



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

Comparing education for sustainable development in initial teacher education across four countries

Citation for published version:

Evans, NS, Inwood, H, Christie, B & Ärlemalm-Hagsér, E 2021, 'Comparing education for sustainable development in initial teacher education across four countries', *International Journal of Sustainability in Higher Education* . <https://doi.org/10.1108/IJSHE-07-2020-0254>

Digital Object Identifier (DOI):

[10.1108/IJSHE-07-2020-0254](https://doi.org/10.1108/IJSHE-07-2020-0254)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Peer reviewed version

Published In:

International Journal of Sustainability in Higher Education

Publisher Rights Statement:

© 2021, Emerald Publishing Limited. This AAM is provided for your own personal use only. It may not be used for resale, reprinting, systematic distribution, emailing, or for any other commercial purpose without the permission of the publisher.

General rights

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact openaccess@ed.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.





Comparing Education for Sustainable Development in initial teacher education across four countries

Journal:	<i>International Journal of Sustainability in Higher Education</i>
Manuscript ID	IJSHE-07-2020-0254.R2
Manuscript Type:	Research Paper
Keywords:	Initial teacher education, Preservice teacher education, Education for sustainable development, Learning for sustainability, Environmental education for sustainability, sustainability

SCHOLARONE™
Manuscripts

1
2
3
4 Comparing Education for Sustainable Development in initial teacher education across four
5 countries
6

7 **Abstract**

8
9
10 **Purpose:** This paper undertakes a cross-comparative inquiry into Education for Sustainable
11 Development (ESD) related to governance, initiatives and practices in initial teacher
12 education (ITE) across four countries with very different contexts – Sweden, Scotland,
13 Canada, and Australia. It provides insights into issues arising internationally, implications for
14 ESD in ITE, and offers learnings for other countries and contexts.
15

16
17 **Design/methodology/approach:** A cross-comparative study design with overarching themes
18 and within-case descriptions was applied to consider, compare and contrast governance
19 characteristics, initiatives and practices from each context.
20

21
22 **Findings:** The approaches to governance, initiatives and practices that each country adopts
23 are unique yet similar, and all four countries have included ESD in initial teacher education
24 to some extent. Comparing and contrasting approaches has revealed learnings focused on
25 ESD in relation to governance and regulation, practices, and leadership.
26

27
28 **Research limitations/implications:** Making comparisons between different contexts is
29 difficult and uncertain, and often misses the richness and nuances of the individual sites
30 under study. However, it remains an important endeavour as the challenges of embedding
31 ESD in initial teacher education will be better understood and overcome if countries can
32 learn from one another.
33

34
35 **Originality/value:** Scrutinising different approaches is valuable for broadening views about
36 possibilities, and understanding how policies and initiatives translate in practice.
37

38
39 **Keywords:** Initial teacher education, pre-service teacher education, Education for
40 Sustainable Development, Learning for Sustainability, Environmental Education,
41 Sustainability
42
43
44

45 **Introduction**

46
47 In demanding times like these, with ecological, economic, social and technological changes
48 and challenges, the importance of embedding Education for Sustainable Development (ESD)
49 into initial teacher education (ITE) cannot be underestimated. This is reinforced by the
50 United Nations' Sustainable Development Goal 4, Target 4.7, that by 2030 all learners will
51 have the necessary knowledge and skills to promote sustainable development (United
52 Nations, n.d.a). Critically, Target 4.7 underpins progress across the entire 2030 sustainable
53 development agenda aiming to promote global peace and prosperity by ending poverty and
54 hunger; achieving universal human rights, gender equality and the empowerment of all
55 women and girls; and ensuring ongoing protection of Earth systems and its natural
56 resources (United Nations, n.d.b). Without building new teachers' capacity in ESD, it is hard
57 to imagine how they, in turn, will enable their future students to develop the necessary
58
59
60

1
2
3 competencies to overcome complex sustainability issues such as climate change, poverty
4 and biodiversity loss.
5

6
7 The push by global policy makers for ESD to be included in ITE is nothing new. A history
8 recognising the importance of ITE in progressing the principles and practices that underpin
9 sustainability dates back to the 1971 International Union for Conservation of Nature (IUCN)
10 Conference on Environment and Conservation Education where a specific session was
11 dedicated to environmental education in primary, secondary and teacher education
12 (International Union for Conservation of Nature and Natural Resources, 1972).

13
14 Understandings have been reinforced ever since through international policy directives by
15 UNESCO (1978), UNESCO-UNEP (1977; 1988) and UNECE (2005; 2012; 2016). These have
16 been further reinforced by initiatives like the UNESCO Chair on Reorienting Teacher
17 Education for Sustainability (York University, n.d), the Decade of Education for Sustainable
18 Development (UNESCO, 2019a) and the Global Action Programme on Education for
19 Sustainable Development (UNESCO, 2019b). ESD and ITE also continue to be an area for
20 scholarly research around the world (e.g., Council of Ministers of Education, Canada [CMEC],
21 2012; Author *et al.*, 2017; Ferreira and Ryan, 2012; Ferreira *et al.*, 2009; Karrow *et al.*, 2016;
22 Karrow and DiGuseppe, 2019; Kennelly and Taylor, 2007; Nolet, 2009; Steele, 2010;
23 Summers *et al.*, 2005). The enactment of policies and initiatives, however, is problematic.
24 After nearly 40 years, the most recent UNESCO (2018a) report on progress towards ESD
25 finds that pre- and in-service teacher education in ESD is unsatisfactory, citing insufficient
26 teacher training as the greatest problem.
27
28
29

30
31 Few would dispute that embedding ESD into ITE is fundamental to ensuring future teachers
32 are prepared to teach in areas related to sustainability. Indeed, around the world, some
33 governments have added ESD to the education agenda. For example, Scotland and Wales
34 include sustainability in the professional standards for teachers (see General Teaching
35 Council for Scotland, 2019; Department for Children, Education, Lifelong Learning and Skills,
36 2008). In Sweden ESD is embedded into the core curriculum of all students from preschool
37 to year 12. Australia includes ESD (or Sustainability Education as it is known there) as a
38 cross-curriculum priority in the national curriculum for students from Year 1 to 10 (see
39 Australian Curriculum, Assessment and Reporting Authority [ACARA], n.d.) and, thereby,
40 into the education of student teachers. Exactly how such policies and other initiatives are
41 enacted in practice, however, is complicated, with little evidence that any one approach is
42 most effective (UNESCO, 2019c; McKeown and Hopkins, 2014).
43
44
45

46
47 This paper adopts a cross-comparative methodology to examine approaches to ESD in ITE
48 based on governance characteristics, initiatives and practices as applied in different corners
49 of the world – Sweden, Scotland, Canada, and Australia – where the first author spent time
50 as part of a six month sabbatical. Governance includes the policies, leadership, and
51 management of an institution as related to ESD (Beveridge *et al.*, 2019). Initiatives refer to a
52 new plan or process to achieve something or solve a problem, and practices are actions
53 taken to accomplish something, in this case to better embed ESD into ITE (Cambridge
54 Dictionary, 2020; Merriam-Webster Dictionary, 2020). The purpose of this paper is to gain
55 insights by comparing issues arising internationally in this field, analysing implications of the
56 issues for ESD in ITE, and identifying insights from this analysis. Scrutinising different
57 approaches can be valuable for broadening views about possibilities, and understanding
58 how ideas work in practice at the ITE system level (Darling-Hammond, 2017). The study's
59
60

1
2
3 four countries were selected due to their historical association with ESD, their response to
4 the DESD and subsequent related educational initiatives. The authors recognise the
5 limitation of including only four countries in terms of diversity and global representation.
6 However, this study sought to provide balance between thick and thin descriptions, and
7 limiting to four countries enabled this to happen within the required word limit. Future
8 studies that to build on this work and diversify the sample are encouraged.
9
10

11 The paper begins by providing the conceptual background, followed by an explanation of
12 the methodology guiding the analysis. An overview of each country's nuanced approach to
13 ESD in ITE is provided before moving onto a comparison of the countries' approaches and
14 implications for ESD in ITE. But first, to address the issue of terminology, it is noted at the
15 outset that while the term ESD is promoted by the United Nations and taken up in many
16 countries, its use is not consistent globally. In reality, many variations are in use, including
17 Environmental Education (EE), Education for Sustainability (EfS), Learning for Sustainability
18 (Lfs), Sustainability Education (SE), Environmental Education for Sustainability (EES) and,
19 more recently, Climate Change Education (CCE). While these variations can be traced back
20 to the philosophical and pedagogical orientations of EE, each term does represent a
21 different area of emphasis for educators (Ferreira *et al.*, 2019; Jickling and Sterling, 2017).
22 Importantly, Jickling and Sterling (2017) warn that when using such terms as ESD there is
23 always a risk that they become empty signifiers. They argue for a critically reflective
24 approach to education capable of responding to an urgent demand to remake education to
25 be responsive to extraordinary and uncertain times. While the terminology may be
26 different, these traditions share a common aim to equip future citizens with the necessary
27 competencies to respond to complex 21st century challenges (UNESCO, 2017). In this paper,
28 the authors have chosen to use the term ESD to reference these various traditions broadly
29 for consistency sake, but do deviate within each of the four stories of practice, recognising
30 the tensions inherent in this choice.
31
32
33
34
35
36

37 **Taking a systems approach to ESD in initial teacher education**

38
39 This work draws on the concepts of 'systems thinking' and 'embedding' to conceptualise a
40 systems-approach to including ESD in ITE (Ferreira *et al.*, 2019). Systems thinking provides a
41 framework for understanding complex phenomena or managing complex issues or
42 problems by focusing on the whole and the relationships between the different parts that
43 make up the whole (Flood, 2001; Sterling, 2004). Embedding is to enclose closely or to make
44 something an integral part (Merriam-Webster dictionary, 2020). A systems-approach to
45 embedding ESD in ITE, also known as 'mainstreaming' (Ferreira *et al.*, 2006; Ferreira *et al.*,
46 2007a), refers to integrating ESD in a thorough and systematic fashion (Ferreira *et al.*, 2019)
47 so that it becomes an integral part of a school or program's philosophies, governance,
48 policies, curriculum and pedagogical practices, processes and activities.
49
50
51

52 A systems-approach to embedding ESD in ITE consists of two premises. The first is that ITE is
53 a complex and difficult to control system (Steele, 2010) as it is nested within a broader
54 education system that comprises multiple, interconnected, hierarchical levels and
55 institutionalised subsystems (Ferreira and Ryan, 2012; Ferreira *et al.*, 2019). Each
56 subsystem, pertaining to the broader education system, has its own rules, interconnections,
57 institutionalised hierarchies, and stakeholders with differing agendas (Ferreira and Ryan,
58 2012; Ferreira *et al.*, 2019). For example, an education system as a whole consists of a
59
60

1
2
3 variety of organisations such as departments of education, boards of teacher registration
4 and accreditation, teacher associations, teacher education institutions, school districts, and
5 schools. Each one of these has multiple members with differing foci, connections and points
6 of influence. Consider, for instance, that a school is made up of a principal, administrative
7 staff, heads of curriculum or departments, teachers, parents and friends associations, local
8 communities and students. Each one of these groups has its own dynamics, has similar or
9 differing agendas and interests, and multiple other connections and influences. Embedding
10 ESD in ITE in a thorough and systematic fashion requires that all actors within the system
11 simultaneously work together for change (Ferreira *et al.*, 2009). However, change under
12 such complex conditions is difficult to control (Steele, 2010), and rarely happens at the same
13 pace.
14
15
16

17
18 The second premise is that thorough and systematic change towards ESD requires iterative
19 and tenacious disruption, reorientation and transformation of existing systems and sub-
20 systems (Jickling and Sterling, 2017; Scott *et al.*, 2012; Sterling, 2012; Stevenson, 1987).
21 Disruption is a consequence of change that goes beyond a particular level or sub-system of
22 interest. This means that actions focused on transforming ITE towards ESD must go beyond
23 teacher educators themselves, to include all agents of change and stakeholders, such as
24 departments of education, boards of teacher registration, professional teacher associations,
25 schools and staff, students, business and community members (Ferreira *et al.*, 2009). This is
26 very different to the type of change known as adaptation, which simply changes parts of the
27 system, such as content and courses, to fit in with existing contexts. We therefore argue
28 that reorienting and transforming ITE towards ESD that can be sustained long-term will
29 require the disruption and transformation of existing philosophies, policies and practices
30 related to operations, culture, governance, management and curriculum (Author *et al.*,
31 2016; Scott *et al.*, 2012).
32
33
34
35

36 In summary, a systems approach to embedding ESD in ITE goes beyond tinkering at the
37 edges to adapt practices or make changes to one part of the system. In following Ferreira *et al.*,
38 (2007a, 2007b), systematic change requires the broad-scale adoption of an idea across a
39 whole system so that it becomes mainstreamed into day-to-day operations and practices. In
40 ITE, then, a systems-approach to embedding ESD goes beyond adding a subject or including
41 it into the curriculum, to it becoming an integral part of a programme, department or
42 institution's values, policies, core curriculum and pedagogical practices (Author *et al.*, 2016).
43 Faculties or departments of education around the world are attempting to bring about this
44 type of systemic change in relation to ESD, with varying degrees of sophistication. As already
45 mentioned, the paper compares how ITE programmes in Sweden, Scotland, Canada, and
46 Australia are working with a variety of administrative, programmatic and curricular changes
47 to embed ESD into their work with pre-service teachers.
48
49
50

51 **Methodology**

52

53
54 Despite the continued reliance on and popularity of international comparative research in
55 Higher Education (Cantwell, 2020), tension still remains between the need for comparative
56 generalisability and contextual detail (Kosmützky *et al.*, 2020). This paper proves no
57 exception to the ongoing debate. The authors recognise that taking a cross-comparative
58 approach is useful for examining ESD in ITE policies or legislation, initiatives, and practices
59 across different contexts. However, whilst the cross-comparative benefits enable general
60

patterns to be revealed, they limit a full examination of the uniqueness of the individual contexts (see Kosmützky *et al.*, 2020 for a discussion of this methodological challenge). Given this tension and limitation, the authors include both overarching themes and within case descriptions. In doing so it is maintained that scrutinising different approaches is valuable for broadening views about possibilities, and understanding how (ESD) ideas work in practice at the ITE system level (Darling-Hammond, 2017).

The comparative framework focuses on three key themes: governance, initiatives, and practices related to ESD. Each author reviewed country specific ESD national, provincial/state and institutional policies, curriculum documents, reports, and guidelines, in combination with critical analysis of their aggregate knowledge and experience to write a narrative case about ESD in ITE within their own country in light of the three themes. The first author then analysed the three narratives independently first, then as a whole to discern unique qualities, similarities and differences (Esser and Vliegthart, 2017) with a focus on comparing and contrasting governance characteristics, initiatives and practices from each context. Discussions between the four authors followed to discuss and further analyse the cases, resulting in cross-case findings that can be contextualised and understood in relation to the country-specific descriptions.

As part of this process, the authors acknowledged their status as four privileged, female, teacher education academics from white middle class western backgrounds. While the cross-comparative methodology provides a rigorous framework for revealing patterns across the four study countries, the authors recognise the influence of their own subjectivities in interpretation, including understandings of the four countries in this study, within which each one lives and works.

Sweden

In Sweden, the government sees education as an important tool for promoting the concept of sustainable development across Swedish society, and ultimately achieving a sustainable society. Accordingly, ESD, also known as learning for sustainable development and learning for sustainability, is legislated across all levels of education. Within higher education Universities sit under the Swedish Higher Education Act which states that “in the course of their operations, higher education institutions shall promote sustainable development to assure for present and future generations a sound and healthy environment, economic and social welfare, and justice” (Swedish Council for Higher Education, 2019, section 5). Specific to ITE, the qualification descriptors in the Qualifications Ordinance of the Swedish Higher Education Act (Annex 2) requires students to demonstrate the capacity to make assessments in educational processes with particular respect to sustainable development. Overall, Swedish universities are making progress, although the level of progress varies between universities (Lundh and Ruling 2008; Swedish Higher Education Authority [UKÄ], 2018). A northern European study (Tilbury *et al.*, 2014) reporting on regional opportunities for developing ESD competences found that some higher education institutions support sustainable development within strategic plans and employ staff specifically to lead and progress strategic work on ESD. A later 2018 evaluation by the Swedish Higher Education Authority (UKÄ) reported that about half of Swedish universities have established overall sustainable development goals and integrated ESD into at least some programmes. A number of universities promote sustainable development through, for example, staff

1
2
3 seminars, training days and networking opportunities. However, overall, there are limited,
4 readily available opportunities for staff development in ESD (Tilbury *et al.*, 2014). Most
5 university lecturers demonstrate greater understanding of ESD as related to curriculum than
6 pedagogy, and focus on one rather than all three of the social, ecological and economic
7 dimensions of sustainability. A similar trend emerges in pre-service teachers. In a study
8 investigating how preschool pre-service teachers describe ESD, Author (2019) found that
9 responses overwhelmingly support the knowledge over the social and ecological domains.
10 As a result, Swedish pre-service teachers may graduate with only a partial understanding of
11 ESD. In another study, Author (2017) critically analysed how pre-service teachers describe
12 their professional experiences (practicums) with ESD. They depict different cultures of
13 'doing' ESD in early childhood settings, reflecting pluralistic and divergent landscapes of
14 understandings, as well as an absence of transformative whole-institution approaches in the
15 implementation of ESD.
16
17
18
19

20 A few initiatives have targeted the advancement of ESD within teacher education generally
21 and, consequently, ITE. These include a national network of teacher educators called Lärhut,
22 and the Global School. Lärhut, now defunct, aimed to grow ESD in teacher education
23 generally and develop teacher educator capacity to integrate ESD in their teaching and
24 learning practices. The Global School is a broader initiative that provides professional
25 development to staff in preschools, primary and secondary schools, pre-service teachers
26 and teacher education academics in learning for sustainable development, including the
27 sustainable development goals, climate change, democracy, human rights, equality, energy,
28 consumption and controversy (Swedish Council for Higher Education, n.d.). The Global
29 School is an important initiative for capacity building in ITE, considering that ESD
30 competencies form part of learning outcomes pertaining to all Swedish teacher education
31 courses, as well as the examination programme that pre-service teachers are required to
32 complete prior to graduation (UNECE, 2016). However, flexible regulation does influence
33 outcomes.
34
35
36
37

38 The Swedish Higher Education Act is unregulated. As a result, there is much variation in the
39 application of ESD, the extent to which teacher education institutions engage with ESD, and
40 the rigor of the examinations. For example, Malmö University has 27 goals on content and
41 skills for student teachers, including global challenges, citizenship, sustainability and
42 intercultural themes. Pre-service teachers studying upper secondary education complete a
43 course called *Global challenges in a subject context*, which aims to provide the skills and
44 awareness on how to implement ESD within their teaching practice (Swedish International
45 Centre of Education for Sustainable Development [SWEDESD], 2017). Mälardalen
46 University's early childhood teacher education programme takes a developmental approach
47 to ESD. ESD is implemented throughout the years to align with the development of pre-
48 service teachers' knowledge and skills. This begins in the first year of studies (semester 1-2)
49 with establishing knowledge about ESD as an objective, continues in the second year
50 (semesters 3-4) with consolidating and applying ESD in practice, and is extended in the third
51 and fourth years (semesters 5-7) by deepening the knowledge and critically examining
52 multiple understandings and approaches by problematising ontological and epistemological
53 perspectives on ESD in theory and practice. Interestingly, an evaluation into the integration
54 of ESD in the early childhood teacher education programme at Mälardalen University
55 (Author, 2015), found a number of different interpretations. Even though ESD was
56
57
58
59
60

1
2
3 incorporated into the programme, varying interpretations and understandings emerged
4 among staff about what pre-service teachers should learn and what sustainability is or may
5 be in ECE settings.
6
7

8 **Scotland**

9 In 2012 Scotland more formally departed from the ways in which ESD was being developed
10 elsewhere and introduced policy development and implementation titled *Learning for*
11 *Sustainability* (Lfs) (Author, 2018). Learning for Sustainability can be defined as an approach
12 to life and learning which enables learners, educators, schools and their wider communities
13 to build a socially-just, sustainable and equitable society. This development built upon a
14 major national curriculum reform in 2004, *Curriculum for Excellence* (Education Scotland,
15 2004), which introduced an initiative to embed global citizenship and ESD as themes across
16 learning and included outdoor learning as a key pedagogical approach within the curriculum
17 (Education Scotland, 2008). It also secured a commitment from the Scottish Government, in
18 2013, to make Lfs an entitlement for all learners in Scotland (Scottish Government, 2012,
19 2013).
20
21
22
23

24 The Lfs policy context in Scotland is globally unique in that it brings together ESD, global
25 citizenship and outdoor learning as an integrated holistic concept (Author, 2018). The policy
26 architecture of Lfs includes regulatory frameworks such as assessment measures; Lfs
27 appears in the fourth edition of Education Scotland's self-evaluation framework for schools,
28 *How good is our school?* (Education Scotland, 2015). Further, the Scottish Qualifications
29 Agency (which oversees pupil assessments), committed in 2020 to embedding Lfs in all new
30 qualifications, and all existing ones as they come up for revision (Scottish Qualifications
31 Agency, 2020).
32
33
34

35 The continued commitment to Lfs was reconfirmed in 2016 when Lfs was aligned with the
36 Sustainable Development Goals through the *Vision 2030+* report (Scottish Government,
37 2016). This re-emphasized the original (2012) recommendations that:

- 38 - all learners should have an entitlement to Lfs;
- 39 - every practitioner, school and education leader should demonstrate Lfs in their
40 practice;
- 41 - every school should have a 'whole-school' approach to Lfs that is robust,
42 demonstrable, evaluated and supported by leadership at all levels;
- 43 - all school buildings, grounds and policies should support Lfs;
- 44 - a strategic national approach to support for Lfs should be established.
45
46
47

48 Scottish Ministers again accepted all five of the *Vision 2030+* recommendations and
49 resolved to progress development of the vision by translating the recommendations into an
50 Lfs Action Plan (Education Scotland, 2019), which highlights how the recommendations of
51 the *Vision 2030+* report will be implemented by Scottish Government over the following
52 three to five years.
53
54

55 Therefore, Scotland has an opportunity to systematically develop Lfs throughout ITE, not
56 least through the regulatory structure of the General Teaching Council of Scotland (GTCS)
57 Professional Standards. Currently all ITE provision must conform to the GTCS professional
58 standards, so, by extension all ITE programmes should be steeped in Lfs; this is not the case.
59
60

1
2
3 As Nicol *et al.*, (2019) note, “despite the existence of LfS in the GTCS professional standards,
4 it appears that such programmes are still being approved where LfS is an “add on” rather
5 than being fully embedded within the initial teacher education curriculum” (p. 27). Their
6 research suggests that whilst a systematic approach was intended, an ad-hoc approach has
7 been the outcome. Other research reveals resistance to change arising from a lack of clarity
8 over what LfS is and means, and a lack of confidence to engage in an approach that may not
9 feel ‘relevant’ to specific teaching discipline (Author, 2019). Further tension stems from an
10 educational system that does not reflect the philosophy of LfS, resulting in teacher
11 educators experiencing dissonance between the rhetoric and the reality of professional
12 practice, which reflects a piecemeal rather than systematic approach to ‘root and branch’
13 change.
14
15
16
17

18 To support the development of ESD in ITE specifically, a UK wide community of practice in
19 Education for Sustainable Development and Global Citizenship, *TEESNet (Teacher Education*
20 *for Equity and Sustainability Network)* was established. In 2019, TEESNet and the University
21 of Edinburgh (Scotland), funded by the British Council, developed professional learning
22 titled *Introducing Learning for Equity and Sustainability in Initial Teacher Education*, offered
23 at an introductory and advanced level. In Scotland it supports the ambition of the LfS Action
24 Plan which seeks to deliver systemic change across all levels of education.
25
26
27

28 Despite recent research (Author, 2020) supporting LfS as a clear priority in Scottish
29 education, recent ITE specific development of governance and policies are limited if ITE does
30 not systematically embrace and embed the initiatives. Aspirant teachers coming into the
31 profession need to meet the GTCS Professional Standards and, importantly, should be
32 supported by staff and an academic institution that truly understands and values LfS as core
33 to that national regulatory process. However, this is not always the case. Initial teacher
34 education leadership at the organisation level in Scotland mostly overlooks the
35 governmental and regulatory frameworks that exist resulting in patchy and inconsistent
36 whole institution approaches to LfS across Higher Education.
37
38
39
40

41 **Canada**

42
43 Education is decentralised in Canada, with governance, policies and practice differing
44 greatly across ten provinces and three territories, making any kind of curricular or
45 pedagogical change towards ESD across the country highly challenging. There is a lack of
46 agreement on the terminology, with some regions using Environmental Education (EE),
47 while others use ESD, signaling a closer affiliation with the UN. While efforts have been
48 made since the 1980s to better embed ESD into ITE, progress has been slow and
49 intermittent (Author, 2020), and not reflective of a systematic model of change in this area.
50 The UNESCO Chair on Reorienting Teacher Education for Sustainability (York university, n.d.)
51 was established in a Canadian university in 1999, and yet ESD has been marginalised and
52 variable across the country, thanks to the decentralised governance of education, though in
53 the last five years this has started to change slowly as policymakers, administrators,
54 scholars, and educators have begun advocating for its development and implementation
55 (Karrow *et al.*, 2016). A report addressing ESD in Canadian Faculties of Education (CMEC,
56 2012) found that many faculties of education across the country have been making efforts
57 to embed ESD or “ESD-like principles” (p. 63) into their ITE programmes, while noting that
58
59
60

1
2
3 this work is fragmented, highly variable, and typically relies on champions within each
4 faculty of education. Some faculties of education have developed ESD courses or infused
5 existing subjects with ESD principles and practices, indicative of an adaptive approach, while
6 a few have developed ESD centres or groups. In universities where ESD is least developed,
7 faculties of education tend to “give lip-service to plans for enhancement and improvement”
8 in relation to ITE (Karrow *et al.*, 2016, p. 13). This is not surprising; according to one study
9 (Beveridge *et al.*, 2017), only four provinces (Ontario, Manitoba, British Columbia and
10 Quebec) have governance policies in place related to education’s role in sustainable
11 development, and Ontario is the only province with a specific policy framework focused on
12 Environmental Education (Ontario Ministry of Education, 2009). Interestingly, curriculum
13 support documents, including pedagogical guides and resources, are available in these four
14 provinces, as well as in some locales without specific ESD policies, as some school districts
15 have taken responsibility for creating their own resources to support inservice teacher
16 education in this area.
17
18
19
20

21 There are signs that ESD in both ITE and inservice teacher education is starting to be found
22 on a broader scale. In 2012, the *Sustainability Education Policy Network* (<https://sepn.ca/>)
23 began a national research collaboration that examines sustainability practices in Canadian K-
24 12 and higher education contexts. This prolific research team has shared findings in relation
25 to many aspects of ESD, including policy, strategic planning, fossil fuel divestment, and
26 climate change education (Bieler and McKenzie, 2017; Henderson *et al.*, 2017; Hargis *et al.*,
27 2018), though it has not conducted research into ESD in ITE in a focused way. SEPN’s
28 research has informed the work of the *Environmental and Sustainability Education in*
29 *Teacher Education* (ESE-TE) network (<http://eseinfacultiesofed.ca/>), an initiative which is
30 dedicated to advancing and supporting the development of high quality ESE in initial and
31 inservice teacher education in Canada through conducting research and professional
32 development, and informing policy. The *ESE-TE* network found its origins in 2013, bringing
33 together faculty and community educators dedicated to this work. It has instigated new
34 research and resources (Author, 2014; Karrow *et al.*, 2016), and led a *National Roundtable*
35 in 2016 which established a National Action Plan focused on deepening knowledge and
36 praxis about ESD in pre-service and inservice teacher education. An anthology of recent
37 research has already resulted from this new pan-Canadian collaboration (Karrow and
38 DiGiuseppe, 2019), as has a special issue of the *Canadian Journal of Environmental*
39 *Education* (35(1)), published in 2020. Their work supports a recent announcement by the
40 Association of the Canadian Deans of Education (2019), which has stated its intention to
41 create a new policy statement on sustainability in 2021, signaling that thinking about ESD in
42 ITE is happening more broadly.
43
44
45
46
47
48

49 Despite the lack of federal governance or policy in ESD, a growing interest in ESD within ITE
50 is translating into innovative practice. A few ITE programmes are fortunate to have
51 sustainability as a core function of their university’s strategic plans. For example, the
52 University of British Columbia, known for its leadership in campus sustainability, has an ITE
53 cohort focused on Education for Sustainability (Robertson *et al.*, 2020), as well as an
54 extensive educational garden (Ostertag, *et al.*, 2019) to enhance pre-service teachers’
55 involvement in environmental and experiential learning. At the University of Saskatchewan,
56 pre-service teachers take a mandatory “pedagogies of place” course, which critically and
57 experientially examines place through an examination of social justice and environmental
58 issues and how to address these in classrooms. At Trent University, a core course on
59
60

1
2
3 Indigenous Education and Environmental Education is a mandatory part of its ITE
4 programme, and is supported by an active Eco-Mentorship programme to enhance
5 students' extracurricular learning. At the Ontario Institute for Studies in Education (OISE),
6 providing extracurricular programming in ESD was a starting point that led to ESD core
7 courses in its ITE programme, an annual ESD conference, an educational garden filled with
8 native plants, and over a dozen community-created environmental art installations. These
9 developments point to the deepening of an adaptive approach to ESD across Canada, but
10 falls far short of the systematic approach needed to effectively and quickly shift ITE
11 programmes towards sustainability in this country.
12
13
14

15 **Australia**

16
17 In Australia ESD is known as Education for Sustainability (EfS) or sustainability education.
18 Overall, Australia's governance of ESD in ITE can be described as ad-hoc. ESD is not, and has
19 never been, a mandated component of Australian school or ITE. Nevertheless, the Decade
20 of Education for Sustainable Development (DESD) did provide impetus for the Australian
21 government to demonstrate strong leadership by developing a range of supportive national
22 and state policies, frameworks and other initiatives to encourage take-up of ESD across the
23 education sector, and by default ITE. This includes, for example, two national action plans
24 (2000 and 2009) to guide ESD, a national environmental education statement providing a
25 framework for schools wishing to engage with ESD (Australian government, Department of
26 the Environment and Heritage, 2005), and the *Australian Sustainable Schools Initiative*
27 (AuSSI) to support schools to develop a whole-school approach to ESD. However, the end of
28 the DESD in 2014, coinciding with the election of national and state conservative
29 governments and increased attention to standardised education, resulted in withdrawal of
30 ESD support and policy related documents from Australian government websites. It should
31 be noted that policy to direct ESD in school education remains in some states. However, the
32 only existing national framework capable of guiding Australian educators across all states
33 and territories in embedding ESD into the curriculum is the Sustainability Cross-curriculum
34 Priority. The priority forms part of the Australian National Curriculum and aims to "allow all
35 young Australians to develop the knowledge, skills, values and world views necessary for
36 them to act in ways that contribute to more sustainable patterns of living" (ACARA, 2016,
37 para 2). According to ACARA (n.d.), sustainability should be included in all learning areas "in
38 ways that are consistent with the content and purpose of the area of study" (para 4).
39
40
41
42
43
44

45 Interestingly, and dismaying to sustainability educators, the most recent (2019) national
46 policy document directing the trajectory of Australian education - the *Alice Springs*
47 *(Mparntwe) Education Declaration* (Australian Government Department of Education, Skills
48 and Employment) has further downgraded ESD by removing references to climate change
49 and sustainability as a cross-curriculum priority. The effect that this latest weakening of ESD
50 has on the future of the sustainability cross-curriculum priority remains to be seen within
51 the context of a curriculum review currently underway. Overall then, prior to and since the
52 end of the DESD, support for ESD has been patchy or non-existent (and most recently
53 downgraded) with ITE programmes mostly ignoring ESD, or including it as an add-on
54 through an elective subject or as an initiative run by small numbers of teacher educators
55 working in isolation at the subject level within programmes (Author, 2015; Davis *et al.*,
56 2015).
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

There are, nevertheless, teacher education institutions that are working to equip pre-service teachers with the knowledge, skills, values and world views to include ESD into teaching and learning practices. One such institution is James Cook University (JCU), located in the tropical region of Queensland. JCU Education emphasises holistic thinking to produce graduates who value social and environmental sustainability goals and are equipped to include understanding into the teaching and learning of future generations (James Cook University, 2020). Since 2009, the Bachelor of Education (BEd) Primary and Early Childhood Education programmes have adopted a whole-of-programme approach to embedding ESD. The work began with academic staff engaging in collaborative projects to design dedicated ESD subjects and embed sustainability concepts, principles and issues across the primary (Preparatory to Year 6) and early childhood (birth to 8 years of age) majors. This resulted in a core first-year subject, *Foundations of Sustainability in Education* - now renamed *Science and Sustainability in Education*, and a core fourth-year subject, *Service Learning for Sustainable Futures*. More recently, a further core subject has been included in the final year of the two programmes, *Leading Wellbeing and Sustainability in Learning Communities*. In first year, student teachers develop understanding of the underlying science and complexity of global and local social-ecological challenges. These initiatives point to progress in the embedding of ESD in ITE at the program level, but fall short of a systematic approach where the integration of ESD goes beyond curriculum and pedagogy, to be embedded into the program's values, philosophies, governance, and processes.

Discussion

In summary, Sweden has strong governance related to legislative, policy and operational frameworks for the implementation of ESD across all sectors of education. In ITE, ESD competencies form part of course learning outcomes and examination programmes that pre-service teachers are required to successfully complete. Scotland has strong governance in the form of policy and operational frameworks for the implementation of ESD in school education and, by default, ITE. This includes the incorporation of ESD values and citizenship as a national educational priority, ESD as a theme across all learning, an ESD action plan and the inclusion of LfS into the professional standards for teachers, educational practitioners and school leaders. Canada and Australia are not systematic in their approach to ESD. Neither country has national policies to compel or guide implementation. Attention to ESD in school education at state or provincial levels is optional and, therefore, easy for ITE institutions to deprioritise or ignore. Even so, examples of good and innovative practice are available in both countries. A point of difference is that while ESD in Canadian ITE appears to be gaining momentum, in Australia progress appears to be plummeting.

To this point, our paper has introduced different approaches to ESD in ITE. There is much variability between Sweden, Scotland, Canada and Australia, but also some commonalities. In the following section the authors consider similarities and differences across the four countries to draw some insights focused on governance characteristics, initiatives and practices for ESD. **Table 1 provides an overview of the data considered.**

Insert Table 1: Summary of Cross-Comparative data

Governance of ESD in ITE

Governance is a broad term that concerns a range of characteristics (Addink, 2019). For this paper, interest lies in governance as related to the policies, leadership, and/or management of ESD within ITE in Sweden, Scotland, Canada and Australia. Hence, the authors found the concept of governance useful for helping to think about how ESD is supported within each context and the consequences that arise.

In Sweden and Scotland there is evidence of a national political commitment to ESD, reflected through specific governance, policies and legislation. ESD policies and legislation provide government level leadership support and elevate attention to ESD, however, there is still no evidence of systematic embedding across ITE in practice. Lack of regulation combined with a high degree of freedom in policy interpretation appears to result in inconsistencies between the production and coordinated implementation of policies, and diminishes potential impact. Consequently, the quality and depth of ESD integration varies across institutions, dependent, to a major extent, on the prioritisation afforded to ESD by the institutional leadership (UKÄ, 2018).

Regulation can enforce policy enactment, however, when policy is absent or weak, regulation may not be seen as strong or important enough to attract attention from players across the system. Formalising policy to create an ostensibly accommodating space for ESD within the Scottish curriculum has not necessarily led to the systematic embedding of ESD across professional practice. In Canada and Australia, where there is limited ESD policy and no regulation, as well as limited, if any, support, ESD is included in ITE (and K-12 school education generally) at a specific institution's discretion. The major difference between Sweden, Scotland, Canada and Australia is that ESD has enforced visibility in Swedish and Scottish ITE. However, in all contexts the depth of attention afforded to ESD can vary (e.g., from completely absent to tokenistic to deep and authentic), depending on leadership. Moving forward, one question worth considering is whether policy is seen as strong, valid or important enough to attract attention from regulatory authorities for further monitoring and accountability actions.

Leadership for ESD. An important insight that emerged from the comparison of different approaches to governance is that of leadership. Leadership is identified as a critical enabler of change for ESD (Nicol *et al.*, 2019; Scott *et al.*, 2012; Steele, 2010; World Wildlife Fund – Scotland, 2012). All levels of leadership are important. National and provincial/state level leadership for ESD can stimulate activity at the institutional and local levels. In the ITE context institutional or departmental leaders can either support or hinder progress on ESD. This is because teacher education institutions and the organisations they are connected to (e.g., schools, universities, government departments) are entrenched within a hierarchical and authoritarian system with top-down decision making and policy processes (Fullan, 2013; Hargreaves and Shirley, 2012). The authors' experience across contexts supports the argument put forward by Nicol *et al.*, (2019) that bringing about systematic change for ESD in ITE requires bold decision makers. What emerges from this study is the importance of leadership coherence across all levels of the education system, as pertaining to ITE, from national to provincial/state and institutional. When leadership across levels is disconnected or fragmented, then systematic change for ESD is impaired.

1
2
3 A comparison of the four countries in this study highlights the difference that leadership can
4 make. Scotland and Sweden experience national-level leadership for ESD via specific
5 policies, legislation and initiatives. At the institutional level ESD leadership varies and,
6 concurrently, so does progress. Legislation in Sweden forces attention to ESD, but does not
7 appear to guarantee systematic action with only about fifty percent of Swedish universities
8 having established sustainable development goals and integrated ESD into programmes.
9 This study is not able to report on the extent of ESD integration in Swedish ITE, however,
10 recent studies have found varying levels of interpretations and practices. The situation is
11 different in Scotland as more often than not clear national imperatives are met with weak
12 policy interpretation and translation, therefore action is patchy and, or marginalised across
13 institutions (Moore et al., 2018). Institutional level support for ESD seems to be low and
14 resistance to change widespread, even with a regulatory structure in place to facilitate
15 integration of ESD, consolidation appears limited to individual efforts.
16
17
18
19

20 Canada and Australia lack national leadership for ESD and experience varying ad-hoc levels
21 of support for ESD from provincial/state and institutional leaders. In some Canadian ITE
22 programmes, ESD has historically been driven by individual faculty 'champions' who have
23 been encouraged by institutional leaders to follow their passion. More recently, with the
24 climate crisis becoming more urgent, institutional leaders are becoming aware of the
25 importance of ESD and are actively making decisions to support its development across their
26 institutions. The result is a speeding up of pace and a broader reach of change than has
27 been experienced in the past. In comparison, Australia is heading in the opposite direction.
28 A decade long (and continuing) conservative national and state governmental policy
29 landscape directed at 'standardisation syndrome' (Brennan, 2019, p. 19) with associated
30 accountability measures, has hindered considered responses to ESD. Consequently, very few
31 educational leaders, stakeholders and communities are making any decisions on ESD,
32 resulting in a muted landscape related to its provision. An important consideration moving
33 forward, then, is to what extent does leadership in an ITE programme, and at an institution,
34 promote a climate that supports advancement of the competencies required for ESD? And
35 how is this best done?
36
37
38
39
40

41 *Initiatives and Practices in ESD in ITE*

42
43 *Initiatives.* Despite the contrasting approaches to governance of ESD, similar types of
44 initiatives have arisen to support its embedding in ITE, with varying sources of support and
45 success. All four countries have had national initiatives to support the development of
46 knowledge and pedagogy in ESD for teacher educators: the Lärhut and Global School
47 national networks in Sweden, TEESnet in Scotland (and the UK), the Australian Sustainable
48 Schools Initiative and the ESE-TE network in Canada. The first three began with government
49 funding, and yet only two of these five initiatives continue to be active, in Sweden and
50 Scotland. The Global School and TEESnet support professional development programmes
51 and regular meetings for teacher educators, continuing to deepen ESD in ITE in these
52 countries. A similar initiative underway in Canada, the ESE-TE network, is a grassroots effort
53 with no federal funding or national governance to support its work; still, it has had modest
54 success in developing a community of practice across the country through the provision of
55 resources, publications, and biennial symposia. This small sampling of cases suggests that
56 neither funding nor governance ensures the longevity or success of these initiatives, they
57 are more likely reliant on ongoing formal or informal leadership to keep them strong.
58
59
60

1
2
3 *Practices.* Each country contributes different promising practices to embedding ESD in ITE,
4 while recognising their limited reach. Scotland offers the development of an overarching
5 vision that frames ESD as a core element of professional standards for its pre-service
6 teachers, but struggles with the lack of its implementation. In Sweden, core courses in ESD
7 in ITE programmes in two universities, Malmo and Malardalen, help pre-service teachers at
8 a range of levels develop competencies related to ESD. Similarly, some ITE programmes in
9 Canada offer core and elective courses, along with co-curricular programming, in ESD,
10 providing some pre-service teachers with an introduction to and competencies in ESD
11 before graduation. Only James Cook University in Australia has taken a whole-of-
12 programme approach that embeds multiple courses into its ITE curriculum to ensure that
13 pre-service teachers have the capacity to plan, implement and reflect upon ESD learning
14 experiences across diverse contexts. Even with these pockets of innovative practice, all four
15 countries fall far short of consistent, widespread and systematic approaches to embedding
16 ESD in ITE.
17
18
19
20

21 **Insights**

22
23 A number of insights have resulted from this cross-case comparison. Development of a
24 systematic, over an *ad-hoc*, approach to implementing ESD in ITE is illustrated in Scotland
25 where ESD is integrated into curriculum, pedagogy, teaching standards and evaluation of
26 schools and teachers. A systematic approach takes emphasis away from the lone
27 sustainability champion or isolated institutional case study to broaden understanding of ESD
28 as being everybody's responsibility, including that of education departments, teacher
29 accreditation bodies, professional associations, policy makers, schools, teacher education
30 institutions and students (Steele, 2010). A systematic approach is supported by the leading
31 Scottish LfS policy informing document – *Vision 2030+* (Scottish Government, 2016) – which
32 recommends a centrally coordinated approach to implementing LfS “will prevent a
33 piecemeal, ‘policy by policy’ response” (p. 9) from stakeholders. However, despite good
34 intentions and a well-developed ESD policy architecture across Scottish education, with
35 specific focus on a systematic approach, research finds that ESD practice in Scotland
36 remains patchy and educators at all levels grapple with the translation of policy into reality
37 (Nicol *et al.*, 2019; Author *et al.*, 2019). This is true in Sweden as well; while it has not had
38 the same level of governance as Scotland, Sweden suffers from the same inconsistency in
39 terms of ongoing initiatives and embedding as have Scottish ITE programmes. Even when
40 governance and support are put in place there is no guarantee that these policy
41 architectures will result in a longevity of a systematic approach, as Australia has found
42 resultant from a change of political leadership. Nor is a grassroots approach highly
43 successful, as evidenced in Canada, in that a lack of governance and funding limits what
44 individual champions working together can do. Combined these findings highlight that
45 despite intentional changes to governance, policy and curriculum, a theory-policy-practice
46 gap (Stevenson, 1987) persists.
47
48
49
50
51
52
53

54 So, what and where are the gaps? The authors suggest one gap is in non-adherence to
55 regulation when, for example, ITE programmes without a focus on ESD are approved by
56 accreditation bodies (Nicol *et al.*, 2019). An important consideration, though, is that
57 regulation of ESD is contentious. Accreditation bodies could insist on all ITE programmes
58 incorporating ESD. Regulation can drive new practices and innovation and create
59 widespread and immediate change; however, imposing requirements can drain initiative
60

and improvement (Wyeth & Termini, 2015) and can be less successful in engaging all individuals (Finnveden et al., 2020). Furthermore, those already concerned about over-regulation of education would likely see ESD regulation as a further imposition. Another gap, according to Nicol *et al.*, (2019) and this study's findings, lies in leadership. Nicol et al., argue, and the findings from this study concur, that systematic change calls for future-thinking decision makers who 'take an activist stance and advocate for change at all levels of leadership' (p.27); it should not be left to a single committed individual working at the local or ground level. Lastly, the authors suggest there is a need to more intentionally disrupt the multiple interconnected, hierarchical levels, institutionalised subsystems, complex rules and numerous stakeholders and interest groups that make up the ITE system (Ferreira and Ryan, 2012).

Conclusion

This paper represents a collective effort by four teacher educators across three continents to examine the state of ESD across very different contexts in an effort to draw some insights to inform the field. A collective examination of ESD across these four countries, which are at various stages of progress towards embedding ESD in ITE, presents an opportunity for inquiry and learning. The approaches in Sweden, Scotland, Canada, and Australia are different in their focus on different part(s) of the system; however, the issues and challenges shared across the four different countries are similar. Embedding ESD in ITE in a systematic fashion is challenging and none of the countries can offer a 'best practices' exemplar; however, there are pockets of action that offer possibilities. Hence, the challenges posed by trying to systematically embed ESD in ITE will be better understood and overcome if researchers, practitioners, leaders and policy-makers can learn from each other about what works in different contexts. These efforts can then lead to a deeper understanding of how to best go about the work of systematically embedding ESD in ITE.

References:

Addink, H. (2019). *Good governance: concept and context*, Oxford University Press, Oxford.

Author (2015).

Author (2019).

Association of Canadian Deans of Education. (2019), "*Quebec City ACDE Statement of Commitment*", available at: <https://educ.queensu.ca/quebec-city-acde-statement-commitment> (accessed 30 November 2019).

Australian Curriculum, Assessment and Reporting Authority (ACARA). (2016), "*Sustainability*", available at: <https://www.acara.edu.au/curriculum/foundation-year-10/cross-curriculum-priorities/sustainability-ccp> (accessed 19 January 2021).

Australian Curriculum, Assessment and Reporting Authority (ACARA). (n.d.), "*Sustainability*", available at: <https://www.australiancurriculum.edu.au/f-10-curriculum/cross-curriculum-priorities/sustainability/> (accessed 19 January 2021).

1
2
3 Australian Government Department of the Environment and Heritage. (2000),
4 “Environmental Education for a Sustainable Future: National Action Plan”, Canberra: Author.

5
6
7 Australian Government Department of the Environment, Water, Heritage and the Arts.
8 (2009), “Living Sustainably: the Australian Government's National Action Plan for Education
9 for Sustainability”, Canberra: Author.

10
11 Australian Government Department of Education, Skills and Employment. (2019), “The Alice
12 Springs (Mparntwe) Education Declaration”, available at:
13 <https://docs.education.gov.au/documents/alice-springs-mparntwe-education-declaration>
14 (accessed 5 January 2020).

15
16
17 Australian Government Department of the Environment and Heritage. (2005), “Educating
18 for a sustainable future: A national environmental education statement for Australian
19 schools”, available at: <https://www.seedengr.com/sustainable-future.pdf> (accessed 2
20 November 2020).

21
22
23 Australian Research Institute in Education for Sustainability [ARIES]. (2009), “Education for
24 sustainability: the role of education in engaging and equipping people for change”, Sydney,
25 Author.

26
27
28 Beveridge, D., McKenzie, M., Aikens, K., Strobbe, K. M. and Beveridge, R.M. (2019),
29 “Sustainability in Canadian K-12 Education: Closing the Research Gap on Understanding
30 National Trends”, Saskatoon, Canada: Sustainability and Education Policy Network,
31 University of Saskatchewan.

32
33
34 Bieler, A. and McKenzie, M. (2017), “Strategic planning for sustainability in the Canadian
35 higher education system”, *Sustainability*, Vol 9 No 2, pp.1-22.

36
37 Brennan, M. (2019), “Changing teaching and teacher education in the ‘Anthropocene’”, *On-*
38 *Education Journal for Research and Debate*, Vol 2 No 4, pp.1-6. [https://doi:](https://doi.org/10.17899/on_ed.2019.4.6)
39 [10.17899/on_ed.2019.4.6](https://doi.org/10.17899/on_ed.2019.4.6).

40
41 Author. (2019).

42
43 Author. (2020).

44
45
46 Cambridge Dictionary. (2020), “Initiative”, Cambridge Dictionary, available at:
47 <https://dictionary.cambridge.org/dictionary/english/initiative> (accessed 3 December 2020).

48
49
50 Cantwell, B. (2020), “Explanatory accounts in international and comparative higher
51 education research”, *Higher Education Quarterly*, Vol 74 No 2, pp.149-161. [https://doi:](https://doi.org/10.1111/hequ.12246)
52 [10.1111/hequ.12246](https://doi.org/10.1111/hequ.12246)

53
54 Council of Ministers of Education (CMEC). (2012), “Education for Sustainable Development
55 in Canadian Faculties of Education”, Toronto: Author.

56
57
58 Davis, J., Ferreira, J-S., Stevenson, R. and Evans, N. (2015), “A systems approach:
59 partnerships for sustainability in teacher education”, *ozEEnews*, June 2015, p.10.

60

1
2
3 Darling-Hammond, L. (2017), "Teaching education around the world: what can we learn
4 from international practice?", *European Journal of Teacher Education*, Vol 40 No 3, pp.291-
5 309. [https://doi: 10.1080/02619768.2017.1315399](https://doi.org/10.1080/02619768.2017.1315399).

6
7
8 Author. (2015).

9
10 Department for Children, Education, Lifelong Learning and Skills. (2008), "Education for
11 Sustainable Development and Global Citizenship: information for teacher trainees and new
12 teachers in Wales", available at: [https://s3-eu-west-1.amazonaws.com/hwb-live-
13 storage/a6/75/74/a7/b2db404986e581a1f5cc08f6/information-for-teacher-trainees-and-
14 new-teachers.pdf](https://s3-eu-west-1.amazonaws.com/hwb-live-storage/a6/75/74/a7/b2db404986e581a1f5cc08f6/information-for-teacher-trainees-and-new-teachers.pdf) (accessed 10 November 2019).

15
16
17 Education Scotland. (2008), "Curriculum for Excellence. Building the Curriculum 3: a
18 Framework for Learning and teaching", available at:
19 <https://education.gov.scot/Documents/btc3.pdf> (accessed 20 March 2020).

20
21
22 Education Scotland. (2015), "How Good is our School?" (4th edition), available at
23 http://www.educationscotland.gov.uk/Images/HGIOS4_tcm4-870533.pdf (accessed 15 May
24 2020).

25
26
27 Education Scotland. (2019), "Learning for Sustainability action plan", available at:
28 [https://education.gov.scot/improvement/Documents/LearningforSustainability-
29 Vision2030ActionPlan.pdf](https://education.gov.scot/improvement/Documents/LearningforSustainability-Vision2030ActionPlan.pdf) (accessed 20 May 2020).

30
31
32 Esser, F. and Vliegthart, R. (2017), "Comparative research methods", *The International
33 Encyclopedia of Communication Research Methods*. John Willey and Sons. [https://doi:
34 10.1002/9781118901731.iecrm0035](https://doi.org/10.1002/9781118901731.iecrm0035).

35
36 Author. (2020).

37
38 Author. (2016).

39
40 Author. (2017).

41
42
43 Ferreira, J., Ryan, L. and Davis, J. (2015), "Developing knowledge and leadership in pre-
44 service teacher education systems", *Australian Journal of Environmental Education*, Vol 31
45 No 2, pp.194-207. [https://doi:10.1017/ae.2015.24](https://doi.org/10.1017/ae.2015.24).

46
47 Author. (2019).

48
49
50 Ferreira, J-A., Ryan, L. and Tilbury, D. (2007a), "Mainstreaming education for sustainable
51 development in initial teacher education in Australia: a review of existing professional
52 development models", *Journal of Education for Teaching*, Vol 33 No 2, pp.225-239.

53
54
55 Ferreira, J-A., Ryan, L. and Tilbury, D. (2007b), "Planning for success: factors influencing
56 change in teacher education", *Australian Journal of Environmental Education*, Vol 23, pp.45-
57 55.

1
2
3 Ferreira, J., Ryan, L., Davis, J., Cavanagh, M. and Thomas, J. (2009), "Mainstreaming
4 sustainability into pre-service teaching education in Australia", Canberra, Australia:
5 Australian Government Department of the Environment, Water, Heritage and the Arts.

6
7
8 Ferreira, J. and Ryan, L. (2012), "Working the system: a model for system-wide change in
9 pre-service teacher education", *Australian Journal of Teacher Education*, Vol 37 No 12,
10 pp.29–45.

11
12
13 Ferreira, J-A., Ryan, L. and Tilbury, D. (2006), "Whole-school approaches to sustainability: A
14 review of models for professional development in pre-service teacher education", Canberra,
15 Australia: Australian Government Department of the Environment and Heritage and the
16 Australian Research Institute in Education for Sustainability (ARIES).

17
18
19 Finnveden, G., Friman, E., Mogren, A., Palmer, H., Sund, P., Carstedt, C., Lundberg, S.,
20 Robertsson, B., Rodhe, H. and Svärd, L. (2020), "Evaluation of integration of sustainable
21 development in higher education in Sweden", *International Journal of Sustainability in
22 Higher Education*, Vol 21 No 4, pp.685-698.

23
24
25 Flood, R. (2001), "The relationship of systems thinking to action research", Reason, P. and
26 Bradbury, H. (Ed.s.), *Handbook of action research – participative practice and inquiry*, Sage
27 Publications, London, pp.133-144.

28
29 Fullan, M. (2013), *Motion leadership in action: more skinny on becoming change savvy*,
30 Sage/Corwin Press, Thousand Oaks, CA.

31
32
33 General Teaching Council for Scotland. (2019), "Professional Standards", available at:
34 <https://www.gtcs.org.uk/professional-standards/standards-for-registration.aspx> (accessed
35 15 August 2019).

36
37
38 Hargreaves, A. and Shirley, D. (2012), *The global fourth way: the quest for educational
39 excellence*. Sage/Corwin Press, Thousand Oaks, CA.

40
41
42 Hargis, K., Chopin, N. and McKenzie, M. (2018), *Ten Canadian school's stories of climate
43 action*, Sustainability and Education Policy Network, University of Saskatchewan, Saskatoon,
44 Canada.

45
46
47 Henderson, J., Bieler, A. and McKenzie, M. (2017), "Climate change and the Canadian higher
48 education system: an institutional policy analysis", *Canadian Journal of Higher Education*,
49 Vol 47 No 1, pp.1-26.

50
51 Author. (2018).

52
53
54 International Union for Conservation of Nature and Natural Resources. (1972), "Final report:
55 European Working Conference on Environmental Conservation Education", available at:
56 <https://portals.iucn.org/library/sites/library/files/documents/NS-SP-034.pdf> (accessed 30
57 November, 2019).

58
59 Author. (2014)

60
Author. (2020).

1
2
3 James Cook University (2020), "About Education", available at:
4 <https://www.jcu.edu.au/courses-and-study/study-areas/education/about-education>
5 (accessed 20 September 2019).
6

7
8 Jickling, B. and Sterling, S. (2017), "Post-Sustainability and Environmental Education:
9 Framing Issues", Jickling, B and Sterling, S. (Ed.s.), *Post-Sustainability and Environmental*
10 *Education. Re-imagining Education for the Future*, Springer Nature AG, Cham, Switzerland,
11 pp.1-11.
12

13
14 Karrow, D., DiGiuseppe, M., Elliott, P., Gwekwerere, Y, and Inwood, H. (2016), "Introduction
15 to Canadian Perspectives on Initial Teacher Environmental Education Praxis", Karrow, D. D.,
16 DiGiuseppe, M., Elliott, P., Gwekwerere, Y. and Inwood, H. (Ed.s.). *Canadian perspectives on*
17 *initial teacher environmental education praxis*. Canadian Association for Teacher Education,
18 Ottawa, Canada, pp.4-14.
19

20
21 Karrow, D. and DiGiuseppe, M. (Ed.s.). (2019), *Environmental and sustainability education:*
22 *Canadian perspectives*, Springer Nature AG, Cham, Switzerland.
23

24
25 Kennelly, J. and Taylor, N. (2007), "Education for Sustainability for the K-6 Curriculum: a unit
26 of work for pre-service primary teachers in NSW", *Australian Journal of Environmental*
27 *Education*, Vol 23, pp.3-12.
28

29
30 Kosmützky, A., Nokkala, T. and Diogo, A. (2020), Between context and comparability:
31 Exploring new solutions for a familiar methodological challenge in qualitative comparative
32 research, *Higher Education Quarterly*, Vol 74, pp.176-192. [https://doi: 10.1111/hequ.1225](https://doi.org/10.1111/hequ.1225).
33

34
35 Lundh, A. and Ruling, Å. (2008), "Lärarutbildningen och utbildning för hållbar utveckling
36 [Teacher Education and Education for Sustainable Development]", Stockholm, Sweden:
37 Swedish National Agency for Higher Education.
38

39
40 McKeown, R. and Hopkins, C. (2014), "Teacher Education and Education for Sustainable
41 Development: Ending the DESD and Beginning the GAP" [Monograph], Toronto, York
42 University.
43

44
45 Merriam-Webster Dictionary. (2020), "Embed", *Merriam-Webster Dictionary*, available at:
46 <https://www.merriam-webster.com/dictionary/embedding> (accessed 15 October 2020).
47

48
49 Merriam-Webster Dictionary. (2020), "Practice", *Merriam-Webster Dictionary*, available at:
50 <https://www.merriam-webster.com/dictionary/practice> (accessed 3 December 2020).
51

52
53 Moore, D., Almeida, S. C. and Barnes, M. (2018), "Education for sustainability policies:
54 ramifications for practice", *Australian Journal of Teacher Education*, Vol 43 No 11, pp.105-
55 121.
56

57
58 Nicol, R., Rae, A., Murray, R., Higgins, P. and Smith, H. (2019), "How can Initial Teacher
59 Education tackle "Super-wicked" Problems?", *Scottish Educational Review*, Vol 51 No 1,
60 pp.17-29.

1
2
3 Nolet, V. (2009), "Preparing sustainability-literate teachers", *Teachers College Record*, Vol
4 111 No 2, pp.409-442.
5

6 Ontario Ministry of Education (2009), "Acting Today, Shaping Tomorrow", Toronto, ON:
7 Queen's Own Printer.
8
9

10 Ostertag, J., Gerofsky, S. and Scott, S. (2019), "Learning to teach environmental education
11 by gardening in the margins of the academy", Karrow, D. and DiGiuseppe, M. (Ed.s.),
12 *Environmental and sustainability education: Canadian perspectives*, Springer Nature AG,
13 Cham, Switzerland, pp.111-130.
14

15
16 Robertson, P., VanWynsberghe, R. and Ford, B. (2020), "Sustainability learning pathways in
17 the UBC Teacher Education Program: Destination Cohort", *Canadian Journal of*
18 *Environmental Education*, Vol 23 No 1, pp.50-67.
19

20
21 Scott, G., Tilbury, D., Sharp, L. and Deane, E. (2012), "Turnaround leadership for
22 sustainability in higher education", report prepared by University of Western Sydney in
23 partnership with The Australian National Institution and the Sustainable Futures Leadership
24 Academy for the Australian Government Office for Learning and Teaching, Sydney: Office for
25 Learning and Teaching.
26

27
28 Scottish Government. (2012), "Learning for Sustainability – Report of the One Planet Schools
29 Ministerial Advisory Group", available at: [https://education.gov.scot/
30 improvement/Documents/One-planet-schools-report-learning-for-sustainability.pdf](https://education.gov.scot/improvement/Documents/One-planet-schools-report-learning-for-sustainability.pdf)
31 (accessed 10th November, 2020).
32

33
34 Scottish Government. (2013), "Ministerial response to the One Planet Schools Report
35 (Learning for Sustainability)", available at: [https://education.gov.scot/improvement/
36 learning-resources/A%20summary%20of%20learning%20for%20sustainability%20resources](https://education.gov.scot/improvement/learning-resources/A%20summary%20of%20learning%20for%20sustainability%20resources)
37 (accessed 10th November, 2020).
38

39
40 Scottish Government. (2016), "Vision 2030+ Concluding report of the Learning for
41 Sustainability National Implementation Group", available at:
42 <https://education.gov.scot/improvement/Documents/res1-vision-2030.pdf> (accessed 17
43 June, 2020).
44

45
46 Scottish Qualifications Agency. (2020), "Learning for Sustainability", available at:
47 <https://www.sqa.org.uk/sqa/80093.html> (accessed 10th November, 2020).
48

49
50 Steele, F. (2010), "Mainstreaming education for sustainability in pre-service teacher
51 education in Australia: enablers and constraints", report prepared by the Australian
52 Research Institute in Education for Sustainability for the Australian Government Department
53 of the Environment, Water, Heritage and the Arts, Canberra.
54

55
56 Sterling, S. (2004), "Higher education, sustainability and the role of systemic learning",
57 Corcoran, P.B. and Wals, A.J.E (Ed.s.), *Higher education and the challenge of sustainability*,
58 Kluwer Academic Publishers, Dordrecht, pp.49-70.
59
60

1
2
3 Sterling, S. (2012), *The Future Fit Framework: An introductory guide to teaching and learning*
4 *for sustainability in HE*, York, UK: The Higher Education Academy.

5
6
7 Stevenson, R. (1987), Schooling and environmental education: contradictions in purpose
8 and practice, Robottom, I. (Ed.), *Environmental education: practice and possibility*, Deakin
9 University Press, Geelong, Australia, pp.69-82.

10
11 Author. (2014).

12
13 Summers, M., Childs, A. and Corney, G. (2005), "Education for sustainable development in
14 initial teacher training: Issues for interdisciplinary collaboration", *Environmental Education*
15 *Research*, Vol 11 No 5, pp.623-647. [https://doi: 10.1080/13504620500169841](https://doi:10.1080/13504620500169841).

16
17
18 Sustainability and Education Policy Network. (n.d.), available at: <https://sepn.ca/> (accessed
19 15 February, 2020).

20
21
22 Swedish Council for Higher Education. (2019), "Swedish Higher Education Act (1992:1434)",
23 available at: [https://www.uhr.se/en/start/laws-and-regulations/Laws-and-regulations/The-](https://www.uhr.se/en/start/laws-and-regulations/Laws-and-regulations/The-Swedish-Higher-Education-Act/)
24 [Swedish-Higher-Education-Act/](https://www.uhr.se/en/start/laws-and-regulations/Laws-and-regulations/The-Swedish-Higher-Education-Act/) (accessed 25 March 2020).

25
26
27 Swedish Higher Education Authority [UKÄ]. (2018), "How Swedish HEI's work in promoting
28 sustainable development", available at: [https://english.uka.se/about-](https://english.uka.se/about-us/publications/reports--guidelines/reports--guidelines/2018-02-15-how-swedish-heis-work-in-promoting-sustainable-development.html)
29 [us/publications/reports--guidelines/reports--guidelines/2018-02-15-how-swedish-heis-](https://english.uka.se/about-us/publications/reports--guidelines/reports--guidelines/2018-02-15-how-swedish-heis-work-in-promoting-sustainable-development.html)
30 [work-in-promoting-sustainable-development.html](https://english.uka.se/about-us/publications/reports--guidelines/reports--guidelines/2018-02-15-how-swedish-heis-work-in-promoting-sustainable-development.html) (accessed 20 August, 2019).

31
32
33 Swedish International Centre of Education for Sustainable Development [SWEDES]. (2017),
34 "Visby recommendations for enhancing ESD in teacher education: Agenda 2030: SDG 4.7
35 UNESCO Gap on ESD Action area 3", available at:
36 https://www.swedesd.uu.se/digitalAssets/611/c_611672-l_3-k_btgvisby2016.pdf (accessed
37 15 September, 2019).

38
39
40 TEESNet (Teacher Education for Equity and Sustainability Network). (n.d.), available at:
41 <http://teesnet.liverpoolworldcentre.org/> (accessed 10th November, 2020).

42
43
44 Tilbury, D., Mula, I. and Ryan, A. (2014), "Mapping opportunities for developing education
45 for sustainable development (ESD) competences", available at:
46 <https://www.ue4sd.eu/images/RegionalMapping/RMappingNorth.pdf> (accessed 3 October,
47 2019).

48
49
50 United Nations. (n.d.a.), "Sustainable Development Goals: 4 quality education", available at:
51 <https://www.un.org/sustainabledevelopment/education/> (accessed 3 October, 2019).

52
53
54 United Nations. (n.d.b.), "Transforming our world: the 2030 agenda for sustainable
55 development", available at:
56 <https://sustainabledevelopment.un.org/post2015/transformingourworld> (accessed 4
57 October 2019).

1
2
3 United Nations Economic Commission for Europe [UNECE]. (2005), "UNECE strategy for
4 education for sustainable development", available at: <https://www.unece.org/env/esd.html>
5 (accessed 10 August 2019).
6

7
8 United Nations Economic Commission for Europe [UNECE]. (2012), "Learning for the future:
9 Competencies in Education for Sustainable Development", available at:
10 https://www.unece.org/fileadmin/DAM/env/esd/ESD_Publications/Competences_Publicati
11 [on.pdf](https://www.unece.org/fileadmin/DAM/env/esd/ESD_Publications/Competences_Publicati) (accessed 10 March 2020).
12

13
14 United Nations Economic Commission for Europe [UNECE]. (2016), "Ten years of the UNECE
15 strategy for education for sustainable development: Evaluation report on the
16 implementation of the UNECE strategy for sustainable development from 2005-2015",
17 available at:
18 http://www.unece.org/fileadmin/DAM/env/esd/ESD_Publications/10_years_UNECE_Strate
19 [gy_for_ESD.pdf](http://www.unece.org/fileadmin/DAM/env/esd/ESD_Publications/10_years_UNECE_Strate) (accessed 26 March 2020).
20
21

22 United Nations Educational, Scientific and Cultural Organization (UNESCO). (1978), "The
23 final report: International conference on environmental education", Paris, France: Author.
24

25 UNESCO. (2017), "Education for Sustainable Development goals: Learning objectives",
26 available at: <https://unesdoc.unesco.org/ark:/48223/pf0000247444> (accessed 21 January
27 2021).
28
29

30 UNESCO. (2018a), "Progress on Education for Sustainable Development and Global
31 Citizenship Education", available at: <https://unesdoc.unesco.org/ark:/48223/pf0000266176>
32 (accessed 15 March 2020).
33

34 UNESCO. (2019a), "UN Decade of ESD", available at:
35 [https://en.unesco.org/themes/education-sustainable-development/what-is-esd/un-decade-](https://en.unesco.org/themes/education-sustainable-development/what-is-esd/un-decade)
36 [of-esd](https://en.unesco.org/themes/education-sustainable-development/what-is-esd/un-decade) (accessed 3 April 2020).
37
38

39 UNESCO. (2019b), "Global Action Programme on Education for Sustainable Development",
40 available at: <https://en.unesco.org/gap> (accessed 6 April 2020).
41
42

43 UNESCO. (2019c), "Beyond commitments – How countries implement SDG 4", available at:
44 <https://unesdoc.unesco.org/ark:/48223/pf0000369008/PDF/369008eng.pdf.multi> (accessed
45 4 April 2020).
46
47

48 United Nations Educational, Scientific and Cultural Organisation – United Nations
49 Environmental Programme (UNESCO-UNEP). (1977), "Intergovernmental conference on
50 environmental education—Final report", available at:
51 <http://unesdoc.unesco.org/images/0003/000327/032763eo.pdf> (accessed 15 September
52 2019).
53

54 United Nations Educational, Scientific and Cultural Organisation – United Nations
55 Environmental Programme (UNESCO-UNEP). (1988), "Congress on environmental education
56 and training: International strategy for action in the field of environmental education and
57 training for the 1990s", Nairobi, Paris: UNESCO-UNEP.
58
59
60

1
2
3 World Wildlife Fund - Scotland. (2012), "One planet schools: Connecting school and
4 community research findings – Learning for Sustainability", available at:
5 http://assets.wwf.org.uk/downloads/1planetschools_web2.pdf (accessed 20 November
6 2019).
7

8
9 Wyeth, G. B. and Termini, B. (2015). "Regulating for sustainability", *Environmental Law*, Vol
10 45 No 3, pp.663-712. <https://www.jstor.org/stable/43610985>.
11

12 York University. (n.d.), "UNESCO Chair in Reorienting Education towards Sustainability",
13 available at: <https://unescochair.info.yorku.ca/> (accessed 19 March 2020).
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Table 1: Summary of cross-comparative data

Criteria	Australia	Canada	Scotland	Sweden
ESD policy in education	Sustainability Cross-curriculum Priority in the Australian Curriculum ESD policy for K-12 schooling in some states	ESD policy for K-12 education in some provinces	Learning for Sustainability General Teaching Council for Scotland Professional Standards	Swedish Higher Education Act
ESD national/regional policy in ITE	N/A	N/A	Learning for Sustainability Action Plan (2019) outlines Scottish Government commitment to 1) work with Scottish Council of Deans of Education to support the delivery of LfS in ITE 2) work with GTCS to ensure LfS continues to be references in the ITE Accreditation Framework	Sustainable development included in the Qualifications Ordinance of ITE
Regulation of ESD policy in ITE	N/A	N/A	N/A	N/A
ESD institutional policy and initiatives	In some institutions: Strategic plans focused on SD generally (not ESD specifically)	Sustainability and Education Policy Network researching ESD in schools and higher education across Canada In some institutions: Strategic plans Staff employed to lead and progress ESD	In some institutions: Strategic plans focused on LfS Staff employed to lead and progress ESD	In some institutions: Strategic plans focused on SD generally (not ESD specifically) Staff employed to lead and progress ESD Staff seminars, training days and networking opportunities
Leadership of ESD in ITE	In some institutions led by teacher educators: Research and practice	Regional and National led by teacher educators Research and practice	Scottish Government and Scottish Council of Deans of Education (as above) Regional and National led by teacher educators	In some institutions: Research and practice
ITE Initiatives in ESD	N/A	UNESCO Chair on Reorienting Teacher Education for Sustainability ESE-TE National Network of teacher educators	Teacher Education for Equity and Sustainability Network (TEESNet)	Lärhult National Network of teacher educators Global School (PD for inservice teachers)
ESD Practices in ITE programmes	In some institutions. At James Cook University: Local Staff Seminars	In some Institutions. At the University of Toronto: ESD core/compulsory and elective courses	In some institutions. At the University of Edinburgh: Development of Teacher Education	In some institutions: At Malmö University: Development of 27 goals on content and

	ESD whole-of-programme approach (core ESD courses & ESD infused across early childhood & primary ITE programmes)	ESD Conferences for pre-service teachers ESD Mentorship & Leadership programmes	Vision with LfS as a underpinning approach. Aim to move away from stand-alone LfS inputs within core courses to LfS as an integrated, holistic approach to teacher education.	skills for pre-service teachers ESD core/compulsory courses At Mälardalen University: ESD embedded throughout the four year degree in a developmental fashion.
	ESD stand-alone subjects offered to pre-service teachers	ITE-ESD Cohorts Educational Gardens ESD Art Installations		

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60