | **Facilitator Action:** Note the disconnect between the global learning and local experience. This disconnect may make students feel like climate change is coming for them, but its causes are too global to do anything about.<br>**Group Discussion:** How can we bring learning back to experience?<br>**Small Group Activity:** Learn more about place-based education by exploring the Teton Science Schools website ("About place-based education," 2023) (Appendix A).<br>**Small Group Activity:** Explore the "Quick Start Guide to Implementing Place-Based Education" ("About place-based education," 2023) and brainstorm ways to bring place-based education into your classroom.<br>**Group Discussion:** What did you find? |
| **Session 5:**<br>Student Voices<br><br>This session is designed to bring the learning educators have done back to a student focus by centering the experiences and voices of students and allowing for | **Group Discussion:** What messages do students receive about climate from social media?<br>• Watch a few examples of climate-focused videos students may see on social media.<br>  ○ **Group Discussion:** What messages do these videos send? |

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| collaborative brainstorming time. | **Small Group Activity:** Break into small groups and have educators search for climate-related search terms on popular social media sites.<br>• As educators search, they should track the emotions they experience and any key themes they want to discuss or remember on the Social Media and Climate Activity Sheet (see appendix C).<br>**Group Discussion:** What did you find? What was surprising to you? How might this impact the way you teach?<br>**Group Learning:** How could social media impact eco-anxiety in students?<br>**Group Learning:** Invite students from schools to join the group and share their experiences.<br>• *Student Questions:* What are your experiences with eco-anxiety? What has helped you when you experience eco-anxiety? What do you feel is needed in your science classes to address eco-anxiety? What do you feel is needed in your school to address eco-anxiety? |

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| | **Small Group Activity:** After hearing from students, students and teachers should form small groups and brainstorm collective action projects together. |

# Chapter Five

## Implementation and Evaluation

The program described in the preceding section cannot stand alone without passionate educators willing to take up the fight. Those educators will face roadblocks as they attempt to bring the workshops to life. In this section I will do my best to break down those roadblocks and provide trails around the ones that might not budge.

### Implementation

The workshop series is designed to adapt to fit the needs of a specific population, so the timeline for implementation will look different depending on the context. In the ideal proposed context of a standalone week-long professional development workshop, the program would be offered during the summer. This would allow for educators to engage more deeply with the content than they might be able to within the school year and will also provide for continuity of learning between sessions. This summer context could help to bring educators of different schools together as well, which could help teachers think differently about their teaching practice and school context.

Another potential timeline is for this workshop series to be offered throughout planned professional development days within a school. In this approach, the workshops would help educators build community within their school and find a network of educators with similar goals. A teacher working to spark change on their own is very vulnerable to burnout, but being in a community of passionate educators has a protective factor. It is also important to note that this approach would not require additional time from educators that is outside of their job requirements at school, lessening the burden.

In whatever context this workshop series is offered, it will need supportive people to thrive. A great place to start to find these people is to conduct an exploratory survey of educators to assess their needs around eco-anxiety and build interest for the workshop series. The survey should attempt to answer questions like:

- Are educators suffering from eco-anxiety, to what extent are they suffering, and what does it look like for them?
- What pedagogical practices are educators currently using to address eco-anxiety in their lives and in the lives of their students?
- What hesitations do educators have about taking a more active approach to address eco-anxiety in their classrooms?

The survey should end with information about the timeline and goals of the workshop series so educators can join if they are interested. The results of this survey could then be used to adapt the workshop sessions to the specific needs of the participants.

Another important step to a successful workshop series is engaging community organizations and leaders. There are phenomenal local organizations in communities across the country that are open to partnering with schools, contributing knowledge, and accepting volunteers. With adequate time remaining before starting the workshop series, the facilitator should reach out to relevant community organizations asking if they would be willing to contribute to the workshops. Organizations that could be helpful cover a wide range of needs, like sustainability-focused groups, community centers, local history organizations, and branches of local Indigenous tribes. The goals in reaching out to community stakeholders should be to build connections, to help teachers identify allies and opportunities for connection, and to hear from voices of people making a difference. Hearing about the impact

community groups have had can also help educators with eco-anxiety—it is important to see that actions are being taken outside of school contexts as well.

Within the context of a school, administrator buy-in will be vital for completing this program. Each facilitator or facilitator group will know the best approach to gaining approval within their school, but the following are helpful suggestions and starting points. When proposing the professional development program, it should be framed with the goals of the school in mind. Connect the workshop content to current school initiatives, and frame the outcomes of the workshop series with these initiatives in mind. For example, some goals of this workshop series are to bolster the mental health of staff members and of students. The pedagogical practices within the workshop series also promote a holistic STEM education and provide opportunities for cross-curricular engagement.

**Evaluation**

A core pillar of critical action research is the pairing of cyclical actions with reflection. Conducting the first version of this workshop series is step one in an unfolding process of meeting teacher needs around eco-anxiety and should be followed up with evaluation and reflection. Evaluation is vital to a successful program because it opens a window into the efficacy of the intervention: what is working and what can be improved? In order to help facilitators evaluate the workshop series and continue in the process of critical action research, I have designed surveys to be given to all workshop participants.

These surveys are planned in conjunction with the workshop series layout. They will give workshop participants the opportunity to reflect on their learning as well as give facilitators valuable data about the perceptions of the participants. There are two comprehensive surveys designed to be given at the beginning and end of the workshop series

in its entirety, as well as smaller surveys designed to be given at the beginning and end of each session to assess takeaways from each day's focus. The surveys given each day are designed to assess how the participants' eco-anxiety changes throughout the sessions and to gauge the impact of the learning done around each day's topic. The surveys to be given before and after the workshop series as a whole (Survey 1 and Survey 11) are designed to gather participant perspectives on eco-anxiety, how to address it, and how their ideas have changed throughout the sessions. All of these surveys can be found in Appendix D.

When analyzing the survey responses, facilitators should be looking for two main changes in participants: a decrease in eco-anxiety and an increase in confidence and understanding around session topics. Both qualitative and quantitative data will be gathered from the surveys, and both forms of data can be utilized to measure and assess the goals above. Quantitative data will be gathered through questions that use a rating system on a scale from one to ten and should be used to make general conclusions about the efficacy of each session. Qualitative data will be gathered from open-ended responses and should be used to get a more holistic picture of the experiences of participants.

Survey responses should be analyzed after each session so facilitators can make small adaptations to the upcoming sessions to better fit each group's needs. All survey data should be analyzed together once the workshop series is concluded using the following guiding questions:

1. How did participants' eco-anxiety change throughout the sessions?
2. What do participants' takeaways reveal about the most impactful activities, messages, and experiences of the workshop series?
3. What went well during the sessions?

4. What could be improved for future workshops?

Conclusions about the guiding questions should be compiled into a document that meets the needs of the facilitator.

Once the data has been analyzed, the facilitator should use the reflections and conclusions to adapt the workshop for the next group. The insights gathered in this reflection process are part of a vital step in action research—taking further action. This workshop series is not a completely finished or static curriculum, it should be a living set of guidelines and possibilities that adapts to each environment as the needs of educators change. Reflection on the data from the surveys will help to reveal the next adaptations needed.

**Potential Limitations and Solutions**

Of course, this workshop series, like any educational intervention, has realistic limitations on its success. In this section I will explain those limitations as well as current and future solutions possible. The first limitation of this program is that it requires facilitators to have a level of knowledge before starting the series. If they do not have a baseline of knowledge they may be caught off guard by the information covered or a discussion as it unfolds and won't be able to adapt to the needs of their group as effectively. As of now, facilitators can learn by engaging in the workshop materials themselves before starting. In the future, I can see space for an asynchronous facilitator course to be designed. This course could lead facilitators through the concepts covered in more depth and also walk them through the necessary steps in preparing for the workshop series, like how to find and reach out to community organizations.

It is also important to note the differences in needs among different school contexts. Eco-anxiety in wealthier schools is going to look very different from eco-anxiety

in under-resourced schools. Each school faces unique challenges and the tools needed to attend to those challenges will be very different. Overall, more research is needed on eco-anxiety in specific populations of adults and young people, especially related to their socioeconomic status, race, gender, and location. Research of this nature will help facilitators adapt the program to their specific needs. Without research on these topics, I would encourage facilitators to open any exploratory survey to students as well, asking them for their opinions on and experiences with eco-anxiety.

Another potential limitation of the program is teacher fear. Part of the goal of the workshop series is to empower educators with experiences and pedagogical practices that help them rise to the challenge of eco-anxiety, but many of these practices look different than what education generally looks like. The workshop series encourages teachers to hand power back to students, to bring learning back to place, to take time for emotion in discussions of science, and to build space for mindfulness and connection with nature. These practices are a deviation from the norm in most contexts, and implementing them may cause fear in educators.

Standardized testing, teacher observations, parent opinions, all these and more can be forces against making changes. Teachers may be fearful of implementing the pedagogical practices they learned, despite their benefits, because of the pressures of teaching. Currently this issue is addressed through creating buy-in from administrators and building communities among educators. In an ideal world, school contexts would change to be more open to diverse types of learning, but in the meantime, building robust examples of transformative learning experiences will help build confidence in systemic changes.

In this same vein, educators may be fearful to start teaching differently because of the immense amount of work that might cause for them. Changing teaching practices and building a new curriculum can be incredibly time intensive, and this barrier may seem like too much of a burden for teachers wanting to make a change. To first address this, I urge facilitators to emphasize that changes in teaching can be small and incremental while still being incredibly impactful. But beyond this small emphasis, educators will need resources for teaching differently. During the workshop series participants experienced many different ways of addressing eco-anxiety. They engaged in mindfulness activities, examined how ecopedagogy relates to eco-anxiety, learned from the writings of Indigenous authors about Traditional Ecological Knowledge and Native Science, and looked at examples of place-based, student-driven sustainability projects. Even with this wealth of perspectives for educators to work from, they will be better supported in moving forward if they have curriculum resources and examples to use in their classrooms.

Frameworks and materials for engaging in these ways of teaching and thinking exist—there are many organizations building a large base of resources for educators to use. Though these resources are available online, it will still take individual educators time to find them. I would like to be able to organize these materials and give them to teachers at the end of the program. With these resources organized participants could leave each session with a deeper understanding of the concepts covered as well as curriculum resources for making changes. Unfortunately, time constraints prohibit this next step from appearing in this thesis, but it is an excellent next step. Ideally these resources could be organized with state standards attached to them to assuage some of the fear teachers might have about shifting teaching modes.

Finally, educators will benefit from staying in communication and collaboration with other educators who participated in the workshop series. Changing education can be tiring and lonely work, but it is also empowering and exciting. Being in a supportive community will help educators continue with the work, so a framework for meetings might be helpful. This is another support that could be worked on to extend the longevity of the learning done during the workshop series.

**Conclusion**

The road before us is long. The climate crisis is ever-intensifying and with it are its mental health effects. At the same time, we are seeing increased policing of curriculum in schools and progress in education happening at a snail's pace. Despite this reality, we also see climate action, activism, and awareness building ever quicker, and increasingly innovative and passionate educators rising to the challenges of their time. It is my hope that this workshop series is one of many steps in the path towards making education more impactful and life-affirming, and making classrooms a space for fighting the climate crisis.

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# Appendix A

## Resource Links Organized by Session

Good Morning America (2022, April 22). *Students open up about eco-anxiety* [Video]. YouTube. https://www.youtube.com/watch?v=4J7nlhBOeuw

Gregory, A. (2021, October 6). *'Eco-anxiety': Fear of environmental doom weighs on young people*. The Guardian. Retrieved April 2, 2023, from https://www.theguardian.com/society/2021/oct/06/eco-anxiety-fear-of-environmental-doom-weighs-on-young-people

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**Session 2:** Combating Eco-anxiety with Collective Action

NowThis News (2019, December 17). *How young climate crisis activists changed the world* [Video]. YouTube. https://www.youtube.com/watch?v=XU0PnoCOXpU

Sunrise Movement (2017, November 1). *Welcome to Sunrise* [Video]. YouTube. https://www.youtube.com/watch?v=an5GbckznRQ

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*Environmental Justice Coalition: About*. Environmental Justice Coalition. (2023). Retrieved April 8, 2023, from https://www.ejcoalition.org/about

**Session 4:** Indigenous Perspectives and Place-Based Education

*About place-based education*. Teton Science Schools. (2023). Retrieved April 8, 2023, from https://www.tetonscience.org/about/place-based-education/

## Appendix B

### Handout: Meditation for Eco-anxiety (Chungyalpa, 2021)

A short practice for coping with our overwhelming fears of climate crisis.

By Dekila Chungyalpa, March 12, 2021

Chungyalpa, D. (2021, May 7). *Meditation for eco-anxiety*. Tricycle. Retrieved April 5, 2023, from https://tricycle.org/article/eco-anxiety-meditation/

Eco-anxiety is fear, grief, and distress regarding the environmental and climate crises we face today. *Tonglen* is a Tibetan Buddhist meditation practice that focuses on giving and receiving, and can be particularly helpful when dealing with eco-anxiety and climate despair. This practice was given to me by Ogyen Trinley Dorje, His Holiness the 17th Karmapa, as a way to transform eco-anxiety into the motivation to heal others—and is particularly useful for environmentalists and climate activists who might be suffering from burnout. For those of us who aren't on the front lines but still feel overwhelmed by these issues, this practice provides an easy way to meet our fears of climate change with an attitude of curiosity and gentleness.

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- Please start by grounding yourself with the earth beneath you.
- Sit comfortably with your spine straight yet relaxed. Extend your awareness to how your body touches your seat or the floor and how through these layers, you are rooted to the earth. Be aware of how the earth holds you up.
- There are many possible reasons why you have [started] this particular practice today. You may be overwhelmed by the news, you may be mourning the loss of lives, you

may be afraid of what the future brings, or it may be something else entirely. Eco-anxiety can manifest in many ways including grief, anger, vulnerability, sadness, fear. However it manifests, whether in emotion, or sensation, I want you to observe it from a short distance and without letting it wash you away.

- When you have a good hold of your eco-anxiety, acknowledge it with respect. It is a completely valid response to an existential threat. It means your inner warning system is working and your emotions come from a place of love and compassion for people, for wildlife, and for nature. Take however long you need to honor your eco-anxiety with compassion.
- Whatever responses arise, whatever emotions come up, whatever fears show up, let it all flow out of you, and into the earth.
- Notice your incoming breath—the air entering your nostrils, your mouth, filling up your belly. All that oxygen that keeps you alive comes from the plants, the trees, the oceans, and the plankton that surround us. All the food we eat, the clothes we wear, the houses that shelter us come from nature. The very basis of our lives is interdependence with the earth. Rest in this awareness and relax here, trusting that you are indivisible from nature.
- Breathe in the earth's compassion and breathe out gratitude.
- Now comes the hard part. Visualize ONE place or being that is suffering from environmental and climate harm. It could be a person, a river, animals, or your community. Bring to mind how environmental degradation and climate change affects them. When the distress arises, focus on your desire to heal and to care for this entity and nurture that into compassion.

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- Begin to move into *tonglen*, or giving and receiving. From a place of caring and compassion, imagine yourself with the ability to draw out their suffering when you inhale, and to heal them when you exhale. If it helps, you can imagine their suffering in the form of a fog or vapor, and as you inhale, you receive their suffering; as you exhale, you give them compassion.
- This may bring up fear or anxiety. If that happens, simply go back to grounding yourself with the earth and rest in her compassion for you. When you are ready, come back to this practice of giving and receiving. Give them compassion and receive their suffering.
- You can do *tonglen* practice for as long as you feel comfortable.
- At the end of this practice, please reverse the direction of giving and receiving. It is time again for you to receive the earth's compassion and to offer your gratitude in return. Take a moment to hold in the earth's compassion for you.

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- As you emerge from this practice, note what it feels like to transform your eco-anxiety into the motivation to heal others.
- Set the intention to return to this practice whenever you feel depleted. You can also practice short moments of giving gratitude and receiving compassion from the earth throughout your day. For those of you who feel energized by this practice, a next step might be taking practical action to help protect what you love.
- May this practice help you and, through you, may it heal the earth.

## Appendix C

## Social Media and Climate Activity Sheet

Use the space below to write down the emotions you experience as you watch social media messaging around climate. For each new video you see, write down any new emotions you experience and put a tally next to any emotion you experience again.

Use the space below to write down any key terms or themes you want to remember or discuss.

# Appendix D

## Surveys

These questionnaires aim to understand teachers' perceptions of and feelings around eco-anxiety and its presence in the classroom before and after a workshop series.

**Survey 1:** To be given before the workshop series begins, at the beginning of *Session 1: What is eco-anxiety and why does it matter?*

1. What is your current understanding of eco-anxiety? How do you experience it?
2. Rate the severity of your eco-anxiety on a scale from one (nonexistent) to ten (severe and debilitating).
3. How does eco-anxiety show up in your classroom?
4. What ways do you currently address eco-anxiety in your own life and in the lives of your students?
5. What other teaching practices do you think could help you address eco-anxiety in your classroom?

**Survey 2:** To be given at the end of *Session 1: What is eco-anxiety and why does it matter?*

1. Rate the severity of your eco-anxiety after today's workshop on a scale from one (nonexistent) to ten (severe and debilitating).
2. What are your biggest takeaways from today's session?

**Survey 3:** To be given before *Session 2: Combating Eco-anxiety with Collective Action*.

1. Rate the severity of your eco-anxiety today on a scale from one (nonexistent) to ten (severe and debilitating).
2. What is your experience with climate action?

3. How likely are you to engage your students in a project designed to combat climate change at a local or global level? Rate your answer on a scale from one (not at all likely) to ten (extremely likely, already have, or in progress).

**Survey 4:** To be given after *Session 2: Combating Eco-anxiety with Collective Action*.

1. Rate the severity of your eco-anxiety after today's workshop on a scale from one (nonexistent) to ten (severe and debilitating).
2. How likely are you to engage your students in a project designed to combat climate change at a local or global level? Rate your answer on a scale from one (not at all likely) to ten (extremely likely, already have, or in progress).
3. What are your biggest takeaways from today's session?

**Survey 5:** To be given before *Session 3: Ecopedagogy for Eco-anxiety*.

1. Rate the severity of your eco-anxiety today on a scale from one (nonexistent) to ten (severe and debilitating).
2. Rate your current understanding of ecopedagogy on a scale from one (nonexistent) to ten (active and confident ecopedagogy practitioner).

**Survey 6:** To be given after *Session 3: Ecopedagogy for Eco-anxiety*.

1. Rate the severity of your eco-anxiety after today's workshop on a scale from one (nonexistent) to ten (severe and debilitating).
2. Rate your current understanding of ecopedagogy on a scale from one (nonexistent) to ten (active and confident ecopedagogy practitioner).
3. What are your biggest takeaways from today's session?

**Survey 7:** To be given before *Session 4: Indigenous Perspectives and Place-Based Education*.

1. Rate the severity of your eco-anxiety today on a scale from one (nonexistent) to ten (severe and debilitating).
2. Rate your current understanding of place-based education on a scale from one (nonexistent) to ten (active and confident place-based education practitioner).
3. Rate your current understanding of Indigenous Knowledge and Traditional Ecological Knowledge on a scale from one (nonexistent) to ten (deep, embodied understanding).

**Survey 8:** To be given after *Session 4: Indigenous Perspectives and Place-Based Education*.

1. Rate the severity of your eco-anxiety after today's workshop on a scale from one (nonexistent) to ten (severe and debilitating).
2. Rate your current understanding of place-based education on a scale from one (nonexistent) to ten (active and confident place-based education practitioner).
3. Rate your current understanding of Indigenous Knowledge and Traditional Ecological Knowledge on a scale from one (nonexistent) to ten (deep, embodied understanding).
4. What are your biggest takeaways from today's session?

**Survey 9:** To be given before *Session 5: Student Voices*.

1. Rate the severity of your eco-anxiety today on a scale from one (nonexistent) to ten (severe and debilitating).
2. Rate your current understanding of your students' needs around eco-anxiety on a scale from one (no knowledge) to ten (understand completely).

**Survey 10:** To be given after *Session 5: Student Voices*.

1. Rate the severity of your eco-anxiety after today's workshop on a scale from one (nonexistent) to ten (severe and debilitating).

2. Rate your current understanding of your students' needs around eco-anxiety on a scale from one (no knowledge) to ten (understand completely).
3. What are your biggest takeaways from today's session?

**Survey 11:** To be given after the workshop series ends.

1. What is your current understanding of eco-anxiety? How do you experience it?
2. Rate your agreement with the following statement on a scale from one (not at all) to ten (completely): The workshop sessions helped me to feel less eco-anxiety.
3. What were your biggest takeaways from the workshop series?
4. What do you feel was missing? Where do you feel you need more support?