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Shaping Sustainability in Classroom Curricula in Singapore: Educators and Students as Collaborative Change Agents

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Key Terms

AAEE	Australian Association for Environmental Education
ACE	Action for Climate Empowerment
ACTS	Australasian Campuses Toward Sustainability Network
APEC	Asia-Pacific Economic Cooperation
ARNEC	Asia-Pacific Regional Network for Early Childhood
ASEAN	Association of Southeast Asian Nations
ASPnet	Associated Schools Project Network
CAPT	College of Alice & Peter Tan (CAPT)
CAS	Creativity, Activity, Service (IB Baccalaureate)
CBT	Cognitive Behavior Theory
CCE	Climate Change Education
CCE	Character & Citizenship Education
CCEP	Climate Change Education Partnership
CDA	Critical Discourse Analysis
COP	Climate Change Conference
CSR	Corporate Social Responsibility
CW	Cyber Wellness
C40	Cities Climate Leadership
DESD	Decade on Education for Sustainable Development
DP	Diploma Programme (IB Baccalaureate)
EBD	Economic Development Board
ECD	Early Childhood Development
ECCE	Early Childhood Care and Education

EE	Environmental Education
EE	Extended Essay (IB Baccalaureate)
EIA	Environmental Impact Assessment
ESD	Education for Sustainable Development
ESS	Environmental Systems and Societies
ESP	Eco-Stewardship Program, Singapore
EPA	Environmental Protection Agency
GAP	Global Action Programme
GC	Global Concerns Programme (UWCSEA)
GDP	Gross Domestic Product
GEWI	Global Early Warnings Initiative
HL	Higher Level (International Baccalaureate)
IB	International Baccalaureate
IESD	Institute for Sustainable Development at Tongji University, China
IGCSE	International General Certificate of Secondary Education (United Kingdom)
IPCC	Intergovernmental Panel on Climate Change
KNCSD	Korean National Commission for Sustainable Development
MDG	Millennium Development Goals
MEST	Ministry of Education, Science and Technology (South Korea)
MH	Mental Health
MOE	Ministry of Education, Singapore
MOE	Ministry of Education, Republic of Korea
MOE	Ministry of Education, People's Republic of China

MSE	Ministry of Sustainability and the Environment
MEV	Ministry of Environment
MRT	Mass Rapid Transit
NCCS	National Climate Change Secretariat
NCSE	National Council for Science and the Environment
NEEA	National Environmental Education Act
NPTD	National Population and Talent Division
NUS	National University of Singapore
OECD	Organization for Economic Co-operation and Development
PSE	Personal and Social Education (UWCSEA)
PADETC	Participatory Development Training Center
PNCSD	Presidential National Commission on Sustainable Development, Republic of Korea
PCGG	Presidential Committee on Green Growth (South Korea)
ROK	Republic of Korea (South Korea)
SCP	Singapore Cooperation Programme
SDG	Sustainable Development Goals of the United Nations
SDSN	Sustainable Development Solutions Network
SL	Standard Level (International Baccalaureate)
TOK	Theory of Knowledge (IB Baccalaureate)
UN	United Nations
UNAI	United Nations Academic Impact
UNICEF	United Nations Children's Fund
UNFCCC	United Nations Framework Convention for Climate Change

UNESCO	United Nations Educational, Scientific and Cultural Organization
UNCED	United Nations Conference on Environment and Development (UNCED)
UWC	United World College Network
UWCSEA	United World College South East Asia

Abstract

Climate change is a global crisis, and in Singapore, the city-state is more disproportionately affected by climate change than other locations in the world. Singapore is a low-lying city-state 85 miles north of the equator, making its geographical location more susceptible to increasing sea levels, extreme weather events, and zoonotic diseases. Singapore's alignment with global commitments to tackle climate change, including the United Nations Sustainable Development Goals, is elevated by its global presence as a leader in urban sustainability.

Through a revised national agenda, the Green Plan 2030, Singapore is accelerating public awareness of climate change and sustainability. As part of the Plan, the new national Eco-Stewardship Program (ESP) aims to educate and empower Singaporean students from primary through post-secondary on climate change and to adopt behaviors for a more sustainable future. This research explores the importance of sustainability as a concept and educators' role in translating curriculum standards into content and experiential learning that informs, educates, and empowers students to become agents of change.

Using a mixed-methods approach, this research builds off findings from a comprehensive literature review using survey responses and ethnographic interviews from local student educators, teachers and students at an international school, and regional experts within the fields of geography, Education for Sustainable Development (ESD), and Early Childhood Development (ECD). This research intentionally aims to share the experiences of educators and students in Singapore to highlight their individual and collective power in the discussion of sustainability locally and globally. Sharing the perspectives of educators and students across learning environments in Singapore will help develop collaborative learning programs that center the voices of educators and students, improving understanding of this important field.

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Chapter 1: Introduction

Climate change is a global crisis. Despite global commitments, including the Paris Agreement and United Nations 2030 Agenda for Sustainable Development, there are serious concerns that these commitments are insufficient to curb the growing climate change crisis and its impact on environments and livelihoods across the globe. Laying 85 miles north of the Equator, climate change is a top priority for the city-state of Singapore (Ministry of Sustainability and the Environment, Singapore). As a low-lying nation, Singapore is hyper-vulnerable to the impacts of climate change, including rising sea levels, extreme weather events, and loss of biodiversity and greenery, all of which affect Singapore's ecosystem (Ministry of Sustainability and the Environment, Singapore). To curb the acceleration of climate change and its impacts, the Singapore government has prioritized sustainable initiatives and has developed specific departments, including the Ministry of Sustainability and the Environment (MSE). Additionally, recognizing the need for sustainability practices to be integrated into society, the Ministry of Education has launched the Eco-Stewardship Plan (ESP) as a comprehensive educational initiative designed to educate students from primary through post-secondary about climate change and empower them to become agents of change (Ministry of Education, Singapore, 2021).

This research is timely because as the climate situation accelerates, there is an overwhelming need for quality, comprehensive climate change education curricula in Singapore and across the globe. In Singapore, youth and educators are equally concerned about climate change and its consequences and are eager to do more to work towards climate change (National Climate Change Secretariat, Singapore (NCSS), 2019). In a 2019 survey on Climate Change Perceptions, 84.8% of Singaporeans ages 15 and up strongly believed that climate change was already happening and will impact future generations (NCCS, 2019). Additionally, respondents viewed community groups and non-governmental organizations as having a part to play in collective action tackling climate change (NCSS, 2019).

This research is also much needed, as there is an existing gap in academia about the importance of interdisciplinary climate change education that takes into account perspectives of the climate situation from different academic disciplines (e.g., geography,

economics, biology, and social studies), and is inclusive for both young people and educators. Interdisciplinary education is of growing importance for the learning of students and adolescents because they are growing up in a more diverse and interconnected world. Thus, to meet the needs of this technology-oriented generation, it is necessary to implement comprehensive education on the climate situation and provide students with tools to understand the world around them and what individual and collective responsibility they hold to change society and care for the planet, ensuring it is a safe and habitable environment for future generations. Climate change has become a subject that is widely taught and explored across formal and informal learning contexts across the globe. At the same time, the increasing need for global action to achieve global targets indicated by the UN's Agenda for Sustainable Development indicates a need for Education for Sustainable Development (ESD) as a new learning process and a critical part of comprehensive, quality education.

Sustainability is present in literature and research across academia and has been integrated into work environments (e.g., corporate social responsibility). Within the education sphere, sustainability continues to be incorporated into learning systems through Education for Sustainable Development (ESD). ESD is a learning approach that centers sustainability as a core paradigm of quality education and offers students different perspectives on learning about the world around them and the interconnectedness of the natural environment with their personal lives (Reid, 2019, UNESCO, 2014, 2021). With an overarching goal to empower *everyone* with the competencies, knowledge, and values necessary to co-create a sustainable future (UNESCO 2014, 2021), ESD responds to the challenges through a comprehensive multilayer approach. ESD responds to the imperative call to rethink education systems in ways that empower people, "requiring the redesign of policies, curricula, funding (*macro-level*), goals, contents, and didactics of learning situations (*micro-level)*, and the transforming of learning environments within local communities and networks (*meso-level*)" (Holst, 2022, 1015-1016). While governments have implemented climate change education (CCE), a key educational approach to address climate change, such policy directives require inter-agency collaboration in "closed" spaces of power (Chang and Pascua, 2017, 173).

Singapore is a unique case study for this preliminary research into ESD because the government already has a well-defined climate change strategy, but it is unclear how existing CCE and new learning initiatives like ESD will be carried out in formal learning spaces. Climate change is widely discussed in schools, mainly through geography and social studies; however, the incorporation of CCE and ESD is merely described as being a new pillar of the Singaporean education curriculum in national policy documents.

Education for Sustainable Development (ESD) is an approach employed by UNESCO to respond to the urgent and ongoing challenges the planet faces (ESD, UNESCO). ESD plays an integral role in the achievement of the ambitious SDGs because it advances education as an agent of change, calling upon governments to provide CCE and ESD to educate, inform, and empower the personal and social transformation necessary to change the current course (UNESCO, 2020, 14). While ESD is an ambitious part of UNESCO's commitment to the UN's SDGs, the revised contemporary learning approach can be perceived as an "add-on" to existing curricula, reducing its validity and potential to enact local and global change (Benavot, 2014).

This limitation is often the result of education focusing on the achievement of learning competencies rather than students' learning and their application of learning in the real world (Brundiers et al. 2021; Rieckmann 2012). While the integration of ESD into education policy, e.g., in Germany (Singer-Brodowski, Etzkorn, and Seggern, 2018); and in Australia (Somerville & Williams, 2015) is being done across specific contexts globally, the lack of intentional, comprehensive integration of ESD into learning environments through whole education system approaches across educational institutions and systems remains a challenge of the 21st-century.

UNESCO serves as a global advocate for ESD and holistic CCE. Acknowledging the importance of socio-physical spaces for learning, in 2014, UNESCO dedicated a key component of the Global Action Programme (GAP) to ESD and its follow-up initiative, "ESD for 2030" to "Transforming learning and training environments" (Global Action Programme for Education for Sustainable Development, 2016). These two programmes called for "whole-institution approaches to ESD in schools and all other learning and training settings," elevating the need for ESD to assist in the transformation of individual

actions and reorganization of social structures to build more "just and sustainable futures" (UNESCO, 2014, 14-18).

In 2017, following the launch of the GAP on ESD, UNESCO launched "Today for Tomorrow: Coordinating and Implementing the Global Action Programme on Education for Sustainable Development," an initiative aimed at achieving GAP's five priority areas and coordinating its implementation (UNESCO, 2016). As part of this initiative, selected countries[1] implemented the whole-school approach to ESD, with a particular focus on climate change (UNESCO, 2016). Specifically, by adopting whole-school approaches to ESD, campuses foster "hidden" curricula, which are amplified through self-directed and unintended learning outside of structured curricular activities (Holst, 2022). Additionally, through informal learning processes, students are empowered with information on the impacts of their daily actions and choices while also encouraging them to tap into their creativity and determination to co-shape innovative solutions and learning opportunities (UNESCO Roadmap for Implementing the Global Action Programme on Education for Sustainable Development, 22).

As explored throughout this paper, educators play a powerful role in delivering educational approaches to sustainable development and facilitating students' agency to become changemakers and "informally" contribute to decision-making concerning their learning. However, to assist them in making the transition toward sustainable societies, they must gain the necessary knowledge, skills, attitudes, and values to facilitate ESD within the classroom (UNESCO Roadmap for Implementing the Global Action Programme on Education for Sustainable Development, 20). One method is the implementation of the Whole-School Approach to ESD, as outlined by UNESCO. In this Approach, ESD is included in every aspect of a learning setting and involves the active participation of internal and external stakeholders (UNESCO, 2016).

[1] First batch countries invited: Brazil, Denmark, Dominican Republic, France, Germany, Greece, Indonesia, Japan, Lebanon, Namibia, Oman, Senegal

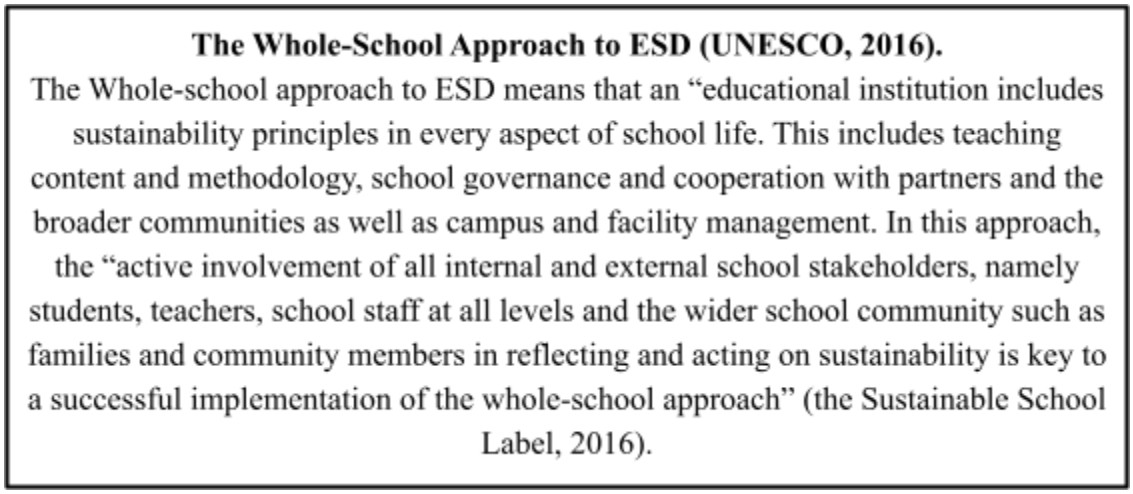


Figure 1. The Whole-School Approach to Education for Sustainable Development (ESD) by the Sustainable School Label, 2016 via UNESCO.

Education for Sustainable Development (ESD) rose out of existing pedagogical frameworks, particularly the Decade on Education for Sustainable Development (DESD) (2005-2014). The overall goal of the DESD was to integrate concepts and values essential for sustainable development, such as environmental protection, urban and rural development, corporate responsibility, poverty, health, and gender equality, into all aspects of learning (OECD, 2008, 2). Since the DESD ended in 2015, ESD has become a growing approach to education across education systems and is today the focus of UNESCO's global framework for achieving the United Nations Sustainable Development Goals (SDGs) (UNESCO, 2020, 12).

UNESCO's #ESDfor2030 campaign is centered around the global education agenda indicated in SDG 4, in which ESD has a distinct role. Acknowledging the unique applicability of ESD to the UN's SDGs, it contributes to all 17 SDGs (UNESCO, 2020, 14). ESD is a critical element of quality education because its "cross-cutting competencies in cognitive, socio-emotional and behavioral dimensions of learning bear relevance to all areas of education" (UNESCO, 2020, 14). Moreover, with an emphasis on building competencies such as empathy, solidarity, and action-taking, #ESDfor2030 helps "advance SDG 4 in building sustainable futures where education supports the successes of individuals and the collective survival and prosperity of the global community" (UNESCO, 2020, 14). By focusing on learning content and its correlation to

the sustainability of people, the planet, and the world around us, ESD is the building bridge connecting SDG 4 with the 17 other SDGs (UNESCO, 2020, 14-16).

This research aims to highlight the importance of ESD by amplifying the voices of educators and students, who are key stakeholders in the education space. Centering this research on local, individual perspectives of key school stakeholders - educators and students - supports knowledge and understanding of the reality of the climate situation in Singapore and the intersection between public rhetoric and the ESD education curriculum. Moreover, highlighting the experiences of educators and students as recipients and transformers of knowledge elevate ESD as a tangible approach to supporting students' learning of the world around them, expanding their understanding of the interdisciplinary nature of the term "sustainability" and recognition of the local and global impacts of their actions.

Focusing this research on the perspectives of educators from international and public education systems in Singapore is advantageous. Despite its unique geography and history, Singapore has risen to a globally recognized nation for its commitment to environmental sustainability. With a small population relative to its neighboring countries in the Asia Pacific, Singapore's government has been able to implement intentional and extensive environmentally-friendly policies, including an extensive Mass Rapid Transit (MRT) system and verdant spaces like the Singapore Botanical Gardens and Gardens by the Bay (Visit Singapore, 2022). While Singapore's achievements in sustainability are noteworthy and well-deserving of global recognition, it is necessary to understand the complexity of Singapore and the conditions to which developed the city-state into what it is and represents today.

Just over 50 years ago, Singapore's landscape looked unrecognizable to the lush green gardens and impressive urban development it displays today. Following Singapore's separation from Malaysia in 1965, Singapore faced many challenges, including deplorable living conditions, unsafe public infrastructure, various public health epidemics, a lack of connectivity to the rest of the world, and employment insecurity (Ministry of National Development, Singapore, 2023). Under Lee Kuan Yew and the PAP, the new government undertook an ambitious challenge to forge a viable nation – the Republic of Singapore – on a small island with few natural resources. Today, a city-state

of just over five million[2]Singapore has exceeded this challenge as a completely changed environment where “everyone has access to a clean and green environment, and to live in an inclusive environment with opportunities for all” (Wong, 2018, 5).

Despite successfully integrating environmentally and socially sustainable practices, Singapore continues to balance two competing priorities. Since its independence, sustainability has been a core national value of the Singapore government, emulated through its visible development and comprehensive public policies. At the same time, the city-state remains hyper-vulnerable to the impacts of climate change. Recognizing its inherent vulnerability to climate change, the Singapore government has integrated policies across levels of government and public awareness campaigns designed to educate and inform residents about the precarious state of the city-state. To preserve its limited natural resources, the Singaporean government has implemented committees and task forces designed to target specific environmental risks, such as rising sea levels and increasing median temperatures (National Climate Change Secretariat, Singapore). These include the Ministry of Environment (MEV), the Garden City Action Committee, and the Singapore Green Plan 2030. In addition, spaces like Marina Barrage, CleanTech Park, Marina Bay Sands, and Changi International Airport symbolize the country’s continuous integration of sustainability with infrastructure and urban development (Da & Hong, 2018, 37; Changi Airport, 2022; Singapore International Energy Week, 2022).

Furthering its commitments to sustainability through recent initiatives like the Green Plan 2030, Singapore strives to become a leader in advancing the UN’s Agenda for Sustainable Development (Singapore Green Plan 2030). By evolving green spaces around the city-state, developing clear policies that incorporate sustainability at all levels of society and business, and supporting students and educators to become environmental stewards, Singapore strives to become a pioneer in "technological and policy solutions for sustainable development" (Da & Hong, 2018, 62-65). At the same time, for Singapore to become a global pioneer, sustainable and climate-resilient practices and policies must be understood by individuals of all ages in Singapore. To aid in this process, the Green

[2] Singapore’s population is composed of citizens, permanent residents, and non-citizens (National Population and Talent Division - NPTD, 2021).

Plan of 2030, a multi-agency effort[3], has outlined specific initiatives to "strengthen Singapore's commitments under the UN's 2030 Sustainable Development Agenda and Paris Agreement, and positioning us to achieve our long-term net zero emissions aspiration by 2050" (Green Plan 2030, Singapore). Recognizing the importance of education as an agent of change, the Singaporean government has employed the Ministry of Education (MOE) as one of the spearheading agencies in the execution of the Green Plan 2030.

The Eco-Stewardship Programme (ESP) is a new initiative built on previous climate education initiatives designed to further students' learning and involvement in their local environment (Ministry of Education, Singapore, 2021). Developed by the MOE, ESP is employed as a new, holistic sustainability curriculum to educate and empower young people to become environmental stewards. While the ESP is a relatively new curriculum, public documents indicate the intentional infusion of ESP with Singapore's nationalized education system, furthering Singapore's global presence in ESD discourse and its national ambitions to be a leader in all forms of sustainability.

Education and extracurricular programs provide students with the context of ongoing global issues like climate change. ESD, in particular, offers a multidisciplinary model to address interconnected global challenges that can be integrated into national strategies, including education. Integration of ESD is necessary as the climate situation evolves because it transforms classrooms into engaging, collaborative environments where students have the agency to think independently, participate in decision-making, and provide their perspectives in designing future innovative learning practices. Likewise, educators need to have the agency to incorporate alternative learning mediums and contribute their input and voices in the analysis of current curricula and conversations concerning the future of ESD within classrooms. This research seeks to approach sustainability from the perspectives of learners and educators and explore curricula and experiential learning in classroom settings in Singapore. Specifically, in this research, using an accredited International Baccalaureate (IB) school as a case study is

[3] The Green Plan 2030 is spearheaded by the Ministry of Education (MEV), the Ministry of National Development (MND), Ministry of Sustainability and the Environment, Ministry of Trade and Industry, and the Ministry of Transport (Green Plan 2030, Singapore).

relevant as it follows different guidelines and has independent syllabi from Singaporean schools. This research employs critical analysis of educational materials and syllabi and qualitative data from in-depth conversations with educators, students, and experts. Overall, the findings of this research support global literature on the role of educators in translating curricula relating to sustainability into classroom and experiential learning that empowers and harnesses students with the skills, knowledge, and agency to cope with current and future challenges and become agents of change.

This research seeks to answer the following questions at a surface level across local, national, and regional levels, with a specific focus on classroom settings in Singapore: **How do educational sustainability policies translate into classroom curricula and experiential learning beyond the classroom?** In answering this question, I explore the following questions specific to this research: What role do educators play in educating and empowering students about climate change and sustainability action at a national and international level? What are students' and teachers' perceptions of the current sustainability curriculum in Singapore? Why is sustainability education important for Singapore and its commitment to sustainability and sustainable development? And to what extent does the existing framework accelerate teachers' and students' engagement with Singapore's sustainability agenda beyond the classroom?

This paper argues that Singapore's implementation of sustainability education leads to higher levels of awareness about the natural environment, practices of sustainability across Singapore, and the ways that educators and students can make a difference locally and globally. While this research specifically explores the application of sustainability and ESD in classrooms in Singapore, similar initiatives are being implemented by governments across the broader Asia-Pacific region. Further discussion of sustainability in the Asia-Pacific region is in Chapter 5.

International schools in Singapore are uniquely positioned because, unlike the public school system, their curriculum is standardized by an existing global framework of education (e.g., the International Baccalaureate). While the IB Curriculum is comprehensive, school administrators and educators have more flexibility in planning their curriculum and the ability to discuss sensitive topics within the classroom. In this research, examining the ESD curriculum within an international school setting from

student perspectives is considered. Specifically, this paper examines how ESD and sustainability-related curricula from the MOE in Singapore and the IB support student agency and foster their ability to make decisions about their learning and understand their individual and collective responsibility.

In considering students, who are usually on the receiving end of information, as agents of change, it is equally important to consider the role of educators as agents of change and the importance of building their capacity to facilitate ESD in and out of the classroom. Within Singapore, educators teaching in Singaporean schools have a responsibility to teach content as indicated by the standardized curriculum set by the MOE. Singapore's education system is often credited for the country's advancing economy; however, in a setting where education is centralized and standardized, there is a natural alignment between policy and programmatic curricula (Deng, Gopinathan, & Lee, 2013). Likewise, the IB Curriculum is standardized by the International Baccalaureate Organization (IBO); yet, given the international scope of the IB, accredited schools have the ability to specialize their learning content based on the geographic context. Taking into consideration the duality of the education curriculums in Singapore, this research seeks to explore how within classrooms and educational settings, educators are powerful champions of change and have the power, ability, and responsibility to "empower students to play their part for the environment" (MOE[4], 2021).

Singapore's geography, regional commitments to sustainability, and proximity to neighboring countries in East Asia strengthen the selection of the city-state as an area for study for this research. Additionally, the array of international schools and the positionality of educators within Singapore's education system supports the specific scope of my study. Singapore's education system is highly regarded across the globe, as the MOE regularly conducts evaluations of its students and educators and invites educators to share their insights and experiences on particular subjects. Most importantly, the MOE agenda is incorporated into the national agenda of Singapore, and in this instance, the Eco-Stewardship Programme (ESP) is explicitly a component of Singapore's Green Plan 2030.

[4] This refers to a specific news article released by the Ministry of Education, Singapore in 2021.

In Chapter 2, I share theoretical frameworks to facilitate discussion of sustainability education and ground this paper in the larger context of ESD within the international sector. In Chapter 3, I provide an overview of the methodology for this research, outlining particular attention to timeline disruptions, limitations in scope, and my positionality. In Chapter 4, I share a short history of the significance of global sustainability education, and in Chapter 5, a brief overview of ESD within Singapore is detailed. In chapters 6-8, I provide context, analyze, reflect, and make conclusions from the surveys and ethnographic semi-structured interviews with educators, student-educators, students, and experts. Finally, in Chapter 9, an overview of current ESD-centric curricula in reviewed, and in Chapter 10, a summary of the findings of this research is offered, with additional insights and recommendations for future research regarding the positionality and importance of ESD in Singapore and the roles of educators and students in paving the way to advance change locally and globally.

Chapter 2: Theoretical Framework:

Introduction

The root of this paper explores how current environmental education curriculums like climate change education (CCE), education for sustainability (Efs), and education for sustainable development (ESD) are taught and employed as a tool to empower students to enact personal and collective social change in educational institutions in Singapore. Sustainability is an evolving conceptual framework that is part of a larger global movement, sustainable development, which was initially developed at the 1992 Earth Summit in Rio de Janeiro, Brazil (United Nations, 1992). However, as my research indicates, the term sustainability is not straightforward, as there are several lenses through which we must approach sustainability beyond the traditional scope of the environment. We must also consider the economic, health, political, and social implications of sustainability.

According to Schreiner, Henricksen & Hansen (2005), education is perceived as a primary strategy to promote environmental awareness and instill social responsibility for global citizens. With the potential to educate students and motivate action beyond the classroom, UNESCO and its partners have launched a global initiative to employ ESD and other forms of CCE and EfS to help governments strengthen their capacity to produce and implement quality ESD (Reid, 2019). Through a multidisciplinary approach that involves all stakeholders, ESD is helping students and stakeholders "understand the impact of the climate crisis, empowering them with the knowledge, skills, values, and attitudes to become agents of change" (UNESCO, ESD for 2030).

In the case of Singapore, the city-state is working towards an eco-friendly community through community initiatives, city infrastructure and planning, and its national education standards. Singapore is perceived as a pioneer in sustainability through its novel infrastructure and government agendas, including the Green Plan 2030. Moreover, to demonstrate further its commitment to education, the MOE launched the Eco-Stewardship Plan (2030), educating and informing its students about sustainability through curriculum, campus, culture, and community (4Cs) (Singapore Eco-Stewardship Plan).

In this section, education and political theories help explain that while Singapore is on the frontlines of promoting and enforcing sustainable development, the city-state's national curriculum for sustainability is centered around its national priorities. The development and implementation of sustainability education in Singapore are influenced by the following theories: power structures, critical discourse analysis, and transformative learning theory.

Power Structures

Students are recipients of learning and information in school, so we must consider their positionality in terms of power or lack thereof. According to Apple (1982), schools are organized not only as spaces for teaching required knowledge but are organized in a fashion that they unconsciously assist in the production of technical/administrative knowledge necessary to expand markets and engage in the production of knowledge to meet the "artificial needs of the population" (Apple, 1982, 22). Simply put, Apple frames schools as both a system of production and reproduction.

In education, power is a highly contested concept with multiple meanings. Some see power as held by powerful stakeholders (power or powerless), while others perceive power as pervasive and embodied in all relationships and discourses (Gaventa, Institute for Development Studies). Specifically, Gaventa states that power can be seen as:

- Power 'over': the ability of those in power to affect the actions and thoughts of the powerless
- Power 'to': the capacity to act; agency
- Power 'with': the synergy of collective action, social mobilization, and alliance building
- Power 'within': a sense of self-dignity and self-awareness that enables agency
    - (Gaventa, Exploring Power, 2007, 2).

To better assess how power impacts the ability to bring about change, Gaventa and his colleagues developed the Power Cube to analyze the levels, spaces, and forms of power and their interrelationships (Gaventa, 2007). The power cube "lets us visually map

ourselves and our situation, including other actors, relationships, and forces, and then look at possibilities for movement, mobilization, and change" (Gaventa, *PowerCube,* 2007).

The Power Cube includes visible, hidden, and invisible power on the first dimension, supranational, national, and sub-national on the second dimension, and closed, invited, and claimed on the third dimension. Each of these dimensions offers us opportunities to analyze levels, spaces, and forms of power and can be applied to any discipline.

In the context of Singapore and its ESD curriculum, the Power Cube looks a bit different because of the places where power inherently exists and is non-existent. The abridged version of the Power Cube for Singapore concerning ESD is below:

- *Visible power* is present in public spaces or formal decision-making bodies. In Singapore, this would be the Ministry of Education (MOE) and the Parliament of Singapore, as they are the formal governing bodies that decide on the Singapore ESD curriculum.
- *Hidden power* is used by specific interests to maintain their power and privilege by establishing barriers to participation, excluding key issues from the public arena, or by control of power from a distance. In Singapore, this likely would be the top governing body of the Parliament.
- *Invisible power* is often perceived as the 'internalization of powerlessness,' and is exercised through control of institutions that create and shape our understanding of the world. In Singapore, this would be the media, television, newspapers, news outlets, and mass consumer culture (social media). However, in the context of Singapore concerning ESD and education, this would be students and educators.
- *Closed space* is the level where elites (politicians, experts, and leaders) make decisions with little broad consultation or involvement.
- *Invited spaces* are created by invitations from authorities, such as the government, supranational agencies, or non-governmental organizations.

In Singapore, these spaces include school programs, partnerships with government-funded organizations, and other organizations.

- *Claimed/created spaces* are spaces claimed by less powerful actors from or against the power holders or created more autonomously by them. Concerning Singapore's educational system, this might look like initiatives created by students or faculty – individuals not within power positions – for a specific topic.

Gaventa (2007) and peers' Power Cube help us visualize forms of power and why it matters. The visualization of power is useful because it helps educators and learners who come from diverse backgrounds – practitioners, academia, and students – with a shared interest in bringing power dynamics to light in their thinking and behavior as agents of change (Gaventa, 2009; PowerCube.net).

In Singapore, ESD is a rising practice among educators and politicians, as it directly relates to Singapore's 2030 Green Plan. For students and individuals who are often in positions of *invisible created spaces* of power, understanding the Power Cube can help them develop an understanding of the interrelationships of power within the context of their education and ability to influence change at scale in Singapore. Specifically, by understanding the Power Cube, educators and leaders in academia can develop approaches that encourage participation from individuals who are 'powerless' to share their experiences with ESD and wishes for the future.

Transformative Learning Theory

Transformative learning theory integrates notions of self-reflection and action and can be a useful lens through which to explore how ESD might integrate learning focused on individual development and changes in environmental behaviors. Transformative learning theory is based on the concept that learners can adjust their thinking based on new information (Western Governors University, 2020). The theory was first coined by Jack Mezirow, known as the father of transformative learning. Specifically, the theory is defined as "an orientation which holds that the way learners interpret and reinterpret their sense experience is central to making meaning and hence learning" (Mezirow, 1997;

Western Governors University, 2020). Simply put, the theory dives into the way that learners find meaning in their lives and understanding by examining things from new perspectives.

In Mezirow's approach, there are two main pillars – instrumental learning and communicative learning. Instrumental learning focuses on the evaluation of cause-and-effect relationships; communicative learning shows how people communicate their feelings, needs, and desires (Mezirow, 1997; Western Governors University, 2020). Both components are important for transformative learning – students need to view new perspectives in order to challenge and develop new understandings. Furthermore, meaning structures play a role in transformational learning. Meaning structures are basically the concepts, beliefs, judgments, and feelings that shape our interpretation of information. Through self-reflection, self-directed learning, and critical theory, students are able to understand their meaning structure and critique previously held assumptions to reassess if past attitudes still hold true in their current life. Therefore, transformative learning theory allows students to better understand themselves and their learning.

From theory to practice, transformative learning theory is facilitated by educators through different approaches. Educators provide students with opportunities to learn about new perspectives through guest speakers, introducing diverse authors and literature in the classroom, and allowing students to observe new perspectives. Transformative learning theory is also directly linked to critical discourse discussions, which provide space for conversation, helping students dissect literature and debate different perspectives. Moreover, small group discussions and activities can help students with developing critical thinking skills and embrace empathy for thoughts and experiences different from their own (Mezirow, 1997; Western Governors University, 2020).

Through transformative learning theory, educators must assume responsibility that allows autonomous thinking and set objectives that foster critical reflection. They hold the dual role of being a facilitator and provocateur rather than an authority on the subject matter. Mezirow (1997) defines the educator's role as:

"The facilitator encourages learners to create norms that accept order, justice, and civility in the classroom and respect and responsibility for helping each other learn; to welcome diversity; to foster peer collaboration; and to provide equal opportunity for participation."

In Singapore, students are enrolled in school from primary to post-secondary. With globalization, technological advancement, and changing demographics within Singapore, the MOE has identified 21st Century Competencies for all students enrolled in educational institutions in Singapore (Ministry of Education, Singapore, 2022). Within these competencies, there are seven core values: respect, responsibility, resilience, integrity, care and harmony, which are acknowledged as values that are at the foundation of our shared societal and national values (Ministry of Education, Singapore, 2022). In addition to the core values, students in Singapore are expected to embody *Social-Emotional Competencies* and *Competencies for a Globalized World,* which include responsible decision-making, critical and attentive thinking, and civic literacy (Ministry of Education, Singapore, 2022).

Transformative learning theory is essential to young adult and adult education. In the case of students in Singapore (18-25 years), transformative learning is essential because this is a period of time during which autonomous thinking and learning through lived experiences are explored. Transformative learning is a form of education that "fosters reflective thought, imaginative problem posing, and discourse that is learner-centered, participatory, and interactive, and it involves group deliberation and group problem solving" (Mezirow, 1997). Through transformative learning, students (18-25) in Singapore can learn 21st Century Competencies and competencies for a Globalized World through discovery, helping students gain more knowledge of different perspectives.

Critical Discourse Analysis

Discourse analysis is a method that helps us understand the true meaning of written or spoken language and often reveals how language is used to achieve specific objectives. Critical discourse analysis (CDA) is a familiar application in education research. It is used to understand the relationship between text and context, the ideological effects of discourse, and how actions have implications beyond the text (Warriner and Anderson, 2017).

CDA first emerged in the late 1980s and was spearheaded by Norman Fairclough and others. Since then, DCA has become one of the most influential branches of discourse analysis (Blommaert and Bulcaen, 2000). CDA is used across disciplines, including linguistics, education, and the social sciences. CDA aims to analyze "opaque as well as transparent structural relationships of dominance, discrimination, power and control as manifested in language" (Wodak, 1995, 204). According to Chouliaraki and Fairclough (1999), discourse is socially constitutive and socially conditioned, and CDA aims to make discourse more visible and transparent. Fairclough's *Discourse and Social Change* (1992a) provides a blueprint for the application of CDA. Specifically, Fairclough's approach is divided into three dimensions:

1. Discourse-as-text
2. Discourse-as-discursive practice
3. Discourse-as-social-practice

While each of these approaches is different, Fairclough's (1999) model of discourse analysis is framed as a theory of ideological processes in society, as discourse is perceived as the process of hegemony and changes in hegemonic discourse. In his second edition, *The Routledge handbook of Discourse Analysis 2nd Edition,* Fairclough (2013) states that CDA has three basic properties: relational, dialectical, and transdisciplinary. CDA is relational because its primary focus is not on individuals but on social relations. For example, 'discourse' may be seen as an entity, but it is instead a complex set of relations, including the communication between people and relations of communicative events (newspaper articles, conversations, speeches, etc.) (Fairclough, 2013). Discourse is dialectical because its relations between objects are different from

one another but are not fully separate in that one excludes the other (Fairclough, 2013). Exploration of CDA will be discussed in Chapter 10.

Synthesis

Power structures and Gaventa's Power Cube help us facilitate an understanding of power dynamics and assess interrelationships across power structures. Power structures incorporate variations of power as *visible, hidden, and invisible,* and *open, closed, or created spaces* to understand how ESD in Singapore is facilitated across Singapore's formal education system. Transformative learning theory explains that through an education system focusing on self-reflection-related behaviors, Singapore's ESD curriculum fosters individual development and transformative environmental behaviors and attitudes. Moreover, the facilitation of ESD by educators through opportunities for sharing of personal experiences, group discussions, and analysis of the discourse surrounding ESD and sustainability will provide students with a comprehensive overview of ESD and an opportunity to develop agency in making a positive impact in Singapore's broader commitment to sustainability and environmentalism. Finally, CDA offers us a framework for analyzing Singapore's ESD standards in public and international education settings, helping us understand how discourse influences the learning, actions, and attitudes of students and educators who are key stakeholders.

Chapter 3: Methodology

Introduction

This research follows a two-stage data collection methodology, using surveys as recruitment tools and ethnographic interviews as qualitative research methods. The methodological approach for this research was informed by Ho & Seow (2017). Ho & Seow (2017) utilized a mixed-method approach with qualitative and quantitative survey data to examine how climate change specific knowledge is positioned within school curricula in Singapore and the Philippines in relation to broader citizenship concepts and ideas. Additionally, this research was inspired by the research of Chang & Pascua (2017) and Reid (2019). Chang & Pascua (2017) examined the intersection and disjoint between government policies on climate change with current curriculum by analyzing the syllabuses of different subjects in Singapore using specific code words, and then interviewed a curriculum specialist to triangulate themes from content analysis. Reid (2019) introduced key themes within three collections of *Environmental Education Research*, and then contrasted these with possibilities from a range of other studies published in EE and related fields of study. Similar to Ho & Seow (2017) and Chang & Pascua (2017), this research uses surveys to collect quantitative and qualitative data supplements with structured open-ended questions in the format of ethnographic interviews.

Ethnographic interviews support survey data and offer additional insights into the experiences of research participants. This decision was made in response to the limitations of survey data and the purpose of the survey as a recruitment tool. Qualitative data offers in-depth responses and nuance to help contextualize situations that cannot be explained in quantitative data (Driscoll et al., 2007; Creswell, 1999; Almalki, 2016). Quantitative data, on the other hand, provides insights regarding general trends in data. Adding semi-structured ethnographic interviews offers critical knowledge and insight into the positionality of sustainability within Singapore society and school curriculum. Elevating the experiences of informants in this research reveals the perceptions of ESD and sustainability among student educators at Singapore schools and educators and students at an international school in Singapore. These interviews were constructed based

on principles taught in Asian Cities, a course by Catherine Chang of the Geography and Asian Studies Department at Macalester in the Spring of 2021. Interview questions were also created in collaboration with Professor Sonia Mehta of the Educational Studies Department at Macalester in the Fall of 2022.

This chapter outlines the study design, explaining the two-stage methodology and data collection and analysis processes. Brief findings from educator surveys are discussed, with special attention to the recruitment methods, survey results and ethnographic interview results. The same process is followed for students and experts, including recruitment methods and results. More extensive results are discussed in Chapters 6-8.

Discussion of Study Design

In October 2022, I received approval from the Institutional Research Board at Macalester College to begin data collection with human subjects. This two-stage methodology allowed the survey to function as both a recruitment tool for semi-structured interviews and a data collection tool. First participants filled out a survey in a Google Form regarding their knowledge of and personal experiences.

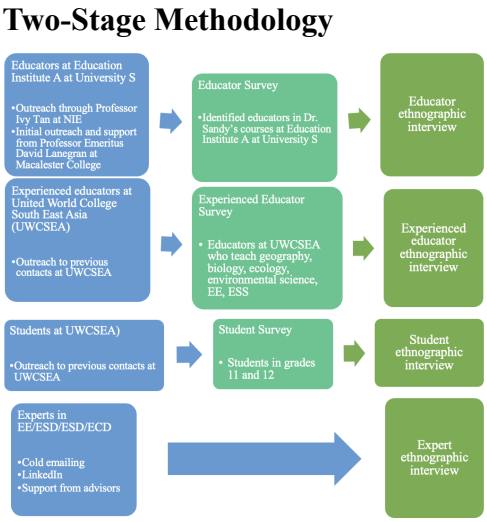


Figure 2. Graphic representation of the two-stage methodology used in this research

Educator surveys included questions regarding the current subject(s) taught, academic setting (private international, or public), familiarity and experience as an educator of ESD, level of engagement of students in the classroom, materials used in and out of the classroom, and short reflection questions about their impressions of ESD and its importance. The only demographic question was about gender, and it did not ask educators about their years of experience teaching. Student surveys included questions about demographics (age and gender), grade level, academic setting, and experience with ESD. Expert interviews followed a similar structure to the educator surveys but included additional reflection questions about the placement of ESD and the future of ESD in Singapore and within the context of the SDGs. Adopting questions from the United Nations Academic Impact (UNAI) Survey, all participants were asked to rank their concerns regarding specific environmental concerns (UNAI, 2023). For expert interviews, the survey was often not the source of recruitment, and participants participated in the interview without filling out the survey. All students except for two were contacted by their indication of being willing to be contacted by the researcher in the initial survey.

This study's primary participants were recipients of Singapore's ESD agenda and broader commitment to sustainability. Overall, this group contains two major groups of people. One part of the participants is educators and students living in Singapore but who are not native citizens of Singapore. The other group is educators and experts who are citizens of Singapore and are living, studying or teaching at local schools in Singapore. Specifically, the target population was educators, student educators, and students at the United World College of South East Asia (UWCSEA) and Education Institute A at University S[5]. Based on these differences in experiences and positionalities, test subjects are divided into groups based on their personal connection to the ESD curriculum in Singapore.

Quantitative aspects of the surveys for all participants were summarized with basic demographic information, grade level (students) and subject (educators), and level of concern regarding specific environmental situations. Educator summary statistics included quantitative data about the dates when ESD curricula were incorporated into the

[5] A pseudonym is used to protect the identity of the Institution

local education system and why they perceive sustainability/ESD to be important to them.

Ethnographic interviews consist of one-on-one conversations between a researcher and an informant. This interview style aims to better understand the informant and the factors affecting the world in which they live and work. The interview style is part of a larger process "by which contemporary society is defined, and individuals understand their position within it" (Cochrane, 2013). In this research, it was important to have questions that prompted responses from interview subjects, have follow-up questions prepared in advance, and be aware of power dynamics within the interview context. As Cochrane (2013) and Smith (2006) argue, starting interviews with those who are already identified as powerful or defined as 'elites', raises important questions; therefore, when initiating interviews, it is important to analyze power as something that is "negotiated or assembled rather than something pre-existing just waiting to be called into play" (Smith, 2006; Allen, 2003). Furthermore, Bondi (2003;72) states that interviews should be understood as both a "performance (in which the researcher and researched are involved) and as a collaborative process, a relationship that may go beyond the particular moment of the interview itself" (Bondi, 2003; Cochrane, 2013, pp. 48-50).

Generally speaking, the style of ethnographic interviewing uses three basic skills. First, the ability of the researcher to ask questions that prompt a response. In response, the researcher must strategically and, in advance, prepare follow-up questions. Finally, the ability to understand and situate the conversation within the world in which the informant operates. This approach takes a special account of a researcher's positionality and prioritizes the development of human connection and deepened understanding over precision and accuracy.

Those that participated in ethnographic interviews expressed explicit interest by opting in to provide identifying information (name and email address) to participate in an interview at the end of the survey. If interested, they were contacted by email to schedule a time to meet for an interview. Digital receipt of consent was received before the interview and verbal consent was received before the start of the conversation. For the purpose and scope of this research, all interviews occurred on Zoom, as all research

participants were physically located[6] in Singapore or the broader East Asia region. Despite this research occurring post the peak of the COVID-19 pandemic, Zoom is still a relevant and advantageous tool that allows for virtual connection across the globe via cloud-based video conferencing (Zoom Video Communications, 2020, 2022).

Individuals who participated in the ethnographic interview also filled out the survey, which was linked to their names. The purpose of this was to refer to survey responses when speaking with them during the ethnographic interview to avoid repetitive questions and information. The informants' data containing information (name) was collected during the original previously anonymous survey, but informants opted to provide further identifying information (email address) to participate in the ethnographic interview. Survey data containing names were eliminated and stored separately from de-identified individual-level data. It is within this scope that every interview with students started with no prior knowledge of the informant other than their name, current grade, and basic information. For interviews with educators, the interviews began with no prior knowledge except for their name and basic contact information.

Ethnographic interviewing is advantageous to the discussion of ESD in the experiences of educators and students in and out of the classroom. To follow-up with survey participants in a more open-ended interview allows the researcher to explore individual responses and allow the interviewee to elaborate on, extend, and share ideas and thoughts. During this research, I spoke to six experienced educators and five students at the United World College South East Asia (Singapore), an international high school; five educators at the Education Institute A at University S, and three experts in ESD/EE/CCE. For each group of interview participants, there was a prepared list of questions that were consistent across all interviews (See Appendix for interview questions). Each conversation began by receiving verbal consent to record the conversation on Zoom, followed by inviting the participant to share their current profession, grade level, and their knowledge of sustainability and experience with classroom and experiential learning curricula concerning sustainability. As each informant spoke, I made notes on a Google Document, and as I listened, I crafted tailored

[6] The inherent location of research participants in Singapore or East Asia was not a barrier to conducting this research. Due to the COVID-19 pandemic and an ability to secure funding to assist in the travel to Singapore, all interviews were conducted on Zoom.

responses and follow-up questions, inviting the informant to share their unique perspective and insights. Despite the preformed list of questions, I made a conscious effort to have the informant lead the direction of the conversation. After each interview, Otter.ai software supported interview transcription, and then the transcription was uploaded into Dovetail App, a qualitative analysis tool used to code the interviews and identify key themes across all interviews (Dovetail Insights, 2022)

In the Dovetail App, I listened and reread the transcriptions, looking for content that represented key themes. Similar to other programs such as Atlas.ti (provided by Macalester), Dovetail uses codes to qualify codes with specific themes. For example, a quotation detailing the use of curriculum to help students learn strategies for sustainable living would be coded as "empowerment."

In the Dovetail App, I read through every transcription, highlighted important sections, and then coded them with an appropriate theme, thus creating a network of quotations and codes. By highlighting and coding the data into themes, I was able to create a narrative regarding how educators and students perceived ESD-centered curricula to influence and impact the landscape of sustainability in Singapore. The themes were kept as general as possible to allow the quotations within major themes to highlight similarities and variance in experience. Specific findings from analysis in Dovetail App are further discussed in Chapters 6 and 7.

This chapter is a written summary of Figure 2 and discusses at length the methodology and findings of two major groups, Educators and Students. First, recruitment efforts are discussed, then survey findings and the ethnographic semi-structured interviews. The second section follows the same structure for expert interviews.

Educators

Recruitment Efforts

To connect with educators at Education Institute A[7] at University S, I first connected with Professor Emeritus, Dr. David Lanegran in the Geography Department at Macalester College. I was connected with Dr. Lanegran by my advisor and mentor, Dr.

[7] The official name of this university is omitted

Holly Barcus, Dewitt Wallace Professor of Geography at Macalester College. Following a conversation with Dr. Lanegran in the fall of 2022, Dr. Lanegran introduced me to Dr. Sandy[8], an Associate Professor at Education Institute A at University S in Singapore. Upon review of my research proposal and conversation over email, Dr. Sandy kindly distributed my survey to educators in the fall of 2022 and spring of 2023.

When educators filled out the surveys, they indicated if they were willing to participate in an interview with the researcher. Of the educators that filled out the survey, five indicated being willing to participate in the interview.

Survey results

The educator survey received seventeen responses. These educators have gone through their Postgraduate Diploma in Education at Education Institute A at University S. The average year in their current program and age of the survey informants is below.

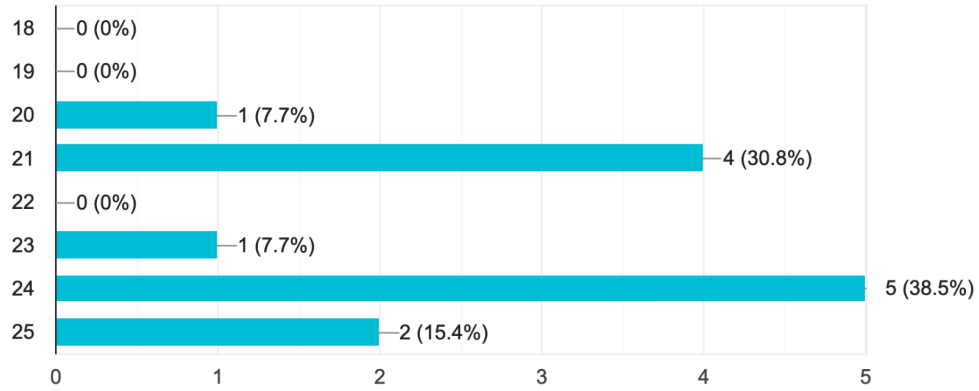
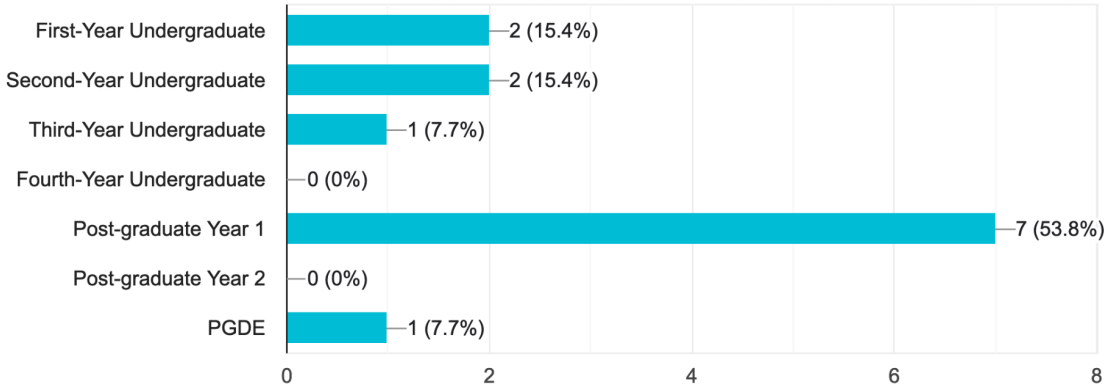


Figure 3. Age breakdown of educators at Education Institute A.



[8] To protect the identity of this individual, they are referred to by their pseudonym

Figure 4. Breakdown of educator's year in school (undergraduate and graduate).

The diversity in age of these educators is advantageous for this research because it offers insight into how young, future educators perceive practices of ESD and how it is relevant to the education spaces they interact in. Additionally, the diverse positionality of respondents within their current studies (undergraduate versus graduate) allows this research to explore differences in experience of students across their studies. As such, this research helps examine the consistency of ESD curricula in higher education and how educators are educated and informed to translate such practices into classroom learning environments for younger students. Of the educators that filled out the survey, seven students reported being in their first-year post-graduate program, and as such, they were actively serving a placement in a local school in preparation of being a full-time educator.

Ethnographic Interview Findings

During the interview process, five educators were interviewed for one hour each. There was significant overlap between the educators, as all were studying at the same institution and were in placements at local Singaporean primary and secondary schools. Of the five educators interviewed, one was still an undergraduate and as such, was not currently in a placement. For this interview, the majority of topics focused on the individual's experience learning about sustainability prior to their current studies and their future plans to become an educator. However, the majority of educators were in the first year of their Diploma in Education program and were new to the environment of teaching in a classroom setting. In all interviews, informants reflected on their previous experiences learning about ESD formally and informally, and discussed at length why they perceived ESD is necessary for future students' education.

Educators from Education Institute A discussed at length the strengths of Singapore's education system. While most of the conversations were centered around how educators' own education experiences have influenced their interest in becoming an educator and influence the choices they make within the classroom, informants offered insights into the causal effects of new developments being made at the national and local levels to encourage students' broader involvement in activities spanning ESD/EE/CCE. They believed that the causes for students' not engaging in activities tied to sustainability

and ESD are tied to existing systemic practices in Singapore's education system. Educators expressed during ethnographic interviews, that they do not have liberty to discuss certain topics with the researcher during the conversation per the sensitivity of such topics; however, they did indicate that there is a certain level of disconnect between the streamlining of activities from the national agenda into schools and therefore, into the hands of students. This can make the application of sustainability and ESD challenging for students to embrace wholeheartedly in their daily activities and feel that they have agency to make individual change. During analysis of interviews in Dovetail App, the most common codes included were Geography, curriculum, decisions, agency, classroom, role modeling, student-centric, case studies, and critical thinking. Further details and specific quotations from ethnographic interviews can be found in Chapter 6.

Experienced Educator Findings - United World College South East Asia (UWCSEA)

Recruitment Efforts

To connect with experienced educators at UWCSEA, I initially reached out to a connection I had at the school through my professional work experience. The timeline of this connection and survey distribution was delayed due to the timing of initial receipt of emails between UWCSEA and the researcher and approval of research by the Head of School. I attribute this to the timing of outreach and connection with educators with regards to the school year, and the fact that my Macalester email was not recognized by my contact at UWCSEA. However, once initial contact was made and my research was approved by the Head of School, targeted experienced educators were invited to fill out the survey, and later contacted if they indicated being willing to participate in an interview. The time period between survey distribution and interviews was quite short due to the natural constraints of this research timeline, so I did not receive nearly as many responses as I anticipated. Further results will be discussed in Chapter 7.

Survey results

The UWCSEA experienced educator survey received ten responses. All educators taught 11th or 12th grades. The breakdown of subjects is below:

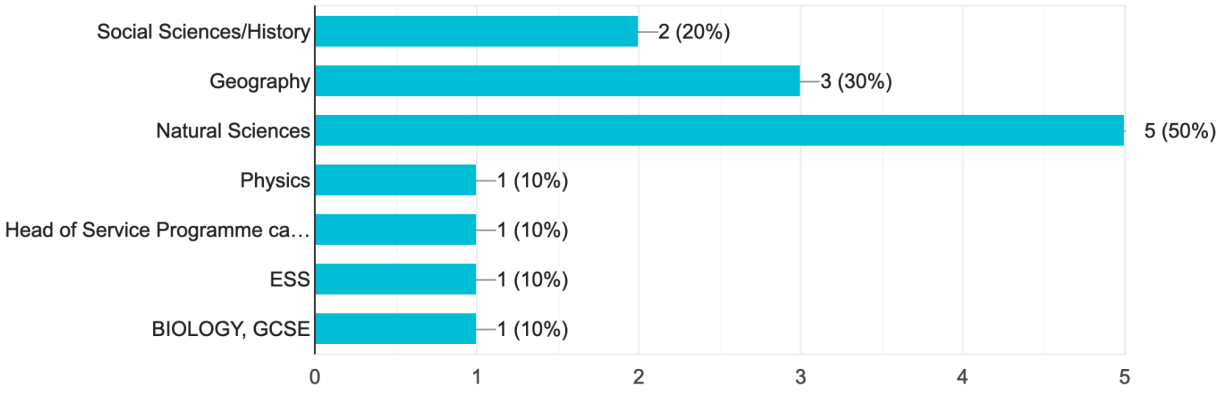


Figure 5. Breakdown of subjects taught by UWCSEA teachers surveyed.

From the data collected, there are more responses than participants surveys. This indicates that certain teachers teach more than one subject. The gender breakdown of educators is as follows. We can see that there is a majority of women-identifying educators who are teaching subjects relating to sustainability than men. UWCSEA follows the IB curriculum, which was reflected by educators' responses on pedagogy approaches. Moreover, within the IB curriculum, there are set standards for materials used, but there is also more freedom for educators to develop their own curricula, and focus on different areas pertaining to sustainability and ESD.

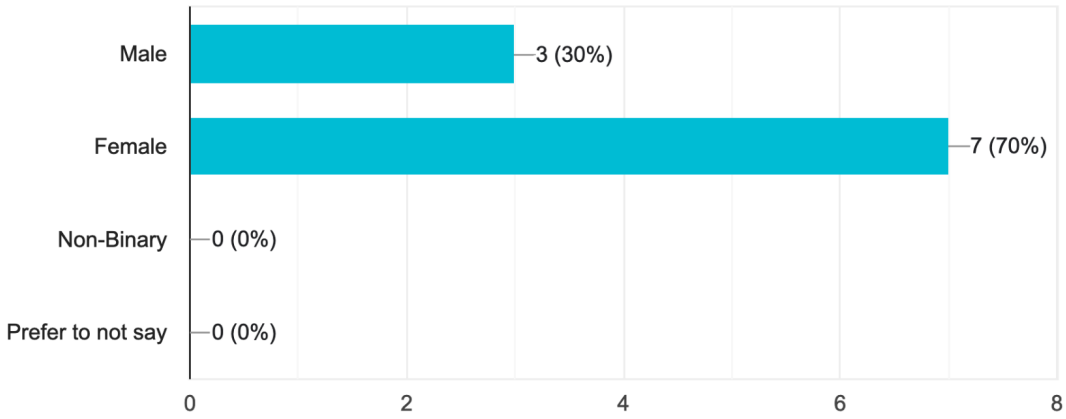


Figure 6. Gender breakdown of teacher(s) surveyed at UWCSEA.

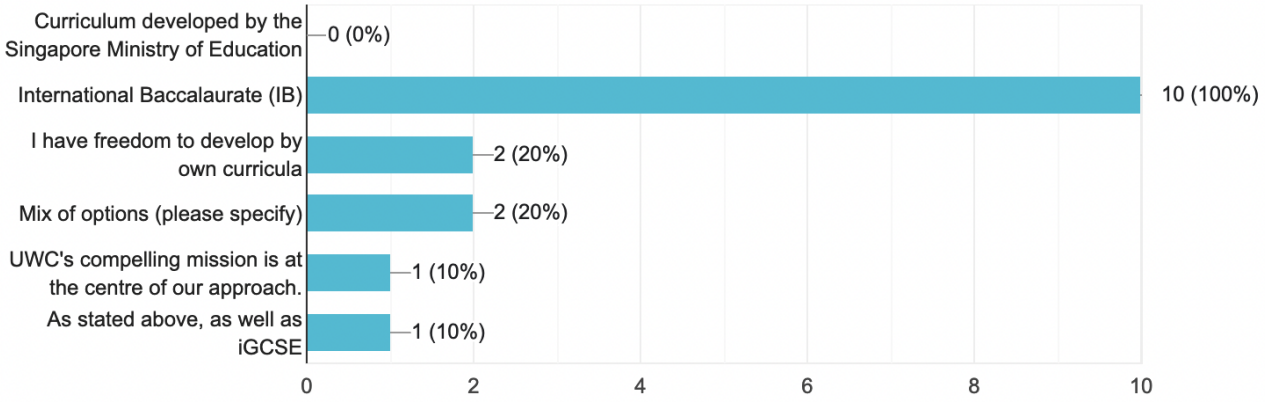


Figure 7. Breakdown of pedagogical approach used by UWCSEA teachers.

In all survey responses, experienced educators mentioned a lack of time when thinking about limitations to ESD curriculum at UWCSEA. This finding was further supported in ethnographic interviews with educators.

Ethnographic Interviews

During the interview process, six experienced educators were interviewed for one hour each (see figure), with the exception of one interview. There was inherent overlap between educators, as all were educators at the same school, though some educators taught at the UWCSEA Dover Campus, while others were educators at the East Campus. Of the six experienced educators, five identified as women, and on average were experienced educators, having taught at other international schools across Asia and Europe before coming to UWCSEA. The majority of the educators had a background in Geography or Social Sciences, with one educator in the natural sciences. In all interviews, they were asked the same questions (with some questions omitted for time purposes), to develop general observations.

All experienced educators discussed their pathway to UWCSEA, with most coming from other international schools either in Asia, Europe, or Australia. They also discussed at length the overall structure of UWCSEA and its values and mission. While most conversations followed a semi-structured format, I intentionally framed this time as a conversation versus an interview. Framing this as a conversation made participants more relaxed and they were willing to share their opinions and perspectives on a range of topics. Most conversations centered on the ways that UWCSEA encourages students to participate in sustainability initiatives on and off campus through experiential learning and the Global Concerns (GC) Programme. It is these practices and pillars that make many educators excited to be a part of UWCSEA and have influenced their choices to include students' voices in the development of educational experiences, such as Project Week in grade 11. When asked how educators play a role in empowering students, many believe that students perceive their educators as role models, so if educators don't follow or engage in existing practices of sustainability, students will likely follow suit. During analysis of interviews in Dovetail App, the most common codes included were UWCSEA efforts, Global Concerns (GC), students, International Baccalaureate (IB), alumni,

experiential learning, student-centric, case studies, and agency. Further details and specific quotations from ethnographic interviews can be found in Chapter 6.

Experts

Recruitment Efforts

Given that I do not have direct contact with experts in ESD or sustainability, I relied on LinkedIn and my advisors' connections to support this section of research. Unlike the sections on educators' experiences, where I had one contact to vouch for and assist with dissemination of my survey, I had to conduct most of this research independently. As such, my methods for contacting experts were through cold emailing or cold outreach on LinkedIn. For two of my experts, I found them independently. One individual was found through an online search on a database of outdoor education programs in Singapore. The second individual was found through LinkedIn under the search "Education for Sustainable Development in Singapore." The other final expert I connected with was through my initial outreach with Dr. Sandy at University S. The breakdown is as follows.

Ethnographic Interviews - Experts of ESD/EE/CCE/Sustainability		
Profession	Pseudonym	Location
Program Director	Mr. David	Singapore
Expert in ESD	Ms. Cheryl	Japan
Professor	Ms. Alyssa	Singapore

Figure 8. Experts interviewed in this research and their pseudonyms.

Ethnographic Interviews

For the purpose of experts and the scope of my research, I did not ask experts to fill out the initial survey before the interview. Instead, potential interviewees were asked to participate in an ethnographic semi-structured interview, which on average, lasted one hour in length. Experts discussed at length their pathway to their current career, but the bulk of the conversation centered on the role that their work plays in the broader context of ECD and ways they believe that educators can support students and empower them to be engaged in environmental movements.

Students

Recruitment Efforts

Like educators at UWCSEA, my research first had to go through the approval stages by the Head of School at UWCSEA. An additional caveat of this stage of research is that per International Research Board (IRB) guidelines, all students that were interviewed needed to be age 18 or older to consent to participate. Following this, my student survey was disseminated to students in different courses at UWCSEA and I received responses from them. Students then indicated if they would be willing to participate in an interview with the researcher, to which they were contacted by email.

Survey responses

For students at UWCSEA, a total of eighteen responses was received, but one student was not in fact eighteen years of age, so a total of 17 were valid. All students except for one student were 18 years old, and most students were in grade 12 (72.2%) compared to Grade 11 (22.2%). The majority of students identified as female (77.8%). Most students reported first learning about sustainability in primary school (72.2%), with 22.2% starting in secondary school, and 5.6% starting in high school. When asked what definition of sustainable they agreed with between three options, the majority of students selected the second option (refer to Figure 9). Additionally, when asked why education on sustainability is relevant, most students responded that it "promotes better understanding about the environment," and "provides students with the knowledge and skills to become active and responsive citizens."

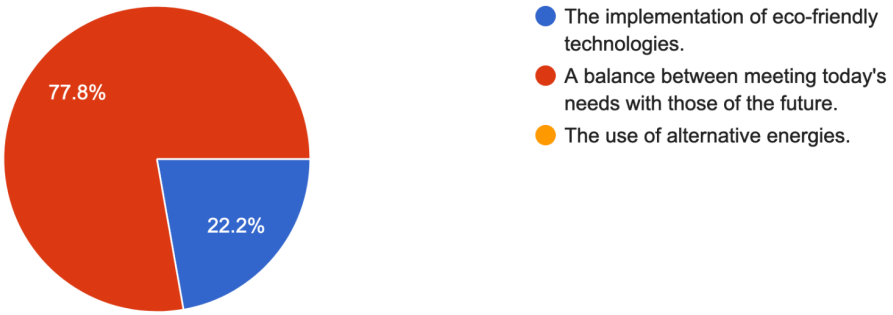


Figure 9. UWCSEA students' preference for definition of "sustainable."

Figure 10. UWCSEA students' responses to why education on sustainability is important

Ethnographic Interviews

The transition between surveys and interviews was quite slow among informants. This is partially due to the nature of communication between high school students and the timing of the interviews with student's exam schedules. Initially six students indicated that they were willing to participate in an interview; however, in reality, only four ethnographic interviews were conducted due to the lack of response from students and the nature of time of this research. One of the interviews has been omitted from the findings because the actual age of the student was later found out as younger than 18 years, making their responses invalid for this research.

Ethnographic Interviews - Students at UWCSEA		
Profession	Pseudonym	Grade Level
Student	Melody	11
Student	Joy	11
Student	Elsa	11
Student	Susanna	11

Figure 11. UWCSEA student participants and their pseudonyms.

During these conversations, all four students reflected on their journey to UWCSEA - two had transferred from other international schools, and one directly came

from their home country. Students talked at length about their experience in the classroom and the types of content their educators taught them about sustainability and ESD. They all mentioned specific projects and initiatives on campus that they were involved in, and experiential learning opportunities facilitated by UWCSEA on the topic(s) of sustainability and environmental protection. Students also spoke at length about practices they thought could be improved at UWCSEA to enhance students' learning and real world understanding of sustainability and climate change in Singapore and across the globe. Moreover, students shared how they perceived the role of their educators in supporting their efforts to become more sustainable, and their aspirations for how this learning partnership can be improved. During the analysis of ethnographic interviews of students at UWCSEA, the most common codes used in the qualitative analysis process in Dovetail App included Veggie Wednesday, Rainforest Restoration, GCs, ESS, geography, IB, empowerment, sustainability, teachers, and action. More specific excerpts from the student interviews can be found in Chapter 7.

Strengths and Limitations

The COVID pandemic and my current geography were significant barriers and limitations in the recruitment and ethnography interview efforts. Due to safety concerns and travel restrictions, all inquiries, surveys, and interviews occurred via email or Zoom. This methodological approach can appear disingenuous and as just another email in people’s inboxes, especially experts in the field. If I had been able to be present in Singapore, make initial connections and build trust with my research participants, develop more knowledge of the local situation concerning sustainability and ESD, and express my passion and interest in educator and student experiences, I imagine that I would have received more responses during each point of the research, and from a more diverse group of people. After completing a full-length interview, many informants shared with me that this research was interesting to them and they felt more connected to me as an individual and student researcher from the U.S. Many informants expressed feeling more supportive of my research scope, despite that all interactions occurred over Zoom. After these initial conversations, I made a conscious effort to initially introduce myself, my positionality, objectives for research, and most importantly, my desire to learn

about this subject from the perspective of the informants as individuals and professionals. By introducing myself and my research in this manner, I was able to have more effective and engaging conversations with each of my informants.

During this research, I struggled most with recruiting survey participants at the educator, student educator, and student levels. Despite the significant gap in quantitative data, I was impressed and grateful for the number of participants willing to sit down for an ethnographic semi-structured interview. Of the thirteen responses from educators at Education Institute A, six indicated being willing to participate in an interview, and of the ten responses from educators at UWCSEA, eight indicated that they would be willing to participate in an interview. Among students at UWCSEA, the majority of students declined participating in an ethnographic interview (66.7%). I attribute this to the time period when most ethnographic interviews took place, before the mid-semester examinations and annual two-week Lunar New Year holiday. For experts, all individuals I received responses from during my initial outreach, were willing to participate in an interview with me. As such, it was through in-depth responses to questions from experts, that I was able to build enough trust and share my passion for my research, that they were willing to participate in the research. Overall, I predicted that receiving survey responses would be easier than finding individuals to interview; however, I found that it was the opposite. People were more eager to share their experiences and expertise (within their field or positionality) within the format of an interview, than through responses in an Google Form survey.

The demographic population for this research broadly covers the city-state of Singapore, highlighting the perspectives of educators and students at a select international school and one of the national universities in Singapore. A significant limitation of this research is the under sampling of students and educators across both groups. While an ideal research project would include a significant amount of survey responses from educators and students, this aspired scenario did not play out due to reasons previously mentioned. The results of the surveys and between student educators and students at UWCSEA reflect the potential applicability of this research to each group of students. Educators at Education Institute A were older and most had undergraduate degrees, making them more knowledgeable of the efforts involved in carrying out undergraduate

research. Students at UWCSEA were also informed later in the process about this research, and in tandem with their exam periods, it created unlikely scenarios for them to be able to participate in the survey and optional ethnographic interview.

Interviews with professional experts reflected a range of skills and backgrounds within education. The only profession not included in this discussion was secondary school instructors and leaders from the Ministry of Education (MOE), Singapore, which is a notable limitation to this research. This research also did not account for other demographic information such as language, ethnicity, religion, and education level, as all experts were assumed to have a certain number of years of experience based on their bios or through email conversation. This is partially because the scope of this research was limited to international schools, as to complete research in Singaporean secondary schools, initial approval from the MOE and each individual school was required before dissemination of the research proposals and surveys. Due to the timeline of this research, I chose to select an international school, and specifically UWCSEA because of previous connections from my professional background. To this extent, the demographic of UWCSEA students is international broadly because of its diverse student population, of which there are 104 nationalities represented and 86 languages spoken (UWCSEA, 2023). Moreover, the identities of educators at Education Institute A were not further explored due to the nature of relation between the researcher, her connection to Dr. Sandy and Dr. Sandy's students who were the targeted population.

Overall, this research is missing important insights from historically marginalized (low income, indigenous, and ethnic minority, and those with less social mobility) communities which is an additional, and significant, shortcoming. Findings from this research do not in any way represent an accurate representation of the experiences of educators and students across Singapore. This research cannot be used to generalize about the roles and responsibilities of educators in public schools in Singapore to harness and empower students to become agents of change. Nor can it be used to generalize the role of students at international schools in Singapore as agents of change. Most importantly, this research serves only a piece of the missing link of qualitative data examining the development and implementation of ESD curricula through the lens of educators and surveys. Further research is needed to make conclusions about the

respective responsibilities of curriculum designers, educators, and students to meet respective ambitions for sustainable development with a local, national, and global scope.

Setting this research within the context of Singapore is advantageous but also presents different challenges. While Singapore presents itself as a modern, urban garden city with "opportunities for all," there is more behind the curtain. The Republic of Singapore is a city-state that has adopted a parliamentary democracy after its independence in 1965 (Singapore - Freedom House, 2021). The current government's framework allows for some political pluralism, but it does constrict the growth of opposition. For the purpose of this research, it was critical to be aware of Singaporean culture and values, in order to protect the identity of all research participants. The literature review helps reinforce findings of ESD within Singapore and broadly across the Asia-Pacific region. However, the results should only be interpreted through the lens of those surveyed and interviewed. This paper serves as a limited lens into the overarching application of ESD in Singapore, particularly regarding the Eco-Stewardship Programme; thus, the findings of the research should be employed as insights for further research into this growing important, interdisciplinary field. Nonetheless, it is reasonable to assume that in this research, educators' and students' concerns towards sustainability and climate change are valuable and should serve as valuable insights in the creation and modification of existing and new educational initiatives. The discussion of marginalized and indigenous populations within Singapore should also be taken into consideration, as these populations often live in "hidden" and "closed" spaces, but their contributions and perspectives are equally valuable to this conversation.

The Scholar-Practitioner

In research, we turn to the expertise and voices of scholars and practitioners to establish guidelines and narratives on best practices for teaching educators how to teach about sustainability, EE, and CCE. The scholar-practitioner divide is particularly salient within the education field because education is a broad field that encompasses many disciplines and carries historical tendencies tied to Eurocentric models of education. Secondly, teaching teachers how to teach is a growing "meta" concept educators need to be taught how to teach subjects for careers that are continuously evolving and that have

not even been discovered or created[9] (Rosen, 2011; Heffernan, 2011). Scholars are generally individuals who studied a specific discipline in significant detail and often possess a Ph.D. degree, while practitioners are individuals who practice in a specific area (University of New England, 2016). In education, scholar-practitioners are becoming more important as job market demands reflect a need to move beyond traditional, Eurocentric learning models of teacher education centered on assessments. This transition marks a new focus on teaching educators for implementing opportunities for students to apply their knowledge and learning to real-world scenarios (University of New England, 2016).

In education, there is a growing push for the backward design model, resulting in activities that empower educators to "develop adapted toolkits, comprehensive assessment plans, data-based literacy practices, and sequenced lesson plans that integrate technology - all rooted in research" (Lancasse via the University of New England, 2016). In this model of learning, educators "scaffold assignments and activities are combined to help students do their best in achieving desired results [in assessments]" (LaPlante, 2016). Instructional scaffolding is a helpful model for 21st century educators because, through these models of learning, educators are supporting the growth of students' knowledge and helping them with new tasks they may struggle with on their own in traditional classroom settings, overall fostering their success (LaPlante, 2016). While instructional scaffolding is not a one-size fits all model for 21st learning competencies, it does offer an additional dimension of learning that can be supportive of the establishment of classroom norms that enhance students' and teachers' collective learning (Gaudet, 2016).

International School Constraints

This research is limited in the scope of positionality of the international school selected for research. UWCSEA is located in Singapore, but is a private, international high school. The campus follows the International Baccalaureate (IB) Programme, which makes it exempt from the national curriculum set by the MOE in Singapore. The school has a total population of almost 6,000 students and 522 teachers, in addition to

[9] In her book, *Now You See It,* Cathay Davidson writes, "65 percent of children entering grade school this year will end up working in careers that haven't even been invented yet" (Davidson, 2011).

educational support staff and administrative and operations staff (UWCSEA, 2022). Of the almost 6,000 students, roughly 3,952 students are families, 292 students are boarders, and 101 students are scholars (UWCSEA, 2022). The student demographics attending UWCSEA is influenced by Singaporean law, which doesn't permit Singaporean citizens to attend international schools. As such, the natural demographic of students attending the College are international. Acknowledging that students' backgrounds are complex and nonlinear, it is important to also weigh family backgrounds, cultural values, and other factors that are immeasurable within the scope of this study. Nonetheless, ethnographic interviews in this research discussed how students' family socioeconomic status influences their preconceptions of sustainability, their concern for the environment around them, and their understanding of how their actions have local and global impacts. Overall, the natural population of students, in conjunction with the diverse faculty and staff, at UWCSEA is both beneficial and problematic for students and their learning and application of sustainability within their local environment within the broader city-state of Singapore.

My Positionality

As I conducted this research, I became more acutely aware of my positionality in this research. As a young, Asian-identifying, cisgender female researcher associated with a western undergraduate institution, I entered spaces of dialogue with privileges that distinctly impacted my ability to connect with informants. While I identify as East Asian, my background of being raised and educated in a western environment like the U.S. and current student researcher from a western institution positions me in a very different light. I am not an educator or student educator; I have never been to Singapore, do not have a command of the local dialect, and was never exposed to the local history before conducting this research. While my identity is very different from those of my research participants, I am also a student and share a common desire to bring to light the importance of ESD and its connection to climate change; and support educators and students as agents of knowledge and social change.

One of the major advantages I have in this research is that I identify as a woman of Asian descent. Because I look and identify as Asian, it is plausible that my research participants were more willing to participate in this research and share their experiences as an educator, student, or expert. At the same time, I am not originally from Singapore. In Singapore, I was aware of some stigmas against the West, particularly towards the U.S., considering the topic of sustainability. Because of my identity, during interviews with educators at Education Institute A and experts, there was an inherent power dynamic. In contrast, with experienced educators and students, none of whom were native to Singapore, there was more freedom for expression and sharing experiences.

Because of my identity and positionality, I spent time preparing how to balance the conversation equally before my interviews. When speaking with informants older than me or of seniority, I spoke formally and addressed them by Mr./Ms., so they would take my research and interest in this topic more seriously. However, as in the West, some participants preferred to be addressed by first name, so I followed suit. In contrast, when speaking with students at UWCSEA, I addressed them more casually to make them feel more comfortable with me during the conversation. My privileges allowed me to present myself as an undergraduate scholar and conform to different situations during this research, highlighting my advantages. While having this specific set of identities is not

obligatory to conducting this research, I recognize how my identity made it easier in some aspects of this process - but also contributed to some of the limitations of this research.

Chapter 4: The historical significance of global sustainability education

Introduction

In this chapter, an overview of the positionality of sustainability in global education frameworks will be presented. First, the discussion of climate change as a topic is discussed, with careful attention given to the language of global warming and the significance of climate change in society in both environmental and social contexts. Then the discussion of climate change and education is presented, offering an insight into the interconnectedness between the two fields. The three schools of thought – ESD, EE, and CCE – follow the discussion of global frameworks and bodies of research by UNESCO and its campaign, #ESDfor2030. Finally, to pull it all together, a discussion of the ESD within the context of Singapore is offered with careful consideration of Singapore's geography and national agenda for creating sustainable living and promoting sustainable behavior across the city-state.

Presenting a holistic view of the history of sustainability and different manifestations of how it is incorporated into global and Singaporean education models provides critical insights that allow for heightened analysis of survey and interview data to enhance the knowledge of how Singapore uniquely positions itself as a global and regional leader in the field of sustainability and why perspectives of educators and students are needed in developments of national and local ESD curricula.

Framing of Climate Change

Up until the early 1990s, terminology like “global warming,” “sustainability,” and “climate change” was not widely used (Jackson, United Nations, 2007). After the Intergovernmental Panel on Climate Change (IPCC) report in 1990, an influx of research on teaching and learning about global warming-induced climate change occurred (Chang, 2015, 181). Further, this rise in interest has also been observed in the political, economic, and social discourses on climate change over the last two decades (Chang, 2014). The issue of climate change is of great importance; however, as Chang (2015) discusses, we should place a greater priority on the discussion of climate change within climate change

education (CCE) than discussing whether there have been enough volumes of literature generated (Chang, 2015).

Today, climate change is one of the most important issues in our society. Individuals are more compelled than ever to take action and be involved in climate change and other environmental concerns (Wolf and Moser, 2011; Leiserowitz et al., 2010). While governments and international bodies hold power to make policy, individuals' views on climate change matter, and their engagement is a vector for developing and implementing climate solutions, thus making individual engagement imperative (Wolf and Moser, 2011). Expressly, when individuals are given more knowledge about the cause of climate change and the information is framed as an act of collective human responsibility rather than framed only as a scientific matter or issue of technological innovation, individuals are more likely to respond accordingly (Wolf and Moser, 2011; Lowe et al. 2006).

Public engagement for climate change is critical, but as (Chang, 2015; Ho and Seow, 2017) argue, there has been a lack of connection between climate change knowledge and apathy and action for climate change (Ho and Seow, 2017, 242; Chang, 2014; Chang, 2015). Many individuals, including students, are unable to see how climate change is relevant to their lives (Chang, 2014), which is further aggravated by a plethora of contradicting literature on climate change that youth and the public are exposed to (Chang, 2015; Weingart et al., 2000). Therefore, it is necessary to raise awareness of the need for CCE as a learning tool and inspire social change surrounding the ongoing climate crisis.

Over the last three decades, the mass media has dictated national policy responses to climate change, which has sparked a worldwide call to action (Weingart et al. 2000, 261). While this is good in theory, Weingart et al. (2000) explain that communications about climate change have resulted in competing dialogues of the topic, ranging from "bad science" to exaggerating risk, inciting public hysteria and conspiracy theories (Weingart et al. 2000, 261; Kerr, 1995). There is, therefore, a global call for education to be used as a vector to promote the "knowledge, skills, values, and perspectives and practices essential to a sustainable future" (Learning for a Sustainable Future, 2022).

Climate Change and Education

Climate change is an urgent interdisciplinary issue with dire consequences for our environment and the human race. Simply put, climate change refers to changes in temperature and weather patterns over time; while these changes can occur naturally, the burning of fossil fuels (coal, fuel and oil) by humans has been a primary driver of climate change (United Nations, 2022). Consequently, as the literature on climate change evolves, it is crucial for scholars and leaders across disciplines to unite and intentionally frame education as a vector for climate change across schools worldwide (Chang, 2014, pp. 19).

Education is perceived as a primary strategy to promote the pillars of environmental awareness and social responsibility for global citizens (Schreinder, Henricksen & Hansen, 2005). In the words of the economist E.F Schumacher:

> "The volume of education has increased and continues to increase, yet so do pollution, exhaustion of resources, and the dangers of ecological catastrophe. If still more education is to save us, it would have to be education of a different kind : an education that takes us into the depth of things"(Schumacher, written 1974, published 1997).

This quote is crucial to the discussion of education as a vector of social responsibility about climate change because it illustrates our current dilemma: education has come to great lengths and is viewed as part of the solution, but it is also part of the problem (Sterling, 2010; Orr, 2004). Reid (2019) adds that while there is broad agreement among experts, educationalists, and activists about the need to focus on ensuring strategic action (IPCC 2014, 95-96, 108, UNESCO 2019a), there is little consensus in public, political and academic spheres about who remains responsible for ensuring quality climate change education takes place, and how to assess, evaluate, and research climate change education. Learning is a "good thing," but this framework prioritizes making learning effective and learning methods instead of considering the effectiveness of such forms of schooling (Sterling, 2010; Schumacher, 1997; Orr, 2004). Therefore, while "learning to learn" may be an essential part of the evolution of

education, Williams (2004) argues that we must consider the qualities of learning we want to instill in future generations and for what purposes.

Since 1992, when the United Nations adopted Education for Sustainable Development (ESD) as their framework for climate change education, there has been an influx of research and reports on the importance of education as an agent of social responsibility and the development of climate-literate citizens. By employing ESD as a global strategy for climate change education, the UN and its government partners seek to synthesize individuals' understandings, perceptions, and engagement with environmental concerns and climate change to motivate collective action toward the current and accelerating climate crisis (Wolf and Moser, 2011; UNESCO Education for Sustainable Development, 2022).

UNESCO and Education for Sustainable Development

The origins of applying education policy to raise awareness for climate change dates to the 1992 United Nations Conference on Environment and Development (UNCED) (United Nations, 1992). Known as the "Earth Summit," this conference resulted in the conclusion that sustainable development was an "attainable goal for all people of the world" and gave way to Agenda 21, a unique program that called to action new strategies to achieve sustainable development in the 21st century (United Nations, UNCED, 1992; Agenda 21, United Nations, 1992). Within Agenda 21, we find evidence of calls for advancing youth participation and contributions in implementing Agenda 21 and sustainable development, including expanding "education for environmental and developmental responsibility"(Agenda 21, Chapter 25, pp. 275-278). The 1992 UN "Earth Summit" played a significant role in the recognition of sustainable development as a concept and was a contributing factor to the adoption of Education for Sustainable Development (ESD) by the United Nations in 2002 (ESD) as a framework for such goals and tasked UNESCO with spearheading future action (UNESCO, 2014; UNESCO and Buckler and Creech, 2014, pp. 17).

UNESCO remains at the forefront of global efforts for education for sustainable development (ESD). In 2005, UNESCO led the United Nations Decade for Education for Sustainability (DESD), which aimed to mobilize various resources and strategies to

create a more sustainable future (UNESCO, 2014). Centering education as a pathway to sustainability, the DESD's primary goal was to "integrate the principles, values, and practices of sustainable development into all aspects of teaching and learning, ultimately creating a more sustainable future for current and future generations (UNESCO, 2014). Since the Decade of Education for Sustainable Development (DESD) ended in 2014, UNESCO has led other campaigns to increase awareness and action within schools to include youth in the global transition towards sustainable development.

In 2020, UNESCO announced the ESD for 2030 education program to "bring about the personal and societal transformation that is necessary to change course" (UNESCO, Education for Sustainable Development, 2022). Within this new program, UNESCO positions itself as an advocate and agent to "strengthen capacities of governments to provide quality Climate Change Education (CCE)" (UNESCO, Education for Sustainable Development, 2022).

UNESCO's ESD for 2030 program came to fruition when leaders from across governments, international, intergovernmental, and non-governmental organizations, civil society, youth, the academic community, the business sector, and all spheres of teaching and learning convened for the World Conference on Education for Sustainable Development in May 2021 (Berlin Declaration on Education for Sustainable Development, 2022). In cooperation with the Federal Ministry of Education and Research of Germany and the German Commission for UNESCO, stakeholders made a case for education as a powerful agent of positive change of attitudes and worldviews and ESD, rooted in Sustainable Development Goal (SDG) 4.7 as the foundation for the necessary global transformation (Berlin Declaration on Education for Sustainable Development, 2022).

The Berlin Declaration on Education for Sustainable Development is a powerful document that emphasizes the significance of ESD as a guiding principle to mobilize action across disciplines among individuals of all ages and backgrounds for the SDGs over the next ten years (Berlin Declaration on Education for Sustainable Development, 2022, 5).

Three Schools of Thought

Currently, climate change is being explored and understood through two dominant paradigms of Environmental Education (EE) and Education for Sustainable Development (ESD) (Chang, 2014, pp. 19). For this research, it is necessary to understand (EE) and (ESD) shape the climate change dialogue within formal education settings across the globe.

Initially, EE, ESD, and CCE[10] share overlapping principles of environmental learning that happen at all levels of education (Environmental and Sustainability Education, University of Toronto). However, for this research, I focus on ESD, which tackles climate change from the respective angle of education and learning based on the ideals and principles that underlie sustainability - human rights, poverty, sustainable livelihoods, peace, environmental protection, health, climate change, etc. (ESD) (Environmental and Sustainable Education, University of Toronto). As each approach is different in its objectives for education, developing a joint framework in which all methods (EE, ESD, and CCE) are blended is problematic (Chang, 2014, pp. 19; Monroe et al., 2019).

Education for Sustainable Development (ESD)

Education for Sustainable Development is rooted in the conceptual framework of Sustainable Development (SD). Sustainable Development fulfills the needs of the present without impacting the ability of future generations to meet their own needs (UNESCO, 2012). Through SD, core elements of economic growth, social inclusion, and environmental protection are considered equally crucial for the well-being of individuals and societies (UN Sustainable Development Goals, 2022). Moreover, as SD considers ecological concerns, it also takes into consideration others, including gender equality, poverty, standards of living, human rights, cultural diversity and preservation, and universal access to education (UNESCO, 2022; Chang, 2014, pp. 19). Through SD, we

[10] Climate Change Education (CCE) is the main thematic focus of ESD per the ESD for 2030 Program through UNESCO. Climate Change Education (CCE) is a framework that helps people understand and address the impacts of the climate crisis, empowering them with the knowledge, skills, values and attitudes needed to act as agents of change (UNESCO, Education for Sustainable Development, 2022).

can make strides towards creating a more “inclusive, sustainable and resilient future for people and the planet” (UN Sustainable Development Goals, 2022).

Education for Sustainable Development (ESD) was developed through UNESCO's campaigns for education on sustainable development and is rooted in its alignment with the United Nations 2030 Sustainable Development Goals (SDGs). According to UNESCO, education for sustainable development (ESD) prepares "learners of all ages the knowledge, skills, values, and agency to address interconnected global challenges including climate change, loss of biodiversity, unsustainable use of resources, and inequality" (UNESCO, 2022). Today, UNESCO is leading the United Nations' efforts for education for sustainable development as part of ESD 2030, the current global framework for ESD (UNESCO, 2022). ESD is the worldwide mission of UNESCO, which has employed the contributions and commitments of over 2,800 stakeholders from 161 countries who recently signed the Berlin Declaration for Education for Sustainable Development in 2021 (UNESCO, Education for Sustainable Development, 2022).

Under the theme of “Learn for Our Planet. Act for Sustainability,” the Berlin Declaration seeks to promote the implementation of UNESCO’s ESD for 2030 curriculum across the globe. Specifically, the ESD for 2030 network is focused on four pillars 1) Promising practices, knowledge sharing & mutual learning; 2) Global advocacy and policy making ; 3) Collaboration & partnership; and 4) Monitoring and Evaluation (UNESCO, ESD for 2030 Network, 2022). Through these four pillars, UNESCO and its partners will push for further commitments by national, regional, and international actors to facilitate the implementation of ESD, encourage peer-to-peer learning, and cultivate partnerships that foster collaboration and projects that sustain and accelerate the progress of ESD.

Environmental Education (EE)

Environmental Education (EE) is a term used to describe an educational pedagogy that helps students learn about the environment and the interrelationship between humans and the environment (Stapp et al, 1997). EE was designed to develop students’ understanding and concern for the environment (Bogner, 1998). According to Stapp’s framework of EE, there are three main principles: 1) within a system consisting of man,

culture, and the biophysical environment, humanity can alter the interrelationships within this system; 2) the existence of our civilization is dependent upon humanity's use of the natural environment ; 3) problems existing in the natural environment are the responsibility of citizens and governments to work together; and 4) attitudes of concern for the environment will encourage social behavior that motivates citizens to work towards collective solutions and inform them of their role in protecting the natural environment (Stapp, 1969, 33-35).

Environmental education offers scientific explanations for ecological concerns and uses science education departments (Shin, 2000). Shin (2000) discusses the upward trend of EE because of the accelerated degradation of the biophysical environment. Further, Kyburz-Graber (1999) explains how as studies of the natural environment evolve, educators across science disciplines, primarily biology, have undertaken the responsibility of providing environmental education as an alternative route to traditional technological and biological methods used to explain natural events and environmental problems (Kyburz-Graber, 1999), since the 1970s when studies of the environment became more common in environmental education. Since then, science educators have placed a stronger emphasis on environmental education because of its ability to impact society's attitudes and behavior towards the environment positively and the steps needed to protect the environment for future generations (Kyburz-Graber, 1999).

Climate Change Education (CCE)

The United Nations Framework Convention on Climate Change (UNFCCC) was written in 1992 as part of the 1992 Earth Summit in Rio de Janeiro, Brazil, with the ultimate goal of preventing "dangerous" human interference with the climate system (UNFCCC, 1992). When the UNFCCC came into effect in 1994, there was less knowledge about climate change than now. As such, the UNFCCC adopted an important line from one of the most influential and successful multilateral environmental treaties in history, the Montreal Protocol of 1987), bounding member states to act in the interest of human safety even in the face of scientific uncertainty (UNFCCC, 1992; Montreal Protocol, 1987). From the UNFCCC, we can observe specific areas where education can address climate change. Article 6, for example, of the Convention established the

necessity of climate change in education, training, and public awareness (UNFCCC, 1992, 10). In addition to Article 6, articles 4 -1.i to "promote and cooperation in education, training and public awareness related to governmental organizations' and Article 5 concerning research and systematic observation, the UNFCCC called for six priority areas of activity: education, training, public awareness, public access to information, public participation, and international cooperation.

Interestingly, the UNFCCC borrowed a significant part from one of the most successful multilateral environmental treaties in history (the Montreal Protocol, in 1987): bounding its member states to act in the interests of human safety even in the face of scientific uncertainty (UNFCCC, 1987, 2-10). However, as Reid (2019) points out, the lack of substantial progress in these areas for over two decades has been recognized as a factor in the frustration felt and deliberations undertaken concerning climate change, leading to Article 12 of the Paris Accord of 2015 (Reid, 2019, 768). Article 6 of the 1992 Convention and Article 12 are designed to purposefully stress Action for Climate Empowerment (ACE) (UNESCO and UNFCCC, 2016). As a result of ACE, climate change education (CCE) was brought into the spotlight via the COP meetings, World Education Day, and in parallel with the Sustainable Development Goals (SDGs), particularly the following Targets :

- 13.3, climate action, with its focus on *improving education, awareness-raising and human and institutional capacity on climate change mitigation, adaption, impact reduction and early warning*;
- 4.7 on education for sustainable development
- 16 on peace, justice and strong institutions;
- 12.8 on information provision ;
- And 13.1 on strengthening resilience and adaptive capacities

It is essential to recognize that in the promotion of ACE Guidelines and consecutive COP meetings, climate change rose as "a thematic focus across all five Priority Action Areas of the Global Action Programme (GAP)" (UNESCO, 2017c). In future documents promoting climate change education, including UNESCO's 2017 *"Changing minds, not the climate : the role of education"* campaign and evaluation of the Doha Work Programme on Article 6, it is evident that the implementation of CCE

nationally, regionally, and internationally is wanted in many regards (Reid, 2019, pp. 770; UNESCO, 2017c). Specifically, the Doha Work Programme (2012-2020) called upon parties to enact activities under the six categories of Article 6 of the Convention and Article 12 of the Paris Agreement, including education. In Section IV, parts A and B, the Programme explicitly calls for the:

A

(f) Promote and enhance the inclusion of climate change in school curricula at all levels and across disciplines. Efforts could be made to develop materials and promote teacher training focused on climate change at the regional and international levels where appropriate;

B

(e) Develop regional programmes and activities, including the preparation of training and education materials as well as other tools, using local languages where applicable and practical;

(Doha Work Programme, 2012-2020, Parts A and B).

Pulling it all together

Education for Sustainable Development (ESD), Environmental education (EE), and Climate Change Education (CCE) are similar in that they all consider humankind's relationship to the environment and are pedagogies that call for active concern for the environment and engagement in actions to protect the environment. They are also similar in that they actively call for the teaching of climate change as a way of helping students and young people understand the world around them and bring about a "fundamental shift in how we think, act, and discharge our responsibilities toward one another and the planet" (UNESCO and UNFCCC, *'Changing minds, not the climate: the role of education*,' 2017).

In the ways that ESD, EE, and CCE are all similar, they are also equally different in the actions and approaches they consider the relationship between the science of climate change and education about climate change. EE typically has a traditional environmental lens attached to the curriculum, with students exploring “conservation, natural resource depletion, and the negative impact of pollution, global warming, and deforestation on the environment and living things in science” (MOE Singapore, 2019). Students explore these issues through critical analysis of case studies and explorational activities in their local communities. On the other hand, in CCE, students focus on learning about climate change and the events that have led to and contributed to its ongoing manifestations of extreme weather, rising sea levels, and the degradation of natural ecosystems.

Recent trends of climate change advocacy efforts and their intersection with education indicate that ESD has become the preferred pedagogy due to its alignment with the UN's SDGs. In this research, I explore the specifics of ESD within the context of Singapore, with the specific intention of understanding the role of educators in translating curriculum into learning activities and experiential learning that empower and harness students with the skills, knowledge, and abilities to cope with the current and future challenges of climate change and become agents of change.

Chapter 5: Education for Sustainable Development: The Case of Singapore

Why Singapore?

Singapore is a city-state located south of the Malay Peninsula, about 85 miles north of the equator. Known for its commitment to sustainability, the city prides itself on being powered by natural gas, and over half the island is covered in lush trees and green foliage (Visit Singapore, 2022). The city-state has over three hundred bus services and an extensive Mass Rapid Transit (MRT) system for citizens and travelers throughout the green city (Visit Singapore, 2022).

To understand Singapore's national sustainability commitment, we must consider Singapore's history. Just 50 years ago, Singapore's living conditions were lower than ideal. In the 1960s, the city-state faced challenging public health conditions, a lack of quality housing and connectivity to the rest of the world, and employment insecurity (Ministry of National Development, Singapore; World Bank, 2019). Today, a small city-state in Singapore is a completely changed environment where "everyone has access to a clean and green environment, and to live in an inclusive environment with opportunities for all" (Wong, 2018). Beginning in 1972, post-independence, the city-state implemented the Ministry of Sustainability and the Environment (MSE). By establishing the MSE, Singapore demonstrated early on that it was focused on balancing environmental protection, economic growth, and social inclusion (Ministry of Sustainability and the Environment, Singapore). Following the founding of the MSE, a new statutory framework was implemented by the ENV to focus on implementing environmental policies in Singapore (Ministry of Sustainability and the Environment, Singapore).

Despite the successful integration of sustainable practices, the small city-state is still at heightened risk of climate change to its environment and residents' well-being. To prepare for climate consequences, the government has implemented various committees and task forces designed to target the risk of rising sea levels and increasing median temperatures. These include the Ministry of Environment (MEV), the Garden City Action Committee, and the Green Plan 2030 (Wong, 2018; Kolcaz, 2022). Newly built green

spaces like the Marina Barrage, CleanTech Park, and Changi International Airport represent Singapore's adoption and implementation of sustainability initiatives (Wong, 2018, 37; Singapore Changi Airport, 2022; Singapore International Energy Week, 2022).

In addition to visible representations of Singapore's commitment to environmentalism and sustainability, Singapore extends this through policies, departments, and initiatives on every level of society. These components are all part of the nation's adoption of the 2030 Sustainable Development Goals (SDGs) of the United Nations (UN). Adopting the UN's definition of sustainability, Singapore has positioned itself as a pilot for expansive sustainability initiatives to become a globally renowned sustainable city.

Beyond expansive infrastructure and architecture, including the newly renovated Changi Airport and Marina Bay, Singapore is demonstrating its ability to put the environment first through developments in its Housing and Development Board and Economic Development Board. These approaches focus on developing Singaporeans' ability to own land, actively participate in their communities, and contribute to growing circular economy trends (Singapore House and Development Board; Singapore EDB, 2022; Kolczak, Amy, 2022). For example, The Pinnacle@Duxton is an impressive complex of seven fifty-story apartments, all connected by a 1,600-foot-long recreational "sky garden," and stands to represent how development can both revitalizes the area and commemorates its historical significance (Kolczak, Amy, 2022; Visit Singapore, 2022).

At first glance, Singapore's construction of public infrastructure at scale while prioritizing the environment is impressive. However, within the scope of environmentalism and sustainable development, it is clear that Singapore's developments also represent its international efforts.

Singapore's International Efforts

As a strong proponent of multilateral approaches to global issues, Singapore is committed to working closely with other countries to tackle the climate challenge. 1997 Singapore ratified the UNFCCC and approved the Kyoto Protocol in 2006 (National Climate Change Secretariat, Singapore, 2021). Following the Doha Amendment to the Kyoto Protocol in 2014 and the Paris Agreement in 2016, Singapore was active in

ratifying and signing these important multilateral agreements (National Climate Change Secretariat, Singapore, 2021). Singapore is also a member of key regional initiatives, such as the Sino-Singapore Tianjin Eco-City, the Asia-Pacific Economic Cooperation (APEC), and the Association of Southeast Asian Nations (ASEAN) (National Climate Change Secretariat, Singapore, 2021). For example, The Sino-Singapore Tianjin Eco-City is a government-government project with the vision of transforming the Tianjin Binhai New Area, roughly 40 minutes from Beijing, China, from a non-potable polluted area into a *"thriving city which is socially harmonious, environmentally-friendly and resource-efficient – a model for sustainable development"* (Sino-Singapore Tianjin Eco-City, Singapore, 2019; National Climate Change Secretariat, Singapore, 2021). Home to thousands of families and businesses, the Sino-Singapore Tianjin Eco-City is a global model for sustainable development, setting new standards for modern living in China and proving to the world that sustainable urbanization can be achieved regardless of complex environmental barriers (Sino-Singapore Tianjin Eco-City, Singapore, 2019; Channel News Asia, 2019).

Singapore also strongly supports climate action at the annual COP Meetings. At COP-26 in Glasgow, Singapore joined initiatives, such as the Greening Government Initiative (GGI)[11] (National Climate Change Secretariat, Singapore, 2021; The White House, 2021). And in November of 2022, at COP-27 in Sharm El-Sheikh, Egypt, Singapore joined additional initiatives to curb carbon emissions and advance climate change, including the UN Global Early Warnings Initiative (GEWI)[12] initiative.

Closer to home, Singapore offers technical assistance and human resource capacity building through the Singapore Cooperation Programme (SCP)[13] and through the Small Island Developing States Technical Cooperation Programme, which caters to the

[11] Created by the Governments of the United States and Canada, the Greening Government Initiative (GGI) aims to "build a community of practice among sustainability leaders in order to strengthen and accelerate greening of national government operations" (The White House, 2021).
[12] The UN Global Early Warnings Initiative (GEWI) aims to "utilize advanced analysis to improve the understanding of the global status of early warnings, across the full early warning to early action value cycle and will include a mapping of international early warning development efforts already planned for the next 5 years" (World Meteorological Organization, 2022).
[13] The Singapore Cooperation Programme is monitored by the Technical Cooperation Directorate of the Ministry of Foreign Affairs, Singapore.

unique needs of small island developing states, including environmental and climate-change-related challenges (National Climate Change Secretariat, Singapore, 2021). The SCP program also includes the Climate Action Package, to which Singapore has "trained over 137,000 officials from over 180 countries and territories in topics like climate adaptation and mitigation, disaster risk management, and green finance" (National Climate Change Secretariat, Singapore 2021; Singapore Cooperation Programme, 2019).

Despite being small, Singapore's global reputation has earned it a seat at the table among the C40 Cities Climate Leadership Group (C40)[14]. As an international network of 100 global cities (including Berlin, Los Angeles, London, Seoul, Tokyo, and Jakarta), the C40 is committed to implementing locally significant and sustainable climate-related actions to address climate change. Through collaborations with international organizations such as the World Bank, the OECD, and the World Resources Initiative, the C40 seeks to advance urban action on climate-related solutions (National Climate Change Secretariat, Singapore, 2021).

A comprehensive national Green Plan reciprocates Singapore's global climate change and sustainability efforts. In 2020, Singapore launched the Green Plan 2030, through which Singapore strives to become a pioneer in "technological and policy solutions for sustainable development" through evolving green spaces across the city-state (Green Plan 2030, Singapore). This comprehensive Plan outlines Singapore's nationwide movement to advance Singapore's national agenda on sustainable development. The Plan aligns with Singapore's commitments toward sustainable development under the UN's 2030 Sustainable Development Agenda and Paris Agreement (Green Plan 2030, Singapore). Within the Green Plan 2030, we can begin exploring in depth the city-state's employment of education as a vector to educate Singaporeans about climate change and climate-related challenges within Singapore's local context and internationally and empower them to become agents of change.

[14] Singapore has been a member of the C40 since 2012.

ESD in Singapore: **The MOE's Eco Stewardship Program**

To become a national and global model of environmental protection and sustainability and achieve targets outlined in its Green Plan 2030 and the UN's SDGs, Singapore is implementing a revamped, innovative, and comprehensive K-12 education curriculum centered on sustainability. Under these standards, teachers will educate youth on climate change, environmentalism, sustainability, and conservation to harness them with the skills to become active change agents and contribute to the city-state's ambitious sustainability plan. As mentioned earlier, EE has been included in Singaporean classrooms since 2019[15] as another approach to the existing CCE curriculum (Ying, 2020, pp. 25). However, in alignment with the Green Plan 2030, the Ministry of Education in Singapore has launched the *Eco Stewardship Program (ESP)* to demonstrate its global presence in the sustainability discourse and ambitions to lead holistic sustainability initiatives. The ESP builds upon existing EE/CCE principles in schools to nurture the next generations through education initiatives centered on sustainability concepts and modeled after UN SDG targets. As of 2021, the ESP has been adopted as the national approach to "refreshing and strengthening the Singapore perspective of sustainable development" (Liu, 2021, through the Ministry of Education, 2021). The ESP is based on four principles, or 4Cs[16] (Curriculum, Culture, Community, and Campus) :

- **Curriculum:** The Singapore MOE has revised its Humanities, Science, and Character and Citizenship Education curricula to enhance the teaching and learning of sustainability concepts by co-developed digital and hands-on learning resources with partners such as Sembcorp and Energy Market Authority.
- **Culture:** The MOE has made sustainability a core pillar of Singapore's Culture, turning sustainability into daily habits that students can easily adopt such as saving energy and water and reducing food waste.
- **Community:** The MOE will continue to further partnerships with the community in enrichment, Values in Action and Education and Career Guidance.
- **Campus:** The MOE will support the move to reduce net carbon emissions in schools by progressively deploying sustainability features such as solar panels and energy-efficient LED lights.

[15] Environmental Education was implemented into Singaporean schools in 2019 (Ministry of Education, Singapore, 2019).
[16] Abbreviations of text from the MOE Eco-Stewardship Program (ESP) https://www.moe.gov.sg/news/press-releases/20220308-strengthening-our-contributions-towards-the-green-economy-and-empowering-the-next-generation-of-sustainability-leaders

ESD in the Asia-Pacific Region

Like Singapore, neighboring countries in East Asia and the Asia-Pacific have struggled to adopt comprehensive initiatives to tackle climate change. This is partly due to the diverse cultures and different national agendas. In Mainland China, for example, the government has pledged that its CO2 emissions will peak in 2030 and that it will decrease the carbon intensity [CO2 emissions per unit of gross domestic product (GDP)] of its economy by 60 to 65% relative to 2005 levels (Shan et al., 2018). However, as urbanization continues to be a significant driver of China's economic growth, the government must recognize that cities produce over 85% of China's CO2 emissions. Thus, as China expands, its cities must acknowledge their role in combating climate change and fulfilling China's international climate change commitments under the Paris Agreement (Shan et al., 2018).

In contrast, South Korea's government quickly ratified and adopted the recommendations of the 1992 Earth Summit, creating its own National Commission on Sustainable Development (NCSD). Since 1992, the South Korean government has adopted the goals of sustainable development and ESD by establishing institutions such as the PCSD in 2000 and the ESD Execution Plan in 2006 (Kwon & Lee, 2019). Moreover, ESD was established in 2009 under the Korean National Commission for UNESCO (Kwon & Lee, 2019). In 2020, South Korea launched the Education 2030 Committee with the MOE and nine educational institutes nationwide (UNESCO, South Korea, 2019).

Education for Sustainable Development (ESD) in the Asia-Pacific region is unique from other renditions of ESD because the context of the area requires specific initiatives to meet the policy agendas of each government and UNESCO's global framework, ESD for 2030. Since the Decade of ESD (DESD) launched in 2005 by UNESCO, countries in the Asia-Pacific region have initiated ESD by developing national ESD committees, conducting national seminars, and online discussions (UNESCO Bangkok, 2009, 7). Countries in this region have also set up specific areas that foster regional development of ESD committees, helping its formal and non-formal education partners learn about ESD and promote international understanding. For example, the Regional Centre for Expertise (RCE) at Okayama is a center for collaboration among

civil society organizations to promote environmental education and ESD (UNESCO Bangkok, 2019, 16). Additionally, the Participatory Development Training Center (PADETC) in Vientiane, Lao PDR, was designed to introduce concepts and practices for holistic, integrative, and sustainable education into the Lao education system over ten years (Somphone, 2009, 20). The Asia-Pacific region is massive, so dividing it into subregions is the best way for ESD to be approached and successfully implemented. Overall, ESD is widely recognized as a necessary skill for the 21st century and is viewed as "an important entry point in changing the mindsets of the next generation to value sustainable development wellbeing" (Samphone, 2019, 2009).

In this section, an overview of specific ESD initiatives in Australia, Mainland China, and South Korea are provided, followed by a brief paragraph outlining ESD in the U.S. Australia was selected because of its similar geographical situation to Singapore as a low-lying nation surrounded by water and having experienced severe weather events, including the devastating 2019 wildfires. Next, Mainland China is discussed because of its global presence and power, making it a relevant nation to explore environmental protection policies and sustainability education initiatives. A closer look at South Korea follows, highlighting the nation's commitment to sustainability and its ambitions to make the city of Songdo the first ubiquitous eco-city (u-eco city) in the world. Additionally, as South Korea is known for promoting sustainability through technology and smart urban planning, it offers unique insights into how South Korea and Singapore share similar values concerning sustainability and the promotion of sustainable urban design. Finally, an overview of ESD in the U.S. is necessary because of the researcher's background as a student in the U.S. The U.S. is known for promoting sustainability overseas but has a poor global reputation for implementing such practices within its territory.

ESD in Australia

For this research, it is necessary to understand the border landscape of education for sustainability and how it's practiced across schools in neighboring regions. Australia is similar to Singapore in terms of its proximity to the ocean and the impending threats of sea level rise to its many coastal communities and intense bushfires to people, animals, habitats, homes, and infrastructure across the country (Australian Museum, 2022).

Australia is not immune to climate change and its impacts, and it's already experiencing higher temperatures, more extreme droughts, floods, and extreme weather patterns (Australian Museum, 2022). Australia is also experiencing unprecedented rates of coral bleaching along the Great Barrier Reef, severely impacting the marine ecosystems that are dependent on them. Across Australia, there are efforts to curb the progression of climate change by regulating industries, public awareness campaigns, and education curricula centered on the environment, climate change, and sustainable development.

Education for Sustainable Development (ESD) has been a topic of discussion in Australia since before the DESD (2005-2014). Tilbury (2004) outlines that ESD in Australia has been part of the government of Australia's efforts to adopt the term "sustainable development" and incorporate "education for sustainable development" into its national curriculum (Tilbury, 2004, pp. 105). Specifically, Australia included ESD in its Environmental Education for a Sustainable Future National Action Plan, which launched in 2000 (Tilbury, 2004, pp. 105). Under this plan, the government of Australia aimed to provide better "coordination of activities and to support leadership across major groups and various levels" (Australia National Action Plan, 2000). Australia also developed additional departments to contextualize ESD policy and practices across Australia, including the National Education Council (NEEC), National Environmental Education Network (NEEN), and the Australian Research Institute in Education for Sustainability (ARIES) (Tilbury, 2004, pp. 106). Moreover, Australia began considering how EE and ESD should be implemented across different sectors, ranging from formal education to industry and education, with an overarching focus on fostering organizational learning and providing opportunities for students, communities, and

businesses to develop the necessary knowledge and skills to lead a sustainable future and participate in Australia's future sustainability initiatives.

Australia's commitment to ESD is represented by its actions before the United Nations 's launched the DESD. Australia organized seminars through the Australian Association for Environmental Education (AAEE) to seek national input for the World Summit (2002) and international implementation plan (2004) draft documents (Tilbury, 2006, pp.79). After UNESCO's launch of the Decade for ESD, Australia launched an independent Decade, including a national symposium by the Australian National Commission in July 2005 and the further development of three fundamental mechanisms[17] to serve as the vehicle for the Australian Government's initiatives for ESD (Tilbury, 2006, pp.79). (Tilbury, 2006, pp. 80).

ESD was further promoted in 2005 when the Australian Government Department of the Environment and Heritage developed *Educating for a Sustainable Future : A National Environmental Education Statement for Australian Schools* (Geep Australia; Australia Government Department of the Environment and Heritage, 2005), to provide teachers, schools, and education systems with a vision and framework for implementation of environmental education for sustainability through all years of schooling. This framework was then updated in 2009 by *Living Sustainably : The Australian Government's National Action Plan for Education for Sustainability*, which aimed to equip all Australians with the knowledge and skills required to live sustainably (Geep Australia; Australian Government National Action Plan for Education for Sustainability, 2005).

Since 2010, Environmental Education (EE) and Education for Sustainable Development (ESD) have become integral parts of Australian education. This aligns with the arrival of the Australian National School Curriculum in mid-2010, helped in part by developments by the Curriculum Development Centre (CD) in 1980 and revisions of the National Goals for Schooling between 1989 and 2008 (Leo, 2012, 25). The Australian Curriculum emphasizes sustainability as a priority for study through cross-curriculum learning to help students develop the "knowledge and skills, values and attitudes

[17] National Environmental Education Council (NEEC) was established in 2000; the National Environmental Education Network (NEEN) was established in 2001; and the Australian Research Institute in Education for Sustainability (ARIES) was established in 2004 (Tilbury, 2004, 106).

necessary to contribute to sustainable patterns of living" (Australian Curriculum Assessment and Reporting Authority, Sustainability). Sustainability has been prioritized through three main concepts: 1) systems; 2) world views; and 3) futures; it is applied to learning areas of English, Mathematics, Science, Humanities and Social Sciences, the Arts, Technologies, Health and Physical Education, Languages, and Work Studies (Australian Curriculum Assessment and Reporting Authority, Sustainability).

Australia has also committed to expanding sustainability beyond the classroom through partnerships with the local communities they serve (Tilbury, 2011, 9). At the University of Western Sydney, sustainability efforts have been carefully constructed through a blended approach within the locality, focusing on serving the communities near the University (Tilbury, 2011, 9). Furthermore, the Australasian Campuses Toward Sustainability Network (ACTS) is an example of a partnership that seeks to "engage, empower and exemplify organizations working to tackle complex social, economic, and environmental challenges and support a meaningful, sustainable future" (ACTS, 2022).

ESD in Mainland China

China faces growing pressure to address its environmental challenges as one of the world's superpowers. Over the last twenty years, the Chinese government has implemented strict regulations and enforcement policies to curb emissions and encourage environmentally-friendly practices, like recycling. The government has also introduced sustainability as part of its national curriculum. Since 1992, the Chinese government has enacted significant initiatives aimed at bolstering the implementation of Agenda 21, including the 1994 *White Paper on China's Population, Environment and Development in the 21st Century* (Min and Dongying, 2007). As China has become more invested in the global market, the government recognizes growing domestic and international challenges to reducing its environmental footprint and promoting more sustainable practices (Min and Dongying, 2007, 185).

Since 2000, the Chinese Ministry of Education (MOE) has carried out a new primary education curriculum, including initiatives for sustainability and ESD (Min and Dongying, 2007). China's Environmental Protection basic national policy, through implementation by the Chinese MOE, seeks to help students acquire the knowledge,

methods, and capabilities essential to harmonious relations between humanity and the environment" (Chinese Ministry of Education, *Notice on the issuance of the guidelines for the implementation of environmental education* China's *primary and secondary schools),* 中小学环境教育实施指南, 2003). Specifically, Min and Dongying (2007) discuss how ecological education and ESD have been integrated into classroom subjects of Geography, Biology, Skills, Physical Education, Health, and Chinese (Min and Dongying, 2007, 185).

In Primary and Middle Schools, The Chinese Ministry of Education has prioritized sustainability through specific initiatives implemented across academic subjects, including Geography and Biology (Min and Dongying, 2007, 187). The government's goal is that through comprehensive teaching, students will learn to "appreciate and love nature, to pay attention to environmental problems faced by their families, communities, countries, and the whole world, and to understand the relationships between individuals, society and nature, and foster awareness, attitudes, and values that are supportive of the environment" (Min and Dongying, 2007, 191). In high school, for example, the geography curriculum includes the study of relationships between humans and the environment, including the sustainable use of the natural environment. Further elective courses are available to students who wish to further their understanding of theory, application, and technology about the environment and sustainability (Min and Dongying, 2007, 189).

Beyond the classroom, China also employs parents to engage their children in environmental literacy. Iwaniec and Lan Curdt-Christiansen (2020) surveyed parents in China to understand the important role that parents play as environmental protection agents. Their and others' research confirms that parents in China generally have a high level of engagement with their children, and parents tend to have more agency in all aspects of their children's education and lives (Iwaniec and Curdt-Christiansen, 2020; Leppänen, J.L; Haahla, A.E; Lensu, A.M; Kuitunen, M.T, 2012; Grønhøj, A; Thøgersen, J, 2009). Therefore, indicating the importance of socialization at home between parents and children to foster the development of children's pro-environmental behaviors and supporting the development of children's agency (Iwaniec and Curdt-Christiansen, 2020)

Since 2010, China has initiated additional programs to further China's commitment to sustainability at the university level. At Tsinghua University, one of China's premier universities, electives like *Introduction to Sustainable Development* have been offered to Ph.D. candidates from all departments since 1997 (Niu, Jiang, and Li, 2010). Moreover, the BELL Project at Peking University, initiated by the World Resources Institute, has worked to integrate business, environment, learning, and leadership for graduate students across backgrounds through courses like "Climate Change for our Future" and the UNEP-Tongji Institute for Sustainable Development (IESD), founded in 2002, at Tongji University has pushed to create a strong base for research, education, and information exchange relating to sustainable development (Niu, Jiang, and Li, 2010).

China's approach to ESD aligns with the broader understanding that "environment" and "sustainable development" are concepts that should be considered from different perspectives and can be achieved (Chang, 2014; Min and Dongying, 2007, 187; Australian Curriculum). And while China's ambitions to push for ESD are notable, given its massive size and population, initiatives of the Chinese Ministry of Education for ESD across primary and secondary, and higher education demonstrate China's recognition of the further potential for ESD. To achieve this potential, China must prioritize ESD beyond the classroom. Moreover, when appropriately responding to the needs required by and for ESD and sustainability, China must consider further integration of sustainability into fields such as economics, construction, city planning, health and wellbeing, and education at all levels.

ESD in the South Korea

Sustainability in South Korea began in the 1990s when the government implemented action items from Agenda 21 through the Presidential National Commission on Sustainable Development (PNCSD) (South Korea, United Nations Sustainable Development Goals, 2016). Adopting the UN definition of sustainable development, South Korea positions itself and its capital city, Seoul, as a replicable model for sustainability initiatives and a model for its ambitions to become a sustainable smart city.

South Korea's commitment to sustainable development is notable because of the nation's impressive post-war growth in the 1950s. Devastation from the Korean War left South Korea poor and in ruins. However, by the 1980s and onward, a long-lasting military regime gave way to democracy, which has aided South Korea's transformation into an Asian tiger economy and global hub for electronic media, science and technology, and sustainability (Corporate Finance Institute).

Over the DESD (2005-2014), South Korea experienced three different administrations that took different approaches to sustainable development and implemented initiatives for ESD. In June 2005, the then-president of Korea launched the *National Vision for Sustainable Development* and, in 2007, the *Basic Law on Sustainable Development*. In 2008, the new government adopted the *Low Carbon, Green Growth* policy*,* forming the *Presidential Committee on Green Growth (PCGG).* Korea's current government system implements ESD through central government organizations, significant institutions, governmental commissions, local governments, and civil organizations (Sung, 2015). Beyond sustainable development initiatives to redesign Seoul and other large cities such as Songdo as sustainable urban spaces, South Korea is pushing sustainability and ESD forward through its comprehensive education system.

From 1980-2000, the South Korean government made significant efforts to enforce the concept of environmental preservation in its young generations by incorporating sustainability and ESD into its formal education system. Environmental Education was introduced during the ROK's fourth and fifth national curriculum (1981-1991). South Korea's model EE School System has operated since 1985 to develop and promote EE practices in South Korea (Sung, 2015). During the following years, the Ministry of Education set up ROK's first Environmental Master Plan (2006-2010), which established a national education plan to promote and preserve EE. Beginning in the 2000s, Korea has transitioned towards sustainable development. The launch of the Action Plan for Education for Sustainable Development in 2006 was followed by the Environmental Education Promotion Act of 2008, and stakeholders implemented Associated Schools Project Network (ASPnet), educator training, research, and workshops (Sung, 2015).

Implementing ESD policies has proved more difficult than anticipated in South Korea. The Korean National Commission for Sustainable Development (KNCSD), MOE, and MEST are responsible for the implementation of policy, and all three have encountered challenges due to unstable promotion through the structure of the KNCSD and limitations of the scope of work by the MOE and MEST (Sung, 2015). Nonetheless, South Korea is overcoming its barriers by establishing the ROK's Green Growth Policy (GGP) into three separate pillars: energy, climate change (CC), and sustainable development (SD) to allow for further specification of initiatives in each category and to encourage government officials and the general public from knowing and participating in activities surrounding the environment (Sung, 2015).

As South Korea strives to make its cities smart and sustainable, its government and MOE must continue to not only adhere to international guidelines regarding sustainable development. The government must also actively promote inclusive, age-appropriate, and accessible ESD and CC education through its Green Growth Policy and additional initiatives across the formal and informal education systems and the public sphere.

ESD in the United States

The United States is a strong advocate for education for sustainable development and environmental education. Potter (2010) explains the history of environmental education and ESD in the U.S. beginning in 1990 when Congress passed the National Environmental Education Act (NEEA), which employed the National Environmental Agency to take the lead on increasing national environmental literacy (Potter, 2010). Specifically, the role of the EPA education office was to "develop and support programs and related efforts, in consultation and coordination with other Federal agencies, to improve understanding of the natural and built environment, and the relationships between humans and their environment, including the global aspects of environmental problems" (National Environmental Education Act (NEEA), 1990, 4b). The Act also required designing, implementing, and managing various programs, including a grants program, national-level educator training, fellowships for students (graduate and undergraduate), and the President's Environmental Youth Awards (Potter, 2010).

Throughout the NEEA, more than 3000 grants worth at least $45 million in federal funds, and another $10 million in matching funds from the recipient, were awarded to nonprofit organizations and education agencies. National EE standards for materials, students, teachers, and nonformal programs were developed and disseminated (Potter, 2010).

Overall, while the NEEA has been responsible for providing over $100 million (USD) to support the expansion of EE across the U.S over 17 years, Potter (2010) echoes concerns that the progress of only $6 million (USD) per year, the U.S will face immense challenges to reach its ambitions to achieve environmentally literate citizens who understand the concept of stewardship and can demonstrate environmentally-conscious behaviors and attitudes in their daily lives (Potter, 2010). Therefore, the question by scholars remains, "what is necessary to achieve environmentally literate citizens and an improved environment for the 21st century?" (Potter, 2010).

As the U.S. faces many challenges - nationally and globally - there is great urgency to address the impending consequences of climate change. In 2008, the National Council for Science and the Environment (NCSE) published its report, *Environmental Research and Education Needs: An Agenda for a New Administration*. In this report, the NCSE stated that one of the primary concerns of our time is "preventing a global climate catastrophe, ensuring safe supplies of food and water, transforming our energy supply and reducing demand, managing ecosystems to minimize irreversible losses of biodiversity and protecting human health." Most importantly, they presented education as a critical pillar to the overarching national strategy "for environmental protection, a sustainable economy, and a secure future" (NCSE, Environmental Research, and Education Needs, 2008). Potter (2010) continues to argue that through EE, we may better understand that all these systems are interconnected and view them as influencing and impacting each other, therefore, contributing towards future initiatives of EE and ESD and meeting our commitments to society as responsible citizens[18] (Potter, 2010).

Since 2011, additional initiatives have been made to increase awareness of ESD in schools in the U.S. In 2011, the U.S launched the Climate Change Education Partnership

[18] Responsible citizenship is "individuals who realize their obligations to take actions that ensure their community is healthy, safe, and secure…and [who] participate in their community to promote personal and public good." Most importantly, responsible citizens "participate in activities that promote the public good by understanding economic, political, social and environmental systems." (The Society for Community Development via Potter, 2010)

(CCEP) to establish a coordinated network of regional partnerships committed to increasing the adoption and implementation of high-quality educational programs and resources related to the science of climate change and its impacts (Climate Change Education Partnership, U.S National Science Foundation, 2011). Through partnerships with organizations like The Cloud Institute, educators, businesses and entrepreneurs, and students have learned about sustainable business practices and other sustainability topics (Venkataraman, 2010). Moreover, the Sustainable Schools Projects in Vermont aims to approach the inclusion of ESD into the curriculum to engage students in the subject and with their local communities (Shelburne Farms Sustainable Schools Project; Venkataraman, 2010). At the high school and higher education levels, organizations like Second Nature are helping drive broader institutional reform, calling institutions to pay closer attention to sustainability issues (Venkataraman, 2010).

The U.S. is improving knowledge, accessibility, and awareness of ESD and E.E. across schools and campuses. Like many nations, the U.S.'s progression toward ESD and E.E. has been contingent on the political climate. Nonetheless, the U.S. continues to put forth an attitude of perseverance to undertake an urgent and ambitious agenda of taking action against climate change (Pipa, Rasmussen, and Pendrak, 2022). A recent report by Brookings, Pipa, Rasmussen, and Pendtrak (2022) highlights the growing commitment of universities to applying the SDGs and leveraging students' "intellectual capital and training the next generation of leaders" (Pipa, Rasmussen, and Pendtrak, 2022). With over 100 U.S. universities and 2.5 million students part of the USA Network for Sustainable Development Solutions Network (SDSN), a global effort under the U.N. Secretary-General, to support solutions for achieving the SDGs, it represents the immense potential to mobilize widespread action and initiatives across U.S. universities to promote action towards ESD, sustainability, and the SDGs (Pipa, Rasmussen and Pendtrak, 2022).

Project Research Overview and Questions

This project examines Singapore's current sustainability education and its implementation in Singaporean universities and government-funded organizations. Specifically, it considers how this framework empowers students to become agents of sustainability and future change-makers. This research emphasizes Singapore's commitment to sustainability education and assumes that the government's sustainability education aligns with global pedagogies around sustainability. Sustainability is a concept of cities in the global North that presumes the goal of sustainability is to "meet the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations, 1987). Furthermore, the global discourse around sustainability education is centered around the development of education for sustainable development, which is spearheaded by the United Nations and its governing departments. That said, we must reassess if sustainability education is equally suitable to nations of the global East (Rana, 2009). By exploring Singapore's sustainability curriculum, Eco-Stewardship Program (ESP), my research seeks to understand the foundations for Singapore's ESP curriculum and its implications on the students and teachers receiving and teaching it. By studying sustainability in Singapore, it is necessary to understand the political, cultural, and historical factors that have and continue to influence Singapore's adoption, development, and implementation of such sustainability educational pedagogies. It is, therefore, that this project asks explicitly:

1. What role do educators play in educating and empowering students about climate change and sustainability actions at a national and international level?
2. What are students' and teachers' perceptions of current sustainability curricula?
3. Why is sustainability education important for Singapore and its commitment to sustainability and sustainable development?
4. To what extent does the existing framework accelerate teachers' and students' engagement with Singapore's national agenda on sustainability beyond the classroom?

Chapter 6: Educators as Champions of Change

Introduction

In this research, five student educators at one education institute in Singapore, Education Institute A[19] at University S, and six educators at UWCSEA were interviewed throughout this research, and a total of twenty-three survey responses were analyzed regarding respondents' experiences as educators of ESD-related curricula in Singapore. These bodies of qualitative research provide valuable insights into the application and relevance of ESD in Singapore and how educators understand, interpret, and translate this curriculum into experiential learning to empower their students' knowledge and behaviors.

The discussion of ESD in the classroom in popular media and academia has established a precedent that paints sustainability as a Western-facing concept that primarily focuses on sustainability through an environmental lens. It centers sustainability as something countries must adopt rather than adapt to their local context. Additionally, sustainable development has historically served the agenda of glossing over the rifts between environmental and development lobbies, allowing for consensus around a general theme that enables everyone to invest in and have their own opinions and imperatives (Selby and Kagawa, 2015). In this research, many who took part sought a space to share their experience as an educator and advocate for sustainable education and holistic, sustainable initiatives. This setup does imply a certain amount of bias but is also valuable when considering the considerations for future research. As a researcher, I had to distinguish between the experiences of local educators and educators at an international school with an objective lens. Upon analysis, the mirrored qualities between both demographics of educators stood out to me across the board. Educators in this research shared a passion for teaching and a desire to empower their students with the agency to make positive, sustainable changes.

The surveys and interviews in this research seek to understand how each respondent and participant conceptualized and applied practices of sustainability and ESD in Singapore's education space. This paper explains a closer understanding of the

[19] The full name of this education institution has been omitted for the protection of the identity of faculty and students interviewed during this research

processes leading to curriculum design to student outcomes through individual perspectives, which provided the humanistic perspective but lacked credible quantity to make conclusive recommendations. From these interviews, I inferred that informants perceive the situation of sustainability and ESD in Singapore as multi-scalar: the Ministry of Education (MOE), educators, and students. Participants mentioned the following processes leading to student empowerment: educators understanding the MOE standards, interpreting curriculum into relevant classroom content, and involving students in developing experiential learning activities. Education Institute A informants were clear about their role as student educators and the limitations of their positionality due to the power dynamics between them as civil servants of the national Singapore government. On the other hand, UWCSEA informants were clear about their positionality at UWCSEA and the institution-specific opportunities and limitations impacting their ability to affect student outcomes.

This chapter discusses surveys and interviews for educators at Education Institute A and UWCSEA. First, the results of surveys from student educators are interpreted, providing summary statistics and insights from short survey questions. Then the same findings from educators at UWCSEA are explored. The results from interviews of both groups are then shared, which read like a narrative and highlight key themes regarding the role of educators and how they interface with students and encourage them to become agents of change. While survey results offer brief insights, the ethnographic interviews serve as compelling and rich content to form a conceptualization of the application of ESD in educational settings across the garden city.

Discussion of Surveys

Analysis and understanding of survey results offer quantifiable and qualitative evidence that presents a snapshot of the essential highlights and reveals the limitations of this research. There were 23 total surveys analyzed (ten survey responses from UWCSEA and thirteen from Education Institute A). The study populations were educators from Singapore teaching in two different academic settings. Respondents from UWCSEA were all educators from abroad, such as the United Kingdom, Australia, and the United States.

On the other hand, all educators from Education Institute A were Singaporean nationals. Most survey respondents were female (70% UWCSEA and 76.9% Education Institute A).

The survey responses highlight educators' concerns at UWCSEA and Education Institute A regarding environmental problems like climate change, air pollution, and the degradation of natural environments. However, as the survey's purpose was mainly to explore educators' perceptions of sustainability solely through an environmental lens, they do not study at length the other considerations of sustainability (social sustainability or health sustainability).

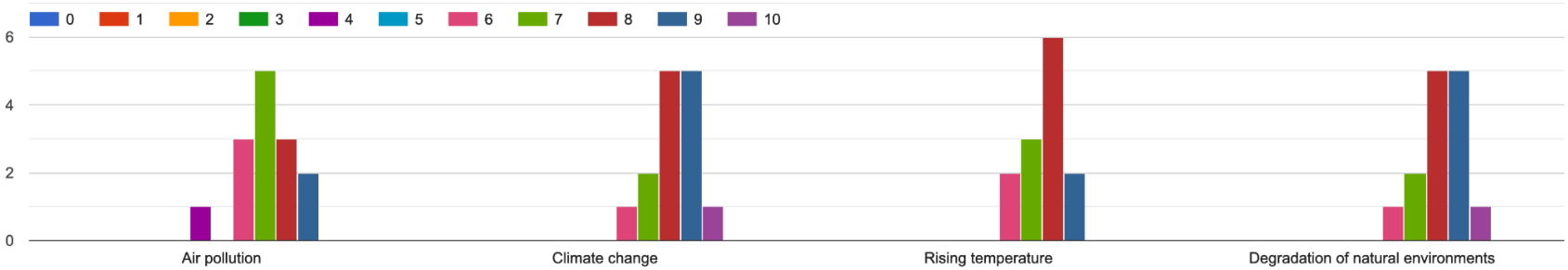


Figure 12. Education Institute A respondents' rankings of environmental concerns (scale of 1-10).

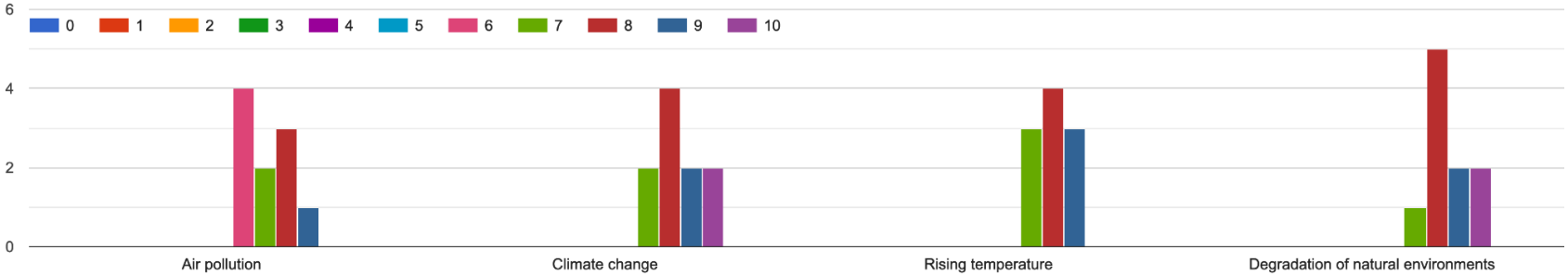


Figure 13. UWCSEA Educators' rankings of environmental concerns.

Education Institute A Student Educators

For student educators at Education Institute A, it was important to survey where they had learned about sustainability and why they believe education for sustainability is relevant to their careers. In the survey – and all surveys in this research – respondents had the option to skip any questions they did not feel comfortable with.

From the results, all respondents agreed with sustainability as "a balance between meeting today's needs with those of the future." Additionally, all respondents (100%) reported learning about sustainability in school. More than 80% of respondents said they learned about sustainability between primary and high school. Beyond school, the following other areas of learning were through friends (53.8%), extracurricular (clubs, sports, academic programs) (38.5%), and volunteering (23.1%). While we cannot gather clear conclusions from the results of these thirteen surveys, they suggest that school and social environments outside the nuclear family play a significant role in educating students about sustainability and involving them in local initiatives.

In crafting this survey, I was curious to understand why educators at Education Institute A, many of whom are completing their postgraduate degrees, value education for sustainability/ESD. Of the responses, more than the majority of respondents reported that ESD is relevant because it "empowers individuals to reflect on their actions" and "it provides students with the knowledge and skills to become active and responsive citizens" (See figure).

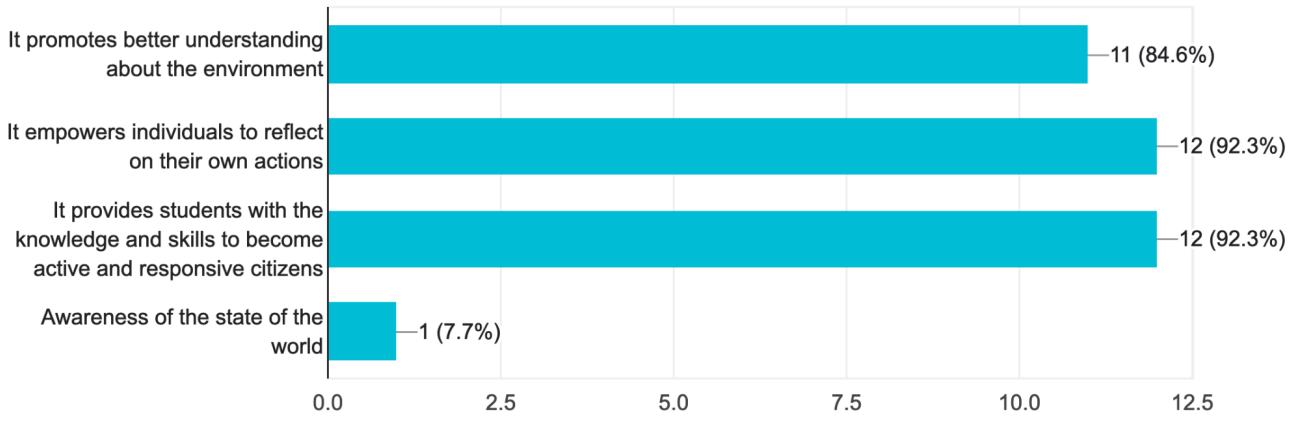


Figure 14. Education Institute A respondents' responses on the importance of ESD

Another aspect of the surveys was incorporating qualitative questions to explore educators' use of classroom and experiential learning to further their students' knowledge and encourage them to become active participants locally and nationally. When asked, "What comes to mind when you hear the word sustainability?" The most common code words were resources, UN Sustainable Development Goals (SDGs), green, and environment. Again, we cannot gather concrete conclusions from these survey responses, yet, they do offer suggestions that are helpful in our understanding of the application of sustainability knowledge and ESD curricula in Singapore classrooms.

Experienced Educators - UWCSEA

Unlike student educators at Education Institute A, UWCSEA educators have more experience in the classroom. While the survey did not explicitly ask educators their year(s) of experience teaching, further discussion of their specific pathway was explored in interviews. In total, ten survey responses were collected from educators at UWCSEA. Given the number of educators at UWCSEA's two campuses, Dover and East, this number is minimal and does not represent the overall educator experience at UWCSEA.

In this survey, educators answered similar questions as the Education Institute A respondents, but they also had more extensive qualitative questions to answer. Like all surveys, respondents could skip any questions they felt uncomfortable with.

From the survey results, all respondents except one teach both 11th and 12 grades. Of the subjects offered at UWCSEA, it is evident that of the respondents, several educators teach more than one course, including specific procedures relating to sustainability (ESS) or community engagement (Global Concernes). Like respondents from Education Institute A, most respondents from UWCSEA identified as female (70%). And while it was assumed that educators at UWCSEA have more teacher autonomy because they are teaching at an international school, all ten respondents (100%) reported following the IB curriculum. Only two respondents said they have the freedom to develop their own curriculum or use various materials.

When it comes to the focus of the learning within the classroom surrounding sustainability, a majority of educators at UWCSEA stated that they focus on teaching students about the causes and consequences of climate change (90%), the science and

impact of climate change, and sustainability (70%), and the individual and national solutions associated with climate change (70%).

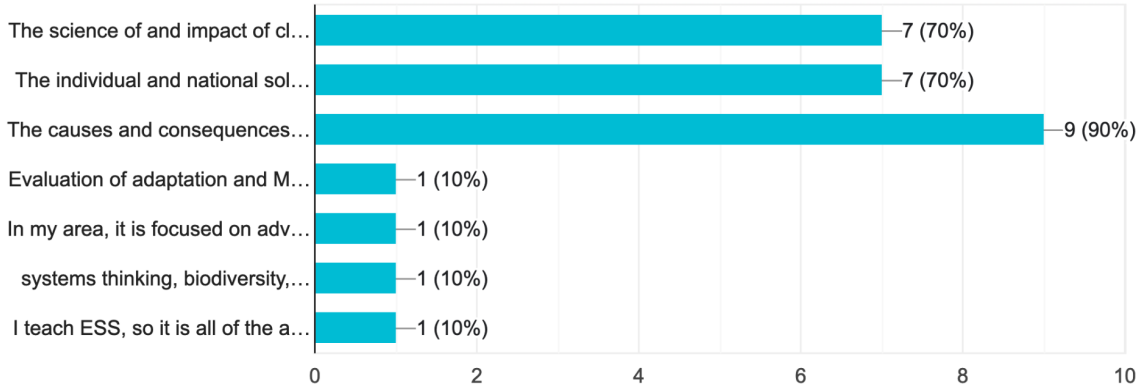


Figure 15. UWCSEA educators' content focus in the classroom concerning sustainability

While the survey for Education Institute A respondents had a few qualitative questions, the survey for UWCSEA respondents incorporated more extensive qualitative questions that asked about educators' experiences in the classroom, their students' engagement, potential limitations in the classroom, and why they value sustainability. When asked about limitations in the classroom, by far, the most common code word was time. This can be attributed to the extensive IB curriculum standards that educators must complete in time for the IB examinations. While the IB curriculum allows for some flexibility in content, for the most part, there are strict guidelines for what educators must teach their students. That said, educators discussed at length in interviews how they utilize experiential learning as a supplemental content source and seek to empower their students to participate in such initiatives.

Concerning student engagement, educators reported that a majority of their students are pretty engaged in the classroom (see Figure 16). The relatively high percentage of student engagement suggests a diverse use of materials in the classroom helps students stay focused and engaged in classroom content. Additionally, the resources available to UWCSEA educators allow educators to bring their students outside of the classroom and into the real world to apply concepts and further their learning.

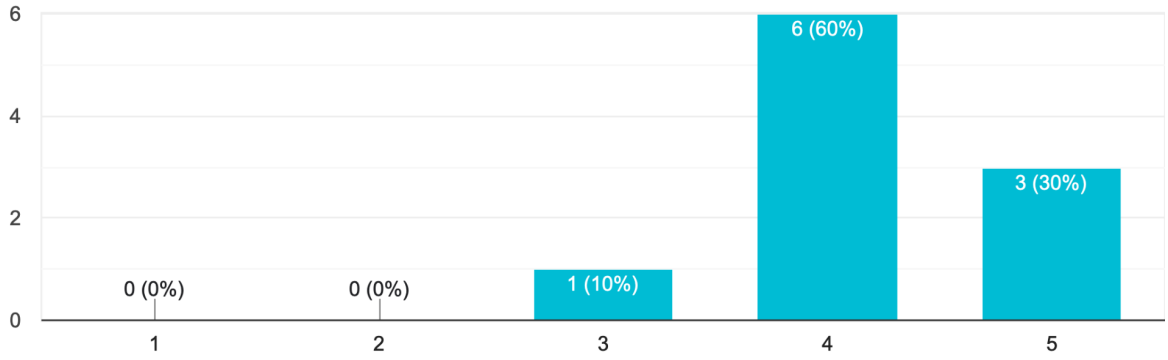


Figure 16. Level of student engagement on a scale of 1-5 according to educators at UWCSEA

When asked why sustainability was important to them, the most common code words were hope, UWCSEA mission, future, and children. These code words were mirrored through in-depth conversations with educators at UWCSEA. While I cannot make concrete conclusions from the survey responses from UWCSEA educators, they do offer insights that are helpful to our understanding of the relevance and applicability of sustainability and ESD strategies at an institution such as UWCSEA.

Discussion of Interviews

Eleven interviews took place with respondents at Education Institute A and UWCSEA during this research. These interviewees were self-identified by explicitly giving consent to being contacted by the researcher and providing their email. Interviewees were contacted by email, and an interview was scheduled for a convenient time between the researcher and the interviewee. For the purpose and geography of this research, all interviews were conducted over Zoom, with the participants in Singapore, and the researcher at Macalester College.

Educators at Education Institute A at University S

Ethnographic Interviews - Educators at Education Institute A at University S		
Profession	Pseudonym	Subject(s)
Educator	Mr. Nicholas	Geography/Social Sciences
Educator	Ms. Priscilla	Geography/Social Sciences
Educator	Ms. Winnie	Geography/Social Sciences
Educator	Ms. Stella	English/Social Sciences
Educator	Mr. Alex	N/A

Figure 17. Chart of Education Institute A interviewees pseudonyms and the subject(s) they teach

Before the start of the interviews, all prospective interviewees signed digital consent forms (see Appendix J) to participate. Further consent was obtained verbally to record Zoom calls for research purposes. Each interview began with the researcher explaining the purpose of the research and allowing the participants to ask any questions. The interviews lasted, on average, one hour. The interview style was semi-constructed interviews because the researcher created questions that were used in each interview. However, based on the progression of each conversation, specific questions were eliminated or added.

While each interview was unique and different in the content explored and discussed, all interviewees from Education Institute A, except one, identified as post-graduate students with Diploma in Education. All interviewees were currently in placements at local public schools in Singapore while also taking classes at Education Institute A at University S. Most interviewees hold a degree in Geography, and many were teaching Geography or Social Studies within their placement school.

Mr. Nicholas

Mr. Nicholas is a Geography and Social Studies teacher at a local secondary school in Singapore and identifies as male. He has a Postgraduate Diploma in Education from Education Institute A at University S. He has an undergraduate degree in

Geography from University L[20]. When asked about sustainability, Mr. Nicholas said future, decisions, and green. According to Mr. Nicholas, sustainability is all about choices and can be perceived as a way of life. These decisions come with trade-offs, but sustainability is about "doing things to maintain your quality of life or whatever you are doing now and in the future without compromising your needs and the needs of others and the environment in the future."

Mr. Nicholas mentioned the importance of expanding the definition of sustainability beyond the environment. For instance, one must invest in their future and consider the financial sustainability of investing in certain products and how beneficial they will be over a long period. As an educator, Mr. Nicholas tries to help his students explore systems and how they are interrelated, interdependent, and interconnected. This is especially relevant when discussing coastal environments and the different types of landforms and environmental hazards unique to specific geographical contexts. While sustainability is not sheltered in the class, everyone understands that these are considerations that they must keep in mind and that their actions on one sphere will also impact other spheres. Overall, the theme of interdependence shines through the modules, discussions, assignments, and debates in Mr. Nicholas's classroom. However, in reality, within the dynamics of the classroom, many of the lessons are not as ideal as he hopes for them to be.

Like other educators, Mr. Nicholas uses case studies extensively to drive students' inquiry and inspire them to ask questions. For example, when discussing cities, students learn how cities are built and related to their urban and rural partners through housing and transportation systems. Students also learn about core issues of congestion, lack of housing, poor housing, and ways urban development is unsustainable, at least according to standards in the curriculum. Mr. Nicholas encourages students in his classroom to ask questions like: "How is this representative of quality housing, quality transportation system, or a quality transportation network?" Subsequently, "through those answers, we explore, we compare, and through case studies, we explore and compare and realize what the tenants of sustainability are" (Mr. Nicholas, 2023).

[20] The identity of the university has been omitted to protect the identity of the University and those interviewed during this research

Teaching at a secondary school, Mr. Nicholas follows the standards set by the Singapore Ministry of Education (MOE). While the MOE sets standards and outlines curricula, Mr. Nicholas says he can include additional materials of his choice (e.g., news articles, short films, and collaborative PPTs). Educators are also encouraged to collaborate with other teachers to develop joint curricula, which Mr. Nicholas said is a growing trend among educators in Singaporean schools. His school also utilizes role modeling to help students recognize concepts of space, place, scale, and environment, all with a hint towards sustainability. By having students explore the application of sustainability from different perspectives in the context of a particular subject (e.g., urban development), they can see how cities are designed and developed and the implications of these practices on local communities and their livelihoods.

Mr. Nicholas is a young teacher who believes his role is to help students maintain a sense of hope for the future. From his perspective, students and educators lack the agency to make choices for the future, leading to cynicism and hopelessness. As an educator, Mr. Nicholas aspires to foster a sense of belonging and agency with his students, helping students retain optimism and a sense that they have a stake and the agency and ability to make a difference. Mr. Nicholas has two goals - short-term and long-term. The short-term goal is to help students recognize and change simple behaviors, such as recycling and being aware of their food consumption. He also wants his students to develop personal conviction and be able to share what they learn in the classroom with immediate family and friends. In the long term, Mr. Nicholas hopes his students gain advocacy skills and translate their learning into decision-making skills for a more sustainable future.

Ms. Priscilla

Ms. Priscilla is a Geography and Social Sciences teacher at a secondary school in Singapore and identifies as female. She recently completed her Postgraduate Diploma in Education from Education Institute A at University S and holds a degree in Geography from University L. For Ms. Priscilla, the phrases that come to mind about sustainability are caring for the environment, caring for the people, and future thinking. These terms, while necessary, feel overrated for Ms. Priscilla because there is such an emphasis on the

environment. Focusing on sustainability deters learning from core principles, making it difficult for educators to distinguish if their students are learning about X subject (e.g., geography) or sustainability. Additionally, the excessive conversation of sustainability in developed nations often backfires because, in the U.S.., for instance, sustainability is understood only to be environmental protection, when in reality, sustainability is more extensive and involves so much more than just the environment (e.g., economic sustainability and personal sustainability) (Ms. Priscilla, 2023).

In her classroom, Ms. Priscilla aims to help her students understand the breadth of sustainability through cross-cultural content. By learning about different cultures, students understand how other cultures understand sustainability and their varying relationships with the natural environment. For example, indigenous communities often refer to nature spirits and use the natural environment based on these spirits. These traditional practices conflict with people in power, like government agencies, and as a result, indigenous groups' needs are subordinate to the wants of the government. Ms. Priscilla says that these tensions reveal a disparity in the value of sustainability and responsibility between social demographics.

When people see how their actions affect the local environment in multiple areas, they are more likely to understand why they should practice sustainability. In the classroom, Ms. Priscilla seeks to create authentic opportunities through the use of technology (e.g., virtual reality, simulations, Google Maps) to activate the "effective side of learning that makes [students] want to take action and have an impact on society" (Ms. Priscilla, 2023). The shift towards more organic and student-centric learning is part of Singapore's shift away from traditional educational models of memorization and exam-based learning. Educators are encouraged to plan their lessons in a way that is less direct instruction. There are no longer mid-year examinations, only end-of-year assessments. Instead, students complete call-based assessments such as written assessments, research projects, and field volunteer service throughout the year.

Sustainability is important, but it is more important for students to understand the term sustainability, its historical and social implications, and how it continues to evolve in today's complex world. In particular, Ms. Priscilla discussed the necessity of making learning relevant to the individual and helping them understand why they should protect

the environment. When people understand the beauty of the natural world, they follow, in a unique way, the ESD pedagogical model.

Ms. Winnie

Ms. Winnie is a Geography and Social Studies student teacher at a secondary school and identifies as female. She has an undergraduate degree in Geography. When asked about sustainability, the first three words that came to Ms. Winnie's mind were the environment, people, and the future. For Ms. Winnie, what has helped her understanding of sustainability has been being in the classroom as both a student and an educator.

> "Sustainability is a very big concept that I encountered during my undergraduate years, where many modules talked about sustainable development and sustainability. The media has also been big because, in recent years, there has been much talk about being sustainable and going green in Singapore" (Ms. Winnie, 2023).

Ms. Winnie recognizes an intergenerational gap in understanding sustainability within Singapore. For Ms. Winnie and her social circle, sustainability is important, but this is plausible because most of them were geography majors in university and care about the environment. Older generations often do not perceive sustainability as important or necessary due to historical and social events they experienced growing up. "Understanding the intergenerational difference in experience and how age influences one's understanding of a topic such as environmentalism or sustainability is an important aspect of being a geography major and teacher" (Ms. Winnie, 2023).

Like other student educators, Ms. Winnie studied at University L, one of the main universities in Singapore. She shared how in her classes, they talked a lot about sustainability in course content, case studies, reading papers, and debates. While formal classroom education was important to build Ms. Winnie's understanding of sustainability, the informal time spent outside exploring and learning about sustainability and environmentalism through the media sealed the deal. "I recognized that sustainability is beyond an environmental lens and can be incorporated and encompassed into many other areas in society or our personal lives" (Ms. Winnie, 2023).

ESD and sustainability are becoming more prevalent in secondary education in Singapore. Like other educators, Ms. Winnie teaches in a secondary school and observes the growing trend of teaching ESD and sustainability. For Ms. Winnie, this trend is partly due to the growing media industry and the rise in social media as an outlet for news and information sharing. The media can be used as an educational tool in the classroom, offering students an outlet to learn about sustainability and an opportunity for teachers to teach them how to decipher valid information through media literacy.

"All students have mobile phones and love sharing their opinions on social media apps. So definitely, it is a way for them to become agents of change for sustainability, considering how the internet has such vast information. Students can easily get all this information online without us teachers telling them or teaching them" (Ms. Winnie, 2023).

While Singaporean schools are primarily for students who are national citizens, the education landscape in Singapore is changing, with a growing number of international students. Ms. Winnie acknowledges that the changing landscape of student demographics requires teachers to recognize that these families might hold different mindsets regarding sustainability. Ms. Winnie does not think that educators can only view them as wrong because they have different points of view. Instead, educators should have empathy because parents might have different lifestyles and mindsets, and sustainability might not be a high priority for them.

Sustainability is a term that originates from the West, but Singapore has been able to adapt the term to fit its unique context. That said, Ms. Winnie and other educators in this research have indicated that Singapore has intentionally tried to adopt more of a Western lens on sustainability to align itself with the SDGs and other sustainability-centric practices. This is modeled through the signage across the city (see Annex).

When we compare Singapore's social sustainability practices with those of neighboring countries, it is evident that there is not the same extent of sustainability, suggesting that local culture and national priorities play a considerable role in

transforming a nation into a sustainably-conscious society. For example, in Mainland China, it is common to receive plastic straws, utensils, and items that are frequently wrapped in plastic. In addition, there are also not many places for accessible recycling and composting, and there is a lack of regulated eco-friendly systems for managing waste. In contrast, there are recycling centers in each residence building in Singapore, and many stores are transitioning to reusable bags and only selling metal utensils for bubble tea and takeaway meals. Schools are also making an effort to include Singaporean examples in the curricula to bring the subject of sustainability to life, helping students recognize the locality of the issue. By and large, Singapore is not perfect. However, its ability to transform itself into the green hub it is today demonstrates the necessity for national prioritization of environmentalism and sustainable behaviors and local communities' adoption of collaborative practices.

Ms. Stella

Ms. Stella is an English and Social Studies student teacher in Singapore and identifies as female. She did her undergraduate studies at University L. When asked about sustainability, the first three words that came to mind were green, technology, and the future. When asked about this, she mentioned that in terms of sustainability, there are different levels. The first level is superficial because, for her, as an individual, there is personal sustainability, which is important but does not have a great impact. Throughout her schooling, she has realized that sustainability is more in the hands of those with power and is influenced by capitalism rather than individuals' behaviors.

Unlike other student educators at University S, Ms. Stella has experience teaching in an international school and a local Singaporean institution. In her experience, she tried to incorporate a module on sustainable consumerism. Despite it being a broad topic, Ms. Stella focused on environmentally-friendly makeup brands, asking her students to think about decisions to implement strategies for more sustainable makeup products across Singapore. In these scenarios, it became apparent that individuals should not make these decisions but should be adopted, implemented, and evaluated by the government.

Ms. Stella primarily teaches social studies in her current position. The Social Studies curriculum in Singapore is divided into primary and secondary. In primary

school, students learn more about the local, immediate environment, like their homes, water systems, and transportation in Singapore. Questions like, “Why has Singapore developed certain transportation, and how has it evolved over the years?” are asked. Entering lower secondary, students learn more about the historical context and consider how history influences the Southeast Asia region. In terms of sustainability, it is not directly related to social studies content, but it is part of the syllabus. Moving into higher secondary, students are tasked with bridging concepts together, and through essays and learning journeys, they can explore concepts like sustainability hands-on.

The national Character and Citizenship Education (CCE) curriculum also teaches Singaporean students about sustainability. The CCE curriculum aims to teach students skills for the 21st century, including active citizenship and awareness of global issues like climate change and sustainability. The CCE curriculum is part of the Singaporean education system, so students, even in higher education, learn about the same environmentalism and sustainability practices. For example, the College of Alice & Peter Tan (CAPT)[21] at the National University of Singapore (NUS) is considered a residential college that provides academic programs for students in and out of the classroom. Within the College, there is flexibility for students to start their initiatives, and students are encouraged to be engaged in community service initiatives like sustainability (Ms. Stella, 2023; College of Alice & Peter Tan, National University of Singapore).

In the classroom, Ms. Stella believes that role modeling is a good way for students to learn sustainability. Students pick up cues from their teachers, even if they are silent, such as being conscious of e-waste and having clear recycling and compost bins in the classroom. Educators can make things very clear to them. However, through the cognitive-behavioral model (CBT) theory, students can improve their cognitive skills and educational experience, leading to the double achievement of improved environmental behaviors and environmental protection (Ms.
Stella, 2023; Ding et al., 2022). Additionally, the ABC model of CBT theory explains that “life events do not directly determine emotions and behaviors” (Selva, 2023).

[21] The College of Alice & Peter Tan (CAPT) is a residential college at the National University of Singapore for undergraduate students. The College “consciously weaves the themes of active citizenship and community engagement through [its] curriculum and other aspects of the student experience” (CAPT, 2023).

Essentially, the model is used in educational psychology and helps people accept rational beliefs and dispute irrational beliefs. According to Ms. Stella, if educators genuinely believe in reducing waste and practicing sustainability, their beliefs will naturally translate into actions, which students will pick up on and potentially adopt themselves (Ms. Stella, 2023).

Mr. Alex

Mr. Alex is an undergraduate student at University S and is in the teacher training program. He identifies as male. When thinking about sustainability, Mr. Alex said: "responsible usage of resources and especially for future generations." Mr. Alex says he views the idea of the environment as intrinsically useful and of value instead of perceiving all resources as only resources in and of themselves (instrumentally valuable). He also mentioned the importance of protecting nature to preserve future generations and ensure we have safe and conducive environments. Mr. Alex shared similar sentiments with other student educators at Education Institute A in that sustainability is more than just doing things for the environment, rather, it is about a mindset that permeates other facets of life.

"I think sustainability is thinking about other people rather than yourself. If everyone is able to have a similar conception of sustainability, which is to be mutually respectful, responsible, and concerned about each other's welfare, whether it's current generations or future generations, I think the world would be a better place whether or not it can solve big problems" (Mr. Alex, 2023).

Unlike the other research participants, Mr. Alex is an undergraduate student double majoring in education and geography at Education Institute A. Since he is still in his preliminary university studies, Mr. Alex is in a unique position because he is both learning concrete subjects for his geography major and the skills to become an educator. When asked about his core classes, Mr. Alex said he is learning about the physical systems and "how our climate is changing and understanding how humans more often than not make an impact on the physical impact" (Mr. Alex, 2023). In most of his

courses, Mr. Alex said that there is a focus on using case studies to help students understand the applicability of sustainability and other subjects. For example, in his water management course, Mr. Alex learned about how specific water management systems, like dams, impact not only the environment but also the ability of local communities to access water, affecting their ability to thrive. For Mr. Alex, global case studies helped show him the universal principles of water management systems and how these (un)sustainable practices affect local populations.

At University S, Mr. Alex said there is a focus on helping students get a solid foundation on sustainability and related areas of geography and social studies. Building the foundational concepts is crucial before students go outside the classroom to apply their knowledge to local situations and global scenarios concerning sustainability. In the classroom, Mr. Alex says most of the learning is student-centric, and he has the autonomy to think for himself. Additionally, while his courses do not directly ask him to be empathetic and put himself in the shoes of the populations he is learning about, Mr. Alex says it is important to him to “personally put [himself] in the shoes of people who are affected because it helps [him] to understand the social realities better” (Mr. Alex, 2023). Furthermore, using case studies and technology applications like Windy.tv, Mr. Alex and his peers can visually glimpse how the environment changes and the evolution of extreme weather patterns. Windy.tv gives them an idea of how actions create consequences, even if they are not personally experiencing them in Singapore.

Mr. Alex views his learning at Education Institute A to "shape me as a person first and foremost. When I study and do my assignments, "my primary goal is to look at how my teachers teach" (Mr. Alex, 2023). Education Institute A is unique from other teaching universities because the professors are educators committed to engaging their students in the classes and have unique pedagogical training and methodologies (Mr. Alex, 2023). At Education Institute A, Mr. Alex recognizes the value in teaching from the student's perspective - teaching things that the student first understands and then what they do not understand and ensuring they have a firm grasp on initial concepts before moving on to the following topics.

Looking forward, Mr. Alex says he does not seek to directly translate his learning into teaching curricula because he wants to observe his future students and develop his

teacher identity. He does not want to become 'that' teacher who regurgitates content but rather reinforces the concepts and empathizes with his students about what is happening in the real world. In doing this, Mr. Alex says it is important to him to convey his teaching through mediums that are significant to him but also relevant and age-appropriate to his students. In particular, Mr. Alex believes engaging students' perspectives and helping them frame their thinking for the future through combined approaches of emotional understanding and intellectual learning is important.

> "I want to take those skills and my identity and convey them to my [future] students. When [students] have empathy and when they have grasped all the concepts, I think the last step is really to empower them to make sense of the environment around them. So hopefully after the lessons in the classroom, [I can] take them out to actually see with their own eyes the impacts of people's actions" (Mr. Alex, 2023).

Experienced Educators - UWCSEA

Like educators at Education Institute A , prospective educators' interviewees were contacted after they indicated their interest in participating in this research. Initially, all ten informants were interested, but only six interviews were conducted. This was in part due to the time of the semester and the lack of responses from educators to set up the interview. Before each interview, digital consent was obtained, and further consent was obtained to record the Zoom conversation. Like interviews with educators at Education Institute A, interviews with experienced educators at UWCSEA lasted, on average, one hour, except for one two-hour interview.

Ethnographic Interviews - United World College South East Asia		
Profession	Pseudonym	Subject(s)
Teacher	Ms. Pearl	Chemistry
Teacher	Elizabeth	ESS, Geography
Teacher	Ms. Hannah	Geography, Global Concerns (GC) Programme
Teacher	Ms. Emma	History
Senior Leader/ Curriculum Designer	Ms. Heidi	N/A
House Parent/Teacher	Mr. Michael	N/A

Figure 18. Breakdown of interviews with UWCSEA educators and their pseudonyms

Each discussion was unique but generally followed the format of semi-structured interviews, with fourteen open-ended questions to guide the conversation. Interview questions were created by the researcher before conducting interviews and were developed in consultation with the researcher's advisor, Professor Sonia Mehta. A complete list of questions can be found in Appendix B. All interviews with participants were conducted over Zoom, which benefited the research because it allowed for the most time flexibility. Overall, educators at UWCSEA were incredibly generous with their time, and what they shared about their previous teaching experiences and the role(s) they consider educators and students to play in the discussion of sustainability.

Ms. Elizabeth

The first UWCSEA interview participant was Ms. Elizabeth - pseudonyms are used to protect the identity of all research participants. Ms. Elizabeth is an educator of ESS and biology and identifies as female. She has over fifteen years of experience teaching at international schools across the globe and recently began teaching at UWCSEA. The first three words that came to mind concerning sustainability for her were sustainable, hope, and improvement. "Sustainability is about well-being for everything, the well-being for humans, the well-being of our atmosphere, our ecosystem [Sustainability is when] that balance is restored" (Ms. Elizabeth, 2023).

Sustainability is a complex term that needs to be unpacked across different cultural, geographical, and linguistic contexts. Like other UWCSEA educators, Ms. Elizabeth has a wealth of experience teaching at international schools across the globe. Teaching overseas, many UWCSEA educators have gained a diverse lens into subject areas like sustainability. While teaching in Thailand, Ms. Elizabeth was exposed to Buddhism and began appreciating objects for their innate nature versus their commercial value. This experience expanded her knowledge of religious and cultural values surrounding the environment and sustainability. Today, teaching in Singapore, a city-state without many natural resources, Ms. Elizabeth thinks more critically about "where objects come from, where their end of life goes to, and if these things are really necessary."

For Ms. Elizabeth, the move to Singapore was more of a return to her youth. As a graduate of the College, Ms. Elizabeth is excited to be back in a teacher role, where she is "delivering a program (ESS) that [she] passionately loves" (Ms. Elizabeth, 2023). Moreover, as an advocate for sustainability initiatives and student advocacy, she is proud to work at UWCSEA, which places sustainability as one of its pillar values.

Sustainability is everywhere at UWCSEA - in the curriculum, classroom lessons, activities, and outdoor education. Ms. Elizabeth offered this example of sustainability applied in physical education (PE) classes:

> "The school was looking at buying sports kits, and rather than just going with a previous supplier that was the cheapest, they critiqued and asked the purchasing department, where are these PE kits coming from? What is the cycle? Where is the end of life, and what are the alternatives? So while we have gone with a new supplier that's more pricey, we believe in the ethical purchasing of where that has come from" (Ms. Elizabeth, 2023).

Educators play a role in supporting students' development of knowledge about sustainability and empowering them to make positive decisions. In the case of PE equipment, Ms. Elizabeth said that the students were advocating for more sustainable suppliers. For her, this was an example of the pathway of knowledge between educators and students.

UWCSEA aims for students to not only become agents of knowledge but also to have a firm grasp of the processes that are involved in decision-making. Allowing students to have a voice at the table where decisions are made (e.g., purchasing PE equipment) encourages them to voice their opinions and apply their classroom knowledge to real-world scenarios. "UWCSEA is innovative and leading in many of the sustainability issues that I have seen in schools from around the world" (Ms. Elizabeth, 2023).

Ms. Elizabeth describes her role as the environmental sustainability coordinator as managing projects from grade 3 to grade 12. One project that students in grade 3 are working on is exploring the ocean and their impact on the world. In grade 5, students learn about the importance of soil and participate in a composting initiative. As students develop and progress through school, their projects become more complex, and they engage in various topics spanning environmental sustainability. Once students are in the IB Diploma Programme (DP), they have often already engaged in projects through the Global Concerns (GC) Programme. An example of the GCs students might be involved in is the Rainforest Restoration Project. The Rainforest Restoration Project started at UWCSEA Dover Campus in 2005 and focuses on increasing the biodiversity of indigenous trees on the UWCSEA campuses and the Singapore community (UWCSEA Global Service, 2023). The GC Programme helps students recognize the feasibility of progress and their agency as students to make decisions within their ecosystem.

In the classroom, Ms. Elizabeth discussed how relevant and consistent the topic of sustainability is. At the beginning of the ESS course, students explore sustainable development and how it impacts society and the environment. In each subsequent chapter, like water, students always return to how this issue impacts society and what solutions are feasible. Regardless of the topic, Ms. Elizabeth aims for her students to come up with appropriate solutions for different scenarios - societies that are economically developed, less economically developed countries, countries that are technocentric, and countries that are eco-centric. Another large section of the ESS course explores the SDGs and how many can be examined through the lens of sustainability. Specifically, returning to the concept of well-being, students learn how society can improve people's lives and achieve the SDGs by looking through the lens of

sustainability. At the same time, Ms. Elizabeth highlights that solutions for Singapore would only sometimes be appropriate for other countries, even in the neighboring South Asia and East Asia regions, due to different contexts and circumstances. She hopes that through case studies, her students will understand how cultural, political, logistical, linguistic, and religious values must be included in the decision-making and implementation processes.

The IB curriculum at UWCSEA allows concepts like sustainability to span across subjects and foster students' collective learning. Ms. Elizabeth also teaches IB Biology, a course that incorporates parts of other sciences like ecology, anatomy and physiology, evolution, and genetics (UWCSEA IB Biology). In class, Ms. Elizabeth has observed several of her students coming to class and making connections between her class and other IB courses they are in. Additionally, through experiential learning at Tioman Island off the coast of Singapore and Project Week in Grade 11, students stay engaged in local and global initiatives that further their learning and engagement. While these opportunities foster collaborative learning, Ms. Elizabeth acknowledges that there is still much to explore, and educators still have much to learn about potential solutions.

"I have as much to learn from them about their background, stories, the countries they have come from, the places they have visited, and the cultures they have. I am not teaching students today for today's problems, I am teaching students for unforeseen problems that might arise in the future, and it is their approach to dealing with those problems, and they can only get that through teaching and critical thinking, and evaluation skills" (Ms. Elizabeth, 2023).

Ms. Pearl

Ms. Pearl is an educator of chemistry at UWCSEA and identifies as female. She has been an educator since 2009 and has experience teaching the IB curriculum at other international schools across Asia and Europe. She recently began teaching at UWCSEA. When asked why she chose UWCSEA, Ms. Pearl expressed,

> "I felt that [UWCSEA] matched my teaching philosophy, particularly its service component. The school really had a grasp on how to marry the academics and the holistic side of teaching. There was a balance between treating students as human beings and striving for a commitment to service and well-being" (Ms. Pearl, 2023).

For Ms. Pearl, the first three words that came to mind regarding sustainability were green, climate change, and consequences. Ms. Pearl perceived these terms within her teaching context, where she strives to educate and empower her students. As "future movers and shakers, I believe it is important for [my students] to be informed and for them to see the feasibility, the consequences, and the kinds of further thinking ahead, and what the potential solutions are - weighing out what are the disadvantages and advantages" (Ms. Pearl, 2023).

Ms. Pearl admires UWCSEA's focus on sustainability through student-centric learning. As a participant of the Green Campus Committee, Ms. Pearl actively promotes behaviors like recycling and engages her students in actions like trash pickup and cleaning. In this way, the Green Campus Committee helps to elevate students' and educators' awareness of the volume consumption. For educators at UWCSEA, these behaviors must extend beyond 'formal' settings like committees or clubs. Students should regularly participate actively in making their campus community cleaner and greener. One example is during large-scale campus events, like UN Night, when the entire school community comes together in celebration. During these events, many students take part in fundraisers for their GC on behalf of local initiatives in Singapore. These fundraisers typically involve food, except for the last three years due to COVID. During UN Night, in particular, organizers require attendees to bring their own containers and cutlery, demonstrating the College’s ongoing commitment to sustainability. Although this seems

like a minor impact compared to other behaviors, the UWCSEA community is committed to making this common practice.

Like other UWCSEA educators, Ms. Pearl has experience teaching at other international schools. She previously taught at an international school in South Korea before coming to UWCSEA. Ms. Pearl observed a growing trend of sustainability discussions at her former institution but perceived these as more "greenwashing" than authentic pledges and commitments by educators and the local education community. In South Korea, there is also a greater emphasis on building the local economy, so naturally, there is debate about prioritizing the environment over the economy or vice versa. Additionally, in South Korea, there is more of an emphasis on collectivism over individualism; students are raised with the value of doing things collectively for the nation's benefit. This was a significant difference from the United States[22], where Ms. Pearl is originally from.

Ms. Pearl assisted lead teachers from the UWCSEA Dover Campus during the Group 4 Project, an interactive project for grade 11 students. In this project, students are placed in groups of 25 with one educator advisor and tasked with creating a collaborative initiative relating to science. This past year's theme was water, and student groups were assigned to countries with set limitations (i.e., GDP, location, access to fresh water, and access to natural resources). While planning this project, Ms. Pearl and others asked students to reflect on their water usage. With the survey as a starting point, students were encouraged to look at their country's water situation from a lens of equity and sustainability. As in real life, certain countries were inherently given more resources due to their GDP. This morphed into an interactive marketplace activity, where students had to donate fake money (e.g., Monopoly money and M&Ms) towards initiatives they believed had the best outcomes.

Teachers play an essential role in helping students feel safe in the classroom to learn, express themselves, and share their opinions. Ms. Pearl, like other UWCSEA educators, believes that giving students the space and time to develop their own autonomy to make decisions is essential. Specifically, concerning sustainability, Ms.

[22] This research does not thoroughly explore ESD in the U.S. education system. Brief notes can be found in Chapter 5.

Pearl believes prioritizing student exploration and decision-making is more important than reflecting upon their current decision-making skills. So, by setting the stage with background knowledge of an issue (e.g., carbon cycle), educators encourage students to reflect on the impact and future consequences of certain behaviors instead of sticking to more surface-level questions to develop basic knowledge. These reflection questions are then expanded to consider the impact on larger international frameworks like the UN's SDGs and sustainable development. Reflection questions and project-based learning (e.g., Group 4 Project and GC Programme) foster the development of creative and critical thinking skills. With critical thinking, "[students] are able to take [their] background knowledge and synthesize and then create something new" (Ms. Pearl, 2023). Ms. Pearl says that by adding critical thinking as a pillar for classroom culture, UWCSEA is trying to reimagine how they assess students' knowledge of content and apply it to real-world situations to remove barriers for students to excel in the classroom.

Teachers are role models for students, so they need to model positive behaviors and maintain positivity. As an educator, Ms. Pearl thinks she must have an attitude to reach for the stars. Most importantly, "you must help students see that you and them can enact change together" (Ms. Pearl, 2023).

Ms. Emma

Ms. Emma is an educator of history and theory of knowledge (TOK) at UWCSEA and identifies as female. She has been teaching at UWCSEA for five years and has experience teaching at other international schools. When asked about sustainability, the first three words that came to mind to Ms. Emma were waste, future, and resources. Ms. Emma felt bad about using the word "waste" to describe sustainability, but like all interviews, there were no "right" answers. When asked what prompted her to go into teaching, Ms. Emma said, "I strongly believe that education is the root to which we are going to achieve greater social equality and equity" (Ms. Emma). Like other UWCSEA educators, Ms. Emma discussed at length the involvement of sustainability in the UWCSEA curriculum, UWC mission, and classroom and experiential learning opportunities. There are reminders on printers and in every classroom about avoiding waste, properly recycling different items, and properly disposing of food waste and trash.

For Ms. Emma, who teaches history, her students learn about the history of the industrial revolution and the rise of consumerism in western and developed countries. Additionally, while Ms. Emma only teaches history, as mentioned by other educators, the IB curriculum helps students connect their different subjects to larger conceptual values like sustainability.

As an educator at UWCSEA, Ms. Emma observes the common topic of sustainability during discussions with her circle of educators. In the meeting rooms, teachers discuss sustainability, primarily from an environmental lens, and explore ways to further engage their students on campus and through experiential learning. This observation cannot also be said for students. This is because there is a diverse range of backgrounds of students at UWCSEA, and not all students come to UWCSEA with a background in knowledge regarding sustainability. That said, Ms. Emma says that because of student opinions and communication with staff, UWCSEA has changed its lamination and single-sided printing practices and encourages students to reprint or find other ways of sharing information.

UWCSEA is situated in Singapore, but students have limited opportunities to interact regularly with local populations. As such, this limits their understanding of comprehensive sustainability initiatives in Singapore. At UWCSEA, sustainability is primarily taught through an environmental perspective. This limited approach excludes students from learning about climate change's historical, social, economic, and social implications and sustainability behaviors and practices.

At UWCSEA, Ms. Emma notices a disparity between students' academic knowledge and the applicability of sustainability within their own lives. Students can explain at length about sustainability. At the same time, however, Ms. Emma and other educators within this research expressed that their students do not apply their knowledge to real-world scenarios and make conscious efforts to be sustainable in their daily lives (e.g., buying bubble tea or making online purchases via delivery apps/services). While this observation is not rooted in data from this research, it is plausible that this finding is because students are learning about sustainability within the bounds of the classroom or specific fostered environments rather than through real-world, independent opportunities.

As teachers, UWCSEA educators try to help students recognize their potential to make a difference for others and the earth, and themselves. Ms. Emma mentioned that through the Personal and Social Education (PSE) curriculum, students engage in conversations about other forms of sustainability by exploring areas where they can improve themselves. In the PSE classes, students discuss burnout, stress, and physical, mental, and emotional wellness, which have become more prevalent during the pandemic. Additionally, with their IB exams at the end of the term, many students aim to make it to those dates, regardless of the impact on their well-being. In recognizing their behaviors, Ms. Emma says that she hopes that students will learn in their PSE class how to translate knowledge of positive choices/behaviors (e.g., getting enough sleep, exercising, and eating well) into sustainable practices throughout their time at UWCSEA and beyond. In this sense, sustainability is not only perceived through an environmental lens but can also be considered an essential aspect of personal well-being.

The IB curriculum inflates students' involvement in on and off-campus activities. The IB curriculum is very demanding, and besides the general course requirements, there are additional requirements specific to IB. The CAS course requires students to engage in community service and write about their experiences. The EE requires students to write an extensive paper about a specific topic. In addition to these IB components, students are involved in several clubs and campus organizations to help boost their resumes for college/university applications. Ms. Emma stated that most students are aiming for universities in the US and outside of Singapore, so there is a heightened emphasis on community involvement. While this is good for students' exposure to different projects and global issues, their broad involvement in many different areas can look disingenuous. This is not to say that students do not care about sustainability; rather, it reflects the extenuating external pressures on students to be in tune academically and socially.

For Ms. Emma, the biggest challenge is ensuring a safe space for her to discuss these topics with her students. Students in the classroom often feel that they must say the right things and "play the part," so Ms. Emma aims to ensure that her classroom is where her students can be honest about their struggles and openly share their concerns and frustrations. Regarding sustainability, Ms. Emma says that some of her students need help understanding why they should care about sustainability or how they can enact change as

young students. In her classroom, Ms. Emma aims to lower the barriers to having more truthful conversations centered around students' concerns about climate change and sustainability. By allowing students to freely express themselves in the classroom and engage in transparent dialogue about different topics, Ms. Emma seeks for her students to develop agency in their thinking and make positive choices that are not only beneficial to them but to their peers, the environment, and the world around them.

Ms. Hannah

Ms. Hannah leads the Global Concerns (GC) Programme at UWCSEA. She has over thirteen years of experience teaching in Australia and has been teaching at UWCSEA for over 27 years. The UWCSEA GC Programme spans the entire curriculum of UWCSEA. For Ms. Hannah, her role is to emphasize the GC Programme for students in grades 9-12. Through the GC program, UWCSEA partners with different grassroots and non-government organizations so students can learn about developmental issues and improve and take action for social, economic, and environmental action points (Ms. Hannah, 2023). The current GC Programme directly links to the SDGs of the UN, and the prior program to the Millennium Development Goals (MDGs), indicating that this Programme seeks to align itself with global frameworks from the United Nations and its governing agencies.

In grades 9-12, students must participate in a Local and/or College Service and may choose to be part of the Global Service Programme. In grades K-8, UWCSEA classes partner with a GC partner they support throughout the academic year. The GC Programme facilitates direct links with the academic curriculum and the grade's GC partner. For Ms. Hannah, making the GC Programme age-appropriate is important because "it gives students a vehicle to take informed action on elements of the environment, society, economics, and health" (Ms. Hannah, 2023).

The GC Programme furthers students' knowledge of sustainability at UWCSEA. In the classroom, students engage in the topic of sustainability and explore the global impacts of climate change. While sustainability is naturally present in subjects like history and geography, UWCSEA teachers also find ways to incorporate sustainability into math and science courses. In a recent visit to a math class, Ms. Hannah observed

students doing data analysis from the solar panels on the campus buildings. UWCSEA has adopted sustainability as a core pillar of the UWCSEA model and aligns with the UWC mission shared by all 18 campuses. Ms. Hannah believes this translates into helping students build their knowledge, become engaged global citizens, and take action steps toward the UWC mission (Ms. Hannah, 2023).

In addition to leading the GC Programme, Ms. Hannah is an educator. When asked what three words came to mind concerning sustainability, she said urgency, responsibility, and justice. In elaborating on her responses, Ms. Hannah said that she feels a sense of despair about the current climate crisis and often finds it difficult to have hope. That said, she believes she still has a responsibility to the earth to play her part. For her, teaching is the best way for her to aim to include them in decisions that will ultimately impact their livelihoods. Ms. Hannah also feels a strong sense of social justice regarding environmental sustainability. Her drive for social justice is furthered by her commitment to the UWCSEA mission to build more peaceful and sustainable futures. In working with students at UWCSEA, Ms. Hannah aims to empower her students to make positive choices and take action beyond the classroom and the facilitated GC Service Programme.

Like others at UWCSEA, Ms. Hannah stated that the College primarily approaches sustainability from an environmental lens. While the current campus culture could better tackle sustainability and climate change through environmental stewardship, educators try to help students make sense of the UN's SDGs and how they are interconnected and interdependent. The GC Programme addresses the SDGs, and the grassroots projects supported through the GC Programme address more than one of the SDG goals; therefore, students are encouraged to explore how environmental, social, and economic prosperity leads to peace. That said, when looking beyond the GC Programme, the campus structure aims to make UWCSEA more sustainable through renewable energy and implementing environmentally friendly practices (e.g., recycling bins, food waste program, and solar panels). These practices are countered by the fact that the College sells canned drinks and distributes single-used plastics daily, revealing a disconnect between the mission of the College and its actions to promote campus-wide sustainability behaviors. This dichotomy demonstrates how students may be knowledgeable about ways

to be environmentally sustainable but are only sometimes conscious of ways they can practice sustainability in their own lives.

The goal of the GC Programme is for students, from a young age, to participate in conversations around the environment, health, economics, and society within the lens of their GC partner and for them to learn how they, as students, can participate and use their education to enact change. Having been at UWCSEA for almost three decades, Ms. Hannah has seen the GC Programme grow and fluctuate. When asked why she has decided to stay at UWCSEA, she said, "It is because of the mission…when your personal philosophy and your lived experience match with your working life, it is quite a remarkable opportunity" (Ms. Hannah, 2023).

Ms. Heidi

Ms. Heidi is a senior leader at UWCSEA. She has a background as a geographer and has extensive experience teaching at international schools in the United Kingdom, Kenya, and Switzerland before returning to UWCSEA. When asked why she chose to return to UWCSEA, she said, "UWCSEA is the defining institution for me. In terms of my identity as an educator, UWCSEA is values driven with a capital V, and I am totally committed to the mission…[UWCSEA] is a very, very special educational institution, and it is a real privilege to work here" (Ms. Heidi, 2023). Like other UWCSEA teachers, Ms. Heidi's children have gone through the UWCSEA system, indicating that educators at UWCSEA are keen supporters of the College as an educational model from a parental perspective.

When asked what three words came to mind about sustainability, she said education, critical, and holistic because she feels that the issue of sustainability is beyond an environmental lens. In her interpretation of sustainability within the College's mission, Ms. Heidi said "sustainability is having well-being for all within the means of nature" (Ms. Heidi, 2023). Keeping a simple but universal understanding of such a broad term as sustainability is essential to help the UWCSEA community understand the importance and implications of sustainability locally and globally. In adopting this simple framework, Ms. Heidi aims to foster students' development of cultural competence and

awareness about how their actions and behaviors impact the people and environments around them.

In her role, Ms. Heidi's primary objective is to educate young people to have the knowledge, skills, and understanding to work towards more sustainable futures. For Ms. Heidi, it is more than just knowledge and skill building. It is also crucial to build student agency and help them believe they can make a difference. UWCSEA's curriculum aims to help change people's hearts and minds, and Ms. Heidi feels that the College is delivering on this promise. This becomes particularly resonant when speaking to alums of the College. Ms. Heidi told me the story of an alum working in financial banking in the States (a common profession for alums of the College) but has also set up an NGO to provide pro bono consultancy for senior financial leaders, helping them become more sustainable. While this alum works in finance, an inherently unsustainable sector, they use their "conscience and are trying to use their knowledge to make a positive change because they feel compelled to make a difference" (Ms. Heidi, 2023).

As mentioned briefly, UWCSEA is a campus that is a model for other campuses in Singapore. The campus has received a platinum level from the government for its sustainability. The buildings have been designed with environmental sustainability in mind, especially the new East Campus, which has the lowest rating for air conditioning use. The College is also working to become net zero by 20230 and is actively elevating awareness of food waste and food insecurity among students in the cafeteria and across campus. In promoting sustainability in all aspects of campus, Ms. Heidi seeks to have students not only become agents of change but also live the mission of UWCSEA during and post-graduation.

The discussion of sustainability at the College attracts a specific group of students. When asked about this, Ms. Heidi said, "There is sometimes a tension between students who come to UWC as scholars – who join for the mission and who sometimes come from more marginalized backgrounds – and students who are fee-paying, often from backgrounds with a higher socio-economic status, whose families have picked the school more because of the academic reputation and less for the mission" (Ms. Heidi, 2023).

The culture of UWCSEA supports space for students' exploration of sustainability and climate change. The learning model of UWCSEA encompasses five elements, including academics and outdoor education. The College has a unique course called environmental systems and societies (ESS), which Ms. Elizabeth and others teach. In this course, students learn about sustainability through an environmental lens by exploring climate change, ecology, and other earth systems. As an IB course, the ESS is an optional elective for grades 11 and 12. On the other hand, outdoor education is compulsory for all students to learn about within Singapore and on campus. As students get older, their involvement in sustainability in the field gets more extensive and for more extended periods. For example, in grade 11, students participate in a service-based adventure known as Project Week, where they visit service partners with whom UWCSEA already has a relationship through the GC Programme and Service Learning. While Project Week is a one-off activity, service learning is a consistent aspect of UWCSEA's education model, inviting and encouraging students to learn about service partners through weekly commitments, fundraising, and advocacy efforts.

The UWCSEA curriculum is holistic, but the College needs to translate the contents of this curriculum into learning activities and opportunities beyond the classroom. Students can become competent in learning standards in the classroom, but for them to learn how to apply it to real-world situations is a step further. In this nature, Ms. Heidi mentioned the importance of having students become mission competent. Being mission competent at UWCSEA means that students are competent with applying sustainability not only on campus in their classes but can carry forth those values and practices in their volunteering service and in their future higher education. To help the College reach this goal, Ms. Heidi mentioned that UWCSEA is partnering with the University of Melbourne to examine how the College assesses complex competencies like student agency.

UWCSEA aims to embed practices of sustainability into core subjects and experiential learning. By having educators do service trips and service within the same space of their classroom, it is easier for students to make explicit links between classroom content and their experiential learning opportunities. In the next few years, the College aims to implement new courses for students in grades 9 and 10 that make the connections

between standards and real life more explicit. Overall, the College aims to have very "porous boundaries between learning inside and outside the classroom by having teachers who intentionally embed relevant links to real-life contexts and applications of sustainability. This helps us make [learning] come alive and breathe for kids so they can see the relevance of [sustainability]" (Ms. Heidi, 2023).

Mr. Michael

Mr. Michael is the house parent for one of the residential units at UWCSEA and identifies as male. He has been at UWCSEA for over eight years and had experience teaching science at UWCSEA before transitioning to his full-time role as a house parent in 2020. As a house parent, Mr. Michael explained, "I am in charge of a house family of about 30 to 35 students. I mainly help with administrative things, but am also the responsible adult for them here in Singapore" (Mr. Michael, 2023).

The boarding homes at UWCSEA are part of the scholarship program. The UWC movement awards scholarships to students from across the globe so they can come to a UWC campus to learn with other international students. In comparison to the population of UWCSEA on the East Campus, which is over two thousand students, the boarding homes only house around one hundred and forty students (Mr. Michael, 2023).

Mr. Michael has a background as a science teacher and received his teaching certificate in physics and chemistry. He initially began teaching in South Africa but then transitioned to an international school in Malaysia before coming to Singapore. Although Mr. Michael has a background in the natural sciences, he has always been interested in geography. When asked about the word sustainability, the first three words that came to mind were future, sustain, and stewardship. Within sustainability, there is an "element of careful stewardship and management. There are also elements of collaboration, cooperation, and an aspect of convincing other people that sustainability is important" (Mr. Michael, 2023). For Mr. Michael,

> "Sustainability is making sure that I have habits and practices that can keep going for the foreseeable future; that I can keep going and that will either benefit me in some way. As you get older, you begin to think more before you buy something. Is it sustainable

financially? Is it sustainable from a mental well-being perspective, emotionally, spiritually?" (Mr. Michael, 2023).

In the boarding house, Mr. Michael says that in his role, he has little power over what happens. He tries to work with the boarding community, the director of boarding, and other boarding parents to embed sustainability into the activities at the boarding houses. As sustainability is a key pillar of the UWCSEA mission, it is part of the boarding manifesto. As other educators have noted, UWCSEA focuses on environmental sustainability, so the focus in the boarding house is on how to be environmentally cautious and build 'sustainable' habits and behaviors. While making sustainability part of the boarding manifesto is a good step, Mr. Michael noted that most of the emphasis on sustainability is made when students first arrive at the boarding house. Because of the international demographic of students at the boarding houses at UWCSEA, they focus on helping students recognize the importance of sustainability and being aware of the environment and their surroundings. "Many students, after being here for a few months, go back home and realize how big the difference is between the person they are now compared to when they first came" (Mr. Michael, 2023). Regarding environmental sustainability, students often come to UWCSEA thinking that sustainability means not littering and preventing pollution. This frame of thinking shifts as they spend more time at UWCSEA and are exposed to new ways of thinking. Overall, students at the boarding house and, more broadly, at UWCSEA are able to speak intelligently about sustainability and why it is an important concept and pillar of the College.

In the future, Mr. Michael says that he hopes students will be able to learn about the meaning of sustainability, particularly as it relates to the sustaining of 'smart' practices over time without compromising the needs of others. UWCSEA students are bright and are eager to be engaged in activities relating to sustainability, but they do not often possess the comprehensive knowledge and background of this subject. This is especially relevant at the boarding house because students are only at UWCSEA for two years before they go on to university. That said, there is a difference between the attitudes of scholar boarding students and non-scholar boarding students towards sustainability. Scholar students are selected to attend UWCSEA, while non-scholar boarding students'

families are fee-paying. “With our non-scholarship students, our regular boarders, it is a bit more difficult to get them to understand why, for example, we don't allow food deliveries or why it's not a good idea to just order everything you want online and have it delivered in separate packaging. Thus, there’s a disconnect and distinct difference between these students and scholar-students' ' (Mr. Michael, 2023). Nonetheless, at the boarding houses, there is an overarching issue of getting students to adopt ‘sustainable’ behaviors like recycling and reducing plastic consumption through online deliveries. As a result, Mr. Michael and other house parents emphasize the importance of sustainability spanning across more areas than just the environment (social, financial, and personal), as an effort to help students recognize their own responsibility to the mission of the College and as global citizens.

Synthesis

UWCSEA experienced educators have similar perceptions of their role as educators in being champions of sustainability to educators at Education Institute A of University S. Their findings are also in line with related scholarship about the rise of ESD as a pedagogical approach and the role of educators in helping students become agents of change. Both groups of educators see the knowledge gaps in defining sustainability and the applicability of sustainable behaviors due to the focus on sustainability through an environmental perspective and the adoption of Western values and approach to sustainability and sustainable development. While educators at UWCSEA have more freedom to add different perspectives to their curriculum because of the design of the IB curriculum, educators at Education Institute A shared that they are encouraged to incorporate other learning mediums to help students develop a more holistic understanding of different subjects, including sustainability. Additionally, educators at Education Institute A reported that the Singapore MOE annually invites educators to discuss their perceptions of the standardized curriculum, lowering the power barriers for discussion between educators and policymakers. At UWCSEA, educators reported discussing with the MOE and other international schools in Singapore to develop more cross-dialogue about how international schools can support the MOE and adopt aspects of the MOE’s curricula into their IB/IGCSE curricula. This suggests that both parties

have concerted efforts to have more invited spaces and created spaces for dialogue and collaboration.

Nonetheless, educators are constrained by the educational systems they serve, whether the IB curriculum at a large international school or the local Singaporean secondary curriculum. There are still closed spaces of power that educators cannot enter due to their positionality. That said, since educators are both gatekeepers of information and champions of change, it is necessary to give educators agency and power 'to' and 'within' to build their agency and empower action in their classrooms. Overall, student educators at Education Institute A and educators at UWCSEA said there is a need for social acceptance and adoption of holistic ESD and 21st century competencies within Singapore for real change to occur at the individual, local and national levels.

Chapter 7: Students as Agents of Change

Introduction

Five students at UWCSEA were interviewed throughout this research, and eighteen survey responses were analyzed. While the population pool severely limits this section of the study, this body of qualitative research provides valuable insights into the relevance of ESD and sustainability for international students living and studying in Singapore. Most importantly, the conversations with students highlight the importance of educators: student relationships in fostering students' knowledge of sustainability and empowering them to become agents of change.

Discussion of surveys

Analysis and understanding of survey results offer quantifiable and qualitative evidence that presents a snapshot of the important highlights and reveals the limitations of this research. In total, there were 19 total surveys analyzed from students at UWCSEA. All students were older than 18 years per the Macalester International Research Board (IRB) guidelines. Most students were in grade 12 (72.2%) compared to grade 11 (22.2%), which made for a diverse range of responses.

Survey responses highlighted students' concerns about environmental issues like climate change, air pollution, and the degradation of natural environments. As evident in the figure below, it is evident that the top concerns for students were climate change and the degradation of natural habitats. This is consistent with the content and subjects students engage in their classes. While the survey was primarily used as a recruitment tool for student interviews, it also sought to explore students' understanding of sustainability at UWCSEA, at what age they began learning about the subject and where, and why they feel ESD is necessary and relevant to their education. This survey, like the educator survey, mainly targeted sustainability through an environmental lens, so it does not consider other sustainability considerations (financial sustainability or personal sustainability).

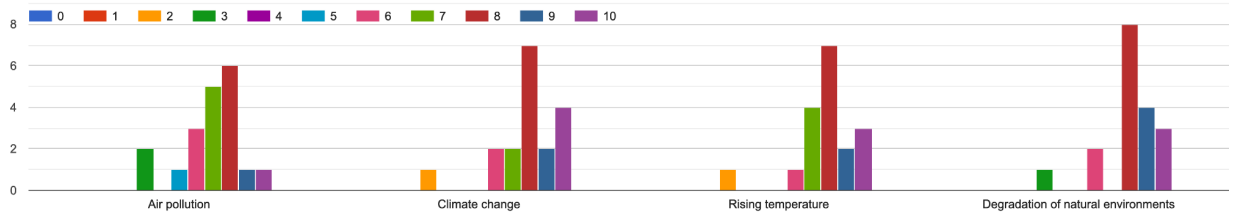


Figure 19. UWCSEA students ranking of environmental concerns (1-10).

For students at UWCSEA, it was important to understand where they learn about sustainability and why they believe ESD is relevant to their education. Like the educator survey, respondents could skip questions they did not wish to answer.

From the results, most respondents (77.8%) agreed with the definition of sustainability as "a balance between meeting today's needs with those of the future." The remaining participants selected "the implementation of eco-friendly technologies," suggesting that students at UWCSEA learn more about the importance of adopting sustainability practices through other mediums like technology. All students reported learning about sustainability in school (100%), and the other top-ranked areas were extracurricular activities (50%), volunteering (50%), and at home (44.4%). Given that less than a third of students selected "family" but selected "home" instead, it suggests that many students are not living with their parents while studying at UWCSEA. Students at UWCSEA can choose to live on campus as boarders in the campus housing units operated by the College and overseen by House Managers.

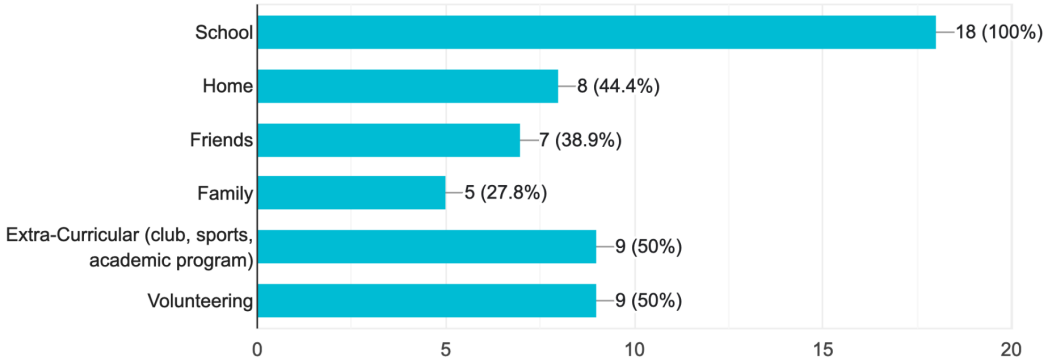


Figure 20. UWCSEA students' rankings on where they learn/have learned about sustainability.

Like the other surveys, I was interested to learn why students consider ESD and sustainability important. For students, in particular, understanding their reasons for being interested in this subject aligns with the global concerns among youth about climate change and the lack of progress toward the SDGs. Of the responses, almost all students (83.3%) reported that ESD "provides students with the knowledge and skills to become active and responsive citizens."

Figure 21. UWCSEA student responses on the importance of ESD.

Discussion of Interviews

During this research, five interviews took place with students at UWCSEA. However, due to one student falsely reporting their age, their discussion was removed for research purposes. These interviewees were self-identified by explicitly giving consent to being contacted by the researcher and providing their email. Interviewees were contacted by email, and an interview was scheduled for a convenient time between the researcher and the interviewee. For the purpose and geography of this research, all interviews were conducted over Zoom, with the participants in Singapore and the researcher at Macalester College.

Ethnographic Interviews - Students at United World College of South East Asia Singapore	
Position	Pseudonym
Student	Melody
Student	Joy
Student	Elsa
Student	Susanna

Figure 22. Chart of UWCSEA students interviewed and their pseudonyms

Before each interview, all prospective interviewees signed digital consent forms (see annex) to participate. Further consent was obtained verbally to record Zoom calls for research purposes. Each interview began with the researcher explaining the purpose of the research and allowing the participants to ask any questions. The interviews, on average, lasted one hour. The interview style was semi-constructed interviews because the researcher created questions that were used in each interview. However, specific questions were eliminated or added based on the flow of each conversation.

Melody and Joy

Melody and Joy are grade 11 students at UWCSEA, and both identify as female. They completed the interview together. For Melody, the first words that came to mind about sustainability were long-term sustainability and eco-friendly. Joy said earth, climate change, and recycling. While they chose different words to describe sustainability, they both mentioned the importance of sustainability being more comprehensive than just environmental. “The biggest part of sustainability is for it to be sustained over a long period of time” (Melody, 2023).

This conversation discussed the relevance of home and culture at length. Melody is originally from the U.S., while Joy is from Mainland China. Both attended the same international school in Malaysia before attending UWCSEA, and they mentioned the impact of that school on their understanding of sustainability. Being raised in the U.S. through elementary school gave Melody a basic understanding of sustainability through the 3Rs - reuse, recycle, and reduce. However, the term sustainability was less widely

used than at her international school in Malaysia and then at UWCSEA. Melody recalled initially feeling confused by the term ‘sustainability’ in Malaysia because she did not know its meaning and how it applied to the world around her. Today, at UWCSEA, through specific courses and her current IB curriculum, Melody feels that she better understands the term and how interconnected sustainability is with other subjects beyond climate change.

Joy grew up in Mainland China and did not come into contact with sustainability during her schooling in China. For Joy, recycling was the only way that she learned about the environment, learning to classify recyclables and non-recyclable items. Joy came to understand sustainability at her international school in Malaysia. Today, at UWCSEA, Joy says she understands the term and its applicability because sustainability is embedded as a core pillar of the school’s mission. “At UWCSEA, sustainability is more practical, and everyone can be involved in these activities. We learn that we can make a little change within our mobility” (Joy, 2023).

At UWCSEA, students are exposed to sustainability across the board through classes, extracurricular activities, and school functions. Every Wednesday at the cafeteria is Veggie Wednesday to make students aware of food waste, sustainability, and alternative diets. While Veggie Wednesday is an ambitious idea, many students strongly dislike the program because it takes away students' autonomy to make choices and removes the aspect of learning through action.

Melody and Joy stated that while they consider sustainability important to them, they struggle to recognize how their actions can significantly impact the grand scheme of things. "I definitely do think [sustainability] should be more of a concern in people's lives, but I do not know, I often struggle to see what, what component it plays because of the role of individual actions versus like collective action" (Melody, 2023).

In the classroom, Melody and Joy reported focusing on sustainability from an academic perspective. They learn about sustainability through modules in core subjects like biology and geography, focusing on the environment. However, there is often insufficient time to explore the subject beyond the allotted class time. In her IB Business Management course, Joy says she learned about sustainability from a business perspective, including corporate social responsibility (CSR). Additionally, in the ESS

course, both Melody and Joy said that they learned about different systems (political, economic, and earth systems) and were challenged to think about where to place sustainability within these complex systems. Overall, both students said that in their classes, their "teachers are trying to combine large problems with things that they are learning in class so students not only reflect on them but also try to come up with their own understanding and ideas" (Melody and Joy, 2023).

UWCSEA allows students to learn and connect with topics relating to the SDGs of the United Nations. For example, in grade 10, students participate in the Group Four project, which focuses on a key SDG area. Last year, students did a project on water conservation and had to work in teams to build a new project and propose it to the 'international community' for funding. In grade 11, students participate in Project Week, connecting with a local partner and creating an initiative by volunteering on-site for one week. In between these structured activities, students participate in on-campus activities like the GC Programme. Melody and Joy are part of the OneSky GC, which advocates and raises needed funds to support OneSky, an early childhood education nonprofit in Asia. In their work with the OneSky GC, Melody and Joy apply their knowledge of SDG 4 and create knowledge-awareness campaigns focusing on the need for quality, sustainable ECD training and educational systems across OneSky's programs.

Elsa

Elsa is in grade 11 at UWCSEA and identifies as female. She is originally from Vietnam and had already graduated from high school before coming to UWCSEA. For Elsa, the first three words that came to mind about sustainability were environment, climate change, and green. Elsa is a graphic artist and collaborates with local environmental organizations, all of which have a common theme of green. She thinks green reminds people of the environment and natural elements. At the same time, she acknowledges that green is also manipulated by large corporations like the oil industry, which use green in their logos.

Before coming to UWCSEA, Elsa said she had little understanding of sustainability. Back in Vietnam, the closest she got to learning about the topic was through her biology class in the ecology modules. After coming to UWCSEA, Elsa said

that through courses like ESS, she learned about system thinking and systems strengthening, which helped her understand sustainability more theoretically and practically.

> "I feel that [sustainability] is integrated into every unit, but we have one unit specifically to study systems, input and output processes, and that way of thinking and feedback loops really changed how I view the idea of sustainability as meeting the needs of current people without sacrificing the ability of future generations to meet their own needs" (Elsa, 2023).

The IB curriculum "empowers school-aged students to take ownership in their own learning and help them develop future-ready skills to make a difference and thrive in a world that changes fast" (International Baccalaureate, 2023). In the IB Diploma Programme, students select elective courses in addition to the predefined courses for the IB HL/SL exams. Elsa explained that the ESS course is perceived as an 'easier' SL course, so students take it to get a better IB score over their genuine interest in the subject. "People take ESS because it is easy, not because they care about the environment. There are people who care about the environment that take ESS, but I feel like they are in the minority, sadly" (Elsa, 2023). Elsa raises a good point about the difference between students' interest in a subject because they care about it and are interested versus, they take the course because it is easy and they can get a better score. While it is unfortunate that students feel that they should only take the ESS course because it is less difficult than other IB courses, by taking the course, students will inherently learn something about sustainability due to the nature of the rigor of all IB courses and the repetitive nature of course content.

Like Melody and Joy, Elsa said students strongly dislike initiatives like Veggie Wednesday. Elsa said that in her social circle, she and her friends dread Veggie Wednesday because the cafeteria limits the options rather than offering the same quantity of food but just meatless. "Veggie Wednesday reduces the options we have. On normal days, we have both vegetarian and non-vegetarian pizza. On Wednesdays, we only have vegetarian pizza. This is the same for the other stations in the cafeteria, so it is like

cutting half of the options for students" (Elsa, 2023). Elsa says that many UWCSEA students regularly eat meals with meat and fish. "Meat helps neutralize different flavors - it tastes good." The concept of Veggie Wednesday is innovative, but it is evident that it needs to be reimagined with student perspectives in mind. Removing meat and fish from Veggie Wednesday can make students dislike their meals and resent the well-intentioned initiative on campus.

UWCSEA allows students to learn, ask questions, and become agents of change by helping them learn about themselves and the world around them. Elsa, coming from Vietnam, where the educational system is very hierarchical, said that students are not trained to think for themselves and think critically about the content they are learning. She thinks this is problematic because, in the future, these students will likely carry through the status quo type of thinking and become agents for people of power to manipulate. At UWCSEA, Elsa has the space to engage in activities like the Green Council and the Rainforest GC, facilitating her ability to become an agent of change. "Being an agent of change starts in the classroom, where educators should train students to question and think for themselves to understand the limitations of knowledge" (Elsa, 2023).

Susanna

Susanna is in grade 11 at UWCSEA and identifies as female. She is originally from Mainland China and has been at UWCSEA for three years. When asked about sustainability, Susanna said environment, social and economic came to mind. Specifically, "[sustainability] is a very holistic, balanced concept. Some people talk about how we need to preserve the environment, but you know, it is at the cost of stealing other people's livelihoods, so I think sustainability is having a balance between the two" (Susanna, 2023).

Susanna enjoys her Geography course because it is an interdisciplinary subject where she has learned about different thinking frameworks, including sustainability. In Geography, Susanna says she learns about environmental and humanistic perspectives on sustainability. Susanna mentioned that she has always had a keen interest in environmental sustainability since a young age, so when she came to UWCSEA, which

was one of her class's core pillars, she was enthusiastic about the course. Coming from Mainland China to UWCSEA, Susanna says that she remembers being able to choose from a "vibrant range of unit activities, and each group focused on tasks within sustainability and peace" (Susanna, 2023). On UWC Day during her first year at the College, she took part in the climate change initiative, and she recalled being inspired by the discussion of how individuals can be advocates and allies and promote all kinds of change.

Like Melody and Joy, Susanna is also a member of the OneSky GC at UWCSEA. As a native of Mainland China, Susanna feels that it is important to give back to the community where she grew up and to ensure that all children have the opportunity to receive quality early childhood education to thrive. She had this to say about participating in the GC Programme:

"I have been really interested in promoting education equality, and I have personally helped a school back home. Both OneSky and the Rainforest GC provide a very good opportunity for me to really engage in sustainability at school. Even though I do not think about it often, I feel that sustainability can connect to all areas of my life" (Susanna, 2023).

Susanna said she would be happy to transition to more sustainable behaviors if they were more readily available to public knowledge. Reflecting upon her behaviors, Susanna says that she is not always cautious about being 'sustainable' when grocery shopping or eating with friends. "It is a systematic inconvenience if you overthink about sustainability. For example, if you do not want to take a plastic straw when buying bubble tea, how else will you drink it? If the whole system could be changed to have cleaner or greener alternatives, I would be happy to switch" (Susanna, 2023).

Susanna brings up an excellent point that individual actions are necessary, but without systematic changes, the imminent issue of climate change will not be fixed. "Individual actions are important, but I felt like if the whole system does not change, then we are still kind of just using pinpointed efforts to stop the massive car wheels coming at us" (Susanna, 2023). Clinging too much to sustainability as an individual is only

sometimes good because it can inconvenience one's life if one constantly thinks about practicing sustainability in all areas. At UWCSEA, when Susanna and her peers in the Rainforest GC wanted to do an awareness campaign, they needed to print fliers and booklets for the scavenger hunt. Susanna recalled worrying that printing was not eco-friendly, so she wanted to try and find an alternative solution. However, her teacher told her that it was not inherently unsustainable for her to print on paper if she was being cautious of the quantity and if the printing was for a good purpose.

Susanna's experience reveals the potential consequences of reinforcing sustainability and eco-friendly practices with student populations. If students are in an environment where they must always try to be environmentally friendly, it can cause them to feel stuck as to what they can and cannot do. Moreover, when the more extensive social system is not set up for people to be sustainable, it presents additional challenges for individuals to make the system environmentally friendly and socially sustainable.

Synthesis

Students at UWCSEA are a unique demographic with multicultural and multilingual backgrounds. They are very committed to being sustainable and improving the world, but they often feel that they need more agency and the tools to make concerted efforts in their more extensive system. How students at UWCSEA perceive their role as agents of change reveals discrepancies between the experience of students and educators at UWCSEA. The findings from ethnographic interviews are inconclusive about trends of students being agents of change for sustainability. However, they offer insights into the larger picture of ESD and the role of students in advancing this agenda. All students see UWCSEA as a source of empowerment and knowledge-building for them as individuals. At the same time, they feel that the UWCSEA network is removed from the larger context of Singapore and the discussion of ESD and sustainability, making it challenging for them to see how their efforts are making significant impacts locally and globally.

Students at UWCSEA are similar to other students worldwide because they are not in positions of power to make decisions about their curriculum. That said, as students shared, UWCSEA is making considerable efforts to include students in invited spaces of discussions about classroom curricula and projects and involve students' voices in

extracurricular clubs and activities. In particular, the GC Programme is unique because it is student-centric and allows students to take the lead in running their GC and its activities. In their GCs, students have the power 'within,' gaining agency to outreach to their GC partners and take the initiative when planning campus activities (Gaventa, 2007).

Nonetheless, students at UWCSEA are still constrained by their educational system. Being at UWCSEA, which follows the IB curriculum, presents unique opportunities and challenges for students learning. On the one hand, students can explore topics like sustainability from different perspectives in courses ranging from IB Business Management to IB Biology but are also at the hands of the set standards of the IB curriculum and their teachers. Rather than placing students at one end of the spectrum (often without agency), students at UWCSEA shared that there is a need for more cross-collaboration with educators and students in developing classroom content and structuring extracurricular activities. There is also an overwhelming need to help students understand that engaging in such activities should not affect their well-being and that being sustainable can manifest itself through different mediums.

Chapter 8: Experts as change agents

Introduction

In exploring the topic of education for sustainable development (ESD) within the context of Singapore from the perspective of educators and students, it is also necessary to get the views of experts in education and sustainability. No expert survey was used as a recruitment tool in this research phase. Instead, LinkedIn and website searches on Google warranted five possible candidates to interview. Unfortunately, because cold emailing and LinkedIn messages were not methods to guarantee responses, there was no predetermined number of experts to be interviewed. In the end, three interviews were conducted with experts.

Experts were classified by an individual's role and positionality within the larger context of ESD, either in Singapore or the Asia-Pacific region. These interviews aimed to contextualize the landscape of ESD and sustainability in Singapore and within the border regional context of East/Southeast Asia. While each expert interviewed had a very different perspective on ESD and sustainability, the results indicate that experts feel that ESD in Singapore and the Asia-Pacific region is moving in a positive direction. For instance, Singaporean experts indicated that ESD and sustainability in Singapore are becoming increasingly well-known and recognized as a pillar of active citizenship.

Ethnographic Interviews

During this research, three interviews took place with EE/ESD/CCE/ECD experts. These interviewees were completed after cold emailing, and outreach led to the identification of prospective candidates. As mentioned, prospective interviewees were identified through outreach through online databases and LinkedIn. A Zoom invitation was created once clear communication with the expert indicated interest. Explicit consent was obtained through a digital consent form (see annex) in advance, and verbal permission was obtained before each interview. For the purpose and geography of this research, all interviews were conducted over Zoom, with participants located in Singapore or East Asia and the researcher at Macalester College.

Expert Interviews

Profession	Title	Location
Program Director	Mr. David	Singapore
Expert in ESD	Ms. Cheryl	Japan
Educator	Ms. Alyssa	Singapore

Figure 23. Identified experts for this research and their pseudonyms

Mr. David

Mr. David is the director of a local nonprofit in Singapore focused on environmental education programming and identifies as male. The organization has multiple programs, but Mr. David discussed the significance of two projects at length. The first is an innovative project with black soldier flies as a new way of reducing food waste in Singapore. The black soldier fly is a type of larvae and can absorb four times the amount of food waste than earthworms. This makes them an excellent candidate for solving the growing food waste issue. In fact, within twenty to thirty meters of the closest government housing units, there are millions of flies, making it convenient and accessible for residents to be engaged in this initiative.

The black soldier fly program focuses on educating and empowering residents to take action against food waste. Residents are encouraged to come to the project site at Tampines Park to contribute their food waste using a QR code on their phones. In exchange, residents receive green currency - the project's point system- to buy local vegetables and fresh-caught fish (Mr. David, 2023). The food waste is then turned into fresh fertilizer that residents can use to plant a garden in their neighborhood. Overall, this project aims to spread the message about circular farming and food production among Singaporean residents.

Mr. David's organization is unique because it created a hydroponic farm, allowing students and the local community to learn about sustainable agriculture through learning and activities. Students in Singapore do not often encounter farms because of the density and lack of land mass for such projects. At the hydroponic farm at Mr. David's organization, he can bring the topic of sustainability and circular farming to life and empower students to create similar initiatives at their schools. In Singapore, a city-state with few natural resources, Mr. David aims to teach students about sustainable farming so they know how to make a difference and reduce their food waste. "I want to teach

students how in a country where there are not enough resources, we must keep everything we have within circulation" (Mr. David, 2023).

Mr. David's program is committed to meeting students halfway and helping bring sustainability to life. Mr. David travels to schools, bringing the black soldier fly project into outdoor classrooms, empowering students and schools to make a difference and implement a model black soldier fly project in their institution. "We empower the local science/environmental club students to champion this project and give them the tools to feed [the black soldier flies] and information to tell everyone about it. I want to empower the kids and other individuals to become advocates" (Mr. David, 2023). While the black soldier fly project only began two years ago and has been impacted by the pandemic, Mr. David says his long-term goal is to create projects like this across the island.

Mr. David's organization also seeks to empower individuals with disabilities to enact change and be leaders in their community. In a new initiative, Mr. David's program collaborates with corporations and companies during team-building projects, inviting individuals with disabilities to lead art workshops. "It is not just about doing art. It is about giving people with disabilities a chance to shine. We want to empower them so that they can impact students, the community, and even the corporate world" (Mr. David, 2023). Overall, Mr. David's organization projects demonstrate the importance of reducing barriers to access and creating accessible and inclusive programs that allow all people to shine and empower them to become agents of change.

Ms. Cheryl

Ms. Cheryl is an early childhood development expert and works for a well-known multilateral organization. She identifies as female. Her focus is exploring the intersection between climate change and ECD within the Asia-Pacific region. When asked about her position and scope of work, she said,

> "It is a very exciting time because, across sectors, colleagues are starting to see what intersections there are with climate change. It is the same for early childhood development. At first glance, you think you know about climate change and its implications on children. However, the more you listen to the climate discourse, you realize that you do not hear anything about young children" (Ms. Cheryl, 2023).

Early childhood development is classified as children between the ages of 0 and 8 years of age[23]. Within the ECD sector, it is known that the 1000 days starting from conception are the most critical for brain and other physical development (UNICEF Early Childhood Development, 2022; OneSky, 2023). Ms. Cheryl says it is essential to call out the differentiation that climate change does not only impact children, but it has a unique impact on young children. "As an early childhood consultant, I work with partners on climate efficacy, discussing the linkages between climate change and its impact on young children and their families" (Ms. Cheryl, 2023).

Ms. Cheryl expressed a need for more data on the impacts of climate change on young children, indicating a growing need for research in this area. She and her team have been doing advocacy work (webinars and guest speakers), but there is still more to do. Most recently, there has been a growing trend for evidence-based data on this topic, not just within the Asia Pacific region but across the globe. Ms. Cheryl and her colleagues are conducting a scoping study to present this exact form of data to advocate for young children to be included in the discussion of climate change. "This is an exciting initiative and effort to tease out the linkages between early childhood and climate change, and then share these findings down to sub-regional levels and then country" (Ms. Cheryl, 2023).

When discussing ECD with climate change experts, Ms. Cheryl observes a disconnect between their understanding of young children and children as a whole. Ms. Cheryl noted a need to articulate the importance of ECD to those working in the climate change sector. "When you talk to climate change professionals right now, they say children, in general, need to be included in climate change discourse, but they do not

[23] Early Childhood Development is the window between 0 and 8 years of age, and is “critical for cognitive, social, emotional and physical development” UNICEF, 2022

really understand why early childhood is so important" (Ms. Cheryl, 2023). Regardless of this, Ms. Cheryl says that she knows that ECD experts cannot do it alone - it requires collaboration.

ECD and ESD are noteworthy sectors but very dependent on funding. Working for a multilateral organization, Ms. Cheryl says that ECD falls into the larger education sector, making the competition for funding quite intense. "International funding is always sectorally focused. We have the educator, health, and nutrition sectors, to name a few. Generally, people look through the lens of core sectors instead of focusing on specific topics, like ECD" (Ms. Cheryl, 2023).

Thinking forward, Ms. Cheryl says it is necessary to identify linkages between ECD and other sectors, including climate change, to garner local and national support. Understanding the impacts of climate change requires an understanding of nurturing care, a key element of early childhood. Taking the first steps to acknowledge linkages and having cross-sectoral dialogue can help increase awareness of the importance of ECD and why young children must be included in discussions of climate change's social and environmental implications.

Ms. Alyssa

Ms. Alyssa is an educator at Education Institute A in Singapore and identifies as female. Ms. Alyssa had over fifteen years of experience teaching in public secondary schools in Singapore. In her undergraduate studies at the University L, Ms. Alyssa was a Geography major, and during her studies, she recognized that she had a passion for teaching. When asked about why she wanted to become an educator, she said,

> "Because of my love for Geography and my interest in working with young people, I thought I would love teaching." (Ms. Alyssa, 2023).

Before teaching full-time, Ms. Alyssa worked in the tourism industry. However, she soon realized she missed teaching and pursued her Postgraduate Diploma in Education at Education Institute A at University S. This led to a career teaching Geography and Social Studies. She also completed her Master of Arts in Humanities

Education at University S while she was teaching in schools. Today, having taught Geography and Social Studies for a long time, Ms. Alyssa said that returning to Education Institute A to pursue her Masters education helped her discover the interlinkages between both subjects. As part of her work, Ms. Alyssa also contributes to the professional development of teachers.

As an educator, Ms. Alyssa aims to help marry academic content and teaching, helping her fellow teachers recognize the interlinkages. Many educators she works with have a background in Geography, so they are familiar with the topic of sustainability. Ms. Alyssa tries to build on their knowledge, drawing case studies and knowledge back to the local context of Singapore. For example, Ms. Alyssa discusses the Eco-Stewardship Programme (ESP) in schools, inviting educators to engage in dialogue about what the Programme means for them and for their students. By providing fellow educators agency to think for themselves and consider their student's learning needs in the classroom, Ms. Alyssa believes that this will help them grasp the application of sustainability and reflect on what outcomes of sustainability education means.

"One of the things that I set up to do is to help teachers realize that understanding Geographical content and concepts is one thing. They need to draw connections to what students know and then, what they do in the classroom to set an awareness of global issues, where Singapore stands in the world. They need to know what they can do for their students" (Ms. Alyssa, 2023).

As discussed throughout this research, the Eco-Stewardship Programme (ESP) is the Singaporean approach to ESD. In this model of education, students learn about sustainability and gain skills for the 21st century through the 4Cs. Before the ESP was launched, schools in Singapore had already positioned the environment and sustainability as necessary topics for learning. However, as Ms. Alyssa explained, the ESP puts more emphasis on the environment to get students to recognize the importance of the environment and sustainability as not just a concept but a platform for developing skills for the 21st century. Ms. Alyssa recognizes that the emphasis on environmental sustainability limits students' exposure to other important forms of sustainability.

However, she says that the biggest challenge of the ESP and similar types of programmes is the communication of the ESP (from school management to educators and from educators to students) and its implementation objectives in schools. It is necessary for schools to think about the intended outcomes and effective ways to achieve meaningful outcomes for students.

The Ministry of Education (MOE), Singapore, outlines guidelines for the ESP program and other sustainability initiatives. Therefore, it is important for all stakeholders to consider the steps for implementation, determine the desired outcomes, and the best strategies for achieving them. "As an educator, you need to take a step back and have a concrete plan for these actions to be effective and sustainable. As educators, we must put effort into planning and implementation." (Ms. Alyssa, 2023).

Looking forward, Ms. Alyssa hopes that her students recognize the issue of sustainability as more comprehensive than environmental. While students in the classroom may not have direct control over their curriculum, Ms. Alyssa hopes that it is through platforms in educational institutions that student agency is fostered and students are given more autonomy to be involved in decision-making processes in sustainability education. In the future, Ms. Alyssa believes there will be more opportunities and support for sustainability education to allow educators to launch and lead initiatives concerning sustainability for meaningful student outcomes.

Synthesis

Experts in this research offered insights that filled some of the knowledge gaps about ESD and its positionality within larger systems such as government and multilateral organizations. While the small population of experts interviewed limited this research, their findings suggest that ESD in Singapore aims to reframe the concept of sustainability as more than just the environment. In particular, Ms. Cheryl and Ms. Alyssa offered contributions about the status of ESD in the discussion of early childhood education and, more specifically, in the context of Singapore’s Green Plan of 2030 and the Ministry of Education. Mr. David presented a unique picture of sustainability through his organization’s approach of creating invited spaces for community engagement and

collaborating with stakeholders to offer them spaces to build agency and become agents of change.

ESD is a multidisciplinary topic with many complexities, making it challenging to develop a one-dimensional approach. From the conversations with experts, it is evident that having cross-sectoral dialogue and partnership is needed to build awareness with experts and those in power. Experts acknowledged that regulations might concern individuals' ability to make scalable impacts within their local context. However, by establishing local partnerships and building agency among individuals and communities, especially young people, older populations, and those with disabilities, governments build community trust and pave the path for much-needed systematic change.

Chapter 9: A closer look at current ESD curricula in Singapore

Introduction

Singapore has had environmental education (EE) and climate change education (CCE) curricula for many years. However, when the UN established the SDGs in 2015, Education for Sustainable Development (ESD) was adopted by UNESCO as the framework to achieve sustainable development through education. As a result, the MOE in Singapore has adopted concepts of ESD and incorporated them into newly abridged curriculum standards, focusing on Character & Citizenship Education (CCE) and 21st century competencies.

International schools in Singapore do not follow the Singaporean MOE standards for learning and student incomes. Instead, most follow the IB or IGCSE models of learning, and their students go on to attend universities outside of Singapore. In this research, I focused on exploring the experiences of educators and students at UWCSEA, an accredited IB and IGCSE school.

This chapter briefly outlines how sustainability is incorporated into the IB and MOE learning standards. While UWCSEA follows a Western education model and the MOE is a Singaporean educational system, both consider sustainability and student competencies like well-being as essential pillars of their educational approaches. First, an overview of the IB ESS curriculum is provided, with careful consideration of the purpose and objectives of the course and how it relates to the overall IB curriculum. Next, a brief comparison of the IB ESS curriculum with the UWCSEA ESS taught by Ms. Elizabeth, who was interviewed during this research. This comparison serves more of a use to share how Ms. Elizabeth adopts the ESS standards set by the IB but also incorporates different materials to further her students' understanding of ESS and sustainability. Finally, a short review of the UWCSEA Mission Aligned Learning initiative and the MOE's CCE curriculum is designed to foster students' learning and growth as individuals, members of society, and global citizens.

IB Environmental Systems and Societies Course

The IB ESS is an interdisciplinary course combining pedagogical approaches, techniques, and knowledge associated with the sciences, individuals, and societies (IB, 2023). The ESS curriculum aims to engage students in the environmental challenges of the 21st century. In this course, students learn scientific approaches through the "exploration of different environmental systems, acquire understandings and methods from different stakeholders in social, cultural, economic, political, and ethical contexts of sustainability issues" (IB, 2023). The IB ESS course is meant to help students gain the skills to produce a holistic synthesis of the topics studied, emphasizing the importance of conducting research and participating in philosophical and ethical discussions and debates on issues spanning local and global levels (IB, 2023).

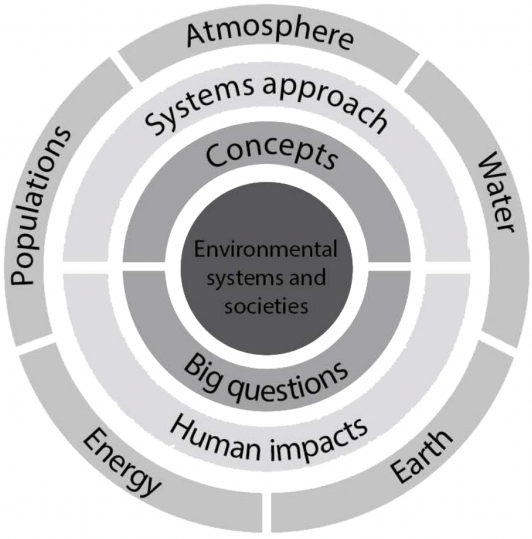


Figure 24. Structure of the ESS Course (IB ESS Guide, 2015, 10).

According to the ESS syllabus, IB recommends allotting 150 hours to complete the SL ESS course (IB ESS SL Syllabus, 2015, 3). There are eight core topics within the course:

Syllabus Component	Recommended teaching hours
Core Content	**120**
Topic 1 - Foundations of environmental systems and societies	16
Topic 2 - Ecosystems and ecology	25
Topic 3 - Biodiversity and conservation	13
Topic 4 - Water and aquatic food production systems and societies	15
Topic 5 - Soil systems and terrestrial food production systems and societies	12
Topic 6 - Atmospheric systems and societies	10
Topic 7 - Climate change and energy production	13
Topic 8 - Human systems and resource use	16
Practical scheme of work	**30**
Practical activities	20
Individual investigation	10
Total teaching hours	**150**

Figure 25. Syllabus outline of the IB SL ESS Course (IB ESS Syllabus, 2015, 4).

Within each core subject, there are subtopics, including humans and population, water pollution, communities and ecosystems, climate change - causes and impact & mitigation and adaptation, and sustainability (IB ESS SL Syllabus, 2015). For example, Topic 1 provides students with background knowledge of environmental systems. Within Topic 1, 1.4 focuses on sustainability, focusing on the following key ideas:

- All systems can be viewed through the lens of sustainability
- Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs
- Environmental indicators and ecological footprints can be used to assess sustainability
- Environmental impact assessments (EIAs) play an important role in sustainable development
    - (IB ESS SL Syllabus, 2015, 13)

Focusing on four core aspects of sustainability, students in the ESS course understand how factors like biodiversity, population, and climate can be used as

quantitative environmental indicators of sustainability, depending on how they are applied across local and global scales (IB ESS SL Syllabus, 2017, 13). As the syllabus outlines, students maintain an international mindset, learning about the processes of developing and producing international tools such as treaties and agreements to address environmental issues like climate change (IB ESS SL Syllabus, 2015, 13).

Throughout this unit, the central question that students return to is: "EIAs incorporate baseline studies before a development project is undertaken - to what extent should environmental concerns limit our pursuit of knowledge?" (IB ESS Syllabus, 2015, 13). This question helps guide classroom discussions during the unit on sustainability, challenging students to think critically about the relationship between "natural capital, natural income, and sustainability," inviting them to share their opinions on the environmental indicators, and empowering them to use their knowledge to evaluate the use of EIAs (IB ESS SL Syllabus, 2015, 14).

In Unit 7, students learn about climate change, which extends to smaller sub-units on energy choices, causes and impacts of climate change, and current mitigation efforts. Unit 7.2 focuses on *climate change - causes and impact* and promotes these core ideas:

- Climate change has been a normal feature of the Earth's history, but human activity has contributed to recent changes
- There has been significant debate about the causes of climate change
- Climate change causes widespread and significant impacts on a global scale
    - (IB ESS SL Syllabus, 2015, 65)

Climate change is a very complex topic, so breaking it down into these major themes is helpful for students to understand and contextualize the issue. This unit is paired with the following unit, 7.3, which focuses on local and global mitigation and adaptation efforts to combat climate change. Unit 7.2 is critical because it informs students how climate change is created and affected by different factors, including oceanic and atmospheric systems and human activity. Additionally, students learn about the unique impacts of climate change across regions and contexts and how these impacts result in changes to the availability of safe water sources, the loss of agriculture, coastal inundation, and damage to human and animal health (IB ESS SL Syllabus, 2015, 66). As in the previous unit, Unit 7.2 maintains an international perspective, challenging students

to consider the impacts of climate change and the necessary actions for collaborative international cooperation.

Unit 7.3 covers climate change mitigation and adaptation efforts. Specifically, students examine mitigation efforts to reduce GHG emissions and remove carbon dioxide. While mitigation efforts are an essential part of tackling climate change, societies are already feeling the impacts of climate change, so adaptation methods must also be considered. Unit 7.3 primarily focuses on mitigation efforts, helping students recognize that the effects of climate change are already underway and require global mitigation strategies (IB ESS Syllabus, 2015, 68). The guiding question for this unit is: "How can we be confident of the ethical responsibilities that may arise from knowledge when that knowledge is often provisional or incomplete?" (IB ESS Syllabus, 2015, 68).

Overall, the IB ESS SL course is a rigorous and interdisciplinary course to harness students with the skills to recognize and evaluate the impacts of complex environmental systems on the natural world (IB ESS - standard level, 2017-2023). While Unit 1.4 is designed to help students grasp background knowledge of environmental systems and topics like sustainability, Units 7.2 and 7.3 provide an overview of climate change and its impacts on communities and ecosystems and present the opportunity for students to discuss mitigation and adaptation strategies with peers. While students will not have the agency or ability to make significant impacts in their local community upon completion of this course, this course strives to harness them with the skills to evaluate, justify, and synthesize arguments to explain theories and models and present their perspectives and proposed solutions for the future (IB ESS - standard level, 2017-2023).

UWCSEA Environmental Systems and Societies Course

Ms. Elizabeth teaches ESS at UWCSEA and kindly shared her blended teaching approach. Ms. Elizabeth engages students in academic sustainability and climate change discussions using different mediums. Ms. Elizabeth believes that by harnessing her students with evaluative, critical thinking, and collaboration skills, they can articulate their thoughts and ideas concisely and effectively. Using the IB Environmental Systems and Societies (ESS) curriculum guide, Ms. Elizabeth facilitates her student's learning, helping them develop a "holistic appreciation of the complexities of environmental issues, and recognizing their position and appreciating the views of others" (IB ESS Guide, 2015, 11). While exact classroom materials cannot be shared due to privacy and confidentiality purposes, Ms. Elizabeth shared that she regularly uses videos from YouTube and news articles to spark students' curiosity in the classroom. In the classroom, Ms. Elizabeth uses a PPT to share slides with her students, going through them systematically to ensure that students understand the content before moving on.

Regarding sustainability, Ms. Elizabeth aligns her curriculum with the values and frameworks offered by the UN and the UN SDGs, encouraging her class to connect to past concepts within the ESS course. She also shows pictures and graphics to help students understand their consumer, human, and ecological footprint. Additionally, through online databases like the Foot Print Network, students can recognize the positionality of different countries with biocapacity reserves and debts (Food Print Network, 2023). Using multimedia mediums, Ms. Elizabeth helps students understand terminologies like sustainability, natural income, natural capital, and renewable and non-renewable resources. Overall, through discussions and projects in class, students in Ms. Elizabeth's ESS course can explain sustainability, its definitions, and how different factors influence climate change's local and global impact.

Mission Aligned Learning at UWCSEA

The mission of the UWC movement is: "to make education a force to unite people, nations and cultures for peace and a sustainable future" (United World College, 2023). Within the mission, there are seven values, including compassion, inclusion, openness, responsibility, and trust. When speaking with Ms. Hannah about her role as the Director of the Global Concernes Programme (GC), she mentioned the theme of Mission-Aligned Learning. Mission-Aligned Learning aims to "equip students to enact the mission of UWC to unite people, nations and cultures for peace and a sustainable future throughout their lives" (Mission Aligned Learning UWCSEA, 2023). This framework includes mission competencies such as self and community well-being, peacebuilding, and sustainable development. These competencies are dispositions from the UWCSEA learning programme, and they emerge when students and alumni of the College enact their Learning in "complex, real-world situations" (Mission Aligned Learning UWCSEA, 2023).

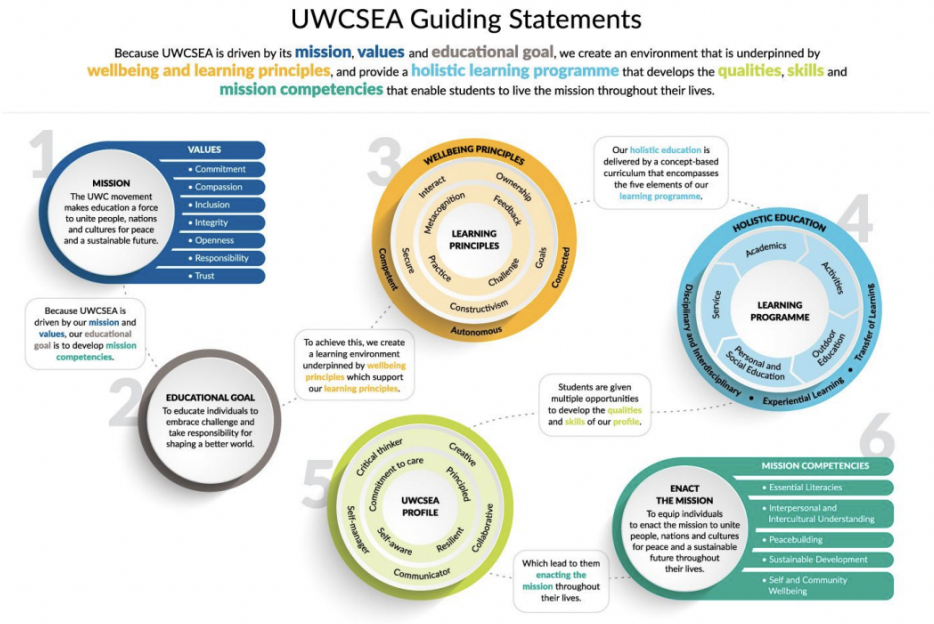


Figure 26. UWCSEA Guiding Statements (courtesy of Ms. Hannah, UWCSEA)

Mission Aligned Learning is one of the guiding principles at UWCSEA. Driven by a strong mission and values, UWCSEA creates an environment for learning

underpinned by well-being and learning principles and provides a holistic learning programme that develops the qualities, skills, and mission competencies that enable students to live out the mission of the College throughout their lives (Mission Aligned Learning UWCSEA, 2023). At UWCSEA, practicing Mission Aligned Learning takes the form of many different actions and behaviors. For example, students can engage in activities directly related to peacebuilding and sustainable development using the Solar for Dover panels in a science course; use real-world issues (SDGs) to organize a learning experience (GCs); or make connections across elements of the learning programme in their classes and outdoor education (Mission Aligned Learning UWCSEA, 2023).

Overall, the objectives of Mission Aligned Learning are to bring the values of the College and the mission of the UWC movement to life and present in students' learning environments. Through Mission Aligned Learning at UWCSEA, students are prepared to cope with and address cross-cultural, interconnected issues like sustainability and become social leaders and agents of change.

Shared Curriculums

The Shared Curriculum at UWCSEA is divided into four main topics: DIL, PSE, OED, and Service. For this research, based on findings from ethnographic interviews with educators at UWCSEA, I will focus on PSE and Service. PSE is Personal and Social Education, and students use their learning in PSE to become “active, self-directed learners and individuals” (Personal and Social Education, UWCSEA). UWCSEA is committed to preparing students for higher education and life. The College recognizes that the skills and qualities students develop at UWCSEA will impact their quality of life. Thus, PSE is a critical pillar of the UWCSEA experience and seeks to empower students to become effective and committed agents of change for a better, shared future. PSE is like any other class at UWCSEA and almost functions like a homeroom course in the West. However, PSE at UWCSEA offers students unique learning opportunities through mentor meetings and PSE lessons, allowing students to connect with their emotions and learn how to interact with peers, building classroom and schoolwide community.

Service is another key pillar of the UWCSEA experience. As discussed in ethnographic interviews with UWCSEA educators, all students engage in the Service

Programme. While students in K-8 are paired with a global partner, students in grades 9 to 12 can choose different service avenues through the GC Programme. The Service Programme allows students to "put the values of the College into action through participation in unique, rewarding experiential learning opportunities" (Service Learning UWCSEA). Within the Service Programme, sustainability is at heart, making this Programme particularly relevant to this research. The UWCSEA Service Programme supports the commitments of the UN's SDGs, and it has identified sustainable development as a key standard of the student service experience. Participating in the GC Programme and Service Learning Programmes at UWCSEA encourages students to develop an awareness of complex issues, analyze systems using tools and systems thinking, and reflect on their role as local changemakers (Shared Curriculum UWCSEA and Service Learning UWCSEA).

The shared curriculum model at UWCSEA presents unparalleled opportunities for students to become active participants in discussions of complex issues and be empowered to take the initiative and be changemakers. Through PSE and Service, UWCSEA students are harnessed with the knowledge, skills, and agency to enact change and make a difference.

Character & Citizenship Education (CCE) Syllabus (Primary)

Character and Citizenship Education (CCE) is a component of the holistic education curriculum for students in Singapore. Combined with National Education (NE) and Social and Emotional Learning (SEL), CCE provides an interdisciplinary approach to "addresses students' development of values, character, social-emotional well-being, and citizenship dispositions coherently and holistically" (CCE, MOE Singapore, 2021, 4). CCE for Primary School is divided into three-pronged approaches: the individual, school, and school-family-community partnership.

The Individual

As an individual, CCE places the child at the center of their learning and is committed to helping every child flourish and "reach their full potential as individuals, family members, friends, community members, and citizens of Singapore and the world"

(CCE, MOE Singapore, 4). At an individual level, CCE aims to help children develop a sense of purpose and recognize that they can make a positive difference for others or contribute positively to society. Additionally, CCE states that individuals consistently build their character and who they choose to be as they engage with others and the environment.

The School

CCE positions schools as a source of rich learning opportunities for students to become "equipped with the knowledge, moral and civic values, skills and dispositions to understand who they are and whom they can become" (CCE, MOE Singapore, 4). Through classroom and experiential learning, students experience being part of something larger than themselves and become aware of their roles and responsibilities in their families, communities, Singapore, and beyond (CCE, MOE Singapore, 4). As a unit of the school, CCE employs school leaders and teachers to role model positive character, social-emotional well-being, and citizenship behaviors for students" (CCE, MOE Singapore, 4).

School-Family-Community Partnership

CCE recognizes the opportunities and challenges of raising children in the 21st century. As such, the School-Family-Community Partnership calls for collaboration between schools, families, and the external community in fostering safe, welcoming environments for children to grow and develop their character, play an active role in society, and become active members of Singaporean and global communities (CCE, MOE Singapore, 4).

The CCE curriculum models after the 21st century competencies and student outcomes and aims to clarify how core competencies are linked to students' social-emotional well-being and are internalized and played out by students. Within the new framework, CCE 2021 Curriculum Frame, three guiding principles underpin the design of this curriculum: student-centricity, intentionality, and coherence. Student-centricity places students at the center of catering to CCE to meet their developmental needs while nurturing their character growth and helping them socialize

into “morally upright individuals, and responsible and active citizens” (CCE, MOE Singapore, 7). Intentionality helps ensure that program and learning are designed with clarity and are “developmentally appropriate to engage students cognitively and effectively” (CCE, MOE Singapore, 7). Finally, coherence helps ensure that CCE is not siloed or taught as an independent subject. Instead, CCE needs to be integrated within a whole-school approach with other vital aspects like Mental Health (MH) and Cyber Wellness (CW) (CCE, MOE Singapore, 7). Overall, Singapore’s CCE curriculum aims to develop in their students:

- Good character
- Resilience and social-emotional well-being
- Future readiness,
- Active citizenship

These values are divided into three major sections: Caring & Enabling School Environment, Enactment of CCE, and CCE Curriculum Content. While sustainability is not explicitly discussed, it is suggested throughout aspects of each pillar. For example, in the Enactment of CCE, students are encouraged to participate in school-based initiatives and study complementary subjects like “social studies, music, and arts to explore national identity, contemporary issues, and Singapore’s constraints and vulnerabilities” (CCE, MOE Singapore, 15). In CCE Pedagogical Approaches, students and educators participate in Learning Journeys, allowing students to “experience, reflect, think, and act to transform their experiences into learning” (CCE, MOE Singapore, 23).

Synthesis

To prepare its students for the uncertainty of the future, schools in Singapore are adopting and implementing curricula for 21st century thinking and competencies. This research explores the experiences of educators at Education Institute A and experienced educators and students at UWCSEA, an international school. Presenting both the Singaporean Ministry of Education (MOE) Character & Citizenship Education (CCE) curriculum and UWCSEA's Mission Aligned Learning Approach highlight how student-centric both schools' philosophies are and their universal commitment to harnessing students with the skills, knowledge, and agency to enact positive change

locally and globally. Specifically, the CCE curriculum places students at the center of their learning environment. CCE also calls upon educators, family members, and the broader community to create safe, welcoming spaces for children to grow and develop their character, sense of belonging, and agency.

The UWCSEA Mission Aligned Learning and ESS models, on the other hand, are designed for older students and are designed to foster student's growth as global citizens and empower them to take responsibility and initiative to make a positive impact in the UWCSEA community and within their own culture(s). Overall, the MOE and UWCSEA approaches are positive and position students as recipients of knowledge, active citizens, and changemakers. The systematic shift in students' discourse as change agents in Singapore and the Asia-Pacific region reflects students' framing of these curriculum models as positive assets to their community.

Empowerment of students must happen in sync with systematic shifts in governance policy about education, specifically ESD and the framing of sustainability within classroom contexts. Sustainability is a topic that is often overrated, as indicated in interviews with both educators at Education Institute A and students at UWCSEA. Therefore, when new initiatives like CCE 2021 and the Eco-Stewardship Program (ESP) get released by the MOE Singapore, educators need to recognize how this curriculum not only advances their knowledge but also how they will translate the standards and objectives into engaging, inclusive activities and learning experiences to educate students and give them agency.

Chapter 10: Conclusion - what comes next?

This qualitative research sought to understand how educators who teach and students who study sustainability and ESD conceptualize, interpret and adopt practices of sustainability in the classroom and their personal lives. This research aims to explore the applicability of sustainability and ESD within international and national educational systems in Singapore through accounts of educators and students and situate the findings with peer-reviewed research on ESD, EE, CCE, and other forms of sustainability-centric learning approaches. This two-part methodology is subject to biases of those who agreed to participate in the study. At the same time, these unique perspectives and reflections of those who teach or study sustainability and ESD in Singapore became the greatest assets of this research.

This paper suggests that while educators across education systems in Singapore do not have the same backgrounds and do not have homogeneous teaching methods, educators at large identify sustainability as a key area of personal interest and value and are committed to using ESD to advance student learning and outcomes. Educators from both teaching institutions - local secondary and private international - identified systemic barriers to learning such as national policy, agency, collaborative learning, and an emphasis on the environment as attributable factors for the lack of progress towards comprehensive social change for sustainability. Educators also mentioned a lack of time to cover additional material during classroom learning, suggesting that set curricula standards are insufficient for providing students with a holistic approach to sustainability and its different social and economic manifestations. Therefore, facilitating spaces for students to gain skills and agency to take action is critical to understanding how students develop and thrive in educational situations.

Knowing the local context of sustainability in Singapore is essential to understanding the processes and policies that inform ESD policy. Ethnographic interviews with experts revealed that knowledge is not the only factor responsible for the lack of systematic change within Singapore and the Asia-Pacific region. Experts shared that there needs to be a more extensive social transformation towards holistic sustainability practices for real change to occur. Currently, a lack of adoption of sustainable educational practices contributes to educators' and students' lack of agency.

Government policies should be streamlined into tangible local action(s) that all individuals can participate in. Within schools, educators need to be educated on ESD; thus, the MOE must build the capacity of educators to teach sustainability issues and facilitate experiential learning beyond the classroom. While Singapore, by far, is leading efforts to blend government policy with ESD-related curricula, without innovation, commitment, and a holistic strategic plan that includes the voices of educators, there is a limitation to the ability of policy to result in scalable change. Educators are critical to ensuring students develop the necessary knowledge and skills; therefore, by harnessing educators with the required tools and empowering them with the agency to teach independently, students will not only learn but will gain an appreciation for the diversity of experiences within Singapore, and understand how they too can play a role in the more significant social transformation.

This paper framed the city-state of Singapore as a case study and then placed this research within the broader context of education for sustainable development globally and, more specifically, within the Asia-Pacific region. Using theories and frameworks that examine how relationships between stakeholders reveal underpinning internal hierarchies and contextualize educators: student interactions with one another connected this research to existing literature and academic scholarship. Through these theories, a two-stage methodology was explained. The purpose of this approach affirms the intentions of this research to uplift the experiences of educators and students while ensuring that it is rooted in qualitative research practices.

A history of the significance of education for sustainable development is detailed. Following this background history, a recount of the history of ESD, its relationship to multilateral organizations like UNESCO, and three schools of thought are provided for further contextualization. Reflecting on the schools of thought and detailing the significance of ESD in UNESCO's multilateral bodies of literature made it easier to pinpoint areas of alignment and contrast between the practices of ESD within local education institutions and international schools in Singapore. A literature review offered insights on how scholars contextualize knowledge of ESD, EE, and CCE and why ESD is especially relevant to Singapore and crucial for building 21st century competencies. Next, findings of surveys and ethnographic interviews were discussed, insights discussed,

and a dialogue formed demonstrating how student educators, educators, students, and experts perceive and respond to climate change and the introduction of ESD as both a pedagogical approach and a plausible solution.

The findings of this research urge us to consider what comes next. This research argued that while ESD and sustainability-centric approaches inform students about the importance and relevance of sustainability, more than ESD and sustainability are needed to overcome the systems that ultimately determine the educational standards of learning for educators and student outcomes. This scenario does not reflect the new initiatives and student-centric learning methods behind closed doors in the classroom. Instead, it reveals a more significant gap in the interconnectedness between student learning and outcomes and systems management of educational standards and policy.

According to Adefila et al. (2021), design thinking allows for creating and presenting innovative ideas (Adefilia et al., 2020, 44; Kelly & Kelley, 2013). However, sustainability and ESD are interrelated and interdependent with policy and social factors, so finding one clear solution or approach is challenging. Additionally, each stakeholder perceives the necessary actions and solutions differently based on their position of power and worldview. As such, this presents a challenge to understand how to identify and develop social norms that are inclusive, culturally responsive, and that encourage the universal adoption of sustainable behaviors (Adefila et al., 2021, 44).

In their book, "Leadership for Sustainability: Strategies for Tackling Wicked Problems," Hull, Robertson, & Mortimer (2020) claim that climate change is a 'wicked' problem requiring unique leadership skills and practical solutions to empower professionals at all levels and work towards collection action for sustainable change (Hull, Robertson, & Mortimer, 2020, intro). Wicked problems require "navigation of controversial topics that polarize and divide people, and require adaptation and systems thinking to tackle root causes embedded in multiscale, complex, and evolving situations" (Hull, Robertson, & Mortimer, 2020, 61). This research affirms the argument that ESD is a wicked problem. Educators' efforts to become champions of change, students' ambitions to become changemakers, and experts' roles as gatekeepers of change occurring across multiple levels of Singapore society to promote awareness of sustainability and ESD

reframe our perception of sustainability as a holistic concept and the roles that stakeholders can and must play.

Framing sustainability and ESD as wicked problems does affect the influence of policies and solutions to mitigate and adapt to the impacts of climate change. The solutions presented by the Singaporean MOE and the UWCSEA leadership team seek to enhance students' knowledge beyond an environmental lens and allow for student-led learning and outcomes. In surveys and interviews, educator informants from Education Institute A shared how their community, close friends and family, and themselves were responding to the rise of sustainability as a social and educational pillar in Singapore. Additionally, student informants from UWCSEA, in surveys and interviews, offered stories of how their peers, teachers, community, and themselves engage in sustainability and ESD initiatives on campus and through experiential learning off campus. Each response was situated within the context of Singapore and highlighted both the significance of sustainability and the overwhelming need for further progress. A few noteworthy initiatives are promoting the GC Programme at UWCSEA to reduce barriers to student and staff involvement in hands-on efforts in an SDG-centric initiative and promote sustainability. As Ms. Hannah mentioned, the guidelines of the GC Programme seek to ensure that students are meeting the College's core competencies and can have fulfilling experiences that foster learning, character growth and build agency and independence.

Informants in this research stated that a comprehensive transformation of the Singaporean social system is necessary to improve Singaporean's awareness and implementation of sustainability initiatives. I agree that adjustments to Singaporean social practices like banning plastic bags and plastic wrap, making public transportation accessible and affordable, and creating shared, open spaces for all people of Singapore to come together regardless of their race, ethnicity, or gender would be practical steps towards elevating awareness of sustainability and improving the green livelihoods of the city-state as a whole. Singapore has already begun supporting some of these recommendations and will continue to develop and enhance additional social initiatives through the Singapore Green Plan 2030. That said, initiatives like banning plastic bags and creating 'sustainable' social programs with incentives are worthy of consideration

and should be presented to those in power. These solutions might shift the sustainability dialogue within educational and social situations, but I do not believe they will solve the overarching problem because of their complex, wicked nature. Instead, I think the question that we are left with, and what future research should explore, is how do we accelerate sustainable, community-driven solutions and foster local agency across Singapore?

Within the discussion of sustainability, I believe that it is essential to focus on several key areas to ensure that all stakeholders in Singapore have access to quality education that supports their ability to learn and live safely and become changemakers for more just, sustainable futures. First, I think it is essential to expand this research to encompass the voices of marginalized populations and ethnic minorities often sheltered from academic scholarship. Second, forming more consistent and collaborative avenues for Singaporean schools to partner with international schools to share learning journeys and service trips will improve students' sense of belonging and awareness of the locality of topics they explore in their classrooms. And third, the development and incorporation of a new strategy to promote the roles of educators and schools as champions of change and protect the well-being of good-intentioned efforts of student changemakers.

Scholars must intentionally expand generalizations of sustainability, ESD as an educational approach, and educator and student stakeholder-specific concerns. To develop and implement effective solutions, there needs to be a concrete understanding of the community and its needs and wishes. This research has claimed that while the experiences of educators from Education Institute A and educators and students from UWCSEA are similar at a surface level, they are not homogenous. Educators from Education Institute A do not possess the same liberties as experienced educators from UWCSEA due to their role as civil servants. As mentioned in this paper, the rise of media, mainly social media, displays sustainability in Singapore as green-facing activities like planting trees, recycling, or building gardens. While important, the media should consider highlighting sustainability as a holistic concept and translating ESD-related policy into fun, engaging learning and activities for educators and students to participate in.

In this research, there remains a fine line of exploring the adoption of ESD within Singaporean schools and the broader undertaking of sustainability within the city-state. Singapore is a city-state, meaning that the government has jurisdiction over the politics, economy, and social services within the city of Singapore. The government of Singapore is for the most-part transparent with its citizens, at least per the literature review in this research. Yet, during the ethnographic interview component of this project, the researcher needed to acknowledge the limitations outlined by the government. Singapore is a prosperous, unified nation that limits growing opposition. Therefore, when speaking to educators in Singapore, it was necessary to understand the potential limitations of information sharing by informants, particularly those from Education Institute A and experts. This was not the case when speaking to experienced educators from UWCSEA. While they are still subject to Singaporean law, educators within the College could talk more freely and share their opinions. This finding aligns with the literature review and the researcher's knowledge of the positionality of educators within such spaces internationally versus in the West. Singapore embraces the UN's SDG goals, evident through its Green Plan 2030. However, considering the skill sets outlined by ESD, including critical thinking, raises questions about the extent to which this might be possible in Singapore. Informants in this research expressed a transformation occurring within Singapore's education system, acknowledging and promoting critical thinking skills as a key objective for learning in the 21st century. However, whether the application of critical thinking within Singaporean schools is similar to that in international schools in Singapore is yet to be determined.

Sustainability has taken off globally since the UN's Earth Climate Summit in 1992, with governments racing to create their own sustainability plans and initiatives. In Singapore, the government has proudly invested in sustainability initiatives and urban development projects to elevate itself as a leader in the Asia-Pacific. That said, with the UN's SDGs set to be met by 2030, Singapore has launched the Green Plan 2030 to further align itself with the international stage. In this research, ethnographic interviews explored the future of what sustainability looks like in Singapore and, specifically, Singapore's role in advancing the UN's SDGs beyond its territory.

It is well known that Singapore has positioned itself as a regional leader in urban sustainability. However, a closer look into the reasons behind this reveals that Singapore is an outlier. A small population, land mass, and central government have allowed a Singapore impetus to evolve. Since its independence in the 1960s, Singapore has risen from an impoverished nation to become an Asian tiger economy and has taken much of its neighbors by storm through its international business hub and impressive, breathtaking green, urban infrastructure. While the "Singapore miracle" is noteworthy and something of great achievement, there is a question of how exactly Singapore was able to make its way to become Asia's most sustainable city. These are all questions of great importance, but due to the scope of this research, they could not be explored.

The educational system of Singapore is still primarily homogeneous, but as the landscape becomes more diverse, the research and media must be reflective of these transformations. This includes the intentional inclusion of ethnic minorities, people with disabilities, and LGBTQ+ voices. The UN SDGs adopts “substantive equality” to resolve long-existing conflicts and inequality while focusing on human rights for underrepresented groups (Do et al., 2020, 3). This practice allows for “appropriate measures to be established to develop the capacities of vulnerable groups and promote opportunities for them to approach and enjoy their human rights" (Do et al., 2020, 3). Specifically, when considering the adoption of SDG 4 – Quality Education – it is pertinent to prioritize the accessibility to quality, inclusive and sustainable education for less advantaged children (Do et al., 2020, 3). Therefore, significant contributions to future scholarship must expand knowledge of and experiences of underserved populations and vulnerable populations, particularly children, highlighting systemic inequalities and limitations of current practices and policies. Creating a narrative that centers the voices of young children, vulnerable people, and underrepresented groups would legitimize the experiences of populations existing in ‘hidden’ spaces of power and improve the scope of scholarship on sustainability, ESD, ethnic studies, and youth development.

Student agency was a theme illustrated by excerpts from ethnographic interviews. While the pool of ethnographic interviews with students was particularly small, limiting its legitimacy, the findings from interviews with educators at UWCSEA and experts in

the field offer unique insights into how students at UWCSEA understand sustainability, its relevance to their lives, and how they can employ sustainability to become agents of change. Students at UWCSEA reported feeling that while they want to enact change at a larger scale beyond campus, they do not think that their actions will make a difference compared to systemic changes made at the national level. For example, bubble tea is a trendy drink often served in a plastic bag with a straw. Students at UWCSEA reported being cautious about their consumption of plastic, but they indicated that overthinking sustainability could be cumbersome and more inconvenient. This sentiment is mirrored in a conversation with Mr. Alex, who said, "Participating in sustainable initiatives does not necessarily make someone become an agent of change" (Mr. Alex, 2023). Therefore, instead of placing the sole responsibility on them as individuals to make the right decision and bring their reusable utensils when buying bubble tea, it is recommended that the Singapore government implement a plastic ban. By banning plastic bags and accessories, Singapore would reduce its waste and position itself as a top leader in environmentally-friendly practices.

Educators and students must have a clear sense of self and positionality to adopt sustainability behaviors. To ensure that knowledge building and adaptation are successful, it must be done through interdependent processes, as both groups must desire growth and collective change for it to be achieved. Educators at Education Institute A reported wanting to accelerate their students' knowledge and awareness of sustainability as a holistic term rather than just through the lens of the environment. While these educators have little impact on changing the curriculum standards set by the MOE, they discussed the importance of adding supplemental materials to further classroom learning and encourage sharing of knowledge with students' friends and communities. Similar to student educators, educators at UWCSEA said that they are committed to including students in curriculum design and experiential learning conversations to foster students' feelings of belonging and build their agency to adapt to new situations and adopt new sustainability practices.

Gaventa and peers' (2007) discuss at length the intersection between education and power. Using the Power Cube (2007) as a model to understand the manifestations of power and how it impacts interrelationships across levels and spaces, Gaventa (2007)

describes the Cube as “letting us visually map ourselves and our situation, including other actors, relationships, and forces, and then look for possibilities for movement, mobilization, and change” (Gaventa, 2007). While large-scale social issues impact our struggles and interpersonal relationships, we have the agency to respond appropriately and with positive choices. Recognizing our positionality within the Power Cube allows us to enter dialogue with compassion and empathy for our peers, creating a precedent for larger-scale conversations on complex topics like sustainability. This model serves sufficient until comprehensive systemic processes also improve and spaces are designed for underserved populations to share insights and experiences.

The future of ESD in Singapore’s educational system is unknown. In national education spaces, educators are provided with standards by the MOE. More recently, as this research outlines, educators are encouraged to incorporate their teaching methods to present a holistic perspective of ESD and its relevance to specific subjects (e.g., geography and social studies). On the other hand, in international schools like UWCSEA, educators follow the IB Diploma Curriculum and are empowered to include students in conversations about classroom content and outdoor learning activities. Small-scale solutions to this extensive ‘wicked’ issue are implemented at the national level to create opportunities for small-scale patterns to be envisioned as transformative realities for sustainable development. While not universal across educational systems, these local and national efforts elevate individuals’ understanding of education for sustainable development (ESD) and foster educators' and students’ agency to become changemakers.

While there are multiple approaches to address ESD, as outlined by UNESCO, ESD in Singapore must be nurtured within formal and informal learning to maintain individual and community-level responses that work to ensure that educators and students have access to safe, inclusive spaces that foster their individual growth, personal conviction, and commitment to making sure that future generations have access to safe, healthy and green spaces for learning.

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Annex

Paris Agreement, 2015.

Article 12

Parties shall cooperate in taking measures, as appropriate, to enhance climate change education, training, public awareness, public participation and public access to information, recognizing the importance of these steps with respect to enhancing actions under this Agreement.

Photos

Image 1. Public sign about wildlife etiquette (courtesy of Ms. Jones, 2022).

Image 2. Solar-powered smart bin (courtesy of Ms. Jones, 2022).

Image 3. Advertisement for e-brochure to explore Singapore (courtesy of Ms. Jones, 2022).

Image 4. Wall in store about how to choose sustainable seafood and how residents can do their part for the ocean (courtesy of Ms. Jones, 2022).

Appendix A - Expert Interview Questions

Background

1. Please introduce yourself (name and current position)
2. What were the driving forces that led you to your current career? What drove you to be engaged in the field of sustainability?
3. What are the first three words/phrases that come to mind when you hear the word "sustainability"?
4. Could you summarize what you do in your career? How does this relate back to themes of sustainability and smart choices?

Empowering students

- Why is it important for people to be able to think for themselves about sustainability/environmentalism? Do you feel that students should be included in spaces of discussion about curriculum design and program development centered on sustainability/climate change?
- How do you think teachers can leverage students' knowledge of sustainability and empower them to become active participants in sustainability initiatives, both in Singapore and across the globe?

Sustainability on a larger scale

- What does education for sustainability/ESD mean in the context of Singapore/Asia-Pacific Region? Not just for the idea of sustainability in Singapore, but for students/people themselves to be able to really present and be able to thrive in a world that is changing so fast?
- How does the Singapore government evaluate school practices of sustainability not only as reputable (education-wise) but also as models that advance Singapore's broader sustainability goals?
- The SDGs of the UN are set to be completed by 2030. Where do you anticipate Singapore to be in 2030 concerning its sustainability practices and student involvement? What has changed, and what has remained the same? How do you perceive your role as an individual and citizens in promoting sustainability and adopting sustainable behaviors?

Appendix B - Experienced Educator Interview Questions

Background

1. Please introduce yourself (name, grade you teach & school, and subject).
2. What were the driving forces that led you to teaching? Why UWCSEA and why sustainability?
3. What are the first three words that come to mind when you hear the word “sustainability”?
4. Could you summarize what your school’s sustainability curriculum objectives are?
5. How does UWCSEA advance students’ understanding of sustainability? And how do you incorporate UWCSEA academic pillars and commitment to sustainability into your classroom curriculum?
6. Could you provide a specific example of how you incorporate real-world learning in your classroom?

Empowering students

1. Why is it important for people to be able to think for themselves about sustainability/environmentalism? Do you feel that students should be included in spaces of discussion about curriculum design and program development centered on sustainability/climate change?
2. How do you think teachers can leverage students’ knowledge of sustainability and empower them to become active participants in sustainability initiatives, both in Singapore and across the globe?
3. What do you hope that your students take away from your class? And from their curriculum at UWCSEA?
4. How is UWCSEA perceived within Singapore? Does the Singapore government perceive the UWCSEA curriculum not only as reputable (education-wise) but also as an education model that can accelerate progress towards Singapore's sustainability agenda?
    - What are the demographics of students of UWCSEA?
    - How does UWCSEA’s teaching model translate to skills for higher education and giving back to UWCSEA later in life?
5. What does being an agent of change mean to you? How can teachers and students become agents of change? How does being an agent of change encompass climate change and sustainability; does this framework shift in different contexts and cultures?

Sustainability on a larger scale

1. What does education for sustainability (EfS)/ESD mean in the context of Singapore/Asia-Pacific Region? Not just for the idea of sustainability in Singapore, but for students/people themselves to be able to really present and be able to thrive in a world that is changing so fast?
2. What do you understand about UWCSEA's role in fulfilling Singapore’s national agenda for sustainability/sustainable development (Green Plan 2030)?
3. The SDGs of the UN are set to be completed by 2030. Where do you anticipate Singapore to be in 2030 concerning its sustainability practices and student involvement? What has changed, and what has remained the same? How do you perceive your role as an individual and citizens in promoting sustainability and adopting sustainable behaviors?

Appendix C Educator Questions

Background

1. Please introduce yourself (name, year in school and degree)
2. What three words/phrases come to mind when you hear 'sustainability'? Why did you choose these three words?
3. What do you understand by the term "sustainability"? What theories, concepts, or frameworks have influenced your knowledge of this term?
4. Do you associate sustainability with something important in your life? If it is important to you, is this something important for all of us to consider? Why?

Your Experience as a Educator

5. Could you summarize how your current curriculum covers sustainability? What types of materials do you engage with?
6. How does your professor(s) inform you about sustainability? Do you feel that these methods and materials are adequate for learning about sustainability?
7. Do you think your sustainability education has informed your understanding of sustainability and the way(s) that it can be used to achieve targets, including those of the Singapore Green Plan 2030 and the UN's SDGs?

As a Future Educator

8. As a future educator, how do you anticipate translating the knowledge and skills from your post-graduate program into your classroom curriculum to educate, engage and empower students?
9. Why is it important to construct courses where students can engage in course topics and projects that extend their learning?
10. Do you feel that students can/should be included in spaces of dialogue where designs on curriculum and learning are made?
11. How do you think teachers can leverage students' knowledge of sustainability and empower them to become active participants in sustainability initiatives, both in Singapore and across the globe?
12. What does being an agent of change mean to you? How can teachers and students become agents of change? How does being an agent of change encompass climate change and sustainability; does this framework shift in different contexts and cultures?

Sustainability on a Larger Scale

13. What does education for sustainability (EfS)/ESD mean in the context of Singapore/Asia-Pacific Region? Not just for the idea of sustainability in Singapore, but for students/people themselves to be able to really present and be able to thrive in a world that is changing so fast?
14. The SDGs of the UN are set to be completed by 2030. Where do you anticipate Singapore to be in 2030 concerning its sustainability practices and student involvement? What has changed, and what has remained the same? How do you perceive your role as an individual and citizens in promoting sustainability and adopting sustainable behaviors?

Appendix D - UWCSEA Student Interview Questions

Background

1. Please introduce yourself (name, year in school and degree)
2. What three words/phrases come to mind when you hear 'sustainability'? Why did you choose these three words?
3. What do you understand by the term "sustainability"? What theories, concepts, or frameworks have influenced your knowledge of this term?
4. Do you associate sustainability with something important in your life? If it is important to you, is this something important for all of us to consider? Why?

Your Experience as a Student

5. Could you summarize how your current curriculum covers sustainability? What types of materials do you engage with?
6. How does your teacher(s) inform you about sustainability? Do you feel that these methods and materials are adequate for learning about sustainability?
7. Do you think your sustainability education has informed your understanding of sustainability and the way(s) that it can be used to achieve targets, including those of the Singapore Green Plan 2030 and the UN's SDGs?
8. How do you think your teachers can leverage students' knowledge of sustainability and empower you, as students, to become active participants in sustainability initiatives, both at UWCSEA, in Singapore and across the globe?
9. What does being an agent of change mean to you? How do you students become agents of change? How does being an agent of change encompass climate change and sustainability; does this framework shift in different contexts and cultures?

Sustainability on a Larger Scale

10. What does education for sustainability (EfS)/ESD mean in the context of Singapore/Asia-Pacific Region? Not just for the idea of sustainability in Singapore, but for students/people themselves to be able to really present and be able to thrive in a world that is changing so fast?
11. The SDGs of the UN are set to be completed by 2030. Where do you anticipate Singapore to be in 2030 concerning its sustainability practices and student involvement? What has changed, and what has remained the same? How do you perceive your role as an individual and citizens in promoting sustainability and adopting sustainable behaviors?

Appendix E - UWCSEA Experienced Educator Survey

Header

Dear Teacher,

Thank you for contributing to the study of sustainability education in Singapore. Your participation is voluntary and much appreciated.

Background : My name is Anna Fromson-Ho, and I am a fourth-year student at Macalester College in St. Paul, Minnesota, United States of America. I am researching Singapore's implementation of sustainability education in local international high schools and universities to understand the role of educators in translating curriculum into learning and activities that empower and harness students with the skills, knowledge, and abilities to cope with the current and future challenges of climate change, and become agents of change.

Overview : During this survey, you will be asked a series of questions about your experience with sustainability education at your school, personal interactions with students in your classroom, and personal experience with sustainability in the community and your personal life. The information from this questionnaire will be summarized and shared during the final presentation of this research in April 2023. When sharing this information, I will not connect responses to individual teachers.

I will combine the responses from this survey with responses from **all** participating teachers. Results will be analyzed as a whole and by a group such as what class year you teach, not by individuals; however, individual anonymous responses may be shared through abridged quotes to illustrate themes found in collected data.

Combining responses from all questionnaire results will help me identify the methodology of sustainability education in Singapore and the ways in which it employs teachers to empower students to become future changemakers in sustainability. I will share my findings with the Macalester community.

Completing this survey is voluntary and confidential. You may choose to skip questions at any time.

Should you have any questions or concerns, please contact Anna Fromson-Ho at afromson@macalester.edu. The student's primary advisor, Professor Holly Barcus, DeWitt Wallace Professor of Geography, Director of Asian Studies can be reached at barcus@macalester.edu. The Chair of the Macalester Institutional Review Board, Professor Dan Trudeau can be reached at trudeau@macalester.edu.

Demographic Information

3. What grade level do you teach?

Check all that apply.

- [ ] 11th
- [ ] 12th

4. What subject do you teach?

Check all that apply.

- [ ] Social Sciences/History
- [ ] Geography
- [ ] Natural Sciences
- [ ] Other: _____

5. What type of school do you teach at?

Mark only one oval.

- ◯ Public school
- ◯ Private school
- ◯ Priviate international school

6. Gender

Check all that apply.

- [ ] Male
- [ ] Female
- [ ] Non-Binary
- [ ] Prefer to not say

Your Experience as a Teacher of Sustainability

7. Using the scale of 0-10, please rank your level of concern regarding these environmental matters

Check all that apply.

	0	1	2	3	4	5	6	7	8	9	10
Air pollution	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Climate change	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Rising temperature	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Degradation of natural environments	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

8. What year was the Education for Sustainability (EfS)/Environmental Education (EE)/Education for Sustainable Devleopment (ESD) curriculum implemented at your school?

Mark only one oval.

- ◯ Prior to 2018
- ◯ 2018
- ◯ 2019
- ◯ 2020
- ◯ 2021
- ◯ 2022

9. What pedagogical approach to sustainability do you apply in your classroom? Please click all that apply

Check all that apply.

- ☐ Curriculum developed by the Singapore Ministry of Education
- ☐ International Baccalaurate (IB)
- ☐ I have freedom to develop by own curricula
- ☐ Mix of options (please specify)
- ☐ Other: _____

10. What do you focus on when teaching about sustainability to your students?

Check all that apply.

- ☐ The science of and impact of climate change and sustainability
- ☐ The individual and national solutions to issues associated with climate change
- ☐ The causes and consequences of climate change
- ☐ Other: _____

11. What limitations, if applicable, are there to the sustainability education curricula?

_____

_____

_____

_____

_____

Student Engagement in the Classroom

12. How would you rate your students' level of engagement in the classroom?

Mark only one oval.

	1	2	3	4	5	
Not	◯	◯	◯	◯	◯	Really enthusiastic (asks questions, engages in subject material outside class)

13. What materials do you utilize to teach about sustainability? (Please click all that apply)

Check all that apply.

- [ ] Textbook
- [ ] Worksheets
- [ ] Lecture
- [ ] PowerPoint or Google Slides
- [ ] Videos or documentaries
- [ ] Other: _____

14. How do you engage your students in sustainability outside of the classroom?

Check all that apply.

- [ ] Group projects
- [ ] Take home assignments or proejcts
- [ ] Community Engagement or Guest Speakers
- [ ] Volunteering Opportunities
- [ ] Other: _____

15. Do you think your school curriculum does a good job teaching students about sustainability?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Maybe, but more could be taught
- ◯ Other: _____

16. If you would like to elaborate on your answer to the previous question, please type your response here

_____

_____

_____

Personal Reflection

17. Why is sustainability important to you as a teacher?

18. What do you hope that your students take away from your class?

(Optional) Follow Up Interview

19. Would you be willing to be contacted for a follow up 1:1 interview? *

Mark only one oval.

- Yes
- No

20. Please type an email address that you can reached at *

Appendix F - Educator Survey

Dear Educator,

Thank you for contributing to the study of sustainability education in Singapore. Your participation is voluntary and much appreciated.

Background: My name is Anna Fromson-Ho, and I am a fourth-year student at Macalester College in St. Paul, Minnesota, United States of America. I am researching Singapore's implementation of sustainability education in local international high schools and universities to understand the role of educators in translating curriculum into learning and activities that empower and harness students with the skills, knowledge, and abilities to cope with the current and future challenges of climate change, and become agents of change.

Overview: During this survey, you will be asked a series of questions about your experience with sustainability education at your school, personal experiences in the community and your personal life. The information from this questionnaire will be summarized and shared during the final presentation of this research in April 2023.

Confidentiality: Your survey responses are confidential. Completing this survey is voluntary. You may choose to skip questions at any point. I will combine the responses from this survey with those from **all** participating students. Results will be analyzed as a whole and by a group such as class year, not by individuals; however, individual anonymous responses may be shared through abridged quotes to illustrate themes found in collected data.

Combining responses from all survey results will help me identify the methodology of sustainability education in Singapore and the ways in which it empowers students to become future changemakers in sustainability. I will share my findings with the Macalester community.

Please note the following :

- You must be 18 years or older to participate
- Participation is voluntary
- Responses will be kept private
- You have the option to opt in to be contacted for an interview

Consent to Participate : By completing this survey, you are indicating that you have read this information, you are age 18 or older, and you agree to voluntarily participate.

Thank you for your time! It is much appreciated!

If you have questions or concerns, please contact :

- Anna Fromson-Ho at afromson@macalester.edu.
- The student's primary advisor, Professor Holly Barcus, DeWitt Wallace Professor of Geography, Director of Asian Studies can be reached at barcus@macalester.edu.
- The Chair of the Macalester Institutional Review Board, Professor Dan Trudeau can be reached at trudeau@macalester.edu.

The Macalester Institutional Research Board (IRB) at irb@macalester.edu. or (651) 696-6872

Demographic Information

4. Age *

Check all that apply.

- [ ] 18
- [ ] 19
- [ ] 20
- [ ] 21
- [ ] 22
- [ ] 23
- [ ] 24
- [ ] 25

5. Grade Level

Check all that apply.

- [ ] First-Year Undergraduate
- [ ] Second-Year Undergraduate
- [ ] Third-Year Undergraduate
- [ ] Fourth-Year Undergraduate
- [ ] Post-graduate Year 1
- [ ] Post-graduate Year 2
- [ ] Other: _____

6. Gender

Check all that apply.

- [ ] Male
- [ ] Female
- [ ] Non-Binary
- [ ] Prefer to not say

Your Experience with Education for Sustainability (EfS)/Education for Sustainable Development (ESD)

7. What comes to mind when you heard the word "sustainability"?

8. At what grade did you first learn about sustainability?

Mark only one oval.

- ◯ Primary School (first-5th grades)
- ◯ Secondary School (6th-8th grades)
- ◯ High School (9th-12th grade)
- ◯ First-Year Undergraduate
- ◯ Second-Year Undergraduate
- ◯ Third-Year Undergraduate
- ◯ Fourth-Year Undergraduate
- ◯ Other:

9. Do you actively study sustainability/Education for Sustainability (EfS) at your current institution?

Check all that apply.

- ☐ Yes
- ☐ Some
- ☐ No
- ☐ Not sure

10. Which of the three definitions of "sustainable" do you agree with?

Mark only one oval.

- ◯ The implementation of eco-friendly technologies.
- ◯ A balance between meeting today's needs with those of the future.
- ◯ The use of alternative energies.

11. Where have you learned about sustainability?

Check all that apply.

- [ ] School
- [ ] Home
- [ ] Friends
- [ ] Family
- [ ] Extra-Curricular (club, sports, academic program)
- [ ] Volunteering

12. Why is education on sustainability relevant?

Check all that apply.

- [ ] It promotes better understanding about the environment
- [ ] It empowers individuals to reflect on their own actions
- [ ] It provides students with the knowledge and skills to become active and responsive citizens
- [ ] Other: _____

13. Using the scale of 0-10, please rank your level of concern regarding these environmental matters

Check all that apply.

	0	1	2	3	4	5	6	7	8	9	10
Air pollution	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Climate change	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Rising temperature	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Degradation of natural environments	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Opportunity : Follow Up Interview

As part of my research, I plan to engage in conversation with students to learn a bit more about students' personal experiences with curriculum on sustainability in Singapore. Interviews will primarily take place on Zoom and will last between 30 minutes to 1 hour. Should you have additional questions about the interview, please contact Anna Fromson-Ho at afromson@macalester.edu.

14. Would you be willing to be contacted for a follow up 1:1 interview? *

Mark only one oval.

- ◯ Yes
- ◯ No

15. By typing your email address, you are consent to be contacted by the researcher. If you agree, please type your email address

_____

Appendix G - Student Survey

Dear Students,

Thank you for contributing to the study of sustainability education in Singapore. Your participation is voluntary and much appreciated.

Background : My name is Anna Fromson-Ho, and I am a fourth-year student at Macalester College in St. Paul, Minnesota, United States of America. I am researching Singapore's implementation of sustainability education in local international high schools and universities to understand the role of educators in translating curriculum into learning and activities that empower and harness students with the skills, knowledge, and abilities to cope with the current and future challenges of climate change, and become agents of change.

Overview : During this survey, you will be asked a series of questions about your experience with sustainability education at your school, personal experiences in the community and your personal life. The information from this questionnaire will be summarized and shared during the final presentation of this research in April 2023.

Confidentiality : Your survey responses are confidential. Completing this survey is voluntary. You may choose to skip questions at any point. I will combine the responses from this survey with those from **all** participating students. Results will be analyzed as a whole and by a group such as class year, not by individuals ; however, individual anonymous responses may be shared through abridged quotes to illustrate themes found in collected data.

Combining responses from all survey results will help me identify the methodology of sustainability education in Singapore and the ways in which it empowers students to become future change makers. I will share my findings with the Macalester College community.

Please note the following :

- You must be 18 years or older to participate
- Participation is voluntary
- Responses will be kept private
- You have the option to opt in to be contacted for an interview

Consent to Participate : By completing this survey, you are indicating that you have read this information, you are age 18 or older, and you agree to voluntarily participate.

Thank you for your time! It is much appreciated!

If you have questions or concerns, please contact :

- Anna Fromson-Ho at afromson@macalester.edu.
- The student's primary advisor, Professor Holly Barcus, DeWitt Wallace Professor of Geography, Director of Asian Studies can be reached at barcus@macalester.edu.
- The Chair of the Macalester Institutional Review Board, Professor Dan Trudeau can be reached at trudeau@macalester.edu.

The Macalester Institutional Research Board (IRB) at irb@macalester.edu. or (651) 696-6872

Demographic Information

4. Age *

Check all that apply.

- [ ] 18
- [ ] 19
- [ ] 20
- [ ] 21
- [ ] 22
- [ ] 23
- [ ] 24
- [ ] 25

5. Grade Level

Check all that apply.

- [ ] Grade 11
- [ ] Grade 12
- [ ] First-Year Undergraduate
- [ ] Second-Year Undergraduate
- [ ] Third-Year Undergraduate
- [ ] Fourth-Year Undergraduate
- [ ] Post-graduate Year 1
- [ ] Post-graduate Year 2
- [ ] Other: _____

6. Gender

Check all that apply.

- [ ] Male
- [ ] Female
- [ ] Non-Binary
- [ ] Prefer to not say

Your Experience with Education for Sustainability (EfS)/Education for Sustainable Development (ESD)

7. What word(s) or phrase(s) comes to mind when you heard the word "sustainability"?

8. At what grade did you first learn about sustainability?

Mark only one oval.

- ◯ Primary School (first-5th grades)
- ◯ Secondary School (6th-8th grades)
- ◯ High School (9th-12th grade)
- ◯ First-Year Undergraduate
- ◯ Second-Year Undergraduate
- ◯ Third-Year Undergraduate
- ◯ Fourth-Year Undergraduate
- ◯ Other:

9. Are you actively study sustainability/Education for Sustainability (EfS) at your current school/institution?

Check all that apply.

- ☐ Yes
- ☐ Some
- ☐ No
- ☐ Not sure

10. Which of the three definitions of "sustainable" do you agree with?

Mark only one oval.

- ◯ The implementation of eco-friendly technologies.
- ◯ A balance between meeting today's needs with those of the future.
- ◯ The use of alternative energies.

11. Where have you learned about sustainability?

Check all that apply.

- [ ] School
- [ ] Home
- [ ] Friends
- [ ] Family
- [ ] Extra-Curricular (club, sports, academic program)
- [ ] Volunteering
- [ ] Other: _____

12. Why is education on sustainability relevant?

Check all that apply.

- [ ] It promotes better understanding about the environment
- [ ] It empowers individuals to reflect on their own actions
- [ ] It provides students with the knowledge and skills to become active and responsive citizens
- [ ] Other: _____

13. Using the scale of 0-10, please rank your level of concern regarding these environmental matters

Check all that apply.

	0	1	2	3	4	5	6	7	8	9	10
Air pollution	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Climate change	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Rising temperature	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Degradation of natural environments	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Opportunity : Follow Up Interview

As part of my research, I plan to engage in conversation with students to learn a bit more about students' personal experiences with curriculum on sustainability in Singapore. Interviews will primarily take place on Zoom and will last between 30 minutes to 1 hour. Should you have additional questions about the interview, please contact Anna Fromson-Ho at afromson@macalester.edu.

14. Would you be willing to be contacted for a follow up 1:1 interview? *

Mark only one oval.

- ◯ Yes
- ◯ No

15. By typing your email address, you are consent to be contacted by the researcher. If you agree, please type your email address

Appendix H - UWCSEA Experienced Educator Consent[24] Form

Dear Teacher,

Thank you for contributing to the study of sustainability education in Singapore international schools. Your participation is voluntary and much appreciated.

My name is Anna Fromson-Ho, and I am a fourth-year student at Macalester College in Saint Paul, Minnesota, United States of America. I am conducting research on sustainability education in Singapore international schools to understand how sustainability education empowers students to become active participants in Singapore's environmental sustainability agenda.

PROCESS
During this interview, you will be asked a series of questions about your experience as a teacher of sustainability, your students' level of engagement in the classroom, your pedagogical approach, and personal reflections about your experience and recommendations for future curricula.

RISKS -- this list is comprehensive and aims to encompass all possible risks to the participant.
This interview may be recorded for the benefit of the researcher to review materials during the analysis and presentation stages of the project. To minimize the risk, teachers will have the option to opt-in or opt-out of being recorded. This will not impact the research or their participation in the interview.

Teachers might feel uncomfortable being interviewed because of a potential risk of sharing information relating to the school's sustainability curriculum that is classified knowledge or extends the boundaries of the school's curriculum and expectations. To minimize the risks, teachers should have received a copy of the interview questions in advance; you have the right to answer all or none of the questions and to share as much information as you feel comfortable. Your responses will be anonymized and during presentation of results, no connection to individual responses will be made. Abridged anonymized quotes may be used to convey themes from all interviews.

As a participant, you have the right to stop engagement at any point during the interview or engagement with the researcher. Again, your participation in this interview is **voluntary** and will **not** impact your standing or interactions at your institution.

BENEFITS
Your responses will also support my understanding of Singapore's sustainability education framework and the ways in which it employs teachers to empower students to become future change makers in sustainability. Summaries from surveys distributed to teachers and students may be made available to teachers through presentations virtually or in-person, to be determined, should the teacher be interested in follow-up contact from the researcher.

QUESTIONS OR CONCERNS?
Should you have any questions or concerns, please contact Anna Fromson-Ho at afromson@macalester.edu. The student's primary advisor, Professor Holly Barcus, DeWitt Wallace Professor of Geography, Director of Asian Studies can be reached at barcus@macalester.edu. The Chair of the Macalester Institutional Review Board, Professor Dan Trudeau can be reached at trudeau@macalester.edu.

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[24] This consent form was adjusted for experts and educators at Education Institute A, but the bulk of the information remained the same

Informed Consent

If you wish to consent to participate in a 1:1 interview, please type out your full, legal name to sign and date with today's date. Thank you!

1. Please type out your full, legal name *

2. Today's Date *

Example: January 7, 2019

Appendix I - UWCSEA Student Consent Form

Dear Student,

Thank you for contributing to the study of sustainability education in Singapore. Your participation is voluntary and much appreciated. You are being invited to participate in a 1:1 interview based on your response to the student survey and eligibility based on your current age.

BACKGROUND

My name is Anna Fromson-Ho, and I am a fourth-year student at Macalester College in St. Paul, Minnesota, United States of America. I am researching Singapore's implementation of sustainability education in local international high schools and universities to understand the role of educators in translating curriculum into learning and activities that empower and harness students with the skills, knowledge, and abilities to cope with the current and future challenges of climate change, and become agents of change.

PROCESS
During this interview, you will be asked a series of questions about your experience as a student of sustainability or sustainability education, your interactions with teachers and peers at your institution, community experiences, education materials, and personal reflections and recommendations for future curricula.

RISKS -- this list is comprehensive and aims to encompass all possible risks to the participant.
This interview may be recorded for the benefit of the researcher to review materials during the analysis and presentation stages of the project. To minimize the risk, students will have the option to opt-in or opt-out of being recorded. This will not impact the research or their participation in the interview.

Students may not want to be interviewed for a variety of reasons. To minimize the risks for students (physical, emotional or mental), you should have been asked about your interest and eligibility to participate in a 1:1 interview.

BENEFITS
Your responses will also support my understanding of Singapore's sustainability education framework and the ways in which it employs teachers to empower students to become future change makers in sustainability.

Please note the following :

- You must be 18 years or older to participate
- Participation is voluntary
- Responses will be kept private
- You have the option to opt in to be contacted for an interview

Informed Consent

If you wish to consent to participate in a 1:1 interview, please type out your full, legal name to sign and date with today's date. Thank you!

1. Please type out your full, legal name *

2. Today's Date *

Example: January 7, 2019