Global Warming and the Disproportionate Impacts of Climate Change on the Global South

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Selected Topics in Educational Problems: Education for Global Citizenship is a graduate course in the Educational Studies program at Concordia University. With a syllabus covering everything from theoretical concepts of citizenship to local and global issues running the gamut of social media to the sale of human organs, students are challenged to think critically about the diverse issues of global citizenship. In the July 2021 summer intensive offering of this course, while students attended nightly Zoom lectures and discussions, the planet itself was sending signals of the most important problem facing global citizens today. For the third year in a row, record-breaking heatwaves in Siberia, Russia fueled forest fires in the tundra and boreal forest, burning an area half the size of Florida in just 2 weeks (Troianovski, 2021). Torrential rainfall in Western Germany and other areas of Europe led to catastrophic flooding causing "Germany's worst mass loss of life in years" (Angerer & Da Silva, 2021, para. 20). In Madagascar, unrelenting drought resulting from changing weather patterns of recent years is threatening the food security of more than 1 million people, 400,000 of which are facing starvation (Taylor, 2021). Global citizens recognize there are an overwhelming number of problems in the world: poverty; food insecurity; health issues and disease; gender inequality and human rights violations; loss of habitat and biodiversity; pollution; water commodification; geopolitical tensions and war. However, the most significant problem facing global citizens today is something that challenges our species' survival on the planet we call home.

This problem is a threat to our very existence, it is a crisis put in motion by the environmental consequences of industry, modernity, and globalization. It is a crisis with the potential to amplify all the existing global issues previously mentioned, from poverty to war. This crisis is

worldwide climate change from human-induced global warming. As this is a course for educators, we need to ask ourselves how education should respond to this crisis. Looking at the situation in Québec it's clear that curriculum changes to address climate change are necessary and long overdue. However, I propose that education will remain ineffective in its response to climate change if it does not challenge the discourses and actions contributing to the crisis, and if it continues to maintain hierarchical and bureaucratic school structures that disempower students.

Atmospheric Conditions and the Science of Global Warming

The summer of 2021 was one of record-breaking climate events and extreme weather conditions. Climate change was a regular headline subject as heatwaves, forest fires, droughts, floods, and storms destroyed habitat, infrastructure, and killed people worldwide. In a "1-in-1,000 year" (Lindsey, 2021, para. 1) heatwave affecting much of Western North America, Canada's highest ever recorded temperature of 49.6°C was reached on June 29th in Lytton, BC (Azpiri, 2021). The village was destroyed by forest fire in the following days (BBC News, 2021). In Southern Oregon, an area already experiencing unprecedented drought conditions, the heatwave helped spur the Bootleg Fire which became so strong it generated its own weather (Fountain, 2021). In a preliminary review, an international team of leading climate scientists have concluded that this destructive heatwave "would be virtually impossible without human-caused climate change" (Main Findings section) and that as global warming continues these unlikely events will become less rare (World Weather Attribution, 2021). Further, Saskatchewan climate scientist Dave Sauchyn was quoted as saying that models have predicted this kind of weather, but "later in the 2020s or a decade or two from now" (Mubarik, 2021, para. 2). Scientists have been warning us about climate change for decades but in recent years the analysis and

conclusions have become more alarming and definitive. This summer's record-breaking weather events provide ample evidence.

Three years ago, the Intergovernmental Panel on Climate Change (IPCC) confirmed that human activities have resulted in an increase of 1.0°C over pre-industrial levels in the global mean surface temperature (GMST) (IPCC, 2018). This existing 1.0°C increase in GMST is responsible for the escalating frequency and severity of current weather events (WMO, 2021; Hoegh-Guldberg et al., 2019). The scientific consensus is that present levels of human-generated emissions of greenhouse gases (GHG) will increase the GMST to 1.5°C above pre-industrial levels between 2030 and 2052 (Hoegh-Guldberg et al., 2019). Hoegh-Guldberg et al. (2019) further conclude that "the next 0.5°C...will involve greater risks per unit temperature than those seen in the last 0.5°C increase" (p. 1) and that this principle is "also likely to drive proportionally and possibly exponentially higher risk levels in the transition from 1.5°C to 2.0°C above the pre-industrial period" (p. 1). Humans have caused current levels of global warming and our actions continue to warm the atmosphere, with dire consequences.

The GMST of the planet is rising and we're starting to experience extreme weather conditions and other adverse effects because of that, and it's possible we're experiencing these earlier than models have previously predicted. At current rates of anthropogenic emissions of GHG the impacts will definitely worsen, perhaps exponentially. What are now considered catastrophic weather events will become more frequent, threatening human life and habitat around the globe. By considering global warming's impact on food insecurity, a fundamental threat to human health and well-being, we get a sense for the scope and scourge of climate change. Further, what

we see in the weighing of the scales of climate change is an unequal distribution of food insecurity between the Global North and South.

Global Warming Induced Food Insecurity and Inequality

In this course we discussed how neoliberal policies, globalization, and transnational companies are threatening food security around the world. This is especially true for the periphery nations of the Global South. These existing vulnerabilities will only be exacerbated and amplified by climate change. Back in 2009 the International Food Policy Research Institute (IFPRI) published that "agriculture and human well-being will be negatively affected by climate change" (p.vii). Specifically, their thorough analysis of detailed modelling predicted that "in developing countries, climate change will cause yield declines for the most important crops" with South Asia being especially affected (IFPRI, 2009, p.vii). The IFPRI modelling also showed that climate change will drive price increases for rice, wheat, maize, and soybeans. Ten years later, the IPCC (2019) definitively concluded that, "climate change, including increases in frequency and intensity of extremes, has adversely impacted food security and terrestrial ecosystems as well as contributed to desertification and land degradation in many regions" (p. 9) of Asia and Africa. Rising temperatures are also reducing crop and livestock yields, while higher concentrations of CO_2 in the atmosphere reduce the nutritional value of foods (IPCC, 2019). Additionally, increasing GMST is raising the sea level due to the melting of glaciers and sea ice and the thermal expansion of water as it warms (Lindsey, 2021). This will amplify flooding in low-lying Asian coastal farming regions, negatively impacting food security in those areas.

Having already established that the frequency and intensity of extreme weather events will rise in the future as the GMST pushes past 1.0°C towards 1.5°C above pre-industrial levels,

it's accurate to say that as climate change worsens, so does food insecurity. The IFPRI predicts that, "calorie availability in 2050 will not only be lower than in the no–climate-change scenario—it will actually decline relative to 2000 levels throughout the developing world" (2009, p.vii). The effects of climate change on food production are already being felt around the world, including North America where heatwaves and droughts are impacting crops in western states and provinces. However, scientists, sustainable development organizations, delegates and representatives of the Global South are sounding the alarm for the disproportionate impact on food security for developing nations.

The primary drivers of food insecurity are poverty and inequality (Holt-Giménez et al., 2012). What is especially concerning to global citizens is that the impacts of climate change in the Global South create crisis and societal disruption, compounding existing conditions of inequality and poverty, further amplifying food insecurity. Crisis escalates the chance for conflict, and climate change is increasingly becoming a crisis in many regions already beset with socio-political and geo-political tensions. The Secretary-General of the United Nations affirms that "conflict and hunger are mutually reinforcing" (GNAFC, 2021, p. 2). The GNAFC report (2021) also states that during 2020, "conflict drove internal and cross-border displacement, deprived people of their livelihoods, disrupted markets, trade and crop production, prevented herders from accessing their pasturelands and contributed to high food prices" (p. 22). In its 2019 report, the IPCC concluded that, "extreme weather and climate or slow-onset events may lead to increased displacement, disrupted food chains, threatened livelihoods and contribute to exacerbated stresses for conflict" (2019, p.18). Climate change is causing displacement as people seek safety and food security.

Take for example the country of Bangladesh, already prone to flooding as a low-lying coastal region. Due to rising sea levels, climate scientists predict that by 2050 20 million of its residents will be displaced to cities as the flooded land becomes too saline for rice farming (Szczepanski et al., 2018). People are moving to the cities looking for jobs as a means to secure food. Displaced from the land where they were once self-sufficient, people work odd jobs as "waste pickers, domestic workers, or garment factory laborers" (Szczepanski et al., 2018, para. 3). These cities lack the resources, infrastructure, and economic opportunities to safely accommodate climate change migrants exacerbating problems of pollution, exploitation, and disease. Bangladesh is just one of many countries where food insecurity caused by climate change is going to drive people to migrate. Mass migrations have the potential to drive conflict and crisis which in turn drives more food insecurity. Sub-Saharan Africa, South Asia, and Latin America are the global regions projected to be most impacted by climate change migration (Rigaud et al., 2018). These mass disruptions contribute to destabilizing regions already negatively impacted and disadvantaged from colonial legacies and neoliberal trade policies.

The developing world is already experiencing food insecurity as a result of global warming. Climate change-induced conflict, displacement, and migration will amplify food insecurity and hunger. The data shows that as the GMST rises to 1.5°C (and higher) above pre-industrial levels, the threats of climate change will disproportionately burden the Global South. What makes this inequality of outcome especially egregious and unjust is that the countries of the Global North are responsible for 92% of the excess global carbon dioxide emissions that are driving climate change (Hickel, 2020). Therefore, while the economies of the Global North create the atmospheric conditions driving climate change, the Global South bears the brunt of its devas-

tation in extreme heatwaves, droughts, famines, storms, floods, sea level rise and deaths. A cause and effect rightly described by Hinkel (2020) as "atmospheric colonisation" (p. e403). As a G-8 nation, Canada's economic and energy policies contribute to this neo-colonization, we contribute to the most important problem facing global citizens today - the existential threat of climate change and its disproportionate impact on developing and periphery nation-states and regions.

An Educational Response in the Québec Context

As educators, some of the core questions we have in response to this are: what is education's role in this existential threat to humanity? What is education's role in this climate injustice against the Global South? What is a critical global citizenship education response? In this summer's course on global citizenship education, participating students who are classroom teachers discussed the limitations to the current curriculum in addressing climate change and other global issues. In brief, the current Québec curriculum is woefully inadequate to the task. From this standpoint, there was a general consensus from course participants on the importance of teaching global citizenship in classroom lessons in an interdisciplinary fashion, regardless of whether these learning objectives are explicitly stated in the curriculum. Individual students of our course proposed how they might incorporate these ideas into their lesson planning moving forward. What is interesting however is that even though the Québec curriculum is nearly devoid of the concepts presented in this course on global citizenship (according to the certified and employed teachers of our cohort), Québec has a history of student activism in protesting increasing food prices, opposing war, and more recently, striking for climate change (Dupuis-Déri, 2021). Unfortunately, when we evaluate administrative responses to student-led activism we see a larger problem than simply curriculum deficiency. We see a systematic disempowerment of student initia-

tive that fundamentally undermines both the urgency of climate change action and the goals of global citizenship education.

Halting global warming is a *"human imperative"* (Hoegh-Guldberg et al., 2019). This imperative is recognized by the nation signatories to the Paris Agreement of 2015 which aims to keep GMST increases "below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C" (UNFCCC, para. 2). I believe that Québec students feel this urgency for change, as evidenced in their participation in the "school strike for climate" rallies of 2019. These efforts culminated in the September 27th mass protest in Montreal attended by up to 500,000 people, the largest of the climate protest rallies worldwide (Dupuis-Déri, 2021). Certainly, not all who participated were students, but a large number were as Montreal school boards, colleges, and universities cancelled classes for the day in response to student and public pressure.

Many students want to take more environmental action at the school and civic level but Dupuis-Déri (2021), a Québec political scientist, finds that secondary school student-led initiatives encounter resistance in "different forms of adult instrumentalization or opposition" (p. 4) at the administrative level. Elected student councils are "dominated by adults who sit on the board and prepare the agenda, determine speaking order, and decide what will be discussed" (Dupuis-Déri, 2021, p.4). School administrations thwart students' efforts to initiate campus waste reduction initiatives and outright refuse to allow student-led green committees to be formed. All of it disempowers students from taking meaningful action at the school level.

School-level actions are not the solution to the global climate crisis, nor is a new curriculum. To be sure, we need both of those, but national and international energy policy uptake and

implementation are where the changes must happen to adhere to the Paris Agreement. In order to influence governments to pass rigorous climate change legislation, political pressure must come from all sectors of society, including education. At the same time, individuals, communities, and cities will have to make changes from infrastructure to energy use, and schools will be a big part of those changes. According to the Brookings Institute (2021), "School districts are the perfect network of institutions that exist in every country in the world that have enough community connection potential to effectively scale green civic learning" (Kwauk & Winthrop, "An Audacious" section). The vision here goes beyond the curriculum taught in the classroom to include harnessing the power of schooling networks as tools for change.

Effective climate change action and climate change education is going to be community-driven, "locally-relevant and tied to local environmental justice issues" (Kwauk & Winthrop, 2021, "An Audacious" section), it's going to empower community level action and ownership. It's going to encourage and allow students "to reflect critically on the legacies and processes of their cultures, to imagine different futures and to take responsibility for decisions and actions" (Andreotti, 2006, p. 48). If the climate rallies of 2019 and the follow-up research of Dupuis-Déri are any indication, many Québec students want to make these changes but encounter resistance from existing educational power structures. The Brookings Institute (2021) advocates that "education that leads to *climate empowerment* [emphasis added] is the linchpin to our ability to unbridle all other climate solutions and to achieve the 1.5°C target" (Kwauk & Winthrop, A Call to Action section). The Québec education system and global citizenship educators should take heed.

Conclusion

North Americans living during the Covid-19 pandemic are probably familiar with the phrase “we’re all in this together”. However, while the pandemic has certainly affected everyone’s life, Sobande (2020) points out that “not everyone is experiencing this crisis the same way, due to structural inequalities and intersecting oppressions.” (p.1). The same is true for climate change. We’re all in this together but we’re definitely not going to experience the same outcomes. Global economic, environmental, social and political forces and discourse create conditions for inequality (Pieterse, 2002). This widening gap of inequality around the world is one of the most salient concerns for global citizens. The Global South, already disadvantaged by inequalities caused by globalization and neoliberal trade and economic policies, is currently experiencing and will continue to experience disproportionately negative climate change outcomes. These negative outcomes include food insecurity, poverty, human displacement, conflict, reduced freshwater resources, destroyed habitat, and overall increased health risks; a laundry list of everything that threatens human well-being. Climate change’s existential threat to human life around the world, and its unequal impact on already disadvantaged regions is the greatest concern for global citizens. A critical global citizenship education response is motivated by this injustice and goes far beyond teaching the science of climate change. It invites students to investigate and question existing structures and discourses that created and perpetuate the problem, it seeks to use institutional leverage to both influence and implement policy in support of the Paris Agreement, and it empowers students to take community-driven, locally-relevant climate action.

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