

Canadian environmental and sustainability education in preservice teacher education

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Abstract

This survey research assesses environmental and sustainability education in preservice teacher education (ESE-PTE) in Canadian faculties of education. In 2019, university faculty members across Canada participated in an online questionnaire, yielding qualitative and quantitative data on their ESE-PTE program knowledge, and their pedagogical views and experiences related to ESE-PTE. The sample included 32 faculty members engaged in teaching ESE-PTE (62 % response rate) from 26 faculties of education (57 % response rate). Key findings include: (a) strong and widespread interest in ESE-PTE; (b) a belief that ESE should be prioritized in PTE programs, with concerns about teacher preparation; and (c) pedagogy—where pedagogical approaches were influenced by Indigenous, Bioregionalist/Place-based, and Praxic perspectives. Recommendations include policy advocacy and further research.

Résumé

Cette enquête porte sur la formation des futur·es enseignant·es en éducation à l'environnement et au développement durable dans les facultés de sciences de l'éducation au Canada. En 2019, nous avons fait parvenir un questionnaire en ligne à des membres de ces facultés un peu partout au pays pour recueillir des données qualitatives et quantitatives relatives à leurs connaissances sur le programme de formation en éducation à l'environnement et au développement durable, à leur point de vue pédagogique et à leur expérience du programme. L'échantillon était composé de 32 participant·es qui enseignent l'éducation à l'environnement et au développement durable (taux de réponse de 62 %) provenant de 26 facultés d'éducation (taux de réponse de 57 %). Les principaux résultats révèlent : a) un intérêt considérable et répandu envers le programme; b) la conviction que ce programme devrait être une priorité dans la formation des futur·es enseignant·es de même que des inquiétudes quant à leur préparation à cet égard; et c) le fait que la dimension pédagogique du programme est largement influencée par les approches autochtone, biorégionaliste (ou fondée sur le lieu) et praxique. Pour conclure, l'article recommande la mise en place de politiques pour ce type de programme et la poursuite des recherches sur le sujet.

Keywords: preservice teacher education, environmental and sustainability education, Canada.

This research study assessed the status of Canadian environmental and sustainability education¹ in preservice teacher education (ESE-PTE), extending earlier, related research stemming from the early 1970s to the late 2000s (Rioux, 1973; Towler, 1980; Lin, 2002; Swayze et al., 2012). Almost 20 years have elapsed since the last survey research was conducted, all of which precede the United Nations Decade of Education for Sustainable Development (DESD). Over this time, socio-environmental challenges have continued to increase at an alarming rate worldwide (Rockström et al., 2024) increasing the need to periodically assess the status of ESE-PTE in Canada and elsewhere.

In general, ESE-PTE addresses the many and varied socio-environmental challenges facing the world today, including pressing public health issues, climate change, biodiversity loss, pollution, desertification and top-soil erosion, and food and water security (UN Environment, 2019). Teachers must be equipped to address these challenges in the classroom to prepare students for a world that is becoming increasingly uncertain.

As an interdisciplinary framework emphasizing approaches such as inquiry-based learning, problem-solving, and place-based learning, ESE-PTE aims to prepare preservice teachers² to integrate environmental sustainability education into all aspects of their teaching.

Another goal of ESE-PTE is to strengthen preservice teachers' appreciation of the many theory–practice relationships in ESE, including connections among systems thinking, environmental ethics, and experiential learning, helping preservice teachers translate abstract ideas into effective classroom learning experiences.

Research Problem

Literature and Rationale

This survey research was inspired through a directive of the National Action Plan of the *National Roundtable on Environmental and Sustainability Education in Preservice Teacher Education* (henceforth, “National Roundtable”),³ held in June 2016 at Trent University in Peterborough, Ontario, Canada (Karrow & DiGiuseppe, 2019). Roundtable discussions regarding the findings of previous Canadian ESE-PTE survey research (Lin, 2002; Swayze et al., 2012; Towler, 1980), which consistently indicated significant deficiencies in ESE-PTE, led participants to call for a reappraisal of the status of ESE in PTE programs across Canada.

The importance of ESE-PTE is well-established, both historically and globally, dating back to a report by the International Union for Conservation of Nature's (IUCN) Conference on Environment and Conservation Education (Cervovsky & Withrington, 1972), with a dedicated session devoted to “recognizing the importance of ITE [Initial Teacher Education] in progressing the principles and

practices that underpin sustainability” (Evans et al., 2021, p. 1352). Since then, the United Nations Educational, Scientific and Cultural Organization—United Nations Environmental Programme (UNESCO—UNEP, 1978, 1988) and the United Nations Economic Commission for Europe (UNECE, 2005, 2012, 2016) have been reinforcing the principles and practices that underpin sustainability. The UNESCO Chair on Reorienting Teacher Education for Sustainability (York University, 2020), the Decade of ESD (UNESCO, 2005), and the Global Action Programme on ESD (UNESCO, 2018a) support these international bodies and their initiatives. More recently, UNESCO published “ESD for 2030,” (UNESCO, 2020) providing a broad framework for advancing education in support of the United Nations’ 2030 Agenda for Sustainable Development (ASD). This framework focuses on integrating sustainability across education systems by strengthening policies, learning environments, teacher preparation, student engagement, and community involvement. It aims to develop the knowledge, skills, values, and attitudes needed to address major environmental and social challenges and support more sustainable and equitable societies. However, despite countries reporting a “high-level of policy commitment to the Guiding Principles” of ESD in PTE, there remains a relatively “less than sufficient level of support for teacher training on the Guiding Principles in the context of pre-service teacher education” (UNESCO, 2018b, p. 9). On this point, international and Canadian ESE-PTE clearly have more work to do.

Assessing the current status of ESE-PTE in Canadian faculties of education has never been more important. Our research contributes to the well-established tradition of survey research on ESE-PTE in Canadian faculties of education, providing longitudinal insights and positioning Canada as a key contributor to international ESE-PTE research. Most importantly, however, ESE-PTE research provides future generations with critical information and insights about living more sustainably in a changing world.

Research Question

The following research question guided our research: *What is the current status of ESE-PTE in Canadian faculties of education?*

Objectives

In this article, we will focus on the following objectives:

1. Programming.
2. Barriers affecting programming.
3. Survey participants’ program perceptions and experiences.
4. Recommendations on program enhancements and improvements.
5. Suggestions for further research.

Theoretical Influences

The Purpose of ESE-PTE

This study employed the theoretical lens of cultural reproduction theory, as presented by Bilton et al. (1996). Cultural reproduction is the process by which cultural practices, norms, values, and social class distinctions are maintained and transmitted across generations. Whereas education currently tends to reproduce a form of education that supports neoliberalism (global unlimited growth) through the deleterious ideology of social efficiency and instrumentalism (Magrini, 2014), we subscribe to a view of education more consistent with education for sustainable development (ESD), as established by the United Nations General Assembly (UNESCO, 2019a). Such a view is consistent too, with the purpose of ESE-PTE, which emphasizes helping teachers, and by implication their students understand complex global challenges and develop the ability to make informed, responsible decisions that support more sustainable and equitable societies.

Canadian and International Perspectives on ESE-PTE

Canadian ESE-PTE scholars subscribe to a variety of theoretical perspectives reflecting diverse nomenclatures and discourses (Karrow et al., 2022; Karrow & DiGiuseppe, 2019). Sometimes, or not, these reflect provincial/territorial Ministry of Education preferences, (e.g., in Ontario, Environmental Education; and in Manitoba, Education for Sustainable Development). Canadian researchers have generally adopted a hybrid of two paradigmatic theoretical frameworks, namely EE and ESD. For instance, the Standing Committee on ESE-PTE, a sub-committee of the Environmental Education and Communication Network of Canada (EECOM) adopted “ESE,” when it became established in 2017. It was reasoned that by asserting the importance of “environmental” and “sustainability” to “education,” whilst removing problematic associations with “development” (Jickling, 1994), a fidelity between ESE and the purpose of ESE-PTE, could be achieved. Exceptions to this generalization can be found in Sauvé (2005), where a cartography of theoretical “currents” (fifteen) are surveyed in relation to conceptions of the environment, aims of environmental education, and programmatic approaches.

Internationally, research on ESE-PTE reflects distinct geographical affinities for particular theoretical perspectives: EE is more common in the United States of America, while ESD is typically used in Europe (Blom & Karrow, 2024). As noted previously, Canadians are increasingly employing ESE. The various theoretical perspectives reflect a historical progression of ideas that have generated some debate (Jickling, 1994; Kopnina, 2012, 2014; Le Grange, 2017; Skordoulis, 2020). Subtending these theoretical frames are other perspectives that influenced our survey design (e.g., Evans et al., 2017; Lin,

2002; Sauvé, 2005; Swayze et al., 2012). These are discussed in more detail below. Furthermore, we use Yueh et al.'s (2010) analysis to help us understand the barriers to advancing ESE in the PTE context, and what might be done to overcome these barriers.

Materials and Methods

Research Design

Cross-sectional Survey-based Research. We employed a cross-sectional survey design to collect data (quantitative and qualitative¹) to assess the status of ESE-PTE programs in Canada. Consistent with Creswell and Guetterman's (2019) description of cross-sectional survey design,² we employed this approach to solicit faculty members' "attitudes, opinions and beliefs" about ESE-PTE (p. 386). Readers are directed to (Karrow & DiGiuseppe, 2019, pp. 306-307) for a detailed historical review of former Canadian ESE-PTE research studies, featuring Lin's (2002) and Swayze et al.'s (2012) survey research. Our own contribution to this historical record extends their work methodologically and theoretically.

Data Collection Instrument: Online Survey. Our data collection instrument was an online survey in the form of a questionnaire via the QuestionPro platform (www.questionpro.com). This method aligned with our research objectives, timeline, and budget; and enabled efficient data collection, processing, and analysis from faculty members in PTE programs across Canada. Creswell and Guetterman (2019) suggest adapting or creating survey instruments when a pre-existing survey instrument does not exist. Accordingly, we adapted two previously administered Canadian ESE-PTE surveys (Lin, 2002; Swayze et al., 2012). In particular, Lin (2002) provides a historical analysis of trends in environmental education within Canadian PTE programs from 1979 to 1996, focusing on how programs evolved over time. Swayze et al. (2012) was a national survey of faculties of education in Canada, primarily involving program administrators such as deans of education, examining the extent to which ESD was being integrated into PTE programs and identifying variations in implementation.

Survey Item Adaptation. Technical adjustments were made to accommodate online delivery. Our questionnaire included closed-ended questions (e.g., yes/no; multiple choice; Likert scale) and open-ended questions (e.g., questions asking participant to freely place comments within textboxes). In general, survey items focused on participants' personal/professional demographic information, and on their ESE-PTE program knowledge, views, and experiences.

While most items were based on Lin's (2002) survey, some of Lin's questions regarding barriers were modified or expanded to reflect the current PTE context. For example, we added "competition with other PTE courses," and we split Lin's

“Lack of administrative/faculty support for EE in programs” into two, which offered us the chance to see which kind of support (or lack thereof) was of importance (lack of administrative support, or lack of faculty support). Further questions were modified from Swayze et al. (2012), while others were inspired by the theoretical contributions of Evans et al. (2017) and the seminal work of Sauvé (2005).

In particular, we included questions inspired by the conceptual framework in Evans et al.’s (2017) research, including questions regarding programmatic approaches for embedding ESE in PTE courses and programs; rationales used by faculty members for embedding ESE in PTE; theoretical frames underpinning the embedding of ESE in PTE; pedagogical approaches used for embedding ESE in PTE; and problems and challenges faced by teacher educators who wish to embed ESE in PTE. Additionally, Sauvé’s (2005) classic study provided a typology of “currents of environmental education” consisting of 15 propositions, which informed a subset of our questions. Notably, we added an “Indigenous”⁵ current to Sauvé’s original “Ethnographic” current to reflect the growing recognition of Indigenous contributions to Canadian ESE-PTE programs (see Table 4).

Pilot-testing Survey Items. Our survey was pilot-tested by members of the Research Development Group,⁴ and various members of the Canadian Network for Environmental Education and Communication (EECOM) Standing Committee on ESE-TE. These individuals were asked to complete the survey, analyze the questions, and provide the Research and Author Team⁵ with feedback for improving the structure, content, and comprehensibility of individual survey items and the survey. Members of the Research Development Group incorporated their feedback in the survey (Appendix C).

Data Collection and Analysis. Survey development occurred from fall 2017 until fall 2018. The survey was written in English and professionally translated into French for use by francophone participants.⁶ Through the spring and summer of 2018, the Research Development Group obtained ethics clearance from their respective institution’s research ethics board. Purposive sampling was used to recruit faculty members known to be involved in ESE-PTE teaching, research, and service. We identified potential participants through the Association of Canadian Deans of Education (ACDE) website and other teacher education resources, sending invitations to 52 faculty members across Canada, including 11 faculty members in francophone faculties or schools of education (Appendix A), and to 41 faculty members in Anglophone institutions (Appendix B).

Data collection began on March 11, 2019, when invitations and informed consent documents, in English and French, were emailed to prospective participants across Canada (see Appendices A and B for the names of institutions that were contacted). Invitations in French, were sent to faculty members in most of the francophone universities in Quebec, New Brunswick, and Manitoba, with a web link directing them to the French-language survey.

English invitations with weblinks were sent to identified faculty in Anglophone institutions. All invitations indicated that the survey would be active from March 11 until November 15, 2019. Reminders were sent to invitees in September and October 2019.

Quantitative Data. Quantitative data were collected through yes/no responses and items involving rating scales and Likert-like scales. Quantitative data were initially analyzed using QuestionPro software and further examined in Microsoft Excel. Descriptive statistics (percentages; scale ratings) were used to summarize quantitative survey results, which in most cases are illustrated using bar charts.

Results

Survey questions and responses are organized according to three thematic categories: (a) participant demographics; (b) programming; and (c) pedagogy.

Participant Demographics

Institutions and Faculty Members. Table 1 summarizes data illustrating the number of participating institutions and faculty members.

1.	Number of faculties of education/schools of education in Canada ^a	62
2.	Number of Canadian faculties of education/schools of education invited to participate in this study ^b	46
3.	Number of faculties of education/schools of education that responded to the survey (percentage of faculties/schools of education that responded to the survey).	26 (57 %) ^c
4.	Number of individual faculty members invited to participate in this study.	52
5.	Number of faculty members that responded to the survey (response rate; percentage of faculty members that responded to the survey).	32 (62 %) ^d

Table 1. Survey Participation

Note. Survey response rates for faculties of education and faculty members are consistent with standards expected of survey research (Sataloff & Vontela, 2021; Wu et al., 2022).

- ^a This value represents the total number of faculties/schools of education in Canada as found in the ACDE website (plus others) identified by the research team in the 2017-2018 academic year.
- ^b See Appendices A and B for institution names.
- ^c Row 3 value ÷ Row 2 value x 100 %.
- ^d Row 5 value ÷ Row 4 value x 100 %.



Figure 1. Geographic Distribution of Participating Institutions
 Note. Figure 1 shows the distribution of participating institution by language of instruction. Individual faculty member survey responses included eight (8) faculty members from British Columbia (25 % of all participants); two (2) from Alberta (6 %), two (2) from Saskatchewan (6 %), four (4) from Manitoba (13 %); twelve (12) from Ontario (38 %), two (2) from Quebec (6 %), one (1) from New Brunswick (3 %), and one (1) from Nova Scotia (3 %).

Professional Status and Academic Background

The majority of our participants were full-time faculty (29; 88 %), with three participants (9 %) being part-time faculty, and one participant (3 %) being a department head. While the majority of participants indicated a background in Education (20; 63 %), relatively large proportions also indicated backgrounds in Life Sciences (13; 41 %), Environmental Education (13; 41 %), and Ecology/ Environmental Science (11; 34 %), with the rest having backgrounds in Earth Science (5; 16 %), Humanities (5; 16 %), Social Science (4; 13 %), Environmental Studies (3; 9 %), and Fine Arts (2; 6 %). Note: participants were asked to choose all backgrounds that applied to them from a list of backgrounds (see Appendix C); thus, percentages do not necessarily add to 100 %.

Programming

Priority. Participants were asked to indicate the extent:to which they felt ESE was a priority in their faculty’s 2017–2018 PTE program; and to which they felt ESE should have been considered a priority. (Figure 2)

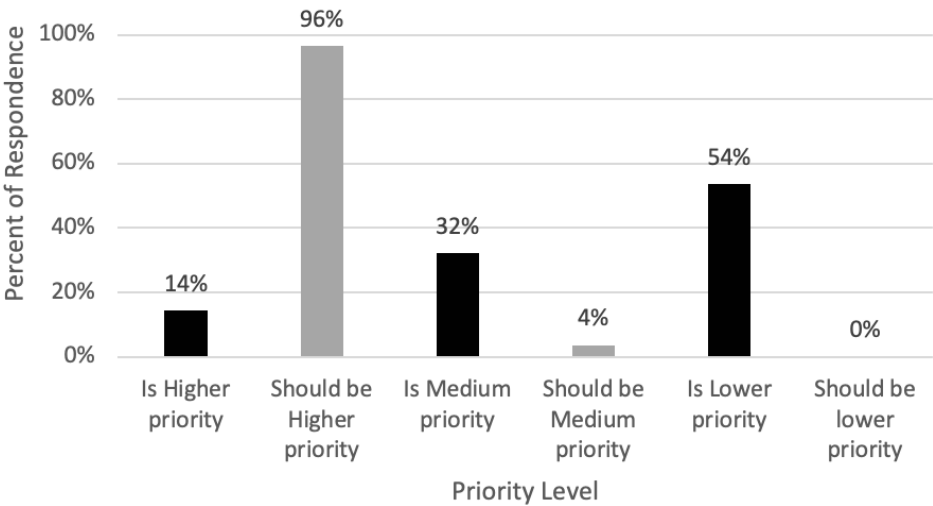


Figure 2. Degree to Which ESE was considered a Priority, and should be considered a Priority, in 2017–2018

A majority (54 %) of our participants felt that ESE was of lower priority in their faculty (Figure 2) while 32 % indicated that ESE was of medium priority, and only 14 % felt it was a higher priority element in their faculty. Conversely, we can also see that the vast majority of participants (96 %) felt that ESE should have been considered a higher priority in 2017–2018, with only 4 % indicating that it should have been a medium priority, and none indicating that it should have been a lower priority.

Rationales Justifying Programs. According to Evans et al. (2017), four key rationales are typically used by teacher educators to justify ESE programming in PTE:

- A. Preparing preservice teachers to develop:
 - i. *capacity* to embed ESE into their teaching practices;
 - ii. *commitment* to embed ESE into their teaching practices.
- B. Responding to international educational policy priorities;
- C. Disrupting instrumentalist, neoliberal education systems; and
- D. “Others” (alternative rationales) (p. 411).

Participants were asked to rank rationales A(i), (ii), B, and C, in order of importance, using a ranking scale in which “1” represented the “most important” rationale and “4” represented the “least important” rationale.

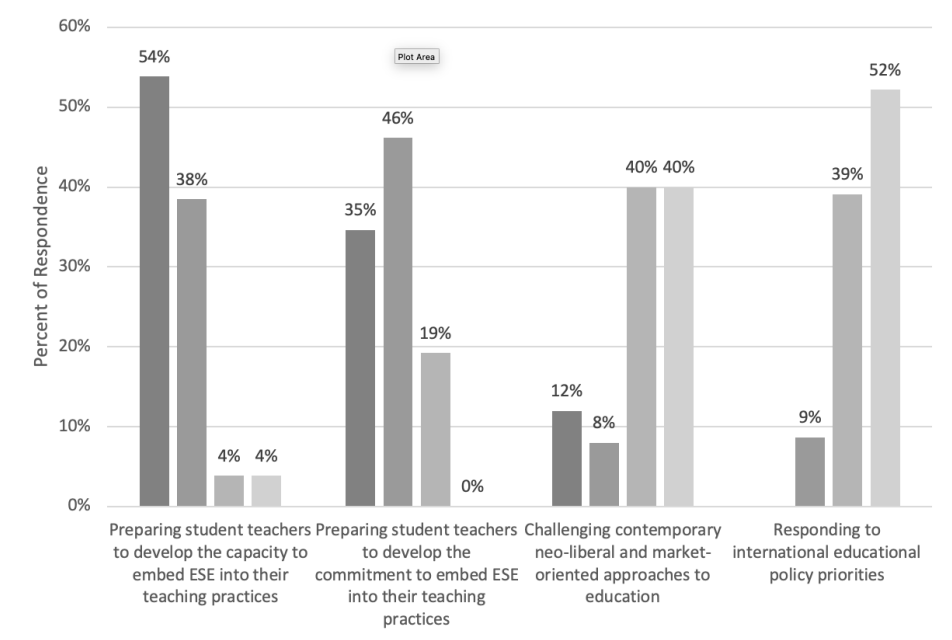


Figure 3. *Rationales for Supporting or Advancing ESE-PTE*

A majority of our participants ranked “Preparing student teachers to develop the *capacity* to embed ESE into their teaching practices” as the most important rational for justifying the inclusion of ESE in PTE programs (Figure 3), with 92 % ranking this rational 1 or 2 out of 4, and only 8 % ranking it 3 or 4 out of 4. The rationale, “Preparing student teachers to develop the *commitment* to embed ESE into their teaching practices” was the second-most highly ranked rationale, with 81 % of participants ranking this rational 1 or 2 out of 4, and only 19 % ranking it 3 or 4 out of 4. In terms of rationales “B” and “C”, only 20 % of participants ranked “Challenging contemporary neo-liberal and market-oriented approaches to education” 1 or 2 out of 4, with 80 % ranking this rationale 3 or 4 out of 4. Only 9 % of participants ranked “Responding to international educational policy priorities” as 1 or 2 out of 4, with 91 % ranking it 3 or 4 out of 4. It is obvious that, in general, our participants viewed rationales A(i) and A(ii) as more important justifications for including ESE in PTE programs than rationales B and C.

Programming Models. Evans et al.’s (2017) review of ESE in PTE programs indicated that, in general, there are four models used to embed ESE in PTE: Model 1 - Integration across whole curriculum areas, courses, or institutions;

Evans et al.'s Models	Results
Model 2. What type of ESE-related courses does your faculty/program offer? ⁷	Science-based courses (n = 19; 28 %) Survey courses (n = 12; 17 %) Field-based courses (n = 11; 16 %) Methods courses (n = 10; 14 %) Humanities-based courses (n = 7; 10 %) Social sciences-based courses (n = 5; 7 %) "Other" (non-specified) types of courses (n = 5; 7 %)
Model 2. In the 2017/2018 academic year, did your preservice teacher education program include an ESE course that all preservice students were required to take?	42 % of participants answered "Yes" 33 % of participants answered "No" 25 % did not answer "Yes" or "No" but provided verbal comments instead. Comments included: "We tried to embed [ESE] across curricula." "The two courses where ESE was integrated were officially designated as Science Education and Curriculum Design." "[ESE content was provided] in combination with Indigenous education."
Model 3. (a) In the 2017/2018 academic year, did your preservice teacher education program have courses that included ESE <i>content</i> as one of a number of components and that all preservice students were required to take.	42 % of participants answered "Yes" 33 % of participants answered "No" 25 % did not answer "Yes" or "No" but provided verbal comments only. Comments included: "We tried to embed across curricula - place-based Indigenous perspectives are a strong emphasis for us and in BC curriculum." "[ESE was] integrated within the elementary science program." "It [ESE] may have been part of a required course in Indigeneity"
Model 4. (a) Did your preservice teacher education program offer non-required (e.g., elective/ optional) ESE courses primarily focused on ESE-related <i>teaching methods</i> in the 2017/2018 academic year?	52 % of participants answered "Yes" 48 % of participants answered "No" No comments were provided.
Model 4. (b) Did your preservice teacher education program offer non-required (e.g., elective/ optional) courses primarily focused on ESE- related <i>content</i> in the 2017/2018 academic year?	48 % of participants answered "Yes" 36 % of participants answered "No" 16 % of participants did not answer "Yes" or "No" but provided verbal comments instead. Comments included: "[ESE was] integrated within the elementary science program." "[An elective] begins in 18/19." "Not this year, but in previous years yes, and next year there will be an elective for senior years." "A series of extra-curricular workshops [were offered]."

Table 2. ESE-PTE Programming Models

*Note.*⁸ The courses identified by participants are courses required as part of teacher certification.

Model 2 - Integration through dedicated core/compulsory courses; Model 3 - Integration through a component of a core/compulsory course focused on (a) ESE content or (b) ESE-related teaching methods; or Model 4 - Integration through a dedicated elective course. While Evans (2017) framework outlines four program models, the present survey was designed to examine Models 2, 3 and 4 only, reflecting the survey instrument, available data (Table 2) and previous surveys (Rioux, 1973; Towler, 1980; Lin, 2002; Swayze et al., 2012).

Adequacy of Preservice Teacher Preparation. Participants were asked whether they felt their preservice teachers received adequate preparation for teaching ESE in their future teaching careers. Our results show that the vast majority of our participants indicated that their preservice students received inadequate preparation to teach ESE-related topics (Figure 4).

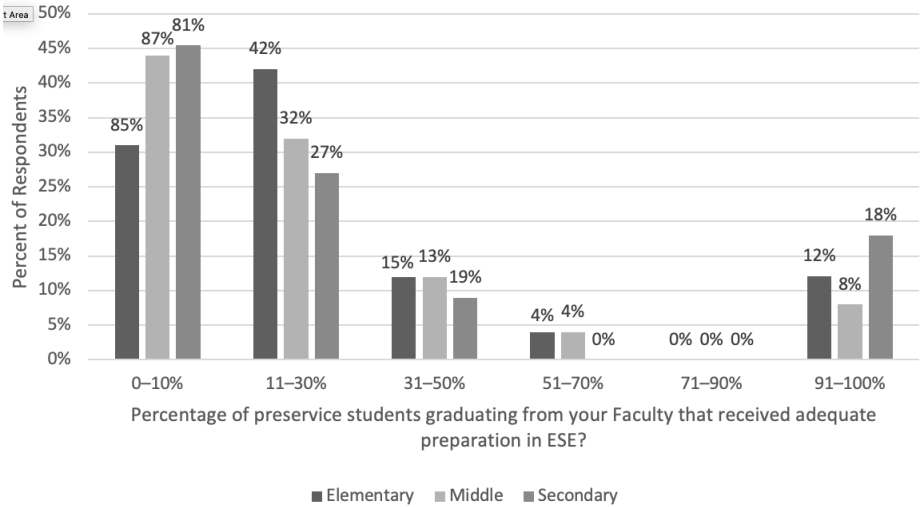


Figure 4. *Adequacy of Preparation in ESE-related Teaching*

Figure 4 indicates that, overall, less than 20% of our respondents felt that their preservice teachers across the three teaching domains had received adequate preparation in ESE pedagogy. Indeed, nearly half of all respondents indicated that their faculty’s middle and secondary school preservice students had had virtually no adequacy at all to teach ESE-related topics.

Barriers in ESE-PTE Programs. We asked participants to rate, on a 5-point scale, a variety of barriers previously identified in the literature as hindering ESE-PTE programs (see especially Lin, 2002, on which this question was based). In this scale, “1” indicated that a particular barrier was considered to be “unimportant”; “2” indicated that the barrier was “somewhat unimportant”; “3” indicated that the barrier was “neither important nor unimportant”; “4” indicated that the barrier was “important”; and “5” indicated that the barrier

was “very important.” Figure 5 illustrates responses 1 (most unimportant) and 4 (most important) to compare multiple barriers.

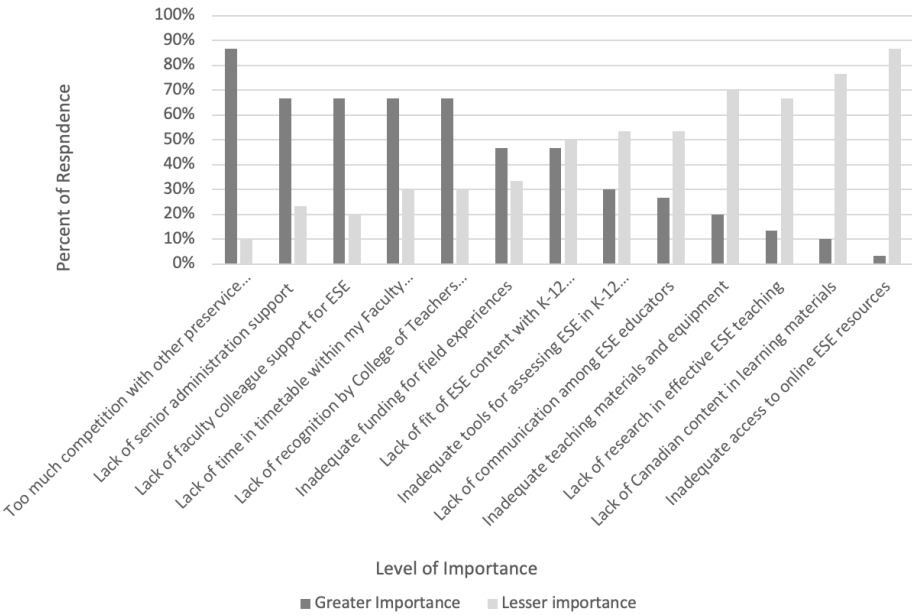


Figure 5. Barriers in ESE-PTE Programs: Levels of Importance

Competition with Other PTE Courses. Figure 5 clearly indicates that the vast majority of our participants felt “Competition with other preservice courses” was an important barrier in ESE-PTE programs (a combined total of 87% of participants indicated this to be a “very important” barrier (67%) or “important” barrier (20%), with a mean Likert scale rating of 4.3/5.

Lack of Senior Administrator Support for ESE-PTE. Participants placed “Lack of senior administration support” among the top five barriers in PTE-ESE. A combined total of 66% of participants indicated this to be a “very important” barrier (43%) or “important” barrier (23%), with a mean Likert scale rating of 3.6/5.

Lack of Faculty Colleague Support for ESE-PTE. Another important barrier noted by our study’s participants was “Lack of faculty colleague support for ESE.” A combined total of 67% of participants indicated this to be a “very important” barrier (40%) or “important” barrier (27%), with a mean Likert scale rating of 3.8/5.

Lack of Time in the PTE Program Timetable. A significant majority of participants indicated that “Lack of time in the PTE program timetable” was an important barrier (combined total of 67% of participants indicating this to

be a “very important” barrier (57 %) or an “important” barrier (10 %), with a mean scale rating of 3.6/5). It should be noted, however, that a small, but not insignificant proportion of our participants considered “Lack of time in the PTE program timetable” not to be a major barrier, with a combined total of 30 % believing it to be “unimportant” (23 %) or “somewhat unimportant” (7 %).

Lack of Professional Governing Body Leadership. Teacher certification bodies (e.g., College of Teachers) are governmental agencies or self-governing organizations that authorize/certify qualified individuals to teach in the public-school systems of the country. Our participants generally indicated that “Lack of recognition by college of teachers ... that ESE is a legitimate teachable subject” poses a significant barrier in ESE in Canadian faculties of education (Figure 5). A combined 67 % of participants indicated this to be a “very important” barrier (47 %) or “important” barrier (20 %), with a mean Likert scale rating of 3.7/5. However, a not insignificant smaller proportion of participants (30 %) considered it a “somewhat unimportant” (13 %) or “unimportant” (17 %) barrier.

Inadequate Funding for Field Experiences. ESE courses often involve outdoor or off-campus experiences which incur additional costs and logistical challenges for students, instructors, and programs. Nearly half (47 %) of respondents indicated that this was a significant barrier to furthering ESE in their faculties.

Lack of Fit or Alignment between ESE in PTE Programs and ESE in K-12 Curriculum. Effective curricular integration requires alignment between the “explicit” curriculum (Eisner, 1985) (i.e., a province’s “official” K-12 curriculum), and the ESE curriculum provided in a faculty of education’s ESE-PTE program. In our study, participants were asked about any “Lack of fit of ESE content with K-12 curriculum in schools” as a barrier in ESE-PTE. Responses varied widely with a combined 47 % of participants indicating this to be a “very important” barrier (7 %) or an “important” barrier (40 %), and a similar combined 50 % indicating that a lack of fit between their faculty’s ESE-PTE content and official K-12 curricula is a “somewhat unimportant” barrier (13 %) or an “unimportant” barrier (37 %).

Inadequate Tools for Assessing ESE in K-12 Schools. A majority of participants (54 %) viewed “Inadequate tools for assessing ESE in K-12 students in schools” as an “unimportant” (37 %) or “somewhat unimportant” (17 %) barrier in ESE-PTE programs. It should be noted, however, that a small, but not insignificant proportion of our participants considered “Inadequate tools for assessing ESE in K-12 students in schools” to be important, with a combined total of 30 % believing it to be “important” (17 %) or “very important” (13 %).

Lack of Communication among ESE Educators. More than 50 % of our survey participants did not consider “Lack of communication between ESE educators” as being a major barrier, with a combined total of 54 % indicating that this potential barrier was “somewhat unimportant” (27 %) or “unimportant” (27 %), and only a combined total of 27 % considering this barrier as being “important” (17 %) or “very important” (10 %).

Inadequate Teacher Resources and Equipment. A significant majority of our participants (70 %) indicated that “Inadequate teaching materials and

equipment” was “unimportant” (43 %) or “somewhat unimportant” (27 %) as a barrier in ESE-PTE programs.

Lack of Research in Effective ESE Teaching. A combined total of 67 % of our participants felt that a “Lack of research in effective ESE teaching” is an “unimportant” (40 %) or “somewhat unimportant” (27 %) barrier in ESE-PTE programs.

Lack of Canadian Content in Learning Materials. A significant majority of participants (77 %) believed “Lack of Canadian content in learning materials” to be an “unimportant” (50 %) or “somewhat unimportant” (27 %) barrier in ESE-PTE programs.

Inadequate Access to Online Resources. A significant majority of our participants (86 %) viewed “Inadequate access to online ESE resources” as an “unimportant” (73 %) or “somewhat unimportant” (13 %) barrier in ESE-PTE programs.

Pedagogy

Theoretical Propositions. Participants were asked to: (a) identify how Sauvé’s (2005) “currents” (including our newly created “Indigenous” current) were present in their faculty’s ESE-PTE courses and programs, and then (b) to rank the currents as to which ones were the most influential in their programs. In the rating scale for this item, “1” meant that the current was “not at all” present in the program, and 5 meant that the current was a “principal current” in the program. The descriptors that participants were to use in their rankings are included in the Survey in Appendix C. Results for this item are illustrated in Figure 6.

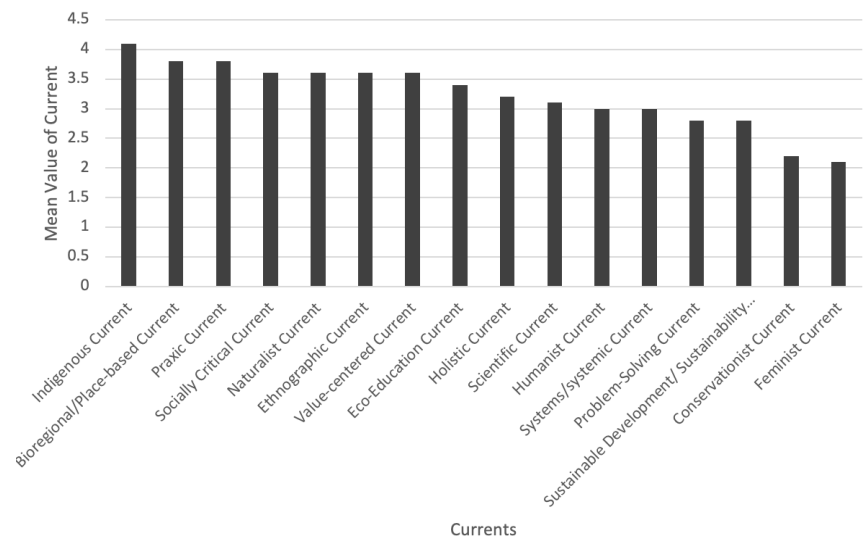


Figure 6. Presence of Sauvé’s (2005) ESE Currents in ESE-PTE Programs

In Figure 6, the three highest-rated currents are the *Indigenous* current, the *Bioregionalist-Place-Based* current, and the *Praxic* current. The lowest-rated currents include the *Problem-solving* current, the *Sustainable Development/Sustainability* current, the *Conservationist/Resourcist* current, and the *Feminist* current. We were surprised by the high ratings given to the *Indigenous* current, and in the context of Canada’s journey of “Truth and Reconciliation” (Truth and Reconciliation Commission of Canada, 2012), we found this to be a significant result, worthy of further investigation.

Effectiveness of Pedagogical Approaches. Previous studies (e.g., Evans et al., 2017; Lin, 2002; Swayze et al., 2012; Towler, 1980) have indicated that PTE instructors employ a variety of pedagogical approaches in their ESE courses and programs. While Evans et al. (2017) included descriptions of various pedagogical approaches employed internationally, they did not explore instructors’ views on their effectiveness. In our survey, we asked participants to rate the effectiveness of ten (10) different ESE-oriented pedagogical approaches on a 1-5 rating scale, where 1 represented the most effective strategy and 5 represented the least effective strategy. Results of this survey item are summarized in Figure 7.

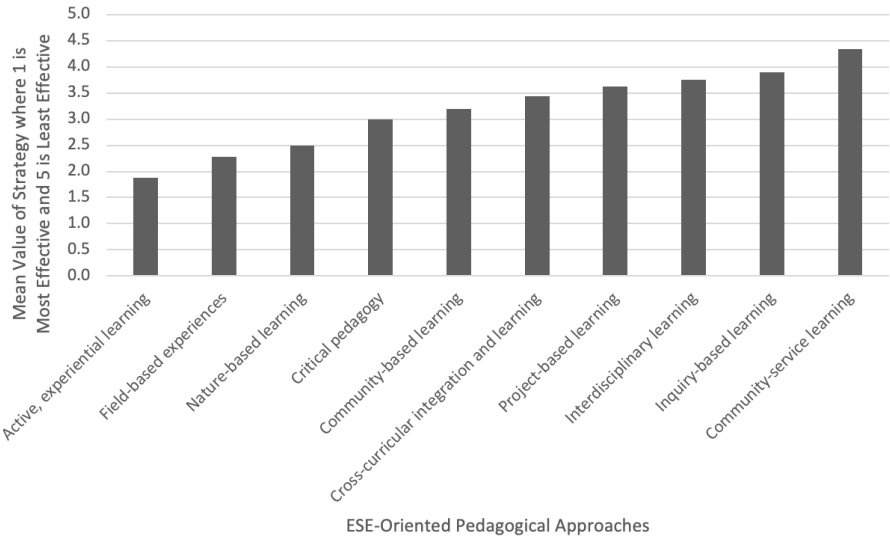


Figure 7 Effectiveness of Pedagogical Approaches in ESE-PTE.

Figure 7 shows that participants viewed most of the approaches as moderately effective, with highest ratings for community service learning, inquiry-based learning, interdisciplinary learning, and project-based learning. These highest-rated approaches tend to be those involving more applied and action-oriented forms of learning. In contrast, active experiential learning,

field-based learning, and nature-based learning received lower scores, possibly reflecting lower effectiveness on account of greater challenges instructors may have experienced in their implementation.

Discussion

ESE and its cognates (environmental education, outdoor education, conservation education etc.) have long occupied a marginal position within compulsory education. While environmental education has been included in some Canadian PTE programs for nearly 50 years, it has rarely achieved a status comparable to that of more traditional, established subjects such as English, mathematics, or the traditional sciences of biology, chemistry and physics. In this section, we will revisit our research question, summarize our findings, and explore implications regarding policy advocacy and research.

What is the Current Status of ESE-PTE in Canadian Faculties of Education?

The following discussion focuses on three major themes emanating from the collected data, namely: ESE-PTE priorities, ESE-PTE programming, and ESE-PTE pedagogy. Where relevant, we compare our findings with earlier Canadian survey research in the field (e.g., Lin, 2002⁹; Swayze et al., 2012), and other research informing our survey questions (e.g., Evans et al., 2017) and Sauvé (2005).

ESE-PTE Priorities. Most of our participants viewed ESE as a low priority in their PTE programs, with less than 25 % considering that it rates a high priority in their faculty. Swayze et al. (2012) did not pose this question but did generate data on the degree to which PTE programs were moving in the direction of better addressing ESE in their curricula (a quasi-indicator of ESE-PTE status). They determined that Canadian Faculties of Education “are beginning to make progress toward reorienting their curricula and contributing to the DESD, [though] there is progress yet to be made toward full implementation” (Swayze et al., 2012, p. 38). In contrast, Lin (2002) reported that 23 % of her participants indicated ESE-PTE was accorded high priority. In particular, our results indicate that only 14 % of participants felt that their faculties accorded ESE-PTE a high priority, while 96 % believed it *should* be given higher priority, and none thought it should be lowered. Lin (2002) did not pose this variation of the question. Although these results are discouraging, they are mitigated by our finding that the majority of respondents teaching ESE feel it should be prioritized more within PTE programs.

ESE-PTE Programming. Our results show that, overall, our participants felt that developing the “capacity” for integrating ESE into preservice teachers’ future teaching practices was the most important rationale for including ESE in PTE programs, followed by developing preservice teachers’ “commitment” to ESE-embedding practices. This helps further extend the work of Evans et

al. (2017) who identified various rationales but provided no indication of their popularity or adoption rates.

Recall, programming models 2, 3 and 4 were surveyed. Regarding Model 2 (i.e., integration through dedicated core/compulsory courses), 42 % of our participants reported the presence of this programming model. In their survey, Evans et al. (2017) reported that this model was unusual, while Swayze et al. (2012) reported a 16 % adoption rate, and Lin (2002) noted a 34 % adoption rate. Regarding Model 3 (i.e., integration through a component of a core/compulsory course focused on (a) ESE content and (b) ESE-related teaching methods), 42 % of our participants indicated that their ESE-PTE programs included a component of a core/compulsory course focused on ESE content, and 52 % of our participants indicated that their ESE-PTE programs included a component of a core/compulsory course focused on ESE-related teaching methods. Evans et al. (2017) reported this to be the most common of the four program models, though Swayze et al. (2012) and Lin (2002) appear not to confirm this, with 17 % and 5 % adoption rates, respectively. Lastly, with Model 4 (i.e., integration through a dedicated elective course), just under half of our participants (48 %) indicated that their PTE programs offered their preservice teachers elective/optional courses specifically focused on ESE content. Evans et al. (2017) reported this to be the most common program model in their survey, while Swayze et al. (2012) and Lin (2002) did not include this item in their surveys. Overall, our survey results reveal an uptake of programming Models 2, 3 and 4, with the uptake of Models 2 and 3 being greater than they were in Swayze (2012) and Lin (2002).

Pre-service Teacher Preparation. We asked participants to evaluate whether their 2017–2018 ESE programs adequately prepared preservice teachers to address ESE in their future careers. Our results indicate that a majority of participants felt that most of their preservice teachers were not suitably prepared to adequately address ESE in their future careers as teachers. These were very disquieting findings, but not unexpected. As environmental challenges grow, the lack of preparation for teachers to address these issues creates a significant gap in our society's ability to address current and future environmental challenges. Despite increasing awareness of environmental problems, Canadian faculties of education seem to be falling short in addressing this critical need. We surmise the reasons for this can be linked with barriers to ESE-PTE programming, which we turn our attention to next. After all, if barriers to programming exist, teacher preparation falters.

Barriers to ESE-PTE Programming. An important part of our study involved assessing the types of barriers our participants felt were impeding ESE-PTE programming in their faculties. While our findings confirm that ESE still has many advocates in PTE programs across the country, it remains on the curricular margins, and barriers to its entrenchment mirror those faced by many new and novel subject areas. Yueh et al. (2010) examined this phenomenon in detail in the context of the introduction of environmental education in the

Taiwanese national curriculum. Yueh et al. (2010) based much of their work on the earlier work of Layton (1972) and Goodson (1987) which primarily focused on K-12 curriculum implementation in the UK.

Yueh et al. (2010) noted that the most important factor in hindering the successful introduction of a new subject area was the lack of its presence in the academic timetable. In our study, our participants indicated that timetabling was a problem for ESE in their PTE programs, noting in particular that there was “too much competition with other preservice courses” (mean = 4.3/5, with 85 % indicating that this is “important,” rated 4 or 5), and that there was a “lack of time in the timetable” (mean = 3.6/5, 62 % indicating that this is “important,” rated 4 or 5). These two factors were identified as the first- and fourth-highest barriers to teaching ESE.

Current study (rank)	Lin (2002) (rank)
1. Competition with other PTE courses.	n/a ^a
2. Lack of senior administrator support.	3. Lack of administrative/faculty support for EE in programs
3. Lack of faculty colleague support.	n/a
4. Lack of time in the PTE program timetable.	2. Lack of time/space in pre-service teaching programs
5. Lack of professional governing body recognition.	n/a
6. Inadequate funding for field experiences.	1. Inadequate funding
7. Lack of fit, or alignment, between ESE-PTE curriculum and K-12 curriculum.	4. No demand/mandate/interest of EE in institutions and/or schools
8. Inadequate tools for assessing ESE-PTE in K-12 education.	n/a
9. Lack of communication among ESE educators.	10.5 Lack of communication among EE educators
10. Inadequate ESE teaching materials.	8.5 Inadequate texts for K-12 schools & 5. Inadequate teaching materials and equipment
11. Lack of research in effective ESE teaching.	10.5 Lack of research
12. Lack of Canadian content in learning.	6.5 Lack of Canadian content in materials 11. EE is only offered in the summer
13. Inadequate access to online ESE resources.	6.5. Inadequate texts for teachers

Table 3. Barrier rankings in the current study and Lin (2002)
Note.^a Lin (2002) did not collect data for these barriers.

Our participants also indicated that lack of support from senior administrators was also a significant obstacle. In fact, “lack of senior administration support” was identified as the second-most important barrier to advancing ESE. In

addition, without the support of faculty colleagues, it is hard to influence administrative decisions. While Swayze et al. (2012) did not explore barriers to ESE-PTE implementation, they did note that “[i]n many instances, the traditional academic culture was itself considered to be a barrier to reorienting teacher education to ESD” (p. 61). Lin (2002), on the other hand, identified the following as major barriers impeding ESE-PTE: “barriers in institutional practices and organizations, barriers at the faculty level, and barriers encountered by instructors of preservice teachers” (p. 212). Interestingly, Lin (2002) stated that at “the faculty level, a lack of awareness, interest, commitment, direction, and leadership” were significant implementation barriers (p. 213). Table 3 provides a comparison of the current study’s rankings of barriers with those reported in Lin’s (2002) study.

Yueh et al. (2010) noted that lack of a university department to house a new subject, lack of external examinations, and lack of support from a coherent group of faculty members were important factors hindering the new subject’s implementation. In our study, we found that the second-most important barrier our participants noted was “lack of faculty colleague support for ESE.” Also, our findings indicate that ESE faculty members and courses tended to be associated with science education departments, and that the interdisciplinary nature of ESE may have caused it not to be taken as seriously as other courses by colleagues teaching in the more traditional “hard” science disciplines.

Further, Yueh et al. (2010) also points out the importance of “the presence of central government leadership.” In our study, we expected that a “lack of professional governing body leadership” would be an important barrier, and our findings confirmed this. We believe that as long as provincial K–12 curricula do not formally recognize or include ESE-related topics and activities, post-secondary administrators will be less inclined to prioritize ESE within PTE programs. Similarly, we believe that ESE will remain marginalized in PTE programs if provincial accrediting bodies continue to resist making ESE a “teachable subject” required for teacher accreditation. An interesting finding in our study was the split in our participants’ responses to “lack of fit, or alignment, between ESE in PTE programs and ESE in K-12 Curriculum” as a barrier. Approximately half considered this to be a “very important” or “important” barrier, with the other half believing it to be a “somewhat unimportant” or “unimportant” barrier. This may be a reflection of provincial differences in curricular fit. While our sample size is too small to make reliable generalizations, it is interesting to note that the two participants from the oil-producing and strongly conservative province of Alberta indicated that this is an important barrier (mean = 4.5), as did the two respondents from the Maritime provinces (mean = 4). Conversely, the seven participants from British Columbia, where the provincial curriculum offers more opportunities for ESE integration, did not see this as a major issue (mean = 2.0).

Similar to Lin’s (2002) findings, a majority of our participants did not view “lack of communication among ESE educators” or “lack of research in

effective ESE teaching” as significant barriers. Given the prevalence of digital communication and rapid dissemination of research, these are unlikely to be key factors hindering ESE’s integration any longer. Furthermore, “lack of ESE teaching resources and equipment,” “lack of Canadian content in learning materials,” “inadequate access to online resources,” and “inadequate tools for assessing ESE in K-12 students in schools,” were relatively “unimportant” or non-problematic barriers in Canadian ESE-PTE. This aligns with Lin’s (2002) findings.

ESE-PTE Pedagogy. Our study included several items exploring participants’ use of Sauvé’s (2005) environmental education “currents.” The three highest-rated currents were the Indigenous current, the Bioregionalist/Place-Based current, and the Praxic current. These findings align with Evans et al. (2017), who identified “inquiry and/or place-based education, experiential education, constructivist and/or socially critical approaches, [and] integrating theory” as popular theoretical propositions. However, Evans et al. (2017) concluded that (at the time) “it was not possible to create a useful taxonomy of theoretical approaches to embedding sustainability in teacher education” (p. 411–412). Table 4 lists Sauvé (2005) “currents” in terms of their historical relevance.

Among those “currents” with a Longer Tradition in Environmental Sustainability Education (ESE)	Among those “currents” more Recently Emerged in Environmental Sustainability Education (ESE)
Naturalist Current Conservationist/Resourcist Current Problem-Solving Current Systemic Current Scientific Current Humanist/Mesological Current Value-centered Current	Holistic Current Bioregionalist Current Praxic Current Socially Critical Current Feminist Current Ethnographic Current Education Current Sustainable Development/Sustainability Current

Table 4. Sauvé’s (2005) Currents of Environmental Education

Of interest and perhaps needing further exploration are those “currents” that received the lowest ratings in our survey, namely, the Problem-solving current, the Sustainable Development/Sustainability current, the Conservationist/Resourcist current, and the Feminist current. Particularly interesting in the Canadian context is that given the UN DESD, the “sustainable development” current was not seen as particularly important by the faculty members we surveyed. There are several reasons that may explain this: (1) the allegiance to the Standing Committee of ESE-PTE’s preference to “ESE” over ESD; (2) reasonable critiques against ESD within the Canadian academic community (Jickling, 1994); and (3) the skewing of participants to jurisdictions where currents other than ESD prevail (BC and Ontario). While in certain parts of Canada resource extraction

industries have spent considerable funds to promote a “Resourcist” approach to ESE (e.g., Keary & Chestnut, 2025), our participants have indicated that this approach is not seen as having a significant place in PTE programs.

Further, we assessed participants’ views on the effectiveness of various pedagogical approaches in ESE teaching and learning, and found that, overall, participants—not unexpectedly—rated “Active, Experiential Learning,” “Field-based Experiences,” and “Nature-based Experiences,” as the three most common pedagogical approaches in their ESE-PTE programs. Swayze et al. (2012) determined that 50% of participants had made significant progress in incorporating “interdisciplinary learning and pedagogical approaches that are consistent with ESD (e.g., systems thinking, futures thinking, active learning, and emphasizing local and global perspectives)” (p. 43). However, comparisons to Lin (2002) are not possible, as her study did not assess this characteristic of ESE-PTE.

Conclusions

This study has found that a large majority of Canadian faculty involved in ESE-PTE are full-time academics with backgrounds in life sciences and education, a pattern that has remained largely unchanged over time. It also shows that interest in and engagement with ESE-PTE within faculties of education across Canada has remained relatively stable.

The study further indicates that, while Canadian ESE-PTE programs are often afforded lower status than more traditional subject areas, such as science and history, nation-wide, most participants believe they should be given greater, if not equal, importance. Participants emphasized that ESE programming plays a key role in developing preservice teachers’ capacity to integrate ESE topics into their teaching in meaningful and action-oriented ways.

Despite showing strong support for including ESE in PTE programming, this study indicates that there is ongoing concern about preservice teacher preparedness, noting that a large proportion of preservice teachers are not adequately equipped to address ESE in their future careers. Participants identified several key barriers that help explain this gap, including limited time within a crowded curriculum, competition with other required courses, and the interdisciplinary nature of ESE, which can make it difficult to implement. They also pointed to a lack of support from senior administrators, limited engagement of faculty colleagues, and insufficient leadership from professional governing bodies. These challenges point to a broader issue in Canada, in that ESE is taught inconsistently in PTE programs, and not always covered with the depth it requires.

In terms of theoretical approaches, the study found that participants placed highest value on Indigenous perspectives, bioregional or place-based approaches, and praxic frameworks that emphasize action and reflection. This emphasis supports wider calls for approaches that may better integrate

Indigenous knowledge with ESE. In contrast, approaches that focus mainly on problem-solving, sustainability frameworks, resource management, and feminist perspectives were rated lower, possibly because they are seen as more abstract or systems-based approaches and less directly amenable to experiential or place-based learning, which were themselves more highly preferred methods. Participants may have indicated preference for these strategies because they see them as moving learning beyond simple awareness and toward more practical, action-oriented engagement.

The findings of this research connect to a broader national conversation about the essential role teachers play in enhancing environmental literacy, sustainable behaviour, and informed decision-making (Environment and Climate Change Canada, 2024), while simultaneously revealing the numerous, persistent implementation challenges faced by Canada's PTE programs.

Overall, while this study shows broad agreement on the importance of providing high-quality ESE-PTE programs across Canada, it also indicates that successful large-scale implementation continues to lag. Strengthening ESE-PTE will require a more concerted effort in addressing the key gaps and barriers outlined in this and earlier research, including the establishment of clearer and more consistent program standards, improving the overall depth and quality of preservice teacher preparation, and providing ongoing support and professional learning for preservice teachers and their PTE program educators. Furthermore, ESE should be made more prominent and better integrated into PTE program curricula, rather than it being treated as a necessary, even vital, yet peripheral add-on. Without successfully addressing these persistent and long-standing challenges, large-scale and effective implementation will likely continue to lag despite widespread recognition of ESE-PTE's importance.

Implications and Recommendations

In Canada, over 10 years have passed since Swayze et al. (2012) published their research, and over 20 years have elapsed since Lin (2002) released her study. Over this period, socio-ecological challenges have grown more urgent, increasing the need for improvements in ESE-PTE. While ESE and related disciplines have maintained a presence in PTE programs, they remain sustained by a relatively small contingent of highly dedicated faculty members and administrators.

In the absence of provincial government direction, many teacher accreditation bodies are not recognizing ESE and related disciplines as "teachable subjects"¹⁰ (Alberta Education, 2020; British Columbia Ministry of Education, 2023; Ontario College of Teachers, n.d.; Ontario Ministry of Education, 2017; Swayze et al., 2012). As a result, most faculty members and senior faculty administrators are unlikely to prioritize ESE in their PTE programs. This study, therefore, is both timely and necessary. It provides an important assessment of the status of ESE-PTE in Canadian faculties of

education at a time when significant improvements are needed. In general, we find the current status of Canadian ESE-PTE to be unacceptable, and in need of significant improvement. Therefore, we make the following recommendations aimed at enhancing ESE-PTE across Canada:

Policy Advocacy

- Members of the EECOM Standing Committee on ESE-TE, and ESE educators more broadly, are called to focus more of their energies on ESE-PTE advocacy/lobbying with relevant government bodies (e.g., ministries of education), professional associations (e.g., ACDE, provincial teacher accreditation bodies), and other policy-making bodies.
- The EECOM Standing Committee on ESE-TE, and ESE educators more broadly, should focus on strengthening links between ministries of education and ministries of the environment to raise the profile and legitimacy of ESE-related curricula in K-12 systems across Canada. Once governments officially recognize the essential nature of ESE-related curricula and instruction, teacher accreditation bodies should then be more willing to recognize preservice teachers' credentials in undergraduate (or graduate) environmental/sustainability education, environmental/sustainability science, and related disciplines, and recognize ESE as a K-12 "teachable subject".

Research

- Retrospective and/or current policy research on the development of ESE-PTE policy at the government level (ministry-level), association level (e.g., ACDE-, CMEC-level), or institution level (e.g., PTE provider-level, university-level, faculty-level).
- Longitudinal surveys examining national and international trends in ESE-PTE.
- Survey-based research on the status and current development of Canadian ESE- PTE in the context of faculty administrators (deans, associate deans, provosts).
- Mixed methods research on the status and current development of Canadian ESE- PTE in the context of faculty members (instructors, professors, researchers).
- Comparative research examining how formerly marginalized fields (e.g., feminism, multiculturalism, information technology) successfully transitioned from post-secondary curricular margins to the curricular mainstream, in relation to curricular developments in ESE-PTE.
- In depth case study research into ESE-PTE barriers and solutions.

These policy advocacy and research recommendations sow the seeds for another generation of ESE-PTE researchers to extend the work of an earlier

generation of scholars (Rioux, 1973; Towler, 1980; Lin, 2002; and Swayze et al., 2012) by an additional 15 years. Such iterative contributions are vital to tracking the history of the field. It is our hope that contemporary and future ESE-PTE researchers extend this scholarly activity moving forward to prepare the next generation of teachers, and by implication, future generations of children, to live safely, ethically, knowingly, and flourishingly in an uncertain world.

Notes

- ¹ In the Canadian context, researchers and educators are increasingly adopting the expression and acronym “environmental and sustainability education” (ESE) as a hybrid of more established expressions, such as “environmental education” (EE) and “education for sustainable development” (ESD).
- ² In this paper, the term “preservice teacher” is used synonymously with “preservice student” and “student teacher,” referring to individuals enrolled in initial teacher education programs who have not yet obtained certification or entered the profession as fully qualified teachers.
- ³ The National Roundtable on Environmental and Sustainability Education in Preservice Teacher Education, the first of its kind in Canada, brought together 73 delegates who attended the 3-day event (Karrow & DiGiuseppe).
- ⁴ For the purposes of this manuscript and length restrictions, only the quantitative data is presented and analyzed.
- ⁵ “In cross-sectional survey design, the researcher collects data at one point in time” (Creswell & Guetterman, 2019, p. 386).
- ⁶ Indigenous Current: This current actively connects Indigenous and traditional understandings of human connections and participation in the natural world.
- ⁷ The Research Development Group was a sub-set of Standing Committee members who conceptualized and developed the survey.
- ⁸ The Research Author Team included: Douglas Karrow, Richard Kool, Matthew Trafford, Maddie Sturgeon, and Maurice DiGiuseppe
- ⁹ The Research Author Team acknowledge the translation contribution of Dr. Laura Sims, Université de Saint Boniface in Winnipeg, Manitoba.
- ¹⁰ The courses identified by participants are courses required as part of teacher certification.
- ¹¹ For the purposes of this discussion, Lin’s (2002) survey research, which references Rioux’s (1973) and Towler’s (1980) works, will serve as a comparison baseline.
- ¹² “Teachable subject” refers to distinct, certifiable areas of specialization for which teachers may obtain formal qualifications, commonly including subjects such as Science, History, and Mathematics. These “teachable subjects” contrast with non-certifiable content that is commonly addressed through the integration of cross-curricular themes across a variety of subjects, including areas such as Indigenous Education, Citizenship Education, and Numeracy.

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Dr. Richard Kool is a retired professor of environment and sustainability at Royal Roads University. Research focusses on environmental education and how it confronts hope and despair.

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Appendix A: French Language Institutions Contacted

Université de Moncton	Université du Québec en Abitibi-Témiscamingue
Université de Saint Boniface	Université du Québec en Outaouais
Université du Québec à Montréal*	Université du Québec à Rimouski
Université du Sherbrooke*	Université du Québec à Trois-Rivières
Université Laval	

* Two invitations to this institution

Appendix B: English Language Institutions Contacted

Acadia University	Bishop's University
Brandon University	Brock University
Burman University	Cape Breton University
King's University College	Lakehead University
Laurentian University	Memorial University of Newfoundland
Mount Royal University	Nipissing University
Queen's University	Red Deer College
Saint Francis Xavier University	Simon Fraser University*
Thompson Rivers University	Trent University
Trinity Western University	University College of the North
University of Alberta	University of British Columbia*
University of Lethbridge	University of Manitoba
University of Northern British Columbia	University of Ontario Institute of Technology*
University of Ottawa	University of Prince Edward Island
University of Regina	University of Saskatchewan*
University of Toronto/OISE	University of Victoria
University of Windsor	University of Winnipeg
Vancouver Island University	Western University
York University	

* Two invitations to this institution

Appendix C: English Language Survey

The Canadian Network for Environmental Education and Communication (EECOM) Standing Committee on Environmental and Sustainability Education in Teacher Education (ESE-TE)* is conducting a survey to examine the status of ESE and associated domains in Canadian Faculties of Education.

We invite you to participate in this survey, which will help us develop a contemporary picture of ESE in preservice teacher education in Canada and allow us to begin to draft recommendations to help advance programs, policy, and practice.

Please answer the survey questions in the context of this past academic year, 2017/2018. While the survey will use the term Environmental and Sustainability Education (ESE) throughout, we are referring to a range of approaches including Environmental Education, Sustainability Education, Education for Sustainability, Education for Sustainable Development, Energy Education, Outdoor Education, Place-based Education etc.

Your responses will be anonymous. This survey will not collect any identifying information beyond your institutional affiliation and your position/rank within the institution; however, this information may make you identifiable and this should be taken into consideration in your decision to participate. In reports and presentation emerging from the study, data will be pooled, and responses will be reported in a way that minimizes the possibility of participant identification. There will be no linkage between your consent to participate and the answers you provide in the survey.

The data collected will be stored on a Canadian server and will not be subject to scrutiny under the US Patriot Act. There are no anticipated risks involved in your participation in the survey, although it is possible that you may experience some emotional distress related to the topic. If you do not want to participate, please do NOT press the final 'submit' button on the survey; you do not have to submit the completed survey. Your submission of the completed survey is an indication that you have read and are fully informed about and give consent to participate in the project. Once the survey is submitted, we will not be able to find and remove your submission. Raw data will be archived for future comparative studies.

If you do not have enough time to complete the survey in one sitting, you can return to the partially completed survey by clicking on the link you received in your invitation email. The survey should take approximately 30–45 minutes to complete and includes options for open-ended responses. Once you click on the final 'submit' button, you will not be able to enter the survey again.

The project has been reviewed and has received ethical approval from each of the participating institutions as required.

Findings from the research will be shared with those who have been invited to participate and others who are interested in the findings.

Many thanks for your willingness to engage in this research project.

Members of the ESE-TE Research group... [names deleted]

Please start by clicking on the NEXT button below.

What position do you currently hold at your institution?

- 1. Part-time/sessional faculty
- 2. Full-time faculty
- 3. Department head
- 4. Faculty administrator (Assistant or Associate Dean)

In your view, relative to content currently required in your faculty’s preservice teacher education, ESE:

	High priority		Medium priority		Low priority
is considered to be a...	☐	☐	☐	☐	☐
should be considered to be a...	☐	☐	☐	☐	☐

What type of ESE-related courses does your faculty/program offer? Select all that apply.

- 1. General survey course(s)
- 2. Field-based courses
- 3. Methods courses
- 4. Science-based courses (e.g., ecology, sustainability, natural history)
- 5. Humanities-based courses (e.g., environmental philosophy, environmental arts)
- 6. Social science-based courses (e.g., environmental psychology)
- 7. None
- 8. Comments / Other _____

Lucie Sauvé (2005) identified ‘currents’, or theoretical frameworks, which influence environmental pedagogy (see Currents in Environmental Education: Mapping a complex and evolving pedagogical field. Canadian Journal of Environmental Education, 10, 11–37). How are these ‘currents’, outlined below, present in your Faculty’s ESE-TE courses or program?

	Not at all (1)	2	3	4	A principal 'current' (5)
Bioregionalist/Place-based Current: "... leads us to see a place from the point of view of natural and social systems, whose dynamic relations contribute to creating a sense of "living place" rooted in natural as much as cultural history."	☐	☐	☐	☐	☐
Conservationist/resourceist Current: "... centered on resource "conservation... Concern for environmental "management" is a recurring theme."	☐	☐	☐	☐	☐
Eco-Education Current: "dominated more by educational concerns than environmental ones. There is no question of pragmatic solving problems or 'managing' the environment, but rather of leveraging our relationship with the environment to further personal development as the basis of meaningful and responsible action."	☐	☐	☐	☐	☐
Ethnographic Current: "... proposes not only that pedagogy should be adapted to different cultural realities, but also that inspiration be drawn from the pedagogy of these diverse cultures, which have another relationship to the environment."	☐	☐	☐	☐	☐
Feminist Current: "...sheds light on the relations between the domination of women and the domination of nature..."	☐	☐	☐	☐	☐
Holistic Current: "... an exclusively analytic and rational approach to environmental realities is at the origin of many contemporary problems..."	☐	☐	☐	☐	☐
Humanist Current: "...places the accent on the human dimension of the environment, forged at the junction of nature and culture."	☐	☐	☐	☐	☐
Indigenous Current: "... actively connects indigenous and traditional understandings of human connections and participation in the natural world	☐	☐	☐	☐	☐

Naturalist Current: "...centered on human relationships with nature."	☐	☐	☐	☐	☐
Praxic Current: "...emphasizes learning in action, by action, and for the ongoing improvement of action."	☐	☐	☐	☐	☐
Problem-Solving Current: "the environment is considered first as a set of problems."	☐	☐	☐	☐	☐
Scientific Current: "...tackling environmental realities and problems rigorously, of better understanding them and more specifically identifying their cause-and-effect relationships."	☐	☐	☐	☐	☐
Socially Critical Current: "...promotes analysis of the social dynamics underpinning environmental realities and problems..."	☐	☐	☐	☐	☐
Sustainable Development/ Sustainability Current: "...economic development is at the basis of human development and recognizes that a "sustainable" economy is closely linked to the conservation of natural resources and the equitable sharing of resources..."	☐	☐	☐	☐	☐
Systems/systemic Current: "Systemic analysis allows for identification of the various components of an environmental situation or issue, as well as for distinguishing their interrelations, including the relations among biophysical and social elements."	☐	☐	☐	☐	☐
Value-centered Current: "...the foundation of our relationship to the environment is moral or ethical in nature..."	☐	☐	☐	☐	☐

Of the "currents" you rated 4 or 5, please rank the top 5 currents you believe are the most influential in your faculty (with 1 being the most influential).

- Bioregionalist/Place-based Current: "...leads us to see a place from the point of view of natural and social systems, whose dynamic relations contribute to creating a sense of "living place" rooted in natural as much as cultural history." _____
- Conservationist/resourceist Current: "...centered on resource "conservation... Concern for environmental "management" is a recurring theme." _____
- Eco-Education Current: "dominated more by educational concerns than environmental ones. There is no question of pragmatic solving problems or 'managing' the environment, but rather of leveraging our relationship with the environment to further personal development as the basis of meaningful and responsible action." _____

- Ethnographic Current: "... proposes not only that pedagogy should be adapted to different cultural realities, but also that inspiration be drawn from the pedagogy of these diverse cultures, which have another relationship to the environment." _____
- Feminist Current: "...sheds light on the relations between the domination of women and the domination of nature..." _____
- Holistic Current: "... develop new forms of understanding" _____
- Humanist Current: "...places the accent on the human dimension of the environment, forged at the junction of nature and culture." _____
- Indigenous Current: "... actively connects indigenous and traditional understandings of human connections and participation in the natural world" _____
- Naturalist Current: "...centered on human relationships with nature." _____
- Praxic Current: "...emphasizes learning in action, by action, and for the ongoing improvement of action." _____
- Problem-Solving Current: "the environment is considered first as a set of problems." _____
- Scientific Current: "...tackling environmental realities and problems rigorously, of better understanding them and more specifically identifying their cause-and-effect relationships." _____
- Socially Critical Current: "...promotes analysis of the social dynamics underpinning environmental realities and problems..." _____
- Sustainable Development/ Sustainability Current: "...economic development is at the basis of human development and recognizes that a "sustainable" economy is closely linked to the conservation of natural resources and the equitable sharing of resources..." _____
- Systems/systemic Current: "Systemic analysis allows for identification of the various components of an environmental situation or issue, as well as for distinguishing their interrelations, including the relations among biophysical and social elements." _____
- Value-centered Current: "...the foundation of our relationship to the environment is moral or ethical in nature..." _____

Please rank according to importance to your program or Faculty, some rationales commonly cited as supporting and advancing ESE in preservice teacher education (select all that apply).

- Preparing student teachers to develop the capacity to embed ESE into their teaching practices _____
- Preparing student teachers to develop the commitment to embed ESE into their teaching practices _____
- Responding to international educational policy priorities _____

- Challenging contemporary neo-liberal and market-oriented approaches to education _____

Below are some commonly reported problems or barriers concerning the teaching of ESE in a preservice teacher education program. How important are these commonly reported problems or barriers to your preservice teacher education program?

	Unimportant (1)	2	3	4	Very important (5)
Lack of senior administration support for ESE in my Faculty of Education	☐	☐	☐	☐	☐
Inadequate access to online ESE resources	☐	☐	☐	☐	☐
Lack of communication among ESE educators	☐	☐	☐	☐	☐
Inadequate funding for field experiences	☐	☐	☐	☐	☐
Inadequate teaching materials and equipment	☐	☐	☐	☐	☐
Lack of research in effective ESE teaching	☐	☐	☐	☐	☐
Lack of faculty colleague support for ESE	☐	☐	☐	☐	☐
Too much competition with other preservice courses	☐	☐	☐	☐	☐
Lack of time in timetable within my Faculty of Education	☐	☐	☐	☐	☐
Lack of Canadian content in learning materials	☐	☐	☐	☐	☐
Lack of fit of ESE content with K-12 curriculum in schools	☐	☐	☐	☐	☐
Lack of recognition by College of Teachers (or equivalent) that ESE is a legitimate teachable subject	☐	☐	☐	☐	☐
Inadequate tools for assessing ESE in K-12 students in schools	☐	☐	☐	☐	☐

Of the problems or barriers, you rated 4 or 5, please rank the top 5 you believe are the most pressing in your faculty (with 1 being the most influential).

- Lack of senior administration support for ESE in my Faculty of Education _____
- Inadequate access to online ESE resources _____
- Lack of communication among ESE educators _____
- Inadequate funding for field experiences _____
- Inadequate teaching materials and equipment _____
- Lack of research in effective ESE teaching _____
- Lack of faculty colleague support for ESE _____
- Too much competition with other preservice courses _____
- Lack of time in timetable within my Faculty of Education _____
- Lack of Canadian content in learning materials _____
- Lack of fit of ESE content with K-12 curriculum in schools _____
- Lack of recognition by College of Teachers (or equivalent) that ESE is a legitimate teachable subject _____
- Inadequate tools for assessing ESE in K-12 students in schools _____

If there are other constraints and/or challenges faced by teacher educators who wish to embed ESE into preservice teacher education at your institution, please explain.

Do you plan on initiating an ESE program or ESE courses in your faculty?

1. Yes, we do plan on implementing ESE courses/program
2. No, we do not intend on implementing ESE courses/program

Can you please explain what your preservice teacher education program intends to do around incorporating ESE.

What would you find most helpful in initiating an ESE program or ESE courses in your faculty. Please rank the top 5 initiatives you believe would be most helpful from the list below (with 1 being the most helpful).

- Developing basic ESE knowledge and skills and understanding about the role of the teacher educator _____
- Exploring how to integrate ESE into existing teacher education programming _____
- Continuing Professional Development with teacher educators to grow and gain confidence through critical reflective practice _____
- Developing partnerships and networks of Teacher Education Institutions for developing teacher educators’ competencies in ESE through collaboration _____
- Developing novel ESE curriculum and resources _____
- Developing monitoring and assessment strategies and Quality Assurance instruments to assess programs _____
- Recognition of ESE as a teachable subject by provincial accreditation boards _____

Below are some commonly reported problems or barriers concerning the teaching of ESE in a preservice teacher education program. How important are these commonly reported problems or barriers to your preservice teacher education program?

	Unimportant (1)	2	3	4	Very important (5)
Lack of senior administration support for ESE in my Faculty of Education	☐	☐	☐	☐	☐
Inadequate access to online ESE resources	☐	☐	☐	☐	☐
Lack of communication among ESE educators	☐	☐	☐	☐	☐
Inadequate funding for field experiences	☐	☐	☐	☐	☐
Inadequate teaching materials and equipment	☐	☐	☐	☐	☐
Lack of research in effective ESE teaching	☐	☐	☐	☐	☐
Lack of faculty colleague support for ESE	☐	☐	☐	☐	☐

Too much competition with other preservice courses	☐	☐	☐	☐	☐
Lack of time in timetable within my Faculty of Education	☐	☐	☐	☐	☐
Lack of Canadian content in learning materials	☐	☐	☐	☐	☐
Lack of fit of ESE content with K-12 curriculum in schools	☐	☐	☐	☐	☐
Lack of recognition by College of Teachers (or equivalent) that ESE is a legitimate teachable subject	☐	☐	☐	☐	☐
Inadequate tools for assessing ESE in K-12 students in schools	☐	☐	☐	☐	☐

Of the problems or barriers, you rated 4 or 5, please rank the top 5 you believe are the most pressing in your faculty (with 1 being the most influential).

- Lack of senior administration support for ESE in my Faculty of Education _____
- Inadequate access to online ESE resources _____
- Lack of communication among ESE educators _____
- Inadequate funding for field experiences _____
- Inadequate teaching materials and equipment _____
- Lack of research in effective ESE teaching _____
- Lack of faculty colleague support for ESE _____
- Too much competition with other preservice courses _____
- Lack of time in timetable within my Faculty of Education _____
- Lack of Canadian content in learning materials _____
- Lack of fit of ESE content with K-12 curriculum in schools _____
- Lack of recognition by College of Teachers (or equivalent) that ESE is a legitimate teachable subject _____
- Inadequate tools for assessing ESE in K-12 students in schools _____

In the 2017/2018 academic year, did the preservice teacher education program include an ESE course that all preservice students were required to take?

1. Yes
2. No
3. Comments _____

As the preservice teacher education program includes an ESE course(s) in the 2017/2018 academic year that all preservice students were required to take, tell us about those specific courses:

	Course name	Primary (P), Intermediate (I) or Secondary (S) Years	Duration (hours)	Total 2017/2018 enrollment	Do students receive recognition upon completion (e.g., a certificate)
Course 1	☐	☐	☐	☐	☐
Course 2	☐	☐	☐	☐	☐
Course 3	☐	☐	☐	☐	☐
Course 4	☐	☐	☐	☐	☐
Course 5	☐	☐	☐	☐	☐

In the 2017/2018 academic year, did the preservice teacher education program have courses that included ESE content as one of a number of components and that all preservice students were required to take?

- 1. Yes
- 2. No
- 3. Comments _____

As the preservice teacher education program had courses in the 2017/2018 academic year that included ESE content as one of a number of components that all preservice students were required to take, tell us about those specific courses:

	Course name	Primary (P), Intermediate (I) or Secondary (S) Years?	Duration (hours)	Total 2017/18 enrolment	Do students receive recognition upon completion (e.g., a certificate)
Course 1	☐	☐	☐	☐	☐
Course 2	☐	☐	☐	☐	☐
Course 3	☐	☐	☐	☐	☐
Course 4	☐	☐	☐	☐	☐
Course 5	☐	☐	☐	☐	☐

Did the preservice teacher education program offer non-required (e.g., elective/ optional) ESE courses primarily focused on ESE-related teaching methods in the 2017/2018 academic year?

- 1. Yes
- 2. No
- 3. Comments _____

As the preservice teacher education program included non-required (e.g., elective/optional) ESE courses primarily focused on ESE-related teaching methods, tell us about those specific courses:

	Course name	Primary (P), Intermediate (I) or Secondary (S) Years?	Duration (hours)	Total 2017/18 enrolment	Do students receive recognition upon completion (e.g., a certificate)
Course 1	☐	☐	☐	☐	☐
Course 2	☐	☐	☐	☐	☐
Course 3	☐	☐	☐	☐	☐
Course 4	☐	☐	☐	☐	☐
Course 5	☐	☐	☐	☐	☐

Did the preservice teacher education program offer non-required (e.g., elective/ optional) courses primarily focused on ESE-related content in the 2017/2018 academic year?

- 1. Yes
- 2. No
- 3. Comments _____

As the preservice teacher education program included non-required (e.g., elective/optional) ESE courses primarily focused on ESE-related content, tell us about those specific courses:

	Course name	Primary (P), Intermediate (I) or Secondary (S) Years?	Duration (hours)	Total 2017/18 enrolment	Do students receive recognition upon completion (e.g., a certificate)
Course 1	☐	☐	☐	☐	☐
Course 2	☐	☐	☐	☐	☐
Course 3	☐	☐	☐	☐	☐
Course 4	☐	☐	☐	☐	☐
Course 5	☐	☐	☐	☐	☐

In the 2017/2018 academic year, did the preservice teacher education program charge students additional fees (e.g., incidental fees) for ESE-based courses?

- 1. Yes
- 2. No
- 3. Not sure _____

As your preservice teacher education program charged students additional fees for ESE-based courses, indicate the approximate amount(s) charged per course.

In the 2017/2018 academic year, in your opinion, what percentage of preservice students graduating from your faculty received adequate preparation in ESE?

	0–10 %	11–30 %	31–50 %	51–70 %	71–90 %	91–100 %
Elementary (primary /junior, grades K-5) preservice teachers	☐	☐	☐	☐	☐	☐
Middle School (junior /intermediate, grades 6–8) preservice teachers	☐	☐	☐	☐	☐	☐
Secondary (intermediate / senior, grades 9–12) preservice teachers	☐	☐	☐	☐	☐	☐

In the 2017/2018 academic year, did the preservice teacher education program allow “major” and/or “minor” specialization in ESE?

1. “Major” specialization
2. “Minor” specialization
3. Both
4. None
5. Not sure
6. Comments (please describe what your major or minor specialization in your program) _____

Below are some common pedagogical approaches employed in ESE. Considering the choices below, please rank the top 5 approaches that, in your opinion, are most effective in addressing ESE in a preservice program (with 1 being the most effective in your opinion).

- Active, experiential learning _____
- Community-based learning _____
- Community-service learning _____
- Critical pedagogy _____
- Cross-curricular integration and learning _____
- Field-based experiences _____
- Inquiry-based learning _____
- Interdisciplinary learning _____
- Nature-based learning _____
- Project-based learning _____

What acknowledgements, encouragements and/or incentives (if any) are offered

to teacher educators who wish to embed ESE into preservice teacher education at your institution?

Are you or any of your faculty colleagues involved in funded non-research projects (e.g., development of learning resources or curricula) in ESE?

- 1. Yes
- 2. No

As you or your colleagues are involved in funded non-research projects (e.g., development of learning resources or curricula) in ESE, can you give project title(s) and brief descriptions?

Are you or any of your faculty colleagues involved in funded research projects in ESE?

- 1. Yes
- 2. No

As you or your faculty colleagues are involved in funded research projects in ESE, can you give project title(s) and brief descriptions?

Are you or your faculty colleagues involved in non-funded research projects in ESE?

- 1. Yes
- 2. No

As you are involved in non-funded research projects in ESE, can you give project title(s) and descriptions?

In your opinion, during the 2017/2018 academic year, which categories (if any) of your elementary school (~ grades K-5) preservice teacher candidates engaged in ESE work during their school-based practica? (if you have no opinion or have no students in this category, skip this question)

	0–10 %	11–30 %	31–50 %	51–70 %	71–90 %	91–100 %
Elementary Science	☐	☐	☐	☐	☐	☐
Elementary Language Arts	☐	☐	☐	☐	☐	☐
Elementary Maths	☐	☐	☐	☐	☐	☐
Elementary Social Studies	☐	☐	☐	☐	☐	☐
Elementary Physical Education	☐	☐	☐	☐	☐	☐
Elementary Technology Education	☐	☐	☐	☐	☐	☐
Elementary Arts	☐	☐	☐	☐	☐	☐

In your opinion, during the 2017/2018 academic year, which categories (if any) of middle school (~ grades 6–8) preservice teacher candidates engaged in ESE work during school-based practica? (if you have no opinion or have no students in this category, skip this question)

	0–10 %	11–30 %	31–50 %	51–70 %	71–90 %	91–100 %
Middle-school Sciences	☐	☐	☐	☐	☐	☐
Middle-school Language Arts	☐	☐	☐	☐	☐	☐
Middle-school Maths	☐	☐	☐	☐	☐	☐
Middle-school Social Studies	☐	☐	☐	☐	☐	☐
Middle-school Physical Education	☐	☐	☐	☐	☐	☐
Middle-school Technology Education	☐	☐	☐	☐	☐	☐
Middle-school Arts	☐	☐	☐	☐	☐	☐

In your opinion, during the 2017/2018 academic year, which categories (if any) of secondary school (~grades 9–12) preservice teacher candidates engaged in ESE work during school-based practica? (if you have no opinion or have no students in this category, skip this question)

	0–10 %	11–30 %	31–50 %	51–70 %	71–90 %	91–100 %
Secondary Sciences	☐	☐	☐	☐	☐	☐
Secondary Language Arts	☐	☐	☐	☐	☐	☐
Secondary Maths	☐	☐	☐	☐	☐	☐
Secondary Social Studies	☐	☐	☐	☐	☐	☐
Secondary Physical Education	☐	☐	☐	☐	☐	☐
Secondary Technology Education	☐	☐	☐	☐	☐	☐
Secondary Arts	☐	☐	☐	☐	☐	☐

If your preservice teacher education program offers ESE-related courses, is there an expectation that teacher candidates taking such courses will engage in ESE practice during school-based practica?

- 1. Yes
- 2. No
- 3. Not sure
- 4. Not applicable
- 5. Comments _____

If preservice teacher candidates engage in school-based ESE work during practica, is this recognized, recorded, celebrated or assessed in any way?

- 1. Yes
- 2. No

Please explain how preservice teacher candidates engaged in school-based ESE work during practica are recognized, recorded, celebrated or assessed in any way.

Do teacher candidates that are particularly interested in ESE have opportunities to engage in (check all that apply):

1. Public school-based practica that support the candidate's interest in ESE
 2. Private school-based practica that support the candidate's interest in ESE
 3. Non-school based experiences (e.g., science centres, outdoor education facilities, camps) that support the candidate's interest in ESE
 4. None of the above
-

As your program offers non-school based experiences, indicate the settings where those activities take place (check all that apply).

1. City farms
 2. Environmental NGOs
 3. Museums
 4. Outdoor education centres
 5. Rural farms
 6. Science centres
 7. Social justice NGOs
 8. Zoos
 9. None of the above
 10. Other _____
-

Please provide the name of the institution you are reporting on in this survey.

1. Acadia University
2. Bishop's University
3. Brandon University
4. Brock University
5. Cape Breton University
6. Carleton University
7. Concordia University
8. Concordia University of Edmonton
9. Dalhousie University
10. Lakehead University
11. Laurentian University
12. McGill University
13. Memorial University of Newfoundland
14. Mount Saint Vincent University
15. Nipissing University
16. Queen's University
17. Redeemer University College
18. Saint Francis Xavier University
19. Saint Mary's University

20. Simon Fraser University
 21. St. Thomas University
 22. Thompson Rivers University
 23. Trent University
 24. Trinity Western University
 25. Université de Moncton
 26. Université de Montréal
 27. Université de Saint-Boniface
 28. Université de Sherbrooke
 29. Université du Québec à Chicoutimi
 30. Université du Québec à Montréal
 31. Université du Québec à Rimouski
 32. Université du Québec à Trois-Rivières
 33. Université du Québec en Abitibi-Témiscamingue
 34. Université du Québec en Outaouais
 35. Université Laval
 36. University College of the North
 37. University of Alberta
 38. University of British Columbia
 39. University of British Columbia-Okanagan
 40. University of Calgary
 41. University of King's College
 42. University of Lethbridge
 43. University of Manitoba
 44. University of New Brunswick
 45. University of Northern British Columbia
 46. University of Ontario Institute of Technology
 47. University of Ottawa
 48. University of Prince Edward Island
 49. University of Regina
 50. University of Saskatchewan
 51. University of the Fraser Valley
 52. University of Toronto
 53. University of Victoria
 54. University of Windsor
 55. University of Winnipeg
 56. Vancouver Island University
 57. Western University
 58. Wilfrid Laurier University
 59. York University
 60. Other _____
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What is your academic background? (Please indicate all that apply)

1. Ecology/Environmental science
2. Environmental studies
3. Environmental education
4. Education
5. Life sciences
6. Physical/Earth sciences
7. Social sciences (e.g. geography, history)
8. Humanities
9. Fine Arts
10. Other _____