

## Article

# 'Don't Say It's Going to Be Okay': How International Educators Embrace Transformative Education to Support Their Students Navigating Our Global Climate Emergency

Jeremy Jimenez <sup>1,\*</sup> and Laura Moorhead <sup>2</sup>

<sup>1</sup> Department of Foundations and Social Advocacy, The State University of New York, Cortland, NY 13045, USA

<sup>2</sup> Department of Journalism, San Francisco State University, San Francisco, CA 94132, USA; lauralm@sfsu.edu

\* Correspondence: jeremy.jimenez@cortland.edu

**Abstract:** Many education professionals are looking to Environmental and Sustainability Education as a guide to incorporate curricular lessons and activities into school classrooms and other learning environments. Building upon the framework of Jickling and Wals (2008) of identifying how to teach about environmental education in transformative ways, this study examined how the experiences and perspectives of seven faculty and staff members at a K-12 International Baccalaureate school in Singapore impacted how they taught about sustainability issues. It also investigated how they work to empower students to become change agents by employing concepts and strategies such as hands-on learning, systems thinking, and service learning. Qualitative interview data revealed four overarching key themes: (1) importance of local context (both the school and the broader socio-political context), (2) pedagogy in relation to student psychology, (3) teacher and staff views on effective pedagogy for teaching about climate crises, and (4) mental health, as experienced by both students and their educators. Teachers and their students regularly struggled with tensions of authority (e.g., school/government, parent/child, teacher/student) and outlook (e.g., "doomism"/hope, empowered/disempowered). Nonetheless, they expressed a variety of thoughtful ways to cultivate their students' lifelong advocacy for the environment and other related social justice issues.

**Keywords:** climate change; eco-anxiety; ecopedagogy; environmental sustainability; teachers; transformative education



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## 1. Introduction

With increasing awareness of the gravity of our myriad threats to ecological sustainability, many education professionals worldwide have been devoting more curricular and pedagogical resources to raising students' environmental awareness and implementing lessons and programs that address these issues through environmental and sustainability education. Given their generally ample resources and freedom from national curriculum mandates, international schools can be ideal locales to study how schools envision, experiment, and implement education for environmental sustainability. However, curriculums do not unfold in a vacuum; rather, they are enacted by professional practitioners with diverse values and, at times, competing priorities.

In our research, we interviewed teachers and school staff who prioritized sustainability issues in their interaction with students, in the context of ongoing global student climate strikes taking place during our visit. We were keen to understand what they thought it meant to live "sustainably", how their teaching was impacted by their local context and foreign identity, the ways in which they were concerned about the climate crisis impacting themselves and their students during their lives, the extent to which they or their students experienced "eco-anxiety" (and how they addressed it), and how their overall optimistic and pessimistic outlooks shaped their pedagogical strategies in teaching about

sustainability. More broadly, we also wanted to assess the extent to which they taught about climate change in “transformative” ways [1], which is less about indoctrinating students to accept particular viewpoints (and adopt particular behaviors) and more about developing students’ capacity to formulate actions based on their independent thinking. Thus, this paper examines in depth how the experiences and outlooks of seven faculty and staff members at a K-12 International Baccalaureate (IB) school in Singapore led them to prioritize teaching about sustainability in ways that empower their students to become change agents, both now and in the future.

## 2. Research Context

In the year prior to the COVID-19 pandemic, global media attention focused on the varied youth-led climate strikes, from the YouthStrike4Climate student march on 12 April in London [2], to the Global Climate Strike [3] held across 117 countries just prior to the United Nations for the Climate Action Summit on 23 September. The movement culminated in a global student strike in December 2019 [4], which mobilized more than a million young people along with many of their teachers and school staff. Our team devised and implemented a research study throughout this period. As we wanted to learn more about educational sustainability experiences and practices in a setting located outside of Europe or North America and among students primarily from a cross-section of countries across Asia, we focused on international schools in Singapore, which offered a particularly rich context for this research [5].

A sovereign city-state in Southeast Asia, Singapore is known both as the tree-lined “Garden City” and as the low-lying island currently facing the world’s likely collective future of rising sea levels—what Prime Minister Lee Hsien Loong called “a matter of life and death” and an existential threat to the island [6]. For this article, we examined one particular international school with a strong sustainability focus, as seen through their mission statements and programming. While the COVID-19 pandemic shifted attention from this growing youth movement, schools and young people are already beginning to refocus their attention on our climate crisis as the intertwining structures of environmental sustainability, public health and equity play out in new and perhaps accelerated ways; for instance, in April 2021, Greta Thunberg, the Swedish environmental activist credited with mobilizing many fellow young activists, spoke at a press conference for the World Health Organization stating “we can no longer separate the health crisis from the ecological crisis . . . we cannot separate the ecological crisis from the climate crisis. It’s all interlinked” [7]. Fridays for Future, the youth-led global group inspired by Thunberg, are once again happening around the globe and the group organized another global strike on 24 September 2021. While our study explores the perspectives and experiences of faculty and staff members working in ESE just before the first COVID-19 cases were reported in China, we will consider how ESE fits within our changing pandemic world.

## 3. Theoretical Framework

Research in the field of sustainability education covers a wide range of topics, including curricular content, teachers’ attitudes, and pedagogical interventions. For instance, some previous studies have focused on the value of introducing environmental principles at different age levels, with some finding that the greatest benefits come from content introduced as early as preschool and continuing the inclusion of those principles through all levels of schooling [8]. Research has also focused on teachers’ attitudes towards environmental issues, with some finding teachers’ comfort being immersed in natural settings being strongly related to positive commitment to incorporating environmental education in their instruction [9]. Other research has focused on the connection between teachers’ pedagogy and students’ environmental behaviors, with some studies finding that education tied to local community issues has been particularly impactful in motivating students to commit themselves to pursue positive environmental actions in their community [10]. Additional research studies employ quantitative research methods to document the cover-

age of sustainability education in curricular materials around the world, which have been greatly expanded over the past 50 years, especially in recent decades [11].

But beyond expanded coverage and positive rationales for environmental education, more recent research has also argued that educators must no longer shy away from addressing students' eco-anxiety and avoid downplaying the tragedy of the reality of what are significantly dire climate projections and worldwide ecosystems' degradation [12]. Given how broad the field of Environmental and Sustainability Education (ESE) is, though, how are teachers to navigate such complexity in their pedagogy?

Of course, ESE is a particularly difficult concept to define, given its myriad subtopics and sometimes conflicting priorities (e.g., protecting natural habitats is often at odds with humans' desire for industrial development). Some have identified three distinct teaching traditions of ESE: (1) the tradition of conveying facts and scientific evidence, (2) the normative tradition of promoting certain values and lifestyles, and (3) the pluralist tradition that prioritizes student participation and leadership [13]. For this paper, we rely on the third tradition while also being mindful of intersectionality issues—notably class, race, and gender—that may emerge [14]. This is one reason we sought to add to this cultural diversity of perspectives by visiting a school in Southeast Asia with predominantly east and south Asian students; the potential shortcoming of many previous ESE studies is that they can be “trapped within a restrictive monocultural definition of sustainability” [15] (p. 1), often focusing on the experiences of children living in Europe or North America, a trend we sought to counter in our previous Singapore study [5].

We also focused considerably on the framework of Jickling and Wals [1], who lamented how global institutions replaced what was previously called “environmental education”—having a clear ecological underpinning—with a more nebulous “sustainable development”, which they argue derailed the previous constructions' clearer environmental messaging. They also point out that much of what is called ‘economic development’ can, in fact, be detrimental to the earth [16]. Some even advocate abandoning the term altogether and advocating for “post-sustainability” [17], a topic to be further explored in the Section 6.

Scholars also distinguish between teaching that is empowering as opposed to teaching prescriptively [1]. Prescriptive, or ‘transmissive’, education relies on packaged curriculum and standardized messaging that “rests on the assumption that education is an instrument for getting one's ‘message’ into impressionable young minds—for implanting a particular agenda” [1] (p. 7). In contrast, transformative education advocates for knowledge and understanding as being co-constructed within a social context, where new learning is shaped by prior knowledge and diverging cultural perspectives. Such a socio-constructivist style of teaching provides more opportunities for independent decision-making on the part of the learner. [1] (p. 7). Other studies have also similarly encouraged student empowerment and critical thinking in curriculum [18,19], while yet additional research has found that the learning outcomes of ESE can translate into these and other competences (e.g., collaborative systems thinking, action, etc.) [13].

Thus, we examined the degree to which participating educators prioritized teaching about environmental issues in “transformative” ways [1]. Of course, even the precise meaning of ‘transformative education for sustainability’ has been contested, with some arguing for the importance of adapting one's pedagogy to diverse cultural perspectives both globally and within one's own learning environment [15]. For our purposes, we were interested in examining how education professionals working at a school committed to sustainability education thought about sustainability in their own lives and work, and what understandings, priorities, and strategies they employed to communicate such lessons to their students.

As such, we analyzed how these teachers' understanding of environmental issues and their assessment of their students' cognitive development and emotional needs guided their pedagogical outlooks and strategies. We also examined how they adjusted their curriculum and instruction to their local lived experience in Singapore, and how they worked to empower students to not feel helpless in the midst of today's alarming environmental

headlines. Given that we conducted our in-person interviews only a few weeks before the first COVID-19 lockdowns in China, we have found that our focus on mental health coincides well with issues often raised during the ongoing COVID-19 pandemic.

#### 4. Materials and Methods

As previously mentioned, the setting for this study was an IB K-12 school in Singapore, a city-state in Southeast Asia facing increasing climate-related crises. Typically, many schools, if at all concerned with teaching about environmental sustainability, incorporate climate and sustainability issues as elective coursework, clubs or one-day school events. However, of the multiple schools in Singapore incorporating IB programs into their curriculum, our chosen school stood out for its comprehensive environmental justice vision, which it shared with students, their families and the public. Students from this school, participating in a previous qualitative study involving multiple IB institutions, initially drew our attention to the school's sustainability focus [5]. We selected the school for its strong focus on and multifaceted approach to teaching sustainability, as determined by its mission statement, curriculum and hiring practices (i.e., the recruitment of teachers and administrators with both experience and passion for addressing the societal issues of climate change).

This phenomenological study, reliant on a typical smaller sample size (e.g., up to 10 persons), was designed to focus on individuals' own experiences of leading and designing curriculum for ESE and to allow observation of these individuals in their own lived work environment [20]. A school liaison who worked in the school's sustainability office reached out to the faculty and staff in the elementary, middle and high school programs via email to solicit potential interest in participating in our study; the message was adapted from our consent form. Seven educators, employed as either teachers or staff at the school and directly teaching or overseeing curricular programming that related to sustainability in education, responded to the liaison's request and were thus selected as study participants (see Limitations section for drawbacks of this convenience sample). While we had hoped to return to Singapore to conduct additional interviews, the COVID-19 outbreak that began to impact much of the world a mere few weeks after our visit precluded us from returning to interview these teachers further or to interview more teachers either at this school or other schools.

All interviews took place in a private room in the teacher's lounge during the school day. All seven participants consented to semi-structured interviews; each interview lasted between 15 and 45 min and was recorded and transcribed by our research team. Three educators taught or worked with primary age students (Maggie, Nia, and Sam), 1 with middle school students (Nigel), and 3 with high school students (Angelo, Lindsey, and Max). Because of the sensitivity involved in being foreign teachers in Singapore, all data have been anonymized and we've restricted the personal details shared of these teachers to their gender (4 females and 3 males) and a brief description of their positions and/or grade levels taught. The SUNY Cortland Institutional Review Board (IRB) reviewed this study (Protocol number 192023) and determined it to be exempt from further review.

We chose the semi-structured format to encourage participants to direct the course of our conversation towards topics and ideas that were most important to them; this work builds upon our previous work with students at international schools in Singapore and includes questions stemming from previous interviews and focus groups [5]. We designed our questions with a focus on simple queries, asking participants to describe their experiences generally and proceeded to make questions more probing as we established trust (see Appendix A for our interview questions). As part of our criteria for developing questions, queries were value-neutral, so as not to lead participants into particular responses; for instance, none of our questions used terms such as 'transformative education', 'systems thinking', or 'change agents, nor did we ask our respondents to explicitly comment on race, class, or gender issues, as we wanted to see how our participants might raise these ideas organically in our discussions.

We relied on grounded theory [21] beginning with open coding [22] in which each researcher individually applied emergent codes derived from interview transcripts. After two individual passes of each transcript, researchers collectively developed codes for shared features of lived experience [20]. We did not predetermine codes or subcategories, but noted what emerged from the interview transcripts. In interviews with staff and faculty members, several themes emerged through the issues and perspectives they raised. We systematically coded data into “clusters of meaning” [23] that represented the phenomenon of interest (i.e., leading and designing curriculum for ESE) [20] (p. 1375). We then moved into a second phase of coding (i.e., axial coding) in which we developed subcategories that led to explanations [22] (p. 24). During the final phase of coding (i.e., selective coding), we worked to develop a deeper theoretical understanding of emergent themes. We collected data using spreadsheets in which rows were assigned to an individual article and columns were assigned to an article’s code of interest or characteristic. Quotations have been occasionally condensed or edited for clarity or redundancy. In the following sections, we discuss these themes and ground them in previously published literature; while many responses were primed by our initial interview questions (see Appendix A) we also note when participants raised ideas without our specific prompting.

## 5. Results

The participants shared insights into how ESE is implemented at their school, what sustainability meant for them personally, and how their understanding of their students’ motivations and needs guided their pedagogical decisions. While multiple themes emerged from the interviews, four overarching themes stood out: (1) context (both the school and the broader socio-political context), (2) pedagogy in relation to student psychology, (3) mental health, as experienced by both students and their educators, and (4) teacher and staff views on effective pedagogy for teaching about climate crises.

### 5.1. Political Context

On one hand, Singapore is a multi-party parliamentary system with regular elections. On the other hand, Singapore is a stringent authoritarian government, ranked by Reporters Without Borders in the Worldwide Press Freedom Index in 2018 (the year before our study) as 151st out of 180 countries for its lack of freedom (by 2021, Singapore dropped to 160 out of 180 on the index) [24]. Shifting to the political realm, several participants discussed the prominent role that authoritarian governments, such as Singapore, can play towards positive climate mobilization; however, they also acknowledged how their school may at times inadvertently reinforce their host country’s authoritarian inclinations. For instance, school officials were wary of promoting any action that the government might perceive as supporting mass organizing, which the government actively curtailed [25]. As high school social studies teacher Max pointed out, international teachers in Singapore are bound by a “legal framework” guided by two priorities: the “politics of the country” and the “politics within the school.” This tension, though particular to this one school and Singapore, offers an opportunity to consider how the intertwining of context and power can affect pedagogy and, ultimately, learning in regard to ESE. Thus, it is important to understand how context impacted participant discussions and teaching of contemporary sustainability issues.

Sam, who identified as a radical environmentalist, perceived government restrictions on organized gatherings for political purposes as an obstacle to her students’ capacity to engage in climate-related activism:

I’m thinking about when the [high school] students asked permission to strike on a Friday and were persuaded [by the school] not to. Are we educating change makers or not? I understand why, especially here in Singapore, [students] would decide to go and say, ‘Would you mind if we did this?’ If they were persuaded not to do that and then not to do anything, then . . . maybe have a big assembly

where they talk about it . . . why didn't they do something like that? They should not have been completely and utterly discouraged from doing [something].

However, a teacher named Maggie found room for positive alternatives within these restrictions. Maggie cited a student who asked—given that she and her peers could not strike for the climate—what could they do instead? Maggie explained how her class “decided that Friday afternoons were going to be their Fridays for the Future, when they could research actions that they could take individually and as a collective that would positively impact the community. I would say people still worked together to take action and bring awareness, even if maybe not in a political form.”

Similarly, Lindsey, a staff member who worked with students directly concerning environmental issues, discussed how she “felt pretty helpless in the grander scheme of things” because she “never could make a change in Singapore because [she was] a foreigner”, whereas if she were in the UK, she “could be a part of . . . actually driving towards change, like with the Extinction Rebellion”. However, this led her instead to focus on “what we can do in the school and [how we can] try and spread that message globally, to the countries where students are from”.

Overall, Lindsey viewed living in Singapore as a “bubble with positives and negatives”:

When Singapore decides to change something, it can happen instantly. That doesn't happen in the UK, where things are long and drawn out . . . I've seen shifts in Singapore over the last year on a basic level, like trying to limit plastic bags. They're trying. There's not a whole lot happening, but you can see the narrative is sort of going in that direction.

Lindsey also acknowledged that the speed and severity of the climate crisis makes her more amenable to contemplating more draconian means to pursue change:

We don't have that much time. I think the time it would take for people to change hearts and minds is longer than what we have. I think there definitely needs to be a certain level of eco-authoritarianism. Yes, definitely. Like in the UK, they charge for plastic bags, and it decreased plastic bag use by 90%.

### 5.2. Sustainability-Focused School

Another crucial local factor in this study was the school's focus on sustainability education [26]. Several participants discussed how the school provided them with a sanctuary of sorts to practice pro-environmental behavior, being nestled in a country with little infrastructure to support such a lifestyle outside of school. Nonetheless, Lindsey mentions “this is something people get quite torn about”, elaborating:

There's also part of me that thinks I'm almost contradicting my belief by living here because there's a lot about Singapore that I don't agree with . . . Are we doing what we're doing for ourselves, or are we actually doing anything for the greater good? It's hard. You kind of tell yourself you're doing that here at this school because you can't really do it outside of this (school) bubble.

Similarly, Sam discussed her experience moving to Singapore a decade ago:

I went to IKEA to buy my boxes for organizing my recycling, my neighbors thought I was a complete nutcase. I was the only person on the street who did it. We'd put it out . . . The same truck comes along, and it all ends up in the same place. That is challenging because on one hand, we're saying to kids, 'You need to do this. You need to think about this. You need to make sensible choices about that.' Yet, there are no sensible choices here.

Beyond individual actions, nearly all participants discussed the UN's sustainability goals in-depth and how essential 'systems thinking' was in facilitating students' development as lifelong environmental advocates. Systems thinking has many definitions, but at

its root focuses on moving beyond studying things in isolation but rather through their relationships [27]. The school's faculty and staff looked for ways to embed systems thinking into their curriculum. For instance, a middle school teacher, Nigel, discussed how he regularly linked current events to the UN sustainability goals by encouraging students to examine issues from "nature, economy, society, and well-being perspectives". Another high school teacher, Max, supported his school's sustainability focus but felt constrained by both the IB and General Certificate of Secondary Education (GCSE) curriculum, saying:

there is a small nod to—it used to be the millennium development goals and now it's the sustainability development goals—carbon pricing and things like that. But things have moved on so much. I'm not sure the new IB syllabus really hits the mark when it comes to environmental economics. It's almost a bit of a . . . nice to have add-on rather than becoming core of what it needs to be. The GCSE has pretty much nothing in it . . . the lesson materials that I've seen around that are quite poor if you actually know a little bit about the broader sustainability issues and themes. I've seen a lot of them that are very much about corporate responsibility and being nice, but not core issues—well, actually the biggest impact of that company is their carbon emissions or their chemical production, storage, and disposal . . . It's very much about 'Oh, we've gotta be nice and do nice things with philanthropy.' It's just a little wishy-washy. I think it can be much better.

Another teacher with a science background, Angelo, applied systems thinking to criticize what he felt was often the uncritical endorsement of increased energy efficiency as a way to solve the world's energy issues. He asked students to imagine what if:

all of a sudden, we have no limit to the amount of energy we can obtain from the environment, pollution free. What happens then? This doesn't cure the innate greed of humans to develop more and more—we end up with a planet that looks like . . . that Star Wars one, where the entire planet is a city.

Such comments mirror the works of some scientists who have argued how current energy efficiency and renewable energy promotion proposals in the United States could actually make our climate crisis worse [28].

Some participants discussed an aversion to their school promoting single awareness days such as 'Earth Day', finding them counterproductive to the school's mission by cordoning off environmental teaching to one day, performative events. Max discussed how he tends not to promote things like 'Earth Hour', an annual international event that encourages the switching off of lights for one shared hour to show support for the planet; he would "much rather have a discussion that's ongoing". Sam similarly considered such events "wishy-washy" and preferred to have multiple days devoted to specific environmental issues ("why not have a Water Day?", she proposed).

### 5.3. Community Engagement

Despite some of the limitations regarding the country's nearly non-existent recycling and composting infrastructure, participants noted how within their island of a school they could more easily practice what they preached, and found opportunities to promote systems thinking and sustainability within their hyperlocal community, particularly alongside the school's service-learning efforts. Researchers have credited community-based learning activities with enhancing academic performance and improving students' environmental literacy [10]. As Maggie described:

I think the idea of service learning is slowly catching on. What this school does really well is putting the environmental piece in a social context and keeping it close to home . . . kids see food from the cafeteria go to the compost center. A year later, it becomes the compost that then goes into the garden.

Several teachers and staff at this school described how students participated in local community service activities through the school. For example, Nigel described a school

program in which students went to an elderly care home. As he explained, the program provided students with a window into the lives of others, given that many students at the school are “ex-pat kids from wealthy, privileged backgrounds who don’t have much access or connection with marginalized communities or with communities that have difficulties or different abilities; it’s just beautiful to see these kids making connections with the elderly, and then we debrief every second week.”

Nigel found that such programs helped students not only recognize their privileged background, but also helped them consider how climate change might affect different socioeconomic groups and marginalized communities differently. However, Lindsey noted that sometimes students’ parents were an obstacle to students pursuing more sustainable individual choices. She discussed how her students struggled to enlist their parents to support them in adopting a plant-based diet (we noted that plant-based diets were strongly promoted through video messages in the cafeteria as well as the school newsletter):

A lot of kids have chosen to limit their meat intake. A few have become vegan. Quite a few are now vegetarian. It’s something that’s really accepted, promoted, and very easy to do here. But when they explain that to their families, that has been the hardest part. You’re supposed to obey your parents.

Lindsey also emphasized the cultural context of the schools’ student population as being a key reason why obeying one’s parents was more imperative than one might experience in a North American or Western European school.

#### 5.4. Student Psychology

Nearly every participant discussed how their pedagogy was guided by their experiences with child or adolescent development. A theme expressed by four participants was how often teenagers saw environmental issues in “either/or” terms. These teachers struggled to get their students to appreciate more nuance in recognizing and promoting sustainable practices, as noted in Table 1 below:

**Table 1.** Participant recognition and promotion of sustainable practices.

Participant	Interview Quote
Sam	<i>I’ve got a \$2 plastic Starbucks cup that . . . I’ve had it for several years. A student came up to me and he went, “That’s plastic. That’s disgraceful.” And I’m going, ‘But I’m reusing it, and I’ve had it for years—I use it every single day’ . . . I think the primary school kids see things very black and white, so either it’s good or it’s bad. It’s trying to get them to see why plastic is good in certain situations, but that we use it or that we dispose of it incorrectly.</i>
Nia	<i>I suggested we can make an assembly where students write the ‘change-makers’ [phrase] on the backs of paper that we’d go, ‘Give us a C, give us an H’ [in a cheer to spell out the word]. And they’re like ‘we don’t want to waste paper; you should use white-boards.’</i>
Max	<i>There’s an awful lot of people trying to break things down to simple behaviors like ‘Let’s not use dairy; let’s use almonds instead.’ I said, ‘Well, if we look at that a bit closer, about 75% of almonds come from California. Almonds have huge water needs, and Central California is a drought-stricken area. How is that good for sustainability for the people who live in California?’ ‘Oh.’ It’s those kinds of examples—just getting them to think a little bit deeper about things.</i>
Nigel	<i>It’s easy to say fossil fuels are bad. They’re clearly not sustainable, so [students] will say, therefore, renewable energy is [all good]. That’s a logical assumption from a teenager. Should we be correcting them and saying, well, actually, yes, it’s better, but is it truly sustainable, like, indefinitely? Too much for [a] 12-year-old kid? . . . So we look at sustainability in a simplified version to give a good message and to make steps towards understanding the SDGs and systems thinking.</i>

#### 5.5. Rebelliousness

Another aspect that participants recognized amongst teenagers was the appeal of rebelliousness, often for its own sake. Nigel mused that many teenagers would be naturally inclined “to buck against what the school system is”; this could explain why some students resisted the schools’ recommended environmental actions, despite their ecosystem benefits.



To some extent, he welcomed student cynicism, which he appreciated as “a form of questioning” with students “having an opinion” and just being a “Devil’s advocate”. However, he noted that sometimes students doubled down on a position simply to win an argument:

I think probably every meat-eater inside deep down genuinely recognizes that [eating meat] isn’t great [for the environment]. But when somebody who is a vegetarian or a vegan calls them up on it—then they’re on the defensive, and so they come across a counter argument they’ll put in their locker for next time—just because they don’t want to lose a fight . . . that is how teenage brains are wired. They’ve got to rebel.

Maggie similarly found that students “don’t all want to drink the Kool-Aid here; I think it’s just more about ‘I’m a teenager and I want to be able to make a decision that’s different’, being against what ‘the man’ tells them”. Nia, another elementary school teacher, finds that one way she can address this rebellion for rebellion’s sake is to empower students to voice their opposition to the school’s specific environmental policies or proposals, but then push them to discuss their alternative idea or plan. When some of her primary school students would say “Let’s get rid of vegetarian Mondays—we hate that”, she would encourage them to follow through and propose alternatives.

Most participants also discussed how students’ climate concerns and commitment to sustainable living were polarized; that is, participants generally claimed to be surprised by the high levels of apathy in some students alongside the very high levels of engagement in others. Nia shared that her own daughter is a teenager who is not concerned about climate change at all, sharing how her daughter once stated “well, it’s going to end anyway”, but then she followed up sharing that she thinks “there are a lot of kids at our school that are always looking for new solutions”. Lindsey noticed similar divergences:

It’s surprising how many students still—even with all the environmentally focused conversations and themes—will openly say they don’t care. Maybe that is part of just disconnecting because they don’t see [climate change] as being solvable, or it’s a particular demographic of people that we have here that are generally from very, very well-off families . . . I don’t know . . . maybe they have different conversations back home? I thought that this age group would be the strongest, especially in terms of, like, Greta Thunberg. But yeah, I haven’t actually seen that to the extent I thought I would. But then of the ones that do care... I don’t think they even see it as ‘my world is being ruined; I need to change things for my benefit.’ I have been surprised by how willing they are to sort of put this above everything else, like above all of the anxieties that teenagers have . . .

### 5.6. Mental Health

Open discussion of mental health issues at all educational levels has become increasingly prominent throughout the COVID-19 pandemic, but many of the participants we interviewed raised the importance of prioritizing mental health issues in their pre-COVID-19 interviews. We asked participants to comment on the extent to which students demonstrated evidence of experiencing eco-anxiety. Lindsey said that “it’s definitely something that has increased a lot in me and in the students . . . it’s been a really fast shift in the last year”. A common issue among people deeply involved with environmental justice work is compassion fatigue, namely, reaching a point where a person becomes so emotionally burdened with the weight of processing how much oppression some people are forced to endure that the person finds it difficult to continue discussing or learning about such issues. Sam shared her assessment of why students’ likelihood of burnout varies at different ages, saying she “doesn’t see empathetic burnout amongst the primary school children”, but admits she may sometimes find it in teenagers.

She continued in this vein, making the connection between being encouraged to reflect on one’s feelings and their capacity to care for the Earth:

Certainly, we learn to talk about our feelings. Boys are allowed to cry and all of that. That's terrific, but you've actually got to also teach them what all of those feelings are so they can name them and know that they're feeling—how despair one minute might be euphoria in another minute. I think that all leads them to empathy and caring about [the] environment as well.

These environmentally conscious international teachers also struggled with balancing living low-impact lifestyles with pursuing choices that aid in their own mental well-being. As Maggie explained,

If we truly lived environmentally—putting the environment at the heart of everything that we did—then the economy, the society, our well-being . . . those would all be negatively impacted, right? And so for me personally, I try to make the right choice, but I know that sometimes I can't. Flying back to New York next week isn't great for the environment, but it's really good for my and my family's well-being. That's what I try to bring to the classroom, too. Maybe it's taking baby steps toward these sustainable actions that we're doing. I worry about the well-being piece of it. If we kill ourselves in the process of trying to do all this, then we haven't really achieved that equilibrium.

These comments speak to how getting caught in the rabbit hole of being the ideal environmental citizen is, itself, unsustainable for most people. Similarly, climate scientist Kate Marvel wrote how she “has no wish to isolate (her son) from friends and family by insisting on radical changes; a carbon-free life seems a solitary one: no travel to see grandparents, awkward refusals of invitations, precious time with friends replaced by gardening, canning, mending . . . ” [29].

Lindsey analogously discussed her difficulty balancing these priorities:

I kind of go between wanting to do everything I possibly can—changing my own actions, changing other people's actions. Then realizing that that's not enough and then thinking ‘Why am I making myself miserable when a lot of people don't care?’ So, I try to disconnect and think, ‘Okay, I'll just try and do what I can myself.’

On the other hand, some participants shared how living in Singapore had insulated them from direct experience of worsening climate change. Sam pointed out that she does not “see massive eco-anxiety in my life; I think we're very sheltered from it here in Singapore”. However, later she shared:

I do have a certain eco-anxiety, particularly with Indonesia and the rainforest and the haze that happens. My son ended up in hospital when he was tiny in Singapore, purely because of the haze. What frustrates me is people in Indonesia said at the time, ‘But they're all Singaporean companies,’ and Singapore is going, ‘Yeah, but it's all happening in Indonesia.’ That really frustrated me. That gives my son a certain amount of anxiety. When he sees on the news that there's burning going on, it's not really an ecological issue for him. It's a personal health issue for him. He gets worried that he's going to get sick again because he was tiny, and it was traumatic.

### 5.7. Pedagogy for Change Agents

“We're trying to produce change makers who are not only aware, but who feel empowered to go about making a difference, make positive change, and encourage that sort of autonomy.”—Angelo

This final section focuses on how teachers prioritized facilitating students to become change agents, and what strategies they found helpful or counterproductive. Often, the notion of change agents in education has been reserved for teachers and how they might create change in their schools [30]. However, teachers at this school regularly spoke of encouraging students to be change agents both inside and outside the school environment,

with some defining a change agent as one who “intentionally make things happen by one’s actions” [31] (p. 20). The first common observation was the focus on inclusivity and its role in leading to positive change; participants were keen to have students at all grade levels participate in some way, and this was further enabled by some school positions specifically aimed at fulfilling this (i.e., participants who were tasked to support primary school teachers in delivering the service and sustainability development curriculum).

Maggie argued that students at the earliest ages already have some sense of wanting to ‘do the right thing’ and that their inclination should be further encouraged. But she felt that it was essential to address environmental issues by the time students are 8 or 9 years old because “that is when they might be starting to independently access media about climate change”. But every participant, in their own way, argued that honest and in-depth coverage of climate crises was important, but insufficient; these teachers also discussed what methods were effective (and ineffective) at keeping students engaged in ‘transformative’ learning practices [1].

Shame has been a tool used by some climate advocates, notably Greta Thunberg and Kevin Anderson (a British climate change scientist) to encourage residents of high-income countries to curtail their high carbon-emitting lifestyles; for example, the term “flygskam” is actually a Swedish neologism that means to shame people for their disproportionately high carbon footprints wrought by air travel (fittingly, both Thunberg and Anderson have lived in Sweden for long periods of time). When we asked about the role of shame in climate advocacy, no participant found it to be a useful way to encourage pro-environmental behavior among students. Nonetheless, the issue of “flight shame” surfaced multiple times. For instance, Angelo called it a dilemma for he and his fellow international teachers. “With half a family on one side of the world and half on the other”, he explained,

we’re thinking about ways to cut down on long-haul flights and the rest of it, but I don’t think shame is the way that people are going to have their minds open to possibilities . . . No one likes to be told what to think.

Lindsey further reiterated that shame is not going to influence “people that don’t care or people that have switched off”. Instead, she found it “better to think about ways to have a conversation that focuses on an area that they do think is important, or an area that they think they could change by trying to meet them on kind of an equal ground, so they don’t feel like they’re being yelled at”.

She further discussed the frustration her students experienced when pursuing shame-based advocacy strategies:

the ones on the environment committee are a lot more angry with governments, countries, previous generations, but also angry with some of the younger (students) . . . there’s a few grade 8s and 9s [14- and 15-year-olds]—that really don’t care . . . These kids have been trying to have conversations with them, and I think they’re just hitting a brick wall because they’re going in strong [and] just explaining: ‘This is the logic; why don’t you understand and how could you not care?’

Similarly, Sam shared that:

Shame is a very negative way of going about it . . . Let’s not throw the blame around. Everybody is to blame. It snowballed. This is where we are. I think blame and shame [are] the wrong thing to do. Let’s move forward in a positive frame of mind.

#### 5.8. *Avoiding ‘Doomism’, without Sugarcoating*

On the topic of positivity, nearly all participants emphasized their wariness in communicating bleak climate assessments in the absence of empowering students with ways to respond. For instance, Maggie said that she “would hope that at a primary age we haven’t scared kids to the point that they have eco-anxiety, because I don’t know if the scare tactics are really super productive”. Sam discussed how she addressed the rainforest destruction in Indonesia:

You might get some kid who is desperately upset about it and you want to say, 'It's going to be okay.' That's where you've got to stop yourself. As an elementary teacher, you want them to leave happy. But whatever it is, don't go, 'Oh, but it's okay because somebody else is doing something about it.' Instead, it can be, like, 'I can see that this is really upsetting you, so let's find a positive way that we can make an impact together to do something about it.' It's about asking them for their help.

Of course, anxiety about global catastrophes was not unique to this generation of students. Angelo recalled how children in his generation grew up fearing "extinction by Russia and America stockpiling nuclear weapons" that were "in your face all the time" through "all sorts of simulations and what ifs (and) movies and war games". Of course, what sets apart today's anxieties from the Cold War is that while some nuclear anxieties still exist, this is further coupled with a steady march of ever worsening environmental news. Most participants openly acknowledged that there is much to be concerned with regarding our planetary health; in fact, 3 participants used the phrase "doom and gloom", even though interviewers never used that phrase. Nonetheless, their assessment made them no less likely to see advocacy and action as imperative responses to these crises. Angelo further explained:

A lot of the anxiety of the really young students these days is about global warming. It's about the tipping points. Now, there's a lot of severe warnings, but people shut off to things which they feel are hopeless. We know that doom and gloom approaches to the hopelessness of humankind or the biosphere or anything else is [not] going to have positive impacts. It cripples people's autonomy, their ability to change things. And so I think that they've got a very ambitious mission here . . . It's not making light of it. I don't work out how close we are to these tipping points. I don't sort of pull in, you know, pictures of polar bears balancing on ice cubes up in the Arctic. That's not really of any benefit. Rather, I focus on how can we be critical thinkers . . . make the biggest changes in our lives become politically active [and] get involved in making positive differences? I think that it . . . has to be based on an optimistic outlook. I would like to think that's the direction that comes from all the teachers in the school.

Other participants agreed as seen in Table 2 below:

**Table 2.** Participant interview responses to avoiding 'doomism'.

Participant	Interview Quote
Nia	<i>You don't want to be doom and gloom about the art you're making every day. You want the work to have meaning. But I think we have to be mindful of not always pushing on them that it's going to be the end of the world. Because I just think they almost get so much of it. It's like watching violence—you're just not affected by it anymore. But we teachers don't really talk about it amongst ourselves, what we're pushing out there.</i>
Nigel	<i>There are pockets of hope, but in the world that we live in, it's stories of doom and gloom. [Those] are the ones that make the headlines, so those are the ones that are in kids' heads. But the hope's there. In every grade level, we often start our classes with what's going on in the world. If we have knowledge that the world's kind of screwed right now, then we need to go, 'Okay, so what's wrong with the world? What can we do about it?'</i>

Sam generally agreed with this role for action, albeit with some inclination to avoid being overly optimistic, stating

we want kids to know that they can take action and we want them to be . . . global citizens. But a kindergartner doesn't have too much impact on the car that they take to school, right? And so keeping things in balance is a big problem. Perhaps it's a pessimistic view but change takes a generation, right? And so we just have to know that . . . we're not changing anything for next week.

Another theme was the importance of teachers allowing their students to come to their own conclusions about how to both interpret and develop action responses to worrying environmental news. Angelo said he is “much more in favor of allowing them opportunities to experience things firsthand; they have to learn to come to their own conclusions about things”. Lindsey also shared how initially she pushed to have deliveries banned because of their environmental impact, but always had doubts if this draconian action was the best course. She shared her own journey in moving towards delegating agency to students:

At the beginning I was trying to control things like, “This is what we do here’. We would discuss it, but I would be controlling what we do. But actually, it’s amazing what teenagers—when they’re passionate about something and the ideas they have, when you give them the space to think and bounce ideas off each other—they can produce some amazing things, things I never would have thought of. Students can really take ownership and work together themselves on this without you needing to take that much control. I think it’s really important to give them the time and the space to be able to do that and to try and figure out solutions and actions themselves.”

In this sense, Lindsey previously had adopted “an authoritarian and hierarchical view of social interactions,” what Jickling and Wals referred to as “Big Brother sustainable development” in which ‘authorities’ have determined the correct course of action and the purpose of education is to implement this course. However, she later decided that rather than tell her students what actions to pursue, she instead shifted to encouraging students “to critique and transcend social norms, patterns of behavior, and lifestyles without authoritatively prescribing alternative norms, behaviors, and lifestyles” [1] (p. 7).

Nigel tied service learning with this optimistic outlook, finding it essential to give opportunities for students to experience positive outcomes from their actions. As he explained:

What’s going to make students want to go to the care home again for people with dementia and play some memory-matching game? It’s that, ‘We tried this; it was our idea; we saw it working; it made a difference. And when they go home that day and their parents are, like, what did you do at school today . . . they’re going to talk about it at home. There you go—there’s an education; there’s hope. And if you can see it because of something that you as an individual did, not something that you read about, not something that you saw on TV, but [as] something that we thought out . . . Yeah, no need to wait until I’m an adult to start trying to make a difference; let’s have a go now. Let’s make mistakes when we’re young, and let’s have successes when we’re young.

Angelo further elaborated both the system thinking and mental health benefits of the school’s urban gardening program, which helped students “appreciate the complexities” that go into their food supply, such as

food security, the miles necessary to transport food, locally produced food, the connection of people to their own physical well-being . . . It’s emotional well-being as well, a very relaxing way to spend time . . . You can’t expect young people to want to conserve it until they’ve had experiential learning first . . . they’re nurturing plants, appreciating interconnections and ecosystems, appreciating that soil isn’t just dirt, appreciate what goes into it . . . even if it’s just a kid that’s not afraid to pick up a worm by the end of it.

In inviting students to come to their own conclusions, however, we had asked Lindsey how she might react if a well-informed student approached her and concluded, “I don’t think we will ever get out of our carbon trap, and we can’t stop climate change from continuously getting worse. Do you agree?” She replied:

No one has approached me saying that, but I’m waiting for when they do. I wouldn’t say I’m that well-informed on the data, but I think underneath I feel

like, really, there is no way out, which is part of that eco-anxiety thing. I suppose I think 'I'll just do the things that I can do myself—at least we can feel good, like we're doing our part. But, yeah, it's really hard. I don't know how you answer that, particularly with younger people that are really just starting their lives.

Given our small sample size of 5 teachers and 2 staff members, we had not initially planned to analyze if there were any differences between these two subgroups. Despite this, after coding our interviews, it was noteworthy that all the teachers indicated it was important for them to project optimism to students in their role; meanwhile, the two staff members were not only more pessimistic about the difficulty of overcoming obstacles preventing collective change, but they never expressed any sentiment about the importance of being optimistic (see Section 6).

In general, discussing climate crises and other daunting lessons is difficult with any audience, but these practitioners often highlighted the importance of appreciating 'the teenage brain' with regard to what they called "black and white" moralizing and a penchant for rebellion. They came to adjust their message based on where each student fell on the activism and apathy spectrum. Much attention has rightfully been paid to the fact that privileged people living in industrialized countries such as Singapore have the luxury of not being too concerned about climate crises at the moment. But some participants shared that their eco-anxiety was not always just about an uncertain future; it could also be about how even living in a high income, developed state cannot protect them, such as from experiencing the impacts of Indonesian palm oil fires.

Overall, we found that many of our participants' perspectives and pedagogical priorities were mirrored in a recently published collection of essays written by scholars and environmental advocates writing from a Deep Adaptation framework [17]; interestingly enough, these scholars early on called for the need for "transformative adaptation", which aligns well to our focus on transformative education. For instance, our participants' anti-shame perspectives match similar research advice to avoid blame (including 'inter-generational blame') and shame, since it's considerably more fruitful instead to focus their action on "the systemic oppression that has caused environmental destruction" [17] (p. 141).

Our participants regularly brought up "systems thinking"; the Deep Adaptation framework similarly advocates for a 'systems thinking' perspective [17] (p. 31) [32] (p. 283), finding it problematic how traditional curricula "separate(s) disciplines without a sense of how they connect" when "education needs to recognize interconnectedness" [33] (p. 229). The Deep Adaptation framework repeatedly and explicitly emphasizes the importance of supporting emotional well-being, as advocated by participants Sam, Max, and Maggie. Nigel's work with service learning and Lindsey's empowering students to decide their own environmental policies for their community mirrors research findings that young people need to be "given more opportunity to engage in meaningful decision making and experience instances of failure and success in a space that embraces the value of both" [33] (p. 232). Furthermore, though most participants discussed to some extent their feelings of guilt in falling short of being ideal environmental citizens, some Deep Adaptation scholars have criticized this 'neoliberal' focus on "individual actions as a consumer (such as) switching light bulbs and buying sustainable furniture" when instead people should be "promoting political action as engaged citizens" [17] (p. 74); nonetheless, our participants usually discussed both, as they considered their own individual ecological footprint alongside empowering their students to be thus collectively engaged (that is, within the limits of possibility afforded by living in Singapore). If there were any participant perspectives that did not align well with the Deep Adaptation framework, it would be our many participants' commitment to maintaining an optimistic orientation (see Section 6).

### 5.9. Limitations and Future Directions

There are numerous limitations to our study that make it impossible to generalize any of our findings to other international teachers in Singapore and elsewhere. First, we chose a school that had a significant sustainability focus (i.e., an institutional mandate);

thus, sustainability-inclined teachers might not only be more likely to seek out this school, but also more likely to volunteer to participate in our sustainability-themed interviews. Secondly, our sample size was small, and again, participants represent a convenience sample from a research site primarily chosen for its student population; that is to say, we prioritized our time at the school to interview students, and asked for our facilitator to help arrange interviews with any willing and available teachers during whatever time available during our visit that was not reserved for student focus group interviews. To some extent, participant availability was limited because our visit took place during the week of the International Student Climate Strike (mid-December 2019), which consequently was also the week before their school's winter break. As such, some potentially willing participants were too occupied with end of semester priorities (service-learning projects, grading, study sessions, etc.) to participate.

Most of our days were spent with student classes and focus groups, data which we triangulated with pre-surveys. We requested that all of the remaining time during our week-long visit be scheduled to interview faculty/staff participants. We expressed our preference to hear from a variety of participants from diverse backgrounds (ethnicity, gender, subject, grade level, teacher vs. staff, etc.); however, the time available for participant interviews aligned with only the seven participants able and willing to be interviewed on relatively short notice and at the end of the school semester, given that our IRB protocol was approved only two weeks before we arrived. We had initially planned to set up additional interviews in a follow-up visit in Spring 2020 as well as interview teachers at another international school featured in our first student-focused study, but by early 2020 the COVID-19 lockdowns that began in Singapore prevented us from returning to interview any additional teachers beyond our initial seven participants. We had briefly contemplated how we might shift to virtual interviews as a potential substitute to an in-person follow-up visit for continued data collection, but our concerns about data privacy and trust building in this particularly sensitive local context ultimately led us to reject this alternative plan.

Some ways in which these limitations can be mitigated for future studies is to encourage researchers to first focus on data collection in the countries in which they reside, given the vast number of teachers available worldwide from which to glean insights. Researchers can also aim to develop more local academic partnerships so that data collection might continue should researchers be unable to return to a site due to COVID-19 protocol or other restrictions. Furthermore, researchers can employ snowball sampling techniques to reach out to teachers in countries in which there is currently very limited data collection, given the vast network of international educators, many of whom spend their entire careers moving every few years to new schools around the world.

Furthermore, although all teachers in Singapore may feel some degree of constraints given the political limitations of the country, international teachers simultaneously have more curricular freedom while nevertheless needing to navigate their precarious residency status of foreign workers. Given that many climate education studies are conducted in countries without formal restrictions of political speech and organizing, we think our study emphasizes the importance of seeking out the voices of students and teachers living in authoritarian contexts, provided such studies are conducted with proper due diligence. Potential future directions for research that might address these limitations include studies that expand this work to additional educators and other schools and geographies. Would similar findings result at other IB schools with a sustainability focus inside and outside Singapore? Also, how do educator views compare between those schools with a sustainability mandate and those with more self-selecting learning opportunities regarding the environment? As this exploratory study highlighted educator-reported differences in viewpoints by student age, further research into how students' developmental stage may affect their climate outlook, along with further studies aimed at learning from current practitioners, is warranted.

## 6. Discussion

Despite Singapore's self-promotion as a 'green city', most participants found it somewhat difficult to pursue both their preferred individual lifestyle choices (due to lack of infrastructure for things like recycling and composting) and minimal capacity to shape any local policies (given their precarious status as foreign workers). Thus, to varying degrees they found their school as a sanctuary for professing and living their environmental ideals. These practitioners were capable of recognizing what George Monbiot has called our hypocrisy gaps—namely, the difference between living the lifestyles we aspire to versus the lifestyles we currently pursue; yet, they continuously strived to question how they could be better environmental citizens [34]. They exemplified commitment to transformative education for sustainability by making students "active participants in ongoing decision-making processes within their communities" [1] (p. 8) while avoiding a "feel-good sustainable development" in which students were granted "a limited, or false, sense of control over their future and their ability to shape the future while in fact authorities of all kinds remain in control" [1] (p. 10).

It was noteworthy how often participant responses aligned with student responses from our earlier study [5]. For instance, both participant groups highlighted the difficulties students experienced in finding acceptance for plant-based diets outside of school; often, parental authorities presented barriers to adoption. However, there were occasional contrasts in our participants' foci; for instance, in our previous study no students discussed air travel as contributing to burning carbon emissions; yet, several educators discussed their awareness of their own carbon emissions from their flights to visit family back home.

### *Reframing Optimism*

Most participants discussed the importance of avoiding "doom and gloom" perspectives to fulfill their school's mission—as well as their own—to develop future change agents. Such a commitment will no doubt be ever more daunting, as some respected climate scientists such as Jennifer Francis, a senior scientist at the Woodwell Climate Research Center, are now no longer embracing an optimistic outlook:

I'm not optimistic . . . we've already put so much carbon dioxide into the atmosphere, and that carbon dioxide lasts a very long time . . . we haven't yet felt the impacts of the carbon dioxide that we've already put in the atmosphere. Even not thinking about feedbacks, we've already got a lot more climate change built into the system. [35]

In fact, some scientists are warning that even if climate mitigation policies were widely adopted soon, we might not see positive impacts for decades [36]. In recent years, there has also been a growing number of academics arguing that global organized society will likely not be able to withstand the myriad forms of environmental devastation alongside growing resource constraints [37]; a recently published study argues that "global civilization is very likely to suffer a catastrophic collapse in the future (within a few decades)" [38]. As such, how can one remain optimistic when nearly every climate change report repeats the same refrain of new data demonstrating that current trends are consistently 'worse than previously expected'?

In their varied nuanced responses acknowledging and elaborating concepts such as resource constraints, tipping points, closing windows of opportunity, time lags for implementing policy, and the fundamental lack of long-term sustainability of so-called 'renewable' energy policies, our participant educators were clearly well-informed of the daunting and complex nature of our myriad environmental predicaments. As such, it's hard to imagine many, or even perhaps any, of our participants ascribing to some rosy narrative of how humans are going to successfully 'step up' to make the necessary lifestyle and policy changes coupled with scaled-up implementation of some key technological advances in carbon capture or other forms of mitigation (such as marine cloud brightening). Thus, an important question going forward would be interrogating this notion of optimism, by eliciting from those remaining optimistic about what an optimistic future may look like.



Can being optimistic mean acknowledging that the future will generally be worse for most people, but not as bad as the worst-case scenarios (i.e., RCP 8.5)? Or maybe it means having confidence in our collective ability to slow down the pace of our carbon emissions leading to global warming, so we can better build resilience towards its future impacts? Or could it be the optimism of those who regularly play the lottery for the jackpot millions—that is, knowing there is not a rational basis for the desired outcome but nonetheless keeps committed for the slimmest chance of a positive outcome? Or might optimism be viewed as being confident that we will still find ways to pursue joy and meaningful lives amidst unfolding future hardships? Lastly, perhaps it might mean accepting that the trials and tribulations we will experience as we transition through the bottleneck of the fossil fuel age back to local agrarian living will only be temporary, and we will emerge on the other side a wiser species that returns to living in balance with nature? Could it be any or all of these, and to what extent might these differing interpretations of “remaining optimistic” impact one’s pedagogy?

These are important questions for educators to ponder, as they carefully balance the need to not sugarcoat reality with keeping students engaged in fighting for a more livable future planet. The Deep Adaptation framework, however, proposes an alternative: letting go of an optimistic orientation and replace it with what researchers discuss as “radical hope” [39,40], as opposed to “passive or magical hope, where the emphasis is on maintaining confidence in our ability to avoid collapse and on cultivating visions of a positive future”, since

we might be able to slow it. We can try to reduce the harm coming from it. We can explore how to live and die lovingly because of it. But all of that we can do because we have a faith or sense that this is the right way to be alive, not because it will work. Most calls for hope that we’re hearing are from, or for, those fearful of living with death in their awareness . . . It is time to drop all hopes and visions that arise from an inability to accept impermanence. [39] (p. 206)

Research has found that unpleasant emotions can increase alertness and a desire to learn more, improve risk assessment, transform apathy to exigency, and generate positive attitude and behavioral changes; nonetheless, they acknowledge the issue is complex and in need of further study [41] (pp. 93–94). Researchers outside of the Deep Adaptation framework have also advocated for focusing specifically on recognizing grief as an appropriate reaction to ecological loss, and advocate for more resources devoted to help people process their ecological grief [42].

In addition to the Deep Adaptation perspective of preparing for the increasing likelihood of societal collapse, other scholars have suggested that we should strive to inhabit that “uncomfortable space of denying neither endings nor possibilities” [43] (p. 2). In other words, given the inability to prepare for any range of uncertainty certain future outcomes, humanity should come to terms with many different potential endings we may encounter this century, including the end of climate stability, familiar ecosystems, capitalism, modern civilization, and perhaps even our own species [43]. Rather than get caught up in despair, this acceptance of various endings could be channeled towards gratitude and deepening our current relationships, rebuilding our severed relationship with natural habitats and other species, and reconciling with various marginalized groups on whose exploitation our modern, global industrial civilization has always depended; through these redemptive acts of individual and collective reckoning, we can then proceed to imagine better future possibilities.

To this end, some scholars have emphasized how teachers as well as people broadly should start focusing on this creative yet necessary work of reimagining civilization in this low-energy future, however bleak may be our prospects for successfully transitioning to one without considerable suffering and loss of life [44]. For some, this might involve focusing on building coalitions between social and environmental justice advocates and artists; for others, it can be building the physical infrastructure of a world where most goods and services are produced and consumed at the local level [44]. Education would also

revive the need to teach basic survival skills, especially those that require a close study of natural environments. Besides preparation for the future, numerous studies have provided evidence that such low consumption and low energy practices based in indigenous traditions of self-restraint and gift economies (as opposed to our contemporary accumulation societies) also are more likely to align with greater happiness and considerable mental health benefits in the present [44].

The devastating climate impacts already being observed and/or experienced worldwide in 2021 (at only approximately +1.2 Celsius above pre-industrial temperatures) help emphasize that sustainability instruction, just like our modern high-consuming lifestyles, can no longer operate with a “business as usual” mentality; what was clear from our results and other studies is that people at all levels of education systems (teachers, administrations, researchers, curriculum developers, and policymakers) need to take eco-anxiety concerns more seriously in their development of sustainability lessons and programs [12]. Our study supports further investigation of how teachers’ pedagogy may align with their own personal coping strategies for dealing with our climate emergency. What would be especially beneficial for future studies would be longitudinal research exploring how teachers adapt their pedagogy alongside worsening ecological realities and projections, coupled with both direct observations of their classrooms as well as triangulating interviews and surveys with the students in their classes, in order to understand how students may respond differently to these educators’ varied approaches to transformative sustainability education.

Regardless of how educators think and teach about what a hopeful future can mean, we can be no more certain how students will react to any environmental lessons as we can be certain of how our future will unfold. Many teachers today—privileged to be born in the 20th century—experienced their own education quite differently, namely, as an ever-expanding horizon without limits. Thus, teachers must first come to terms with the reality that we are living in the twilight era of the windfall gains of modern industrial living brought to us by centuries of increasingly scarce fossilized carbon fuels; only then can we effectively guide our students to face their uncertain future with compassion and bravery in the face of a daunting future landscape. The commitment of teachers and staff members to transformative education—such as those we interviewed in Singapore—helps create a space for such possibilities for positive change for future generations to navigate, however limited and uncertain those possibilities may be.

## 7. Conclusions

All of the teachers in our study wrestled with what it meant to both live sustainably and teach about such a complex topic as sustainability. They also shared their struggles with accommodating their own understanding of the severity of our climate crisis with local obstacles such as competing curriculum mandates, their precarious foreigner status in a speech-restrictive country, infrastructure inimical to pursuing greener lifestyles, and adjusting their climate messaging in age-appropriate ways to their students’ learning styles. Regardless of these teachers’ varied subject specialties, grade level, gender, and nationalities, however, they each communicated their commitment to going beyond descriptive and prescriptive sustainability lessons to building their students’ agency to be lifelong advocates for their own future as well as others less fortunate; most participants also often discussed the importance of incorporating systems thinking into their lessons. In addition, participants repeatedly raised the importance of addressing mental health issues, even though all interviews were conducted before the COVID-19 pandemic. Furthermore, many also expressed the importance of sharing an optimistic outlook with their students, although they seldom provided a clear articulation about what it means to be optimistic when each new year presents more dire environmental realities, which might make such a commitment more difficult to maintain over time.

The COVID-19 national shutdown in Singapore (and elsewhere) impeded us from returning to interview more teachers beyond our initial participants as well as further discussing with these teachers the emergent themes that came from these seven interviews;

thus, our findings can in no way be generalized even to other international teachers in Singapore. Despite these limitations, though, our study validates the need for future research into these essential lines of inquiry regarding sustainability education in a few novel ways. First, we provide a template and rationale for researchers, teachers, administrators, and curriculum developers to learn from the many educators around the world who need to navigate teaching in environments where their expression and pedagogical activities may be hindered by local cultural and/or political considerations. Secondly, we incorporate particularly recent research and theoretical frameworks that radically reconceptualize what it means to teach about our sustainability education and our climate crisis that is currently unfolding in much more concerning ways than was observed and predicted even just a few years ago. Lastly, we highlight the importance of reaching out to learn from the many thoughtful and empathic educators, such as our participants, who are currently on the frontlines and committed to helping their students grapple with these complex yet essential ideas. When concluding an interview with one participant by asking, “is there something you’d like to share that I didn’t ask?” She responded, “I don’t think so . . . I’ve never been asked that much.” In addition to the insights gleaned from our participant responses, we hope this study also highlights the value—to students, teachers, and society as a whole—in giving voice to educators about their ideas, hopes, and struggles with living, and teaching, in a rapidly warming world.

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## Appendix A. Semi-Structured Interview Questions

Tell us a little bit more about your position. What exactly does your position entail and how did you end up in it?

What do you think sustainable development means?

How does your (environmental club/class/group) make an impact towards promotion of the Sustainable Development Goals?

What concerns you the most when you hear about climate change?

To what extent do you or your students experience burnout in the face of all the increasingly negative climate or environmental news? How do you manage it?

To what extent is your content or pedagogical decisions concerning climate change supported or constrained by your local environment, whether that be the national political environment, the context of the school environment, and/or the context of parent, student, or teacher relationships?

What, if anything, would you like to see done differently in this school specifically regarding sustainability education?

To what extent, if at all, has Eco-anxiety impacted you personally and, if applicable, in your work here?

To what extent do you feel that it has similarly impacted your students?

What do you think about the role of shame in advocacy or in education? How important or unimportant should shame be as part of the way to foster change versus other methods of encouraging behavior?

Where do you stand on the optimism/pessimism spectrum about the future and our capacity to address climate change and other environmental issues?

Where do you stand on the relative importance of individual vs. collective (policy) changes as a response to climate change?

Any last parting words about—in your experiences—what is helpful for teachers to know that are teaching anyone from ages 5–17?

Is there anything we haven't asked you that you would have liked to discuss?

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