

Creating a Climate of Change: Professional Development in Environmental and Sustainability Education through University and School Board Partnerships

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Abstract

With over eight million students, teachers, and professors in Canada, both pre-service and in-service K-12 teacher education are key to addressing the climate crisis through Environmental and Sustainability Education (ESE). Yet these approaches to professional learning in ESE are often delivered in isolation, with little precedence for bringing pre-service and in-service teachers together. This article explores this type of integrative professional development by introducing an innovative collaboration between a large Canadian pre-service teacher training program and an urban school board's EcoSchools Program. It presents the initial findings of a three-year case study that tracks the impacts of this partnership; with some early successes already identified, this may prove to be an innovative addition to the research on how university/school board partnerships can effectively support professional learning in ESE.

Résumé

On compte plus de huit millions d'élèves, enseignants et professeurs au Canada : il est donc essentiel, en vue d'affronter la crise climatique, de former les futurs enseignants et les enseignants en exercice de la maternelle à la 12e année dans le domaine de l'éducation à l'environnement et au développement durable (EEDD). Pourtant, les approches de perfectionnement professionnel en EEDD demeurent souvent des initiatives isolées. Qui plus est, les enseignants en formation et ceux en exercice sont rarement réunis dans ces projets. Le présent article explore une approche intégratrice du perfectionnement professionnel où une collaboration novatrice a été établie entre un important programme canadien de formation des enseignants et le programme ÉcoÉcoles d'un conseil scolaire urbain. L'article présente les conclusions initiales d'une étude de cas d'une durée de trois ans qui s'est penchée sur les effets de ce partenariat. Certaines réussites sont déjà évidentes, et il serait novateur de les intégrer à la recherche afin d'examiner l'efficacité des partenariats entre universités et conseils scolaires pour soutenir le perfectionnement professionnel en EEDD.

Keywords: environmental and sustainability education, pre-service teacher education, in-service teacher education, EcoSchools program, university/school board collaboration, professional development

Mots-clés : éducation à l'environnement et au développement durable, formation des futurs enseignants, formation des enseignants en exercice, programme ÉcoÉcoles, collaboration entre universités et conseils scolaires, perfectionnement professionnel

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The urgency needed to bring about significant shifts in addressing climate change has never been more clear, as evidenced by the latest report from the International Panel on Climate Change (2018). This prestigious panel of environmental scientists has given humanity just over a decade to limit increases to greenhouse gases (GHG) and atmospheric temperature before irrevocable damage is done to the ecosystems on our planet. This makes the critical role of education clear to those working in this sector; every aspect of formal and informal education, from elementary to post-secondary, in school and community settings, must contribute to a wide-scale transformation toward environmental sustainability. With an estimated eight million students, teachers, and professors involved in formal education systems in Canada (Statistics Canada, 2014), this offers a means to bring about social, cultural, and environmental change through curriculum, pedagogy, and infrastructure improvements in schools, colleges, and universities.

Pre-service and in-service teacher education both play a critical role in getting educators on board to actively contribute to a radical shift through the concepts and practices of Environmental and Sustainability Education (ESE). In recent years, there have been a range of initiatives and programs developing capacity in ESE with pre-service teachers (Hopkins & McKeown, 2005; Greenwood, 2010; Nolet, 2013; Inwood & Jagger, 2014; Karrow, DiGiuseppe, Elliott, Gwekwerere, & Inwood, 2016) and practicing teachers (Fien & Rowling, 1996; Wade, 1996; Ernst, 2007; Liu, Yeh, Liang, Fang, & Tsai, 2015), yet there is little precedence for integrating these groups. Could bringing pre-service and in-service teacher education together for ESE offer greater benefits, complexity, or depth to these areas of professional learning? Could integrating them potentially help to bring about systemic change in education in regard to environmental sustainability more quickly, broadly, or deeply?

This article shares an exploration of this type of integrative programming by focussing on the establishment of an innovative collaboration between a graduate-level teacher training program in Canada's largest faculty of education and one of the country's most active EcoSchools programs in a school board. It also presents the initial findings of a three-year case study that tracks the impacts of this partnership in professional development (PD), begun in 2017, between the Ontario Institute of Studies in Education (OISE) at the University of Toronto and the Sustainability Office at the Toronto District School Board (TDSB). The partnership integrates PD in ESE for pre-service teachers with that of practicing (in-service) teachers, aiming to amplify the benefits of this type of professional learning for both, while minimizing its challenges. As many of OISE's pre-service teachers get hired by the TDSB upon graduation, it offers the

potential of increasing the number of new teachers in the TDSB dedicated to implementing ESE with K–12 students, thereby contributing to the expansion of their EcoSchools Program. Over time, this may be one of the ways that a school board and university partnership can contribute to the cultural shift of Toronto into a more sustainable city. As this partnership is still in its early stages, as is its accompanying research study, this first report on this case study will outline its origins in hopes of inspiring similar types of partnerships across Canada. Our aim is to document and analyze the project as it unfolds over its three-year duration, sharing our observations, analysis, and insights into its implementation with a wide audience.

Starting Points for ESE in Teacher Education

The TDSB and OISE have been simultaneously developing their approaches to ESE for pre-service education and in-service (K–12) teachers for many years, so it is surprising that this collaboration has not happened sooner. Its inception can be attributed to the rapid development and success of the TDSB’s EcoSchools Program on the one hand, and OISE’s ESE Initiative on the other, each of which has a unique foundation that has informed the beginning of their new collaborative approach to PD.

Growing the TDSB’s EcoSchools Program

The TDSB’s EcoSchools Program was founded in 1998 by Richard Christie and Eleanor Dudar as a way to shift Canada’s largest school board toward sustainability. With over 200,000 students, 15,000 teachers, 35,000 staff and 575 schools, the TDSB offered a generative context in which to experiment with a large-scale implementation of the EcoSchools movement in Canada. Originally focussed on energy conservation, waste minimization, and schoolyard greening, these forward-thinking program leaders convinced TDSB managers and trustees of the environmental and economic benefits that would come with students and teachers turning off lights and sorting waste into recycling streams. Its EcoSchools Program grew rapidly, from 11 schools in the first year, to over 427 schools at its peak. This impressive growth was supported by a formative partnership with Evergreen, a national non-governmental organization (NGO) dedicated to greening school grounds, whose staff helped to nurture the program’s development.

Over the years, the TDSB’s EcoSchools Program has grown to support six major goals: fostering leadership and teamwork; conserving energy; minimizing waste; caring for and creating vibrant school grounds; improving student achievement through ecological literacy; and contributing to healthy, active, safe, and sustainable school communities (TDSB, 2018). Four staff run the program, which includes supporting and certifying EcoSchools at the bronze, silver, gold,

or platinum levels; designing and delivering PD for EcoTeams across the city; running annual student conferences; creating print and online resources; and supporting a range of partnerships with NGOs. They were generous in sharing the program structure and resources to help establish the Ontario EcoSchools Program in 2005, which is now an NGO with 11 staff and 1,600 certified EcoSchools across the province.

As the TDSB's EcoSchools Program expanded, the board established a Sustainability Office, in which the program is now located. This has led to growing support for a wider range of sustainability measures, such as establishing outdoor classrooms and gardens in schoolyards, mapping and planting trees on school properties, and building high-performance green buildings. In conjunction with the EcoSchools Program, the TDSB began installing solar panels on school roofs; these are now found in over 300 schools. The solar installation was a stroke of brilliance; substantial income has been generated from selling energy back into Ontario's power grid and from the sale of carbon credits. This now fuels the Environmental Legacy Fund, which provides dedicated funding for sustainability projects at the board level—underwriting some of the costs of its EcoSchools Program, such as cycling education programs, water bottle refill stations, and bike racks—as well as funding for PD in ESE for teachers and staff. As many school boards own large numbers of buildings and acres of green space, this is a funding model built on green energy infrastructure improvements that deserves further study for its potential economic benefits. It certainly provides environmental benefits: There has been a 21% decrease in overall GHG emissions at the TDSB since 2001, suggesting that the sustainability practices instilled as part of the EcoSchools Program have been successful.

Establishing the ESE Initiative at OISE

As the EcoSchools Program began to flourish, the roots for ESE were being laid at OISE. As the largest faculty of education in Canada, OISE offered a variety of pathways to teacher education in the early 2000s, including undergraduate and graduate degrees in consecutive and concurrent formats, graduating approximately 2,000 new teachers each year. When the Ontario Ministry of Education began investigating the establishment of a new policy framework in Environmental Education in 2006, OISE teacher educators Hilary Inwood, Jane Forbes, and David Montemurro saw an opportunity to integrate ESE into its undergraduate Bachelor of Education program. Starting with a modest set of extracurricular workshops, they formally established the ESE Initiative in 2008 to provide pre-service teachers with learning of ESE as it had a minimal presence in OISE's teacher education program. With support from Associate Dean Mark Evans and Program Director Kathy Broad, Inwood became OISE's Lead in ESE in 2009, and the initiative quickly expanded. By 2012, over 1,000 pre-service teachers and graduate students were engaging in different aspects of ESE each year through

workshops, talks, special events, elective courses, and graduate student training.

Now celebrating its first decade, the ESE Initiative has established an inventive set of ways to ensure that OISE pre-service teachers are well-grounded in ESE, preparing them to become active EcoSchools teachers and environmentally literate citizens (Inwood, 2019). In addition to delivering over 20 extracurricular events each year, the Initiative hosted an ESE conference and EcoFair for graduate students from 2012–16. These events have been supported by many ESE-focused NGOs in Toronto, including Natural Curiosity, Evergreen, FoodShare, and Learning for a Sustainable Future. This success led to the establishment of two school-based cohorts of pre-service teachers focussed on ESE, one embedded in a local elementary EcoSchool (centred on Social Justice and EcoJustice Education), and another located in a secondary school (based on Global Education). As of 2015, there are mandatory core courses in ESE that all pre-service teachers must take to graduate, as well as elective courses in this area. For the last five years, the Initiative has planted and nurtured an urban educational garden at the front of the OISE building. It has also developed a walking art gallery with over a dozen student-created eco-art installations that encourage the OISE community to use the stairs (rather than take the elevator) as an energy conservation measure and to support health and well-being. Research projects have run in alignment with some of these activities, contributing to scholarship in ESE (Inwood, Miller, & Forbes, 2014; Inwood & Jagger, 2014). All of these components have offered paid training for students, who help to plan and implement the wide range of activities of the ESE Initiative.

Working through the Challenges

Despite the great strides that the TDSB and OISE were making in bringing ESE to their educational communities, each reached a point where sustained growth was proving to be challenging. For the TDSB, the intense workload on their staff made providing year-round PD for EcoSchools teachers untenable, even though teachers were requesting help to deepen their expertise in ESE. With few in-house PD opportunities, teachers were unable to learn from other educators or strengthen their professional learning networks in this area. The EcoSchools staff also puzzled over how to continue to grow the EcoSchools Program without getting new teachers involved each year; the number of schools involved in the program had plateaued, and the staff struggled to support the existing ones, let alone enticing new teachers to get involved.

There were also challenges at OISE; while pre-service teachers were excited about the possibilities that ESE offered and eager to try it out in their teaching, they were not often seeing it modelled in their practice teaching blocks, which is critical to learning how to teach any subject. In addition, in 2014 the ESE Initiative lost its administrative home and financial support in a major reconfiguration of OISE's teacher education programs, putting it at risk of being shut down

altogether. How could it continue to operate its programming, advocacy, and research programs without administrative backing? For both organizations, these challenges proved daunting, with no clear solutions, despite a body of literature that catalogued similar issues.

Looking for Precursors in ESE in the Teacher Education Literature

Both organizations were drawing on developments in ESE in formal education settings as they developed their innovative programs. The TDSB team drew inspiration from the models provided by the EcoSchools organization in Europe (www.ecoschools.global), which had been established in 1994 in response to the needs identified at the United Nations Conference on Environment and Development (Cincera, Boeve-de Pauw, Goldman, & Simonova, 2018). One of a number of organizations worldwide that are dedicated to using schools as sites for environmental learning, the TDSB's EcoSchools Program is part of a movement also referred to as "green schools" in the US and China, "sustainable schools" in the UK and Australia, and "enviroschools" in New Zealand (Foundation for Environmental Education, 2010). This movement has been studied in other countries since its inception (Henderson & Tilbury, 2004; Mogenson & Mayer, 2005; Birney & Reed, 2009), but has not been as often researched in Canada, as noted by Fazio and Karrow (2013).

Fazio and Karrow's (2013) study is of particular interest in that it examined an EcoSchools Program in an Ontario context similar to the one in Toronto. One of its findings was that teachers identified PD opportunities as a support needed for teaching about the environment, "providing them time and professional growth opportunities to work together and network with other schools, [which] would go far in developing learning resources and capacities to support school-based EE practices" (p. 650.) This aligned with the calls for teachers' PD in the Ontario Ministry of Education's (OME) (2009) policy framework in Environmental Education (EE) called *Acting Today, Shaping Tomorrow*. In it, the OME identified actions that should be taken in conjunction with school boards to support teachers' professional learning in EE (though as many in Ontario would acknowledge, this has not materialized as broadly or deeply as it should have).

Calls for professional development in ESE in pre-service and in-service teacher training began far earlier than the OME's (2009) policy; for example, in 1999, the Ontario Teachers' Federation and the Canadian Teachers' Federation both adopted resolutions pertaining to education for sustainability (Council of Ministers of Education [CMEC], 2000). The same year, Charles Hopkins was named the UNESCO Chair in Reorienting Teacher Education Towards Sustainability, based at York University. (In his previous roles as TDSB principal and superintendent, he was very supportive of the founding of the TDSB's EcoSchools Program). A year later, the Pan Canadian Network of Faculties of Education Supporting Sustainability and Stewardship was formed, leading to discussions

about ESE in pre-service teacher education (though it is unclear how long this group lasted). The CMEC's (2000) research report on Education for Sustainable Development (ESD) in Canada noted a lack of pre-service teacher education in this area; this was substantiated by Lin's (2002) study that found little evidence of implementation of EE/ESD in Canadian faculties of education from 1976–96, and by Beckford in 2008.

Inspired in part by the UN's Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability (Hopkins & McKeown, 2005), a growing interest was seen internationally in regards to in-service and pre-service teacher education in ESE, though the literature shows these two areas being treated distinctly. While some aspects of in-service teacher education in ESE have been explored over the last few decades (Ham & Sewing, 1988; Hart, 1990; Lane, Wilke, Champeau, & Sivek, 1994; Fien & Rowling, 1996; Wade, 1996; Ernst, 2007; Liu et al., 2015), a greater emphasis has been placed on pre-service teacher education in ESE (McKeown-Ice, 2000; Cutter-Mackenzie & Tidbury, 2002; Heimlich, Braus, Olivolo, McKeown-Ice, & Barringer-Smith, 2004; Van Petegem, Blicek, Imbrecht, & Van Hout, 2005; Ferreira, Ryan, & Tilbury, 2007; Gooch, Rigano, Hickey, & Fien, 2008; Greenwood, 2010; Nolet, 2013; Franzen, 2017; Evans, Stevenson, Lasen, Ferrerria, & Davis, 2017). In Canada, a small body of scholars have called for more pre-service teacher education in ESE (Hart, 1990; Russell, Bell, & Fawcett, 2000; Pickard, 2007; Alsop, Dippo, & Zandvliet, 2007; Beckford, 2008) and, more recently, have experimented with ways to implement it (Puk & Stibbards, 2010; Inwood & Jagger, 2014; Zhou, 2015; Ormond, Zandvliet, McClaren, Robertson, Leddy, & Metcalfe, 2014; Karrow et al., 2016). These studies and programs may have helped to improve the presence of ESE in Canadian pre-service teacher education programs, as evidenced by research conducted in the past eight years (CMEC, 2012; Sims & Falkenberg, 2013; Falkenberg & Babiuk, 2014).

What has been missing from the ESE literature, however, are references to the integration of in-service and pre-service teacher education, despite the deep body of literature in teacher education that identifies the benefits of connecting pre-service and in-service teachers in school-based cohorts and practice teaching blocks. It is surprising that there has been so little written about this in regards to ESE, as Powers (2004) proposed that having in-service teachers who implement EE matched with pre-service teachers would be helpful for the latter's understanding; she also recognized that this was limited by the number of in-service teachers available to serve as potential role models. The UNESCO guidelines prepared by Hopkins and McKeown (2005) had also recommended strengthening partnerships between teacher education programs and schools to support ESD. Ferreira and Ryan (2012) offered a "mainstreaming change model" for improving EE in pre-service teacher education that would bring together teacher education institutions with schools to work toward whole-school approaches to sustainability. These authors reinforced the importance

of a range of partnerships and networks in EE, including with school boards, as one of six factors that were critical to the successful integration of EE into pre-service programs (Ferreira et al., 2014). As part of our team's work, we investigated the impacts of partnerships in practica between pre-service and in-service teachers in relation to ESE (Inwood et al., 2014). This study found a range of positive outcomes for both, including an increase in environmental teaching, more frequent outdoor learning, and greater enthusiasm for supporting K–12 students' environmental activism. This provided evidence that these types of partnerships can simultaneously be an effective form of teacher education and professional development. Moore, O'Leary, Sinott, and O'Connor (2019) supported this more recently by recommending the extension of "communities of practice" to involve teachers, higher education institutions, and local industry.

Integrating Professional Development in ESE

Evidenced by the growing literature, we perceived that there were benefits to bringing in-service and pre-service teachers together for professional learning, and so we began to consider what an integrated model might look like. While two of the lead educators, Hilary Inwood from OISE and Pam Miller from the TDSB, had done workshops and talks for each other's institutions, their ESE programs had remained independent. This began to change in late 2013 when OISE received accreditation by the Ontario College of Teachers to offer in-service courses in ESE (called "Additional Qualification" courses). These summer courses for teachers were intense, involving three weeks of full-time study, and yet were fully enrolled in the first few years. As a result of seeing a high demand for more PD opportunities, Richard Christie, Senior Manager of the TDSB's Sustainability Office, posited an intriguing idea in the fall of 2015: Could pre-service and in-service teacher education in ESE be integrated year-round at OISE? While the prospect of offering PD in ESE for a few thousand pre-service teachers and TDSB teachers seemed daunting at first, the opportunities this potential collaboration offered proved hard to resist. It took almost two years of negotiation between the two organizations to develop a set of guidelines for the project, resulting in a new administrative home for the ESE Initiative at OISE. Its funding comes from the board's Environmental Legacy Fund (described earlier) that could be adopted by other school boards and universities, manifesting systems-thinking as a way to facilitate systemic educational change.

Now two years into the TDSB/OISE collaboration in PD in ESE, it is running year-round for in-service and pre-service teachers. There have been over 30 ESE professional learning events offered in this period, from lectures, workshops, and field trips, to conferences, EcoFairs, and year-end celebrations of EcoSchools learning. An Action Research Team focussed on ESE has been formed, involving 14 teachers and early childhood educators. Initial feedback from both groups has

been very positive: Pre-service teachers are inspired to be meeting, networking with, and learning from experienced EcoSchools teachers; in return, the teachers are finding OISE students eager to volunteer in their classrooms and help with their EcoSchools teams, activities, and events. But we want to know more about what is transpiring: What are the learning expectations, experiences, and impacts of pre-service teachers and EcoSchools teachers involved in this TDSB/OISE collaboration? This key question is at the heart of a three-year qualitative research study that has begun to explore this innovative partnership in PD in ESE.

Exploring an Integrated Approach Through Case Study

As both the collaboration and research study are in their early stages, it is too early to provide definitive answers to our broad research question. Our team has begun to collect data by building two qualitative case studies in three phases. One case will focus on examining the experiences of OISE pre-service teachers who are engaged in this ESE PD programming, while the other case will focus on the experiences of in-service TDSB teachers. The two cases will work in tandem: The first phase of the study, which is underway, is investigating the needs and expectations of those involved; phase two will investigate their experiences in this integrated approach to ESE PD. Phase three will focus on the impacts of this PD through the teaching and learning of both the pre-service and in-service teachers engaged in the collaboration. A qualitative case study methodology is at the heart of our study, drawing on the work of Yin (2002), Stake (1995), and Merriam (1998) as we seek to understand how those involved are making meaning of their experiences and the impacts that this integrated model of PD in ESE may have on their teaching.

Data Collection Methods

Data collection methods across all three phases will be diverse; these will include online surveys, focus group interviews, and informal feedback about participation in ESE PD via feedback forms, photos, videos, and work samples from a range of ESE events. Archival records (i.e., annual reports, budgets) will also be utilized. Yin's (2002) principles of data collection informed our methods, which include using multiple sources of evidence to triangulate the data and increase construct validity; creating a case study database to clearly organize the data; and maintaining a chain of evidence to cite evidence from the data appropriately. We recognize the limitations to this multi-phase qualitative study. There may be bias from the perceived power dynamics between the pre-service and in-service teachers and researchers; therefore, online surveys will be anonymous, and focus group sessions will be conducted by members of the research team not directly engaged with those participating. We are aware that by collecting data only from those engaged in the ESE collaboration, the study will

miss further exploring the motivations and barriers of those who choose not to be engaged with it.

Initial Findings from the First Year of Study

While our case study is still in its early phases, we have accessed archival materials in building an understanding of each organization's early beginnings in ESE, and we have collected data through two online surveys and three focus groups (two for pre-service teachers, another for in-service teachers). What follows is a summary of our initial findings.

Summary of Responses from Pre-Service Teachers

The demographics of those who have responded to the online survey of pre-service teachers aligned with those of the Teacher Education programs at OISE. The majority identified as female, had a median age of 25 years old, and were training to teach at the primary-junior level (n = 23). Climate change is the environmental issue/challenge that about half of the respondents self-reported being most aware of; the other half flagged recycling/waste and water issues as their main interests. When asked to rate their initial knowledge of environmental issues when they began at OISE, over half reported having a moderate-to-good or high level of knowledge. The majority of respondents did not have a background in ESE, but stated they were very interested in learning more about ESE as part of their pre-service teacher education. Focus group participants (n = 16) cited promoting sustainability, encouraging mental health and wellness, fostering connections to nature, and inspiring students as their main reasons for wanting to know more about ESE. One participant commented that she was influenced by passionate ESE teachers because "seeing their passion and all the work they're doing . . . inspired me to do the same thing that they did for me." The connections between social justice issues and ESE was the most popular topic these participants wanted to learn more about.

When asked where pre-service teachers expected to learn about ESE, the majority felt this learning should take place in their teacher education program through mandatory courses, extra-curricular events, in their teaching practica, and in elective courses (in order of preference). When asked where they had been involved in ESE in their teacher education program to date, the majority reported mostly in extracurricular events and mandatory courses. One focus group participant raised an important point about the effectiveness of mainly extracurricular ESE programming:

I like the workshops; I wish [we had] that in our courses. . . . I just think that the people who are interested are always going to come to the events . . . it makes me worried about teachers who don't even have any idea about ESE that they might not be getting any of that information.

The majority of pre-service teachers reported that they chose to attend ESE events because they wanted to deepen their existing knowledge about ESE, get activity ideas for practicum, have hands-on learning experiences, and meet others interested in ESE. This last motivation suggests there is a social aspect to ESE that participants considered important. This latter emphasis was also found in the focus groups, as participants acknowledged their desire to not only work collaboratively but also to connect with local environmental-related organizations and teacher education programs around the globe.

Half of the survey respondents had some expectations for the ESE PD they attended: they wanted to learn new ideas and activities to integrate ESE into classrooms; acquire and share knowledge about ESE and environmental issues; and make connections and network with like-minded people. Focus group participants mentioned the importance of bringing ESE into classrooms to support K–12 students to become environmentally-responsible leaders in the future. Most of the respondents who attended ESE events agreed that their expectations were met for various reasons, with the most common reason being that “the event provided new information and resources” and encouraged participants to “make connections with other teachers and students.” They were happy to learn alongside all kinds of people, including fellow OISE students, practicing teachers, and elementary or secondary students. Their preferred mode of ESE learning was in-person, opposed to online or through print resources, which aligned with the responses of the focus group participants. Types of learning experiences within ESE were ranked, with outdoor learning as the top response, followed by interactive workshops, conferences, video/documentaries, then talks. Interestingly, there was low interest in learning about ESE online generally (which contradicted their assertion that online resources were helpful to them). Overall, the most common response about best resources was related specifically to activities, workshops, skills, contacts, and websites that could be incorporated into the classroom with K–12 students.

Summary of Responses from In-Service Teachers

Over half of teachers who responded to the EcoSchools survey to date ($n = 58$) have been teaching for more than 10 years, are between 41 and 55 years old, and did not have any ESE training as part of their undergraduate or teacher training. The majority of participants had been working in and contributing to a certified EcoSchool for 5–10+ years (many at the platinum level), and half rated their confidence in their role as an EcoSchools teacher as high. The majority of respondents were delivering ESE in their classrooms, as well as helping to run their school’s EcoTeam. Almost every respondent rated their level of interest in making ESE a greater part of their teaching practice very highly on a five-point Likert scale, reporting that they wanted PD opportunities in ESE to support their work with the EcoSchools Program.

The majority valued the PD opportunities they have had in EE in the TDSB, including the EcoSchools Kickoffs, workshops, accessing the EcoSchools website and digital newsletter, ESE conferences, and Additional Qualification courses. Not surprisingly, their preferred timing for PD in ESE was during school hours (with teaching release time), but just under half signalled that after school or weekends were acceptable. They chose the fall as the time when professional learning in ESE was most useful, and summer as the least. These teachers' favourite mode of PD in ESE was overwhelmingly in-person learning; online learning was ranked last. Half wanted to learn in outdoor spaces, and a third identified both OISE and learning at their school as their preferred locations. The majority reported that they liked a combination of individual and group learning experiences, including workshops, talks by expert speakers, conferences, and the EcoSchools fall Kickoff event. Feedback on the Kickoffs highlighted that they wanted more time to learn from, and collaborate with, other EcoSchools as well as more time to try out more hands-on learning. The EcoSchools newsletter was reported as being useful by most of these educators, with many appreciating the links to resources, campaign and lesson ideas, information on environment issues, and event notices.

Discussion and Conclusion

What do these initial findings tell us about the learning needs and expectations of the pre-service and in-service teachers involved in the first year of this collaborative approach to PD in ESE? Granted that these are still small survey numbers; hence, we will continue to encourage participation in the survey throughout the end of 2019. The demographics of those who have responded to the online surveys from both groups are fairly representative of those in OISE's teacher education programs and the teachers in elementary education in the TDSB; this makes us wonder what might be done to engage a wider group of pre-service and in-service teachers in this PD program. There is recognition that the respondents have been those eager to participate in PD in ESE (rather than those who are not), but this is appropriate for this study given its focus on those who are engaged in this collaboration. The two groups demonstrate a strong level of self-efficacy in terms of their experience and expertise with environmental issues (for the pre-service teachers) and ESE (for the in-service teachers); despite this high level of comfort, they are choosing to seek out more professional learning in this area. As well, both groups would prefer to have this learning woven into their daily schedules, rather than added on top of it.

There is some initial confirmation that the PD we have led is headed in the right direction; both pre-service and in-service teachers articulated that they prefer in-person learning, rather than online offerings, and enjoy accessing learning through interactive workshops, expert talks, and conferences. Both groups have expressed their preference for learning in community, with social aspects being a

preferred mode. This confirms what we have been hearing anecdotally from pre-service teachers—that they have been getting so much out of connecting with EcoSchools teachers and learning from their expertise and experience. More data are needed on this aspect moving forward. We are also discovering the gaps in our programming, as many expressed the desire to do more PD outdoors; there is some nature-based and Land-based learning included in the PD programming, but this should be increased. Both groups have expressed that they would like to have ESE PD worked into their daily schedules more effectively. While we concur that this would be advantageous, it is problematic in that it is costly for TDSB to release teachers from their classroom duties, and it would mean that pre-service and in-service teachers could not access the potential benefits of learning together because of differing schedules.

As this collaborative partnership, integrative programming, and multi-phase study continues between OISE's ESE Initiative and the TDSB EcoSchools Program, our team will document and analyze what is needed in PD in ESE for pre-service and in-service teachers learning together. We hope that this model may serve to inspire more university and school board partnerships in ESE. Certainly, more research is needed to better understand professional learning in ESE across the country, and the critical roles educators play in instilling awareness, knowledge, and activism in K–12 students in relation to environmental sustainability.

Notes on Contributors

Dr. Hilary Inwood is a teacher educator, researcher, and artist who leads the *Environmental & Sustainability Education Initiative* at OISE, University of Toronto. Her research focuses on developing teachers' knowledge and skills in environmental literacy and environmental art education, extending beyond classrooms into school gardens, outdoor education centres, parks, and galleries.

Alysse Kennedy is a doctoral candidate at OISE, University of Toronto, and an occasional teacher with the Toronto District School Board. Her research investigates meaningful pedagogical approaches to teaching about the environment in accessible and relevant ways. She helps to coordinate professional learning for the *Environmental & Sustainability Education Initiative* at OISE.

References

- Alsop, S., Dippo, D. & Zandvliet, D. (2007). Teacher education as/for social and ecological transformation: place-based reflections on local and global participatory methods and collaborative practices. *Journal of Education and Teaching*, 33(2), 207-223.
- Beckford, C. (2008). Re-Orienting environmental education in teacher education programs in Ontario. *Journal of Teaching and Learning*, 5(1), 56-66.

- Birney, A., & Reed, J. (2009). *Sustainability and renewal: Findings from the leading sustainable schools research project*. Nottingham, UK: National College for Leadership of Schools and Children's Services. Retrieved from: <http://dera.ioe.ac.uk/2061/>
- Boeve-de Pauw, J., & Van Petegem, P. (2018). Eco-school evaluation beyond labels: the impact of environmental policy, didactics and nature at school on student outcomes. *Environmental Education Research*, 24(9), 1250-1267.
- Cincera, J., Jelle Boeve-de Pauw, J., Goldman, D., & Simonova, P. (2018). Emancipatory or instrumental? Students' and teachers' perceptions of the implementation of the EcoSchool Program, *Environmental Education Research*, DOI: 10.1080/13504622.2018.1506911
- Council of Ministers of Education, Canada. (2000). *Educating for sustainability: The status of sustainable development education in Canada*. Retrieved from: <https://www.cmec.ca/Publications/Lists/Publications/Attachments/9/environment.en.pdf>
- Council of Ministers of Education, Canada. (2012). *Education for sustainable development in Canadian faculties of education*. Retrieved from: https://www.cmec.ca/Publications/Lists/Publications/Attachments/279/ESD_Dean_reportEN.pdf
- Cutter-Mackenzie, A. & Tidbury, D. (2002). Meeting commitments for a sustainable future: Environmental education in pre-service teacher education. In B. A. Knight (Ed.), *Re-conceptualizing learning in the knowledge society*. (pp. 17-34). Post Pressed, Flaxton Qld.
- Ernst, J. (2007). Factors associated with K-12 teachers' use of environment-based education, *The Journal of Environmental Education*, 38(3), 15-32.
- Evans, N., Stevenson, R., Lasen, M., Ferrerria, J., & Davis, J. (2017). Approaches to embedding sustainability in teacher education: A synthesis of the literature. *Teaching and Teacher Education* 63, 405-417.
- Falkenberg, T., & Babiuk, G. (2014). The status of education for sustainability in initial teacher education programmes: A Canadian case study. *International Journal of Sustainability in Higher Education*, 15(4), 418-430.
- Fazio, X. & D. Karrow. (2013). Negotiating the constraints of schools: Environmental education practices within a school district. *Environmental Education Research* 19(5): 639-655.
- Ferreira, J., & Ryan, L. (2012). Working the system: A model for system-wide change in pre-service teacher education. *Australian Journal of Teacher Education*, 37(12), 29-45.
- Ferreira, J., Ryan, L. & Tilbury, D. (2007). Mainstreaming education for sustainable development in initial teacher education in Australia: A review of existing professional development models. *Journal of Education for Teaching: International Research and Pedagogy*, 33(2), 225- 239.
- Ferreira, J., Ryan, L. & Tilbury, D. (2014). Planning for success: Factors influencing change in teacher education. *Australian Journal of Environmental Education*, 23, 45-55.
- Fien, J. & Rowling, R. (1996). Reflective practice: A case study of professional development for environmental education. *Journal of Environmental Education*, 27(3), 11-20.
- Foundation for Environmental Education. (2010). *Eco-schools programme: Celebrating 15 years*. Copenhagen: Author.
- Franzen, R.L. (2017). Environmental education in teacher education programs: Incorporation and use of professional guidelines. *Journal of Sustainability Education*, 16. Retrieved from: http://www.susted.com/wordpress/content/environmental-education-in-teacher-education-programs-incorporation-and-use-of-professional-guidelines_2018_01/

- Gooch, M., Rigano, D., Hickey, R., & Fien, J. (2008). How do primary pre-service teachers in a regional Australian university plan for teaching, learning and acting in environmentally responsible ways? *Environmental Education Research*, 14(2), 175-186.
- Greenwood, D. (2010). A critical analysis of sustainability education in schooling's bureaucracy: Barriers and small openings in teacher education. *Teacher Education Quarterly*, 37(4), 139-54.
- Ham, S.H., & Sewing, D.R. (1988). Barriers to environmental education. *The Journal of Environmental Education*, 19(2), 17-24.
- Hart, P. (1990). Environmental education in Canada: Contemporary issues & future possibilities. *Australian Journal of Environmental Education*, 6, 45-66.
- Heimlich, J., Braus, J., Olivolo, B., McKeown-Ice, R., & Barringer-Smith, L. (2004). Environmental education and pre-service teacher preparation: A national study. *The Journal of Environmental Education*, 35(2), 17-60.
- Henderson, K., & Tilbury, D. (2004). *Whole-school Approaches to Sustainability: An International Review of Whole-school Sustainability Programs*. Report prepared by the Australian Research Institute in Education for Sustainability (ARIES) for the Department of The Environment and Heritage. Retrieved from: http://aries.mq.edu.au/projects/whole_school/files/international_review.pdf
- Hopkins, C., & McKeown, R. (2005). *Guidelines and recommendations for reorienting teacher education to address sustainability* (Education for Sustainable Development in Action technical paper no. 2). Paris: UNESCO Education Sector. Retrieved from: <http://unesdoc.unesco.org/images/0014/001433/143370e.pdf>
- International Panel on Climate Change (IPCC.) (2018.) *Special Report on the Impacts of Global Warming of 1.5°C Above Pre-Industrial Levels*. Geneva, Switzerland: World Meteorological Organization.
- Inwood, H., Miller, P. & Forbes, J. (2014). Professional learning in environmental & sustainability education: Identifying strategies and supports for successful school-university partnerships. In K. Broad, M. Evans, D. Montemurro, & M. Gambhir (Eds). *Inquiry into practice: Learning global matters in local classrooms*. Toronto, ON: OISE/University of Toronto.
- Inwood, H. & Jagger, S. (2014). *DEEPER: Deepening environmental education in pre-service education resource*. Toronto, ON: Ontario Institute for Studies in Education. Retrieved from: <http://eseinfacultiesofed.ca/practice-pages/deeper.html>
- Inwood, H. (2019). Growing innovative approaches to environmental and sustainability education in teacher education programmes. In Karrow, D. & DiGiusseppe, M. (Eds.), *Environmental and sustainability education in pre-service teacher education*. London, UK: Springer Publishing.
- Lane, J., Wilke, R., Champeau, R. & Sivek, D. (1994). Environmental education in Wisconsin: A teacher survey. *The Journal of Environmental Education*, 25(4), 9-17.
- Lin, E. (2002). Trend of environmental education in Canadian pre-service teacher education programs from 1979 to 1996. *Canadian Journal of Environmental Education*, 7(1), 199-215.
- Liu, S., Yeh, S., Liang, S., Fang, W. & Tsai, H. (2015). A National investigation of teachers' environmental literacy as a reference for promoting environmental education in Taiwan,

The Journal of Environmental Education, 46(2), 114-132.

- Karrow, D., DiGiuseppe, M., Elliott, P., Gwekwerere, Y., & Inwood, H. (Eds.). (2016). *Canadian perspectives on initial teacher environmental education praxis*. Ottawa, ON: Canadian Association for Teacher Education. Retrieved from: <https://cate-acfe.ca/polygraph-book-series/>
- McKeown-Ice, R. (2000). Environmental education in the United States: A survey of pre-service teacher education programs. *The Journal of Environmental Education*, 32(1), 4- 11.
- Merriam, S. (1998). *Qualitative research and case study applications in education*. San Francisco, CA: Jossey-Bass.
- Mogensen, F. & Mayer, M. (2005). *ECO-schools: Trends and divergences – a comparative study on ECO-school development processes in 13 countries*. Vienna, Austria: SEED, Austrian Federal Ministry of Education, Science and Culture. Retrieved from: <http://www.ubu10.dk/downloadfiles/Comparative2.pdf>
- Moore, M., O’Leary, P., Sinott, D., & O’Connor, J. (2019). Extending communities of practice: a partnership model for sustainable schools. *Environment, Development and Sustainability*, 21(4), 1745-1762.
- Nolet, V. (2013). Teacher education and ESD in the United States: The vision, challenges, and implementation. In R. McKeown, & V. Nolet (Eds.), *Schooling for sustainable development in Canada and the United States* (pp. 53-67). Dordrecht, Netherlands: Springer.
- Ontario Ministry of Education. (2009). *Acting today, shaping tomorrow: A policy framework for environmental studies in Ontario schools*. Retrieved from: <http://www.edu.gov.on.ca/eng/teachers/enviroed/ShapeTomorrow.pdf>
- Ormond, C., Zandvliet, D., McClaren, M., Robertson, P., Leddy, S., & Metcalfe, S. (2014). Environmental education as teacher education: Melancholic reflections from an emerging community of practice. *Canadian Journal of Environmental Education*, 19, 160-179.
- Pickard, G. (2007). Coming to our senses: The preparation of pre-service teachers and the implications for education for sustainability. *The International Journal of Environmental, Cultural, Economic, and Social Sustainability*, 3(3), 1-8.
- Powers, A. (2004). Teacher preparation for environmental education: Faculty perspectives on the infusion of environmental education into pre-service methods courses. *The Journal of Environmental Education*, 35(3), 3-11.
- Puk, T., & Stibbards, A. (2010). Ecological concept development of pre-service teacher candidates: Opaque empty shells. *International Journal of Environmental and Science Education*, 5(4), 461-76.
- Russell, C., Bell, A., & Fawcett, L. (2000). Navigating the waters of Canadian environmental education. In T. Goldstein & D. Selby (Eds.), *Weaving connections: Educating for peace, social, and environmental justice* (pp. 197–217). Toronto, ON: Sumach Press.
- Sims, L., & Falkenberg, T. (2013). Developing competencies for education for sustainable development: A case study of Canadian faculties of education. *International Journal of Higher Education*, 2(4), 1–14.
- Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: SAGE Publications.
- Statistics Canada (2014). *Back to school...by the numbers*. Retrieved from: https://www.statcan.gc.ca/eng/dai/smr08/2014/smr08_190_2014
- Toronto District School Board (TDSB). (2019). *EcoSchools certification toolkit*. Retrieved from: <https://www.tdsb.on.ca/ecoschools/Home/Resources-and-Guides/Certification-Guides>

- Van Petegem, P., Blicek, A., Imbrecht, I. & Van Hout, T. (2005). Implementing environmental education in pre-service teacher training. *Environmental Education Research*, 1(2), 161-171.
- Wade, K.S. (1996). EE teacher in-service education: The need for new perspectives, *The Journal of Environmental Education*, 1(2), 11-17.
- Yin, R. K. (2002). *Case study research: Design and methods*. Thousand Oaks, CA: SAGE Publications.
- Zhou, G. (2015). Environmental pedagogical content knowledge: A conceptual framework for teacher knowledge and development. In S. Stratton, R. Hagevik, A. Feldman, & M. Bloom (Eds.), *Educating science teachers for sustainability* (pp. 185–203). New York, NY: Springer.