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Climate Action and Sustainable Development: Making the case for Geography in ESD

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List of Abbreviations

AccE	Accidental Ethnography
CASD	Climate Action and Sustainable Development
DoE	Department of Education
ESD	Education for Sustainable Development
JC	Junior Cycle
LC	Leaving Certificate
NCCA	National Council for Curriculum and Assessment
SC	Senior Cycle
SDG	Sustainable Development Goal

1 Introduction

An issue of particular concern in post-primary education today is that of sustainability. As the impacts of climate change on both the natural world and human communities—particularly in the Global South—continue to worsen, the need for concerted, international, and collaborative climate action grows in kind. Therefore, the importance of implementing climate and sustainability education into post-primary curricula cannot be understated.

In the Irish context, the national strategy for addressing climate and sustainability concerns in curricula is referred to as Education for Sustainable Development (ESD). In the key policy document *ESD to 2030*, the Department of Education (2022a, p. 6) describes ESD as empowering learners with "knowledge, skills, values and attitudes to take informed decisions and make informed actions environmental integrity, economic viability and a just society". In other words, ESD seeks to inform students on global social, economic, and environmental concerns of the present and equip them with the understanding and tools necessary to overcome them for the future. The importance of ESD is highlighted widely in educational policy, and is reflected in the expectations placed on post-primary schools. As noted in *Looking at Our School 2022:*

> Students are recognised as key contributors to our sustainable future. In line with the curriculum, their understanding of environmental, social and economic issues and of active citizenship, with the associated rights and responsibilities and wider contexts is being developed. **Students are enabled to contribute positively, actively and compassionately towards the creation of a more sustainable and just world**. (Department of Education, 2022, p. 27).

In post-primary curricula, steps towards implementing ESD can be seen most clearly within the development of the upcoming Senior Cycle/Leaving Certificate course Climate Action and Sustainable Development (CASD). While the development of courses such as CASD serves as an effective means to address ESD, it is critical to consider the presence of ESD in the subjects that are already available to students and construct pedagogies which promote these ideas within other disciplines.

Few subjects in the Leaving Certificate (LC) curriculum offer as many opportunities to engage aspects of ESD as Geography. Incorporating elements of geoscience, climate science, economics, and sociology, the LC Geography course addresses many of the aims of ESD with a particular focus on how these elements interact. Due to its status as both a social and natural science,

it can be argued that Geography is the subject best suited to teaching sustainability (Meadows, 2020). As such, the fact that LC Geography is largely absent from discussions on the upcoming CASD course warrants investigation.

1.1 Context

In a background paper for CASD, the National Council for Curriculum and Assessment (NCCA) draws connections between CASD and various Senior Cycle (SC) and LC courses, including Agricultural Science, Computer Science, Economics, and Politics and Society (NCCA, 2022). Despite the links between ESD and geography, there is no mention of the LC Geography course anywhere in this background paper. This occlusion is made almost baffling considering the paper goes on to discuss the connections between senior Geography courses and sustainability education in international contexts, such as Australia and New Zealand. Geography as a discipline is not absent; but LC Geography certainly is. This issue becomes particularly glaring when considered in conjunction with the recent background paper and brief on LC Geography, which explicitly states that "the second National Strategy on Education for Sustainable Development… have a bearing on the review and redevelopment of Leaving Certificate Geography" (NCCA, 2024b, p. 4). Incidentally, this paper also neglects to mention the upcoming CASD course, suggesting that the two courses—despite their thematic overlaps—are being considered in isolation from one another.

While there is literature that makes the case for Geography as a core component of ESD, some academics would argue the opposite—that by its very structure, Geography is a wholly inappropriate subject for teaching ESD. This is the argument presented by Bagoly-Simó (2013; 2023), who suggests that Geography curricula are far more likely to leave students with a sense of climate defeatism than they are to inspire action or effort toward sustainability, further declaring that the subject has failed to deliver on its promises of meaningful ESD contribution. While such discourse exists about Geography in other national contexts, there is little academic discussion on the contribution of Leaving Certificate Geography to ESD in Ireland. While CASD is still in its developmental stages, and with a redeveloped LC Geography course entering schools as early as 2026 (NCCA, 2024b), it is key to consider the ways in which each subject can contribute to ESD.

1.2 Methodology

This dissertation seeks to examine the ways in which both Leaving Certificate Geography and the upcoming Leaving Certificate/Senior Cycle Climate Action and Sustainable Development course can contribute to the development of ESD in Irish post-primary schools. To achieve this, several key questions will be explored: (1) what the theoretical basis for the development of CASD is within the context of Ireland's ESD strategy; (2) how CASD and LC Geography aim to and currently contribute to ESD; and (3) how student voice and insight can inform pedagogical approaches to ESD through the two subjects.

This research will be accomplished through a blend of textual and reflective analyses, merging insights from academic and policy documents with personal experiences as a student teacher of Geography. Starting by identifying key areas of focus within ESD, this dissertation will explore the LC Geography syllabus as well as the prospective specification for CASD and gauge the extent to which the two subjects address ESD objectives on a purely theoretical basis. Through this, comparisons will be made between the two subjects and their efficacy in contributing to ESD. Considering these analyses, this paper goes on to reflect on two years of student teaching practice in Geography and appraise how students respond to topics of sustainability and climate action.

Through this exploration of ESD, CASD, and Geography, this dissertation will cultivate a deeper appreciation of the intricacies of climate and sustainability education at post-primary level and how it applies to—and may already be present in—LC Geography. Considering the ever-growing interest in sustainable development and global citizenship in Irish education (Foley, 2017; O'Flaherty & Liddy, 2018), it is crucial to understand the ways in which subjects such as Geography contribute to ESD, as well as the ways the discipline may need to adapt to better fulfil this purpose.

2 Literature review

ESD as a concept first emerged in the thirty-sixth chapter of *Agenda 21*, produced following the United Nations Conference on Environment and Development in Rio de Janeiro in 1992. In this chapter, priority is placed on adapting education with sustainable development in mind (United Nations, 1992). Later, the period 2005-2014 was declared the 'Decade of Education for Sustainable Development' by the UN, and a clear definition of ESD was provided during this

period: "[ESD] empowers everyone to make informed decisions for environmental integrity, economic viability and a just society for present and future generations, while respecting cultural diversity" (UNESCO, 2014, p. 20). The sentiment of ESD is reflected in the UN Sustainable Development Goals (SDGs), which are used address the sustainability aims of the UN 2030 Agenda. Target 4.7 under the goal of Quality Education specifically states that students should "acquire the knowledge and skills needed to promote sustainable development" (UN, 2015, p. 19). ESD, therefore, plays a key role in cultivating SDG target 4.7 and the way in which it is approached or implemented in curriculum becomes vital.

The Irish strategy for ESD can be measured most effectively in the document *ESD to 2030*, as aforementioned. In this document, the Department of Education (DoE) highlights specific areas for intervention across all academic levels. One area of significance to the matter of curriculum development is "Priority Action Area 3: Building Capacities of Educators" (DoE, 2022a, p. 22). Encouraging the implementation of ESD competencies across subjects and the embedding of ESD within curricula are two key priorities within this area, with emphasis placed on the centrality of the SDGs to education and professional development. In the context of post-primary education, this suggests that contribution to ESD should be achieved across the curriculum and that the SDGs should play a key role in cultivating student understanding of ESD. This strategy falls in line with a well-established understanding of ESD in literature. Speaking in the context of technology education, McGarr (2009, p. 317) observed that "the challenge for all subjects at post-primary level... is to examine ways in which ESD can be embedded into their existing syllabi". This sentiment can be found beyond the Irish context also; Martin *et al.* (2015) posit that sustainability education can be incorporated into a wide range of subjects and that ESD is, by its very nature, interdisciplinary. Given the national and international motivation to adapt existing syllabi to incorporate ESD, the decision by the NCCA to instead construct the CASD course needs to be scrutinised.

2.1 'Defending' CASD

In an earlier background paper to the CASD course, the NCCA situates the development of the course within wider national and international policy contexts. The background paper cites the 2019 and 2021 Climate Action Plans in stating that education plays a critical role in developing climate literacy, which is stated as being key to "the empowerment of young people to understand

complex information about the planet" (NCCA, 2022, p. 5). If the NCCA is successful in centring climate literacy in CASD, the course has potential to not only contribute meaningfully to ESD in Irish post-primary schools but may also translate into increased climate action by Irish young people. This phenomenon has been documented across schools in Czechia which participated in a project called 'CO_2 League', which was demonstrated to have improved student climate literacy and, critically, increased their willingness to act in response to climate change (Kolenatý *et al*., 2022). Considering that encouraging young people to take action is central to the agenda for ESD in the Irish context, expressed clearly in *ESD to 2030* as "Priority Action Area 4: Empowering and Mobilising Young People" (DoE, 2022a, p. 23), the case for CASD as a dedicated subject towards climate and sustainability education becomes very strong.

The background paper also addresses the impression of ESD presented in literature: that ESD has no *specific* place in curriculum and should be cultivated holistically throughout education. While the paper acknowledges that ESD is inherently multidisciplinary, it raises the point that there is "potential for pluralism and 'fuzziness'... when the concepts of ESD, climate action and sustainable development... yield multiple interpretations" (NCCA, 2022, p. 21). The meaning and implications of climate action and sustainability may differ across subject areas, and in highlighting this point, the NCCA proposes that the development of a specific course such as CASD would help generate a clearer strategy for how ESD should be developed in post-primary schools, both within the context of a CASD curriculum and in other subjects. Of course, the existence of a dedicated course 'for' ESD does not preclude other subjects from being responsible for contributing to developing ESD. As such, it is critical to understand how other subjects, such as Geography, can play a role in developing climate and sustainability education at the post-primary level.

2.2 The intersections of Geography and CASD

Drawing connections between LC Geography and CASD presents a valuable framework for beginning to understand how Geography can contribute to ESD. To achieve this, reflecting on the Geography syllabus and comparing it to current materials on CASD will prove an effective starting point. At time of writing, there is no definitive specification or syllabus for CASD, though a prospective specification has been produced for public consultation.

The draft specification for CASD indicates that the focus of the course is on meaningful action, cultivating an understanding of climate science, the implications of climate change and adaptation, and their own roles as global citizens (NCCA, 2024a). The content of the course is divided into three interwoven strands: Earth & Planet; People, Power, & Place; and Global Connections; each with a range of specific learning outcomes and objectives. The language of sustainable development is used extensively; concepts such as environmental change, climate justice, policy and sustainable development are addressed throughout all three strands of the specification. Unsurprisingly, this makes it possible to draw a multitude of clear connections between the CASD specification and *ESD to 2030*, placing ideas such as healthy ecosystems, international cooperation, and good governance at the centre of climate and the heart of the subject (DoE, 2022a).

There are many similarities between the CASD specification and content in the LC Geography syllabus, most notably in the first and second strands of CASD: Earth & Planet, and People, Power, & Place. The Earth & Planet strand focuses on climate science and systems within environments, encouraging students to "explore the causes and effects of environmental change and develop understanding of ways in which those changes can be measured" (NCCA, 2024a, p. 13). In a similar vein, Optional Unit 9 of the Geography syllabus—The Atmosphere – Ocean Environment—observes how oceans and the atmosphere impact global climates, placing emphasis on "the measurement of the characteristics of the atmosphere – ocean systems" (NCCA, 2003, p. 42). In both cases, the NCCA has centred the measurement of climate factors in developing an understanding of climate sciences.

Further comparisons can between the People, Power, & Place strand of CASD and a range of learning foci in Geography. The People, Power & Place strand focuses on enabling students to "explore our place in climate action and sustainable development and the constantly evolving relationship between people and place" (NCCA, 2024a, p. 15). As well as having immediately identifiable connections to Geography Core Unit 2 – Regional Geography and Elective Unit 5 – Patterns and Processes in the Human Environment (NCCA, 2003), the 'constantly evolving relationship between people and place' is a concept enshrined in the discipline of geography, as has been explored for decades (Buttimer & Seamon, 1980). It could be argued, therefore, that much of CASD is intrinsically tied to Geography. Considering that CASD specifically aims to address

ESD, as is emphasised clearly within the background paper to the specification (NCCA, 2022), it can be argued that Geography also contributes to ESD in multiple of the same ways that CASD seeks to. However, it is also critical to understand where Geography can contribute to ESD in ways that CASD may not be equally capable of.

2.3 Geography and ESD

It is undeniable that many Geography teachers feel an innate responsibility to support students in learning about and acting for a sustainable future (Firth, 2011). Furthermore, according to the background paper to LC Geography redevelopment, the topic of sustainable development in Geography education is important to students and teachers in Irish schools (NCCA, 2024b). Despite the failings of Geography to adequately contribute to ESD thus far, there is a clear understanding, on the foundational level, the subject has unique offerings to ESD. When compared to other subjects, Geography stands out for its strong conceptual and thematic connections to sustainable development. As observed by Miao *et al*. (2022a; 2022b), this can be seen in the Chinese and American Geography curricula, in which 'development', 'sustainable', and 'environment[al]' are frequent key terms or concepts (Figures 1 & 2).

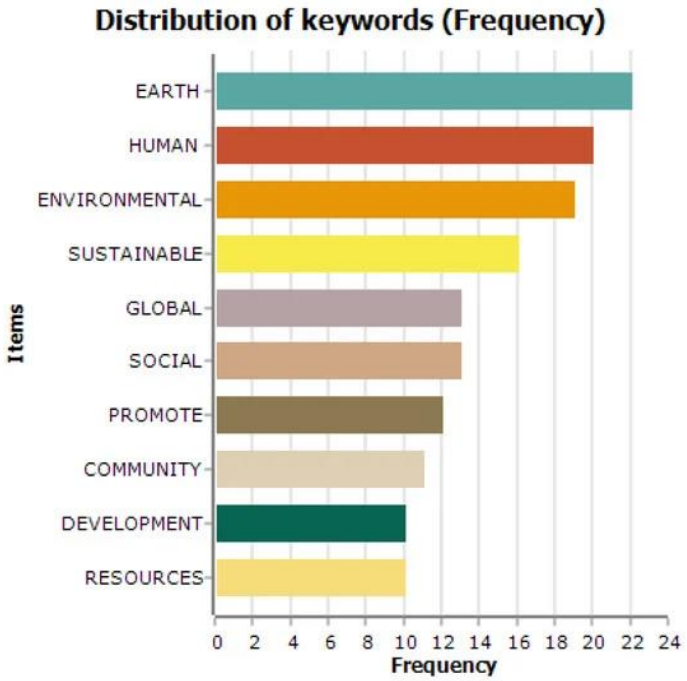

Figure 1: Frequency of key words in the United States' Geography Curriculum Standards (Miao *et al.*, 2022a)

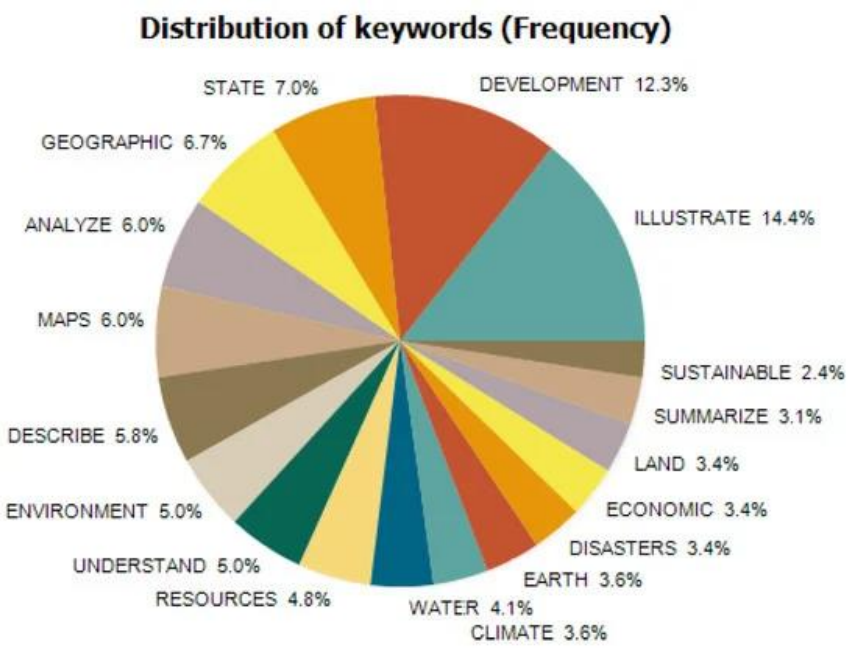

Figure 2. Frequency of key words in China's Geography Curriculum Standards (Miao *et al.*, 2022b)

The challenge is to determine *where* those links can be made within the bounds of curriculum (Bagoly-Simó & Kriewaldt, 2023). The LC Geography course is extensive, so it is crucial to identify specific opportunities for the development of climate and sustainability education within the curriculum.

The concept of sustainable development emerges in the Geography syllabus in two specific units; the first is Elective Unit 4: Patterns and Processes in Economic Activities (NCCA, 2003), where it is considered in the context of the environmental impacts of economic activity. Drawing connections between the environmental and social/economic activity is a core concept within the theory of sustainable development (Morgan, 2011), and exploring the ways in which economic activity and consumption can be adapted for the sake of the environment is a valuable way in which Leaving Cert Geography can contribute to ESD. Another area in which sustainable development emerges, alongside other ESD concepts, is in Optional Unit 6: Global Interdependence (NCCA, 2003). In this unit, sustainable development is explored alongside several other key concepts, including issues of justice, the impacts of globalisation on the environment, and the importance of empowering people as central to linking human and economic development. All of these are key targets of the Irish strategy towards ESD (DoE, 2022a), further

demonstrating that, by its very design, Leaving Cert Geography was effectively contributing to ESD long before the government began prioritising it. Between these two units, many of the core foci of Ireland's ESD strategy are addressed. Where this becomes problematic is that many students of Geography in Ireland will not cover either of these topics as neither of them is compulsory.

Much of the Geography syllabus is optional and elective content. As outlined in the syllabus, there are a total of nine units in the LC Geography curriculum at Higher Level, of which students cover five (NCCA, 2003). At Ordinary Level, students will cover four of a total of five units. The three units addressed so far—Economic Activities, Global Interdependence, and The Atmosphere – Ocean Environment—are all non-compulsory. The background paper to LC Geography redevelopment suggests that all three of these units—The Atmosphere – Ocean Environment in particular—may not be as popular as respective alternative units, Human Environment and Geoecology respectively (NCCA, 2024b). As such, it is critical to identify areas for engaging with ESD in not only the optional and elective units of the course, but also in the core units: Patterns and Processes in the Physical Environment, Regional Geography, and The Geographical Investigation and Skills Unit (NCCA, 2003). In reflecting on personal teaching practice, considering intersections between sustainability education and these core areas will be central to demonstrating a robust link between LC Geography and ESD.

3 Reviewing my practice through the lens of a literature review

Over the last two years of my teaching practice, I have observed and worked with students across both Junior Cycle (JC) and Leaving Certificate Geography. While I have more practical experience teaching the JC Geography curriculum, there are lessons to be learned in these teaching experiences which can be invaluable in approaching LC Geography with ESD in mind. In this reflection, I will consider key themes or topics of sustainable development that have emerged throughout my teaching practice. With reference to the literature, I will gauge the efficacy of these approaches to ESD and use these findings to identify valuable strategies for incorporating ESD into the Geography. To explore connections to ESD and CASD, I will focus on two key experiences from my teaching practice: (1) teaching climate change through energy exploitation, and (2) teaching sustainable development through the Sustainable Development Goals.

3.1 Teaching climate change through energy exploitation

Energy is a core aspect of the JC Geography course which emerges continually in both LC Geography and CASD. At JC level, energy is primarily explored through Learning Outcome 1.9, "differentiate between the types of energy resources produced by the physical world" (Department of Education and Skills, 2017, p. 14). However, in my experience, many students enter the post-primary Geography classroom aware of the environmental implications of energy exploitation—coal, gas, and oil are recognised as bad for the environment by students, whereas solar and wind energy are known to be far more sustainable given that they are renewable.

Where students lacked knowledge, however, is on what this actually means in terms of environmental sustainability. This issue has been acknowledged in schooling in a variety of contexts: in the context of the science classroom, Kumar *et al.* (2023) noticed that students generally understand the impacts of climate change, but not what causes it. Encouragingly, Satchwell (2013, p. 295) observed that students "who claimed they knew very little about causes of climate change were keen to learn" about them. In the context of teaching climate change through energy, this can be achieved through looking at the ways in which energy exploitation results in climate change. In my own teaching, I have used acid rain (Figure 3) as an example of this. Acid rain is a concept which some students are already familiar with, and I have found that students develop an understanding of the causes and implications of acid rain quite effectively.

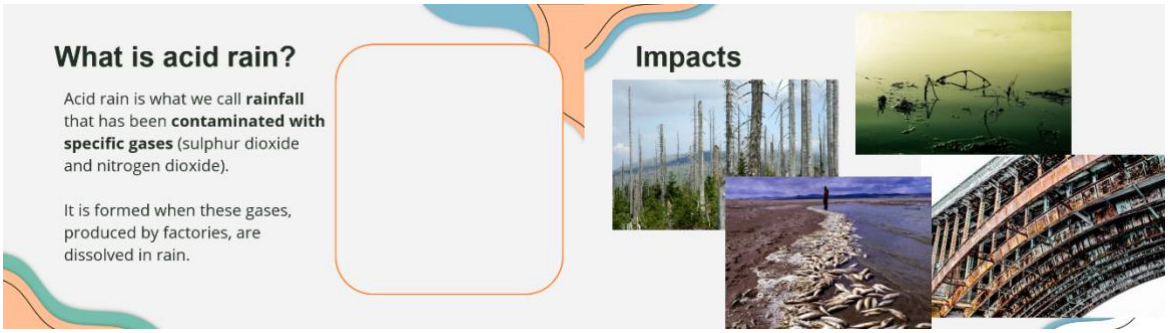

Figure 3. Excerpts from a PowerPoint presentation discussing acid rain, its formation, and its impacts.

While the literature suggests that an overwhelming focus on cause and impact of climate change is part of why Geography can be an ineffective subject for ESD (Bagoly-Simó, 2023), I have found the opposite; giving attention to these ideas is critical to developing the skills that ESD

seeks for young people to have. While the approach I adopted may not specifically satisfy the solutions-oriented approach that ESD encourages, this method provides students some foundational knowledge on what the causes of climate change can look like, and the implications that climate change can have. The CASD course for senior level explicitly states that students should be able to "demonstrate, using evidence from satellite and instrumental data, and historical environmental records, how humans contribute to climate change" (NCCA, 2024a, p. 13). One way I might be able to take this idea further is to encourage students to explore these climate phenomena more closely. For example, students could work in groups to investigate various climate change phenomenon—rising sea levels and temperature, atmospheric carbon levels, and growing extremity of weather patterns, for example—and explore the causes and implications of each. Of course, such an investigation would demonstrate that many of these phenomena are linked, as has been demonstrated in a variety of environmental case studies (Valone, 2019; Zheng *et al.*, 2017). Such an investigation would no doubt develop student appreciation for how nuanced the environmental challenges facing the world today are, and provide the foundation for well-rounded ESD moving forward.

3.2 Teaching sustainable development through the Sustainable Development Goals

As aforementioned, *ESD to 2030* indicates that the SDGs set out by the UN should be central to embedding ESD in curricula (DoE, 2022a). As a student teacher, I initially felt that the SDGs would prove a valuable tool for introducing students to the concept of sustainable development within the Geography classroom. Particularly during my first year of teaching, wherein most of my classes were first-year groups, I implemented the SDGs into learning on different topics where relevant. For instance, in exploring the impacts of volcanic activity across social, economic, and environmental dimensions, students were introduced to SDGs 11, 13, and 15: Sustainable Cities and Communities; Climate Action; and Life on Land respectively (Figure 4). Initially, I found this to be a valuable method for introducing students to the concept of sustainable development and the SDGs and applied this approach to ESD in several topics where relevant.

Figure 4. PowerPoint slides connecting SDGs 11, 13, and 15 to volcanic activity.

On a surface level, this approach undoubtedly satisfies the idea set out by the DoE that SDGs should be central to ESD in schooling in a very literal sense. Furthermore, as the topic of volcanic activity is part of the LC Geography core unit Patterns and Processes in the Physical Environment (NCCA, 2003), this approach demonstrates that there are avenues for embedding ESD in compulsory areas of the LC Geography course. However, several flaws emerge with this approach to incorporating the SDGs into learning.

Perhaps the most notable limitation of this approach is that the SDGs themselves become, essentially, 'facts' that the students are expected to learn. While it may be a helpful way to introduce students to the concept of sustainable development and the SDGs, it does not explore or engage with them in any meaningful way. This is due in-part to the approach I took—telling students which SDGs were relevant as opposed to encouraging them to think for themselves. ESD necessitates that students are problem-solvers regarding sustainable development, and an approach rooted in critically engaging with the SDGs would be far more effective in accomplishing this (Conway *et al*., 2021). This idea is likely a key factor in the solutions-oriented nature of the CASD course (NCCA, 2024a), and should be considered more earnestly in approaches to ESD in Geography at both JC and LC level. To this end, there are several creative ways the SDGs can be applied in the Geography classroom which more aptly facilitates ESD. One such approach is to incorporate SDGs into case study investigations. As a central aspect of the LC Geography course (NCCA, 2003), case studies are a highly effective way of applying knowledge and can be an opportunity for identifying and solving problems in given contexts. Writing in the context of social work education, Addo *et al*. (2022) propose that incorporating the SDGs into case study teaching and learning is a highly effective way of encouraging critical thinking regarding sustainability. In terms of my own teaching practice, this would mean reverse engineering my current approach;

presenting a case study and requiring students to draw connections to the SDGs would encourage the problem-solving and solutions focus integral to ESD.

3.2.1 The SDG quandary

Part of this issue, however, is to do with the very design of the SDGs as a model for sustainable development. It is by no means a unique idea that the SDGs are unfit for practical use outside policy settings; the SDG framework is known to be difficult to translate into local or community action (Choudhary, 2023). Critical engagement with the SDGs is key, but it also key to be critical *of* the SDGs for their contradictions when considered holistically—to what extent can SDG 8, Decent Work and Economic Growth, be achieved globally without impinging on any one of the goals related to environment-focused SDGs, for example? Kopnina (2021, p. 8) highlights that the SDGs' balancing act of social, economic, and environmental goals "is not only anthropocentric... but also counterproductive in educating future planetary citizens". In other words, effective ESD should involve engaging critically with social and economic structures in order to understand environmental challenges. These ideas are considered as part of the CASD specification on what 'action' entails as it emphasises that the course "aims to address root causes of climate and sustainability issues" and "considers power, and who has power, in a given context" (NCCA, 2024a, p. 9). In the Geography context, this could involve having students construct missions or targets for sustainability outside the SDG framework and based upon a class-wide understanding of what sustainable development means. Such an approach would be rooted in critical thinking and, crucially, place heavy emphasis on problem-solving, hence addressing ESD more effectively.

3.3 Limitations of curriculum

The research and my teaching practice both reflect the idea that, with creativity, Geography becomes a highly effective subject for the development of ESD in post-primary education. What I have found in this investigation, however, is that much of what ESD entails in learning goes beyond the bounds of what the Geography curricula of Irish schools tend to cover. There are certainly some connections between the Geography curricula and what I explored in this reflection—one of the Learning Outcomes of JC Geography is to "examine the causes and implications of climate change", for instance (DES, 2017, p. 15). Beyond this, however, many of my efforts to incorporate ESD into my teaching has placed me under significant time pressure in

certain topics. The specification for JC Geography is extensive, but the LC Geography course covers a particularly broad range of topics considering the less-than-two-year time frame students have to complete it. For ESD to be more effectively implemented in Geography, the scope and depth of these curricula may need to be revisited.

4 Conclusion

The initial motivation for this thesis arose from an interesting conversation with Geography and Green Schools teachers in a placement school of the author. One of the more experienced teachers in the group, on the raising of CASD as a topic of conversation, declared that they would refuse to ever teach the subject, as they suspected it would be used as justification for a reduction of the eventual Senior Cycle Geography course. A cursory reading of the current literature on CASD does little to dispel this concern; as aforementioned, no mention of Leaving Certificate Geography is made in the initial background paper to CASD (NCCA, 2022). However, upon further investigation of literature and reflection on teaching practice, this dissertation found that, instead, Geography proves as an exceptionally valuable subject for understanding and preparing for CASD and ESD alike.

4.1 Geography, CASD, ESD, and the SDGs

With many thematic and topic overlaps between the two subjects, Junior Cycle Geography could become a foundational subject for students interested in taking CASD as an eventual Senior Cycle subject. In investigating specific topics, such as climate change, it becomes clear that JC Geography establishes much of the groundwork that would later be developed in CASD. Furthermore, LC Geography could become a highly valuable subject to take alongside CASD as they adopt slightly different approaches to the topics they share. Where Geography is more scientific in its exploration of the causes and implications of geophysical and climate phenomena, CASD is more solutions oriented, meaning the two subjects could synchronise well to contribute to a rounded experience of ESD in post-primary schooling.

A review of current research revealed an academic landscape divided on the effectiveness of Geography as a subject for ESD (Bagoly-Simó, 2023; Meadows, 2020). This dissertation has demonstrated that, with some creative restructuring of pedagogical tools enshrined in Geography teaching practice, ESD becomes a very natural and meaningful part of the Geography curriculum,

as it encourages students to explore the structures of social and economic power that affect the environment, and even engage critically with the language and tools of sustainable development as a whole. The Sustainable Development Goals have, in recent years, become a pervasive shorthand for social, economic, and environmental action, a phenomenon which is also present in schooling. Literature on the SDGs and education have demonstrated that students need to be able to engage critically with the SDGs and consider their role in local, regional, national, and international climate and sustainability action (Choudhary, 2023; Conway *et al.*, 2021).

4.2 Reflection on practitioner research

In recent years, practitioner research become a fundamental part of teacher education and a core aspect of early professional development for teachers (Oolbekkink-Marchand *et al*., 2022). It is understood that through practitioner research, teachers become more cognisant of their pedagogies and, as a result, generally become better at developing or improving their teaching practice (Menter *et al*., 2016). The practitioner research undertaken for this dissertation has reflected this sentiment, particularly in relation to the teaching of Geography and awareness of the intersections of Geography and ESD. In reflecting on the approaches to Geography and ESD through practitioner research—and considering them in relation to academic theory and discourse—it becomes possible to think more critically about how Geography contributes to ESD as well as how it *could* contribute to ESD with creative pedagogies.

A key idea in practitioner research which is reflected in this dissertation is that of accidental ethnography (AccE), described by Levitan *et al*. (2017) as analysis of data which has not been gathered for a specific study. The implication of data gathered by ‘accident’, in particular, speaks to the experience that, at times, the features teaching practice that ultimately proved most significant for this dissertation were weaknesses in pedagogy. In thinking more deeply about the role of SDGs in teaching and how, ultimately, they have proven a somewhat ineffective tool, a deeper discourse on the structure and application of the SDGs in education more widely is reflected. To this end, AccE became a formative aspect of this research, and introduced a layer of critical geographic and educational theory to this dissertation that has broader implications for the position of the SDGs in education.

4.3 Implications for teaching practice

This dissertation has been an invaluable way to assess and reflect on the development of teaching practice over two years. With the aid of literature and practitioner research, this dissertation has cultivated a deeper understanding not only of the intersections between Geography, ESD, and CASD, but also the ways in which these intersections can be accessed through pedagogy.

Many of the teaching methods discussed in this dissertation are, on some level, already a core dimension of Geography teaching and learning in Ireland. Case studies are a necessity across a considerable portion of the LC Geography curricula (NCCA, 2003), and examining cause and implication of geographic phenomena such as climate change is a specific outcome of JC Geography (DES, 2017). However, it is apparent that critical and creative thinking are essential to harnessing the latent connections between Geography and ESD. Clarke & Witt (2019) propose that one of the essential steps that student teachers make in teacher education is to unsettle preconceptions about the rigidity of curriculum in teaching. Placing emphasis on teacher imagination and creativity makes it easier to identify avenues for engaging ESD in Geography that, while pushing beyond the limits of the Geography curriculum, result in a far more valuable experience of ESD for students.

4.4 Implications for curriculum and policy

As aforementioned, this dissertation arose from a place of mild suspicion; this dissertation sought to explore why LC Geography was overlooked in the initial background paper to the development of Senior Cycle CASD (NCCA, 2022). While the intersections between the two subjects are now more apparent, there are still some considerations that need to be made regarding further development of CASD and the eventual redevelopment of Geography through Senior Cycle reform. These considerations are as follows:

(1) While the language of sustainability and sustainable development are apparent within the LC Geography syllabus, it is critical that future Geography reform centres the skills and language of ESD specifically to ensure the subject contributes effectively to ESD in future. The recent background paper on LC Geography indicates that the Irish strategy for ESD is being considered in the redevelopment of the subject (NCCA, 2024b), which is promising. It is critical that ESD is central to the redevelopment of LC Geography so as to assert the subject as a key

contributor to ESD and begin to mend the relationship between Geography and ESD (Bagoly-Simó & Kriewaldt, J., 2023).

(2) The decision to build the Irish ESD strategy on the SDGs is, in the very least, worth revisiting. As demonstrated here, the SDGs can be difficult to apply within the post-primary classroom effectively, just as they can be difficult to apply to local sustainable development efforts (Choudhary, 2023). There is merit in the SDGs as a way of understanding how sustainable development occurs in the present, but engagement with them in educational policy needs to be more critical (Conway *et al*., 2021). Rather than simply basing the Irish ESD strategy on the SDGs, as is expressed throughout *ESD to 2030* (DoE, 2022a), educational policy needs to scrutinise the SDGs thoroughly to develop a more effective approach to ESD in post-primary education.

(3) The similarities between Geography and CASD as LC/SC subjects in terms of both topics and skills are abundant. Even a cursory glance at the respective syllabus and specification reveals considerable overlaps in topics, particularly around interpreting environmental data and the implications of human activity on the environment (NCCA, 2003; NCCA, 2024a). However, LC Geography reform and CASD are seemingly being developed with no clear consultation between one another, as each neglects to discuss the other in their respective background papers (NCCA, 2024b, NCCA, 2022). There are lessons that CASD can learn from LC Geography and vice versa, so it is critical that the NCCA consider this in further development of both courses.

While these considerations are not essential to the development of Geography, ESD, or CASD in Irish post-primary schools, cultivating the connections between these three topics will help ensure students leave Irish schools with a clearer understanding of climate and sustainability issues, and the language and skills necessary to bring about positive change for the future.

References

Addo, R., Koers, G. & Timpson, W. M. (2022). Teaching sustainable development goals and social development: a case study teaching method. *Social Work Education*, 41(7), 1478-1488.

Bagoly-Simó, P. (2013). Half-told stories of climate change: school geography and (un)sustainable development. *Geography*, 98(3), 123-32.

Bagoly-Simó, P. (2023). Geography's unkept promises of education for sustainable development (ESD) on geography's wasted potential to educate for a more sustainable future. *International Research in Geographical and Environmental Education*, 32(1), 53-68.

Bagoly-Simó, P. & Kriewaldt, J. (2023). Future geography teachers for the planet. Powerful (disciplinary) knowledge and education for sustainable development (ESD) in initial teacher education (ITE). *International Research in Geographical and Environmental Education*, 32(1), 1-3. https://doi.org/10.1080/10382046.2023.2158622

Buttimer, A. & Seamon, D. (1980). *The Human Experience of Space and Place*. London: Croom Helm Ltd.

Choudhary, N. (2023). Critiquing the SDG Framework Through the Lens of Goal Two: Empirical Reflections from Two Case Studies in India. *Forum for Development Studies*, 50(2), 261-281.

Clarke, H. & Witt, S. (2019). Seeking to Unsettle Student Teachers' Notion of Curriculum: Making Sense of Imaginative Encounters in the Natural World. In Bamber, P. (Ed.) *Teacher Education for Sustainable Development and Global Citizenship* (pp. 132-143). Routledge.

Conway, B., Leahy, K. & McMahon, M. (2021). Design Education for Sustainability: Identifying Opportunities in Ireland's Second Level Education System. *Sustainability*, 13, 8711. https://doi.org/10.3390/su13168711

Department of Education (2022a). *ESD to 2030: Second National Strategy on Education for Sustainable Development*. https://www.gov.ie/pdf/?file=https://assets.gov.ie/228330/c69895a6-88f0-4132-b6d1-9085a9c31996.pdf

Department of Education (2022b). *Looking at Our School 2022: A Quality Framework for Post-Primary Schools*. https://www.gov.ie/pdf/?file=https://assets.gov.ie/232730/4afcbe10-7c78-4b49-a36d-e0349a9f8fb7.pdf

Department of Education and Skills (2017). *Junior Cycle Geography*. https://curriculumonline.ie/getmedia/2a7a8d03-00e6-4980-bf20-f58def95688f/JC_Geography-en.pdf

Firth, R. (2011). The Nature of ESD through geography: some thoughts and questions. *Teaching Geography*, 36(1), 14-16.

Foley, H. (2017). *Understanding sustainability from a global perspective: exploring the role of education for sustainable development within contemporary education in Ireland*. [Doctoral thesis, University College Cork]. Cork Open Research Archive. https://cora.ucc.ie/server/api/core/bitstreams/5d4d120c-b2cb-4df8-8bd2-d67726046fa0/content

Kenny, S. & Horan, A. (2023). *Cyclone 2nd Edition*. Gill Education.

Kolenatý, M., Kroufek, R. & Činčera, J. (2022). What Triggers Climate Action: The Impact of a Climate Change Education Program on Students' Climate Literacy and Their Willingness to Act. *Sustainability*, 14(16), 10365. https://doi.org/10.3390/su141610365

Kopnina, H. (2021). Transitioning to Quality Education: Examining Education for Sustainable Development Goals, Its Limitations, and Alternatives. In Jeronen, E. (Ed.) *Transitioning to Quality Education* (pp. 1-22). Multidisciplinary Digital Publishing Institute.

Kumar, P., Sahani, J., Rawat, N., Debele, S., Tiwari, A., Mendes Emygdio, A. P., Abhijith, K. V., Kukadia, V., Holmes, K. & Pfautsch, S. (2023). Using empirical science education in schools to improve climate change literacy. *Renewable and Sustainable Energy Reviews*, 178, 113232. https://doi.org/10.1016/j.rser.2023.113232

Levitan, J., Carr-Chellman, D. & Carr-Chellman, A. (2020). Accidental ethnography: A method for practitioner-based education research. *Action Research*, 18(3), 336-352.

Martin, S., Dillon, J., Higgins, P., Strachan, G. & Vare, P. (2015). Reflections on ESD in UK Schools. In Jucker, R. & Mathar, R (eds), *Schooling for Sustainable Development in*

Europe: Concepts, Policies and Educational Experiences at the End of the UN Decade of Education for Sustainable Development (pp. 335-360). Springer International Publishing.

McGarr, O. (2010). Education for sustainable development in technology education in Irish schools: a curriculum analysis. *International Journal of Technology and Design Education*, 20, 317-332.

Meadows, M. E. (2020). Geography Education for Sustainable Development. *Geography and Sustainability*, 1(1), 88-92.

Menter, I., Elliot, D., Hulme, M., Lewin, J. & Lowden, K. (2016). *A Guide to Practitioner Research in Education*. SAGE Publications Ltd.

Miao, S., Meadows, M. E., Duan, Y. & Guo, F. (2022). *Distribution of keywords in American Geography Curriculum Standards.* [Graph]. In "How Does the Geography Curriculum Contribute to Education for Sustainable Development? Lessons from China and the USA". *Sustainability*, 14, 10637, p. 12. https://doi.org/10.3390/su141710637

Miao, S., Meadows, M. E., Duan, Y. & Guo, F. (2022). *Distribution of keywords in Chinese Geography Curriculum Standards.* [Graph]. In "How Does the Geography Curriculum Contribute to Education for Sustainable Development? Lessons from China and the USA". *Sustainability*, 14, 10637, p. 9. https://doi.org/10.3390/su141710637

Morgan, A. (2011). Sustaining ESD in Geography. *Teaching Geography*, 36(1), 6-8.

National Council for Curriculum and Assessment (2003). *Leaving Certificate Geography Syllabus*. https://www.curriculumonline.ie/getmedia/9da21be1-3f99-4f50-88ee-ba7ce6638e1a/SCSEC17_Geography_syllabus_eng.pdf

National Council for Curriculum and Assessment (2022). *Background paper and brief for the development of Leaving Certificate Climate Action and Sustainable Development*. https://ncca.ie/media/5920/background-paper-for-lc-casd_0622.pdf

National Council for Curriculum and Assessment (2024a). *Draft Leaving Certificate Climate Action & Sustainable Development specification: For consultation*. https://ncca.ie/media/xuqm5a0i/lc-climate-action-sustainable-development-draft-specification-2024.pdf

National Council for Curriculum and Assessment (2024b). *LC Geography Background paper and brief*. https://ncca.ie/media/5vhl1qgk/lc-geography_background-paper-and-brief.pdf

O'Flaherty, J. & Liddy, M. (2018). The impact of development education and education for sustainable development interventions: a synthesis of the research. *Environmental Education Research*, 24(7), 1031-1049. https://doi.org/10.1080/13504622.2017.1392484

Oolbekkink-Marchand, H., Oosterheert, I., Scholte Lubberink, L. & Denessen, E. (2022). The position of student teacher practitioner research in teacher education: teacher educators' perspectives. *Educational Action Research*, 30(3), 445-461.

Satchwell, C. (2013). "Carbon literacy practices": textual footprints between school and home in children's construction of knowledge about climate change. *Local Environment*, 18(3), 289-304.

United Nations (1992). *Agenda 21*. United Nations Conference on Environment & Development. https://sdgs.un.org/sites/default/files/publications/Agenda21.pdf

United Nations (2015). *Transforming Our World: The 2030 Agenda for Sustainable Development*. https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf

United Nations Educational, Scientific and Cultural Organization (2014). *Shaping the Future We Want: UN Decade of Education for Sustainable Development (2005-2014), Final Report*. https://unesdoc.unesco.org/ark:/48223/pf0000230171/PDF/230171eng.pdf.multi

Valone, T. F. (2019). Predictive connection for 2100 between Atmospheric Carbon, Global Warming and Ocean Height Based on Climate History. *International Journal of Environment and Climate Change*, 9(10), 562-593.

Zheng, Y., Pancost, R. D., Liu, X., Wang, Z., Naafs, B. D. A., Xie, X., Liu, Z., Yu, X. & Yang, H. (2017). Atmospheric connections with the North Atlantic enhanced the deglacial warming in northeast China. *Geology*, 45(11), 1031-1034.