

From the Margins to the Mainstream: Canadian and International ESE

There has never been a more important time to be a teacher of environmental and sustainability education.¹ This is underscored by several urgent socio-ecological issues facing humanity, including COVID-19, climate change, biodiversity loss, poverty, mass migration, conflict and war, and food and water shortages (United Nations, 2021; Worldwatch Institute, 2018). Teacher education² will play an increasingly important role in the education of future teachers, who in turn, are charged with the task of educating future generations of children to adequately deal with such socio-ecological challenges (Hopkins & Kohl, 2019).

As teacher educators, our aspirations for a more just socio-ecological world reside in the research we conduct to nurture the developing field of teacher environmental and sustainability education (TESE). Such research is critical to advancing the field from the margins to the mainstream. To advance this aim, this special edition of *Brock Education Journal* (BEJ) has invited Canadian and international TESE scholars to move TESE from the margins to the mainstream by considering the following.

Recently, Canada has made promising gains in establishing itself as an important contributor to nurturing and advancing the field of TESE (Sims et al., 2021; Karrow & Howard, 2020; Karrow & DiGiuseppe, 2019; Harwood, 2019; Harwood, Barrat, & Collier, 2019; and Inwood & Jagger, 2014). Aligned with calls from international TESE researchers (Evans et al., 2021; Evans et al., 2017; Gough, 2016; and Pipere, Veisson & Salite, 2015), Canadian TESE research priorities have tentatively been identified as consisting of: re-defining ESE; reviewing Canadian and international TESE research literature; and examining potential Canadian and international TESE research topics including but not limited to: connecting the social and the ecological; teacher ‘identity’ and ‘agency’; community-based TESE; teaching/student learning and belief systems; and challenges in applying research to practice (Karrow & Howard, 2020). In their comprehensive review of the international TESE research, Evans et al. (2017) conclude that future priorities should include: the necessity for academics working at program and course levels to make TESE more comprehensive and integrated; an evaluation of the effectiveness of TESE pedagogies; and continued qualitative and quantitative TESE research, strengthening its theoretical base.

There are additional yet salient characterizations of the field of TESE research. For instance, given its relative newness, Evans et al. (2017) implore, “. . . teacher education academics to respond to the call for more research and to expand the research base in SE [sustainability education] within initial teacher education globally” (p. 414). What’s more, as is so often the

¹ In this sense, we use the term “teacher” as it applies to the Canadian ECE-12 setting. We also recognize, that ‘educator’ may be an international referent.

² “Teacher education” refers to the education of future Early Childhood Education-12 teachers (ECE). Our consideration of the term applies to preservice teacher education (prior to certification) and inservice teacher education (post-certification), in formal (school-like contexts—ECE-12) and non-formal (beyond school-like contexts) settings). ³ Environmental sustainability education refers to and is inclusive of the recognized “currents” of environmental education (Sauvé, 2005), including but not limited to ‘environmental education’, ‘sustainable development education’, ‘sustainability education’, ‘place-based education’, ‘humane education’, ‘conservation education’, ‘values-based education’, etc.

case with new fields of study, they commonly tend to be undertheorized and descriptive in nature, with Canada being no exception (Karrow & DiGiuseppe, 2019). Our small but international sample of research into TESE begins to interrogate some of these earlier observations of the developing field.

Aim of this Special Issue

This special issue of BEJ provides a rich variety of scholarly resources that analyze Canadian and international TESE research contributing to the interdisciplinary field by advancing and deepening debates about research priorities. To help facilitate this, Dr. Douglas D. Karrow and Dr. Debra Harwood, member and former member, respectively, of the Standing Committee on Environmental and Sustainability in Teacher Education of the Canadian Network for Environmental Education and Communication (EECOM) met with Associate Professor Neus (Snowy) Evans (A/Prof. Evans) during fall 2019. From conception to publication, this issue of BEJ has had a long trajectory, originally intended to emerge from manuscripts delivered at the annual EECOM 2020 Research Symposium on Environmental and Sustainability Education in Teacher Education. However, the pandemic struck us in 2020, creating turmoil and uncertainty across academia and, consequently, the postponement of EECOM 2020. Now, having worked through challenging times, we are pleased to bring you this special issue in summer 2022.

Responses to the Call for Papers

In response to our invitation, the articles in this special issue consider the following questions:

- What do evaluation-driven research programs contribute to our understanding of effective TESE pedagogies?
- What forms of empirical (qualitative and quantitative TESE research) and non-empirical research could strengthen TESE's theoretical base?

Evans et al. (2017) addressed variations of the two questions in their appeal to researchers, summarized within an international meta-analysis of TESE trends examining approaches to embedding ESE in teacher education:

There is also a need for deeper evaluation of the effectiveness of the pedagogies that are currently in play. While many teacher educators report their use of participatory, inquiry oriented and other teaching and learning methods that are well-grounded in the SE and broader educational literature, a lack of reflexivity and critique limits the transferability of many of these efforts and the development of an in-depth understanding of SE practices in initial teacher education. Finally, as we have noted, research in this emerging area of teacher education practice is small-scale and theoretically weak. (p. 414)

Four of the five submissions (two Canadian and three international) in this issue of BEJ are evaluation-based studies examining ESE-related pedagogies in similar but different contexts, using various methodologies and research designs. The fifth submission provides a theoretical investigation of the naming of the field of ESE and the challenge this poses to the field of TESE

as a whole. What unites these pieces is an examination of the challenge(s) in mainstreaming⁴ TESE in faculties of education across the world. While the working contexts may differ for various reasons, they share common challenges in moving the field to the mainstream, as it has been traditionally marginalized within faculties of education.

In this introduction we provide a brief overview of each article. We then distill themes across the article set that provide a snapshot of responses to the common question(s) from an international perspective. We then revisit Evans et al.'s (2017) appeal to researchers, in lieu of our modest volume, to assess progress to date.

Overview of Articles

Turkish Preservice Teachers' Tendencies Towards EfS in the Practicum (Author--Sule Alici)

“Implementation of Education for Sustainability in Turkish Pre-Service Teachers' Practicum” Turkish researchers Alici and Alan look to the potential of teacher education to transform ECEs and the children they educate. The omission of EfS in ECE-pre-service teacher (ECEPT) education is the impetus for their research. Theoretically underpinned by critical theory, Alici and Alan develop a conceptual framework articulating the four functions of HE (ÄrlemalmHagsér & Elliott, 2017) interpreting those research findings in the context of EfS in teacher education. Alici and Alan further describe ECE in Turkiye as non-compulsory, targeting preschool children. This mixed-methods study consisted of a cross-case comparison between two universities (University A and B) operating ECEPT programs. University A was in a large urban city, comprehensive in nature (research focused), classified as a “green campus.” A general ethos of “sustainability” permeated the campus through its mission statement, program, courses, and workshops. University B was in a small town and did not have an ethos of “sustainability.” As such, few if any programs, courses, or workshops existed to support sustainability. Students had minimal if any previous exposure to the concept of sustainability or EfS; however, they had heard of both these terms. Two sources of data were collected and analyzed: participant activity plans (lesson plans) and participant interviews. Participant activity plans were evaluated on the degree to which they addressed the four pillars of sustainability (UNESCO, 2005), measured using the “7Rs and Explanations” checklist (OMEP, 2011). A subset of participants was selected for follow-up interviews. Alici and Alan interpret these results in relation with the four functions of EfS in HE (Ärlemalm-Hagsér, 2017), arguing for teacher education's transformative potential for EfS. Implications for the study are drawn through a final appeal to consider Ferreira and Davis's (2015) systems approach to ECEPT programming, which Alici and Alan's research begins to model.

Exploring Effective Pedagogies in ESE for Teacher Education: Story of New Zealand Preservice Teachers' Learning Experiences

Birdsall argues that stewardship, otherwise referred to as “environmental awareness and concern” as a prerequisite to a “personal environmental ethic” (Tilbury, 1995, p. 201) is part of a long tradition in ESE and becomes the inspiration of this research. Birdsall's article aims to add to this research base by exploring Aotearoa-New Zealand pre-service teachers' learning during an elective course about teaching ESE. The pedagogies employed are critically evaluated and

transformative learning theory is used to analyze learning that took place. Transformative learning theory is useful in examining pre-service teacher pedagogies and whether such pedagogies transform pre-service teachers so they see themselves as part of their environment and develop a personal environmental ethic (Reid et al., 2020; Tilbury, 1995). Given the deficiency in the research on ESE pedagogies in pre-service teacher education (Evans & Ferreira, 2020), Birdsall's research aims to explore said teachers' learning in an ESE course targeted to embed ESE in their future practice. Qualitatively oriented and interpretive by nature, the study sets out to explore how a set of specific ESE pedagogies map onto Mezirow's (1990) transformative learning theory situated around a 3-week course, delivered as a "workshop" for one and a half hours per week. Teacher candidates were exposed to a set of carefully constructed learning activities designed to teach the concept of sustainability and ESE. Data consisted of individually self-recorded reflections following the instructional activities as well as peer discussions. Another data set consisted of follow-up one-on-one interviews orchestrated by the researcher. Data were inductively analyzed to generate themes. Themes were then deductively analyzed in terms of evidence of construed meaning (transformative learning). Birdsall then provides a detailed analysis of the results linking these with Mezirow's (1990) transformative learning theory.

Education for Sustainable Development (ESD) Infusion into Curricula: Influences on Students' Understandings of Sustainable Development

Ferguson et al. add an important voice to the burgeoning research emanating from the Global South and in particular the growing body of literature from the Caribbean (e.g., Collins Figueroa, 2012; Down, 2015a, 2015b). The Caribbean, specifically Jamaica, is considered a Small Island Developing State (SIDS) and given the nation's many vulnerabilities, ESD is deemed critical (Roofe et al., 2021). Understanding how SD and ESD are framed within such a context is the focus of Ferguson et al.'s collaborative action research (CAR) project. The researchers paint a vivid picture of the complexities inherent in influencing pre- and in-service teachers' understandings. Teacher education within Jamaica has been described as resistant to change and conservative, resultant of the legacy of colonization (Gentles, 2018). As Ferguson and colleagues point out, even when teacher education is focused on ESD and empowering future educators, "deep and enduring changes" are complex (McKeown, 2014, p. 129) and much depends on teachers' knowledge, values, and skills, and building capacity across all levels of the system (i.e., curricula, programs, subjects, whole institution) (Laurie et al., 2016; Otto & Wohlpert, 2009). Ferguson et al. conducted a CAR project as part of a larger interdisciplinary team that focused on the exploration of practices and strategies for SD/ESD infusion for both teacher-educators and pre- and in-service educators. The results of the research on the collaborative processes, decision-making, strategies, and practices undertaken by the teacher educators are also significant, particularly given the integral role they play in the promotion of SD/ESD to future educators. Here in this special issue, Ferguson et al. examine the ways the process of ESD infusion through a variety of disciplines enhanced students' knowledge and awareness of SD. The infusion of ESD skills, issues, perspectives, and values across the disciplines occurred through the incorporation of new materials, activities, assignments, and/or assessments. To ascertain shifts in thinking and understanding, participants were asked to complete the open-ended questionnaire at the outset and conclusion of their courses. Participants were asked to

explain their understanding of four concepts—SD, ESD, teachers promoting ESD, and each participant’s role in promoting ESD—at each point. Data were analyzed thematically. Ferguson et al.’s study provides an important impetus for teacher educators and programs to consider how to enhance students’ SD/ESD awareness through inter- and multidisciplinary approaches of infusion within existing courses. Moreover, they raise important questions regarding pedagogical approaches such as project- and problem-based learning and community action projects that would translate knowledge into action.

Embedding Environmental Sustainability Education in our Master of Teaching Program: Reflections on improvisation and learning-by-doing at OISE, University of Toronto

Stickney offers a descriptive and expository narrative of his own experiences of introducing an ESE course within OISE’s teacher education program at the University of Toronto as a way of inviting readers to consider their own journey and as an impetus to begin conversations within other institutions. The narration depicts Stickney’s personal 4-year journey of ESE course development and illustrates the experimental, improvisational, and evolutionary nature of constructing a mandatory ESE course. Stickney offers one example of addressing what Bonnett (2013, 2020) has deemed as the need to ecologize education by highlighting the urgent need to address climate change, underscored by the latest UN Intergovernmental Panel on Climate Change (IPCC) report. Through a brief historical account of OISE’s approximate 10-year history of focused attention on ESE and the policy development undertaken during that time (e.g., OME, 2009, 2017), Stickney highlights the evolutionary nature, complex decision-making, challenges, and opportunities inherent in designing an ESE course. Stickney also describes some of his own personal-professional experiences to highlight tensions and complexities within course design and delivery (e.g., balancing the philosophical and theoretical discussions around ESE with teacher candidates). Readers will be interested in the description of the course structure and issue-based approach of the design, as well as insights into the varied pedagogical approaches.

What’s in a Name? The Signifiers and Empty Signifiers of Environmental and Sustainability Education: Implications for Teacher Education

Karrow et al. invite us to consider how a long history of fluidity and contestation in the conceptual emphasis and terminology pertaining to the field of environmental and sustainability education is reflected in teacher education. The authors tackle this problem through a theoretical exploration of the role that signifiers and empty signifiers contribute to the mainstreaming of ESE in teacher education. They explore the diversity of names (signifiers) by which ESE is known and ruminate about the potential impact on the mainstreaming of ESE in teacher education. Karrow et al. commence by asking “what’s in a name?” They then explore the plurality of the signifying fields and sub-fields connected to ESE by asking, “what are the benefits and limitations of ESE’s signification in teacher education?” Building on from this first question, Karrow et al. move us to consider implications for teacher education and its mainstreaming in faculties of education. Inspired by a general under-theorization of the field

(Evans et al., 2017), Karrow et al.'s contribution encourages us to shift our thinking from the practical to the theoretical through philosophical inquiry supplemented by a modified form of semiotic analysis. The combination of two approaches, Karrow et al. posit, enables them to argue how ESE is an empty signifier (meaningless). The authors of this paper leave nothing to chance when it comes to helping the reader understand concepts. This is achieved through clear explanations and a historical exploration of the field and sub-field of ESE signifiers and worldviews and the larger context of pre-sustainability, sustainability, and post-sustainability. Knowledge of historical underpinnings provides understanding about the milieu of ideas that shape a scholarly area. In this paper, the comprehensive historical overview has the added benefit of providing a clear pathway for understanding the analysis. Karrow et al. elaborate on their philosophical inquiry and semiotic analysis to highlight the challenges and tensions related to adopting a coordinated approach to mainstreaming ESE in teacher education. They also provide three options for teacher educators and faculties of education to consider. Although focusing on the state of Ontario, the points and implications are relevant to other contexts as experiences related to ESE and teacher education are similar across the globe.

Questions Responding to the Call for Papers

Recall, contributing authors' works coalesced around two of the original questions extended in the Call. We consider each of these questions by highlighting the specificity of each article's contribution. We are cautious about the tentative themes highlighted here and offer them as touchstones for readers to consider.

1) What Do Evaluation-Driven Research Programs Contribute to Our Understanding of Effective TESE Pedagogies?

All five articles in this issue of BEJ, explicitly or implicitly, addressed this question through their research program, although they differed in their methodological approaches. Three of these articles (Alici and Alan; Birdsall; and Ferguson et al.) took an empirical approach to evaluating various TESE pedagogical and curriculum strategies, with a variety of study participants, (e.g., ECEPTs, pre-service teachers, in-service teachers, and teacher educators). Of the remaining two non-empirical articles, the fourth article (Stickney) provided a personal, self-reflective account of the pedagogical and curricular approaches considered in the development of a new course over several years. The fifth article in the set (Karrow et al.) examined the problem of ESE's diverse signifiers, arguing this diversity exacerbates TESE's marginalization by making it difficult for the field to identify itself in teacher education, which is given to defined disciplines and derivative subjects.

The five articles are each interested in supporting or developing TESE in their respective programs. In this sense, they could be described as "interventionist": they seek to change the status quo (marginalization of TESE) by evoking change (mainstreaming TESE). While united in their objective, they demonstrate different leverage points. Alici and Alan focus on program change by advocating for a "systems-approach" to TESE (Evans et al., 2017). Birdsall examines specific pedagogical strategies underpinned by theory (transformative learning theory). Ferguson et al. prefer a curricular approach, considering ESE's infusion within existing courses (e.g., interdisciplinarity). Stickney prefers outright course development. And Karrow et al. argue for the importance of "field identity" to successfully mainstream TESE. The variety of "leverage

points” and the ability to examine the phenomenon of TESE through various angles and study participants is an opportunity for future TESE researchers to be more strategic as they consider their own research programs.

The five articles comprising this issue of BEJ effected a degree of change, albeit with mixed results. They are each moving TESE from the margins to the mainstream; some do this by tinkering around the edges, while others tackle the problem at its core. And while the limitations of each study are previously considered, for those of an empirical nature, the short duration of the intervention and/or the participant pool are obvious places for future researchers to build upon. As for the non-empirical studies, their introspection and self contemplation could be dismissed as academic self-indulgence. These researchers are reminded of the importance of continually seeking to ground their theorizations through practice. Regardless of the empirical/non-empirical divide, we are reminded of the importance of the dialectical relationship between theory and practice, achieved through praxis.

2) What Forms of Empirical (Qualitative and Quantitative TESE Research) and Non-Empirical Research Could Strengthen TESE’s Theoretical Base?

Empirical and non-empirical work are equally essential in advancing a field of study—in this case, TESE. Empirical work, by its inductive nature, contributes to theory confirmation/refutation; non-empirical work, by its deductive nature, advances theory development. The two are necessary for the further development of TESE.

Drawing from the empirical camp of research articles (Alici and Alan; Birdsall; Ferguson et al.), this small sample illustrated a variety of research designs. Alici and Alan adopted a mixed methods methodology utilizing cross-case research design; Birdsall, a qualitative methodology, employing interpretive design; and Ferguson et al., a qualitative methodology, demonstrating the design of CAR. From the non-empirical camp of research articles, Stickney adopted a qualitative methodology, illustrating self-study design, and Karrow et al. illustrated philosophical inquiry as their “methodology,” augmented through a modified version of semiotics.

From this small set of research articles, we are reminded of the advantages and disadvantages of each methodology and design. And while each has strengths, limitations, and philosophical and ideological biases, taken together they help expose aspects of the complex phenomenon of TESE our research community is trying to understand. Researchers pursuing empirical and nonempirical research will appreciate the importance of conceptualizing robust research while ensuring the “rules” and “practices” of conducting reliable and valid research, germane to each approach, are maintained.

Concluding Thoughts and Future Work

In conclusion, we return to our co-editor, A/Prof. Evans’s appeal to TESE scholars, summarized at the outset of this article (Evans et al., 2017). Our special issue on TESE represents a modest response to this appeal. Herein, there is research being conducted within Canada and internationally that strengthens the empirical/non-empirical research spectrum. Even in this small collection of articles, there is a variety of methodological forms and research designs.

What's more, the theoretical frameworks used to conduct these studies have been acknowledged, in some cases validated, in other cases elaborated upon. In the developing field of TESE (as with any sub-field in education) its many moving conceptual parts (e.g., pedagogy, learning, curriculum, ESE) are each informed by a theoretical position. While not exhaustive, for example, Alici and Alan, and Birdsall, cite transformative learning theory as the theoretical perspective driving their learning-focused interventionist work with teacher candidates. Ferguson et al. delve into the theory of integrated curriculum models to channel their work on infusing ESD with their teacher educators and candidates. Stickney waxes poetically about course conceptualization through a developing body of research known as self-study. And Karrow et al. draw from several theoretical fields: semiotics to facilitate their examination of the topic of study and disciplinary emergence to orient their argument. In Canada, there is a continued need to move the type of research being conducted beyond descriptive studies. This will come in time, as the field of TESE increases its profile, expands its research community, and delves further into the complexity of the phenomenon itself.

As the field of TESE develops, so too will the community of researchers, conducting research in the field. Invariably, the numbers of researchers and studies will increase. Given the complexity of the TESE enterprise and the variety of its dimensions (pedagogy, learning, curriculum, and milieu), we encourage researchers to consider employing a variety of methodologies to address their diverse topics/problems/questions. As well, the importance of framing research studies examining TESE's diverse dimensions within theoretical perspectives will become increasingly important to help verify and validate established and novel theories.

Canada continues to establish its reputation in the international field of TESE. This modest volume, along with others (Boileau et al., 2021; Evans et al., 2021; Karrow & DiGiuseppe, 2019; Karrow & Howard, 2020; Karrow et al., 2020; Sims et al., 2021) are a testament to this. This invitation on the part of Canadian TESE researchers to work alongside an international TESE researcher such as Dr. Evans was a deliberate effort to broaden our own national perspective, strengthen our research community by considering different perspectives and pursuing further collaborations, continue to raise the profile of Canada within the international scene, and to learn from one another. In this sense, we have partly succeeded, yet further work remains.

We entertain the following future work. Along with advocating for increasing and diversifying TESE research will come the concordant responsibility of the research community to uphold the standards of robust research. This will become increasingly important as we work collaboratively to increase the profile of TESE and TESE research. It is something our research community would be wise to anticipate. It is incumbent on all of us to continue to educate ourselves about the variety of philosophical, theoretical, and methodological perspectives, each with their inherent strengths and limitations, and how they might help address future research problems and questions. Furthermore, the very diversity of signifiers illustrated through the articles comprising this special issue further highlights the complexity of the problem, particularly so at the level of research. For instance, in this special issue, the terms EfS, ESD, and ESE, at a minimum, are at play. And while the authors Karrow et al. expose the benefits and limitations of diverse names, this can make many activities (e.g., research, pedagogy, learning, curriculum, and theory) challenging for the field as it strives for prominence in teacher education because of the unique way teacher education is conceptualized and the manner its Ministries and colleges provide oversight through degree granting and certification.

There is continued need to support those researchers who are conducting research on TESE, who are often working by themselves, or with others, advocating to elevate the status of TESE in their field/institutes. Conducting research is one thing; having to politic to move TESE from the margins to the mainstream is another. And while the two activities may be jointly motivated and mutually coordinated, sometimes the energies and time dedicated to one may detract from the other. We are reminded of this daily in our pursuit to elevate the status of TESE to a level comparable to other fields of study in teacher education—information, communication, and technology (ICT). There are lessons to be learned from the successes of these other fields that were once at the margins of their disciplines. Close examination of the evolution of these fields, their successes and failures, might reveal insights for those of us advocating the same for TESE.

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