

# Preface

## Introducing the Book Series

Welcome to the first book for the Springer book series, *Environmental Discourses in Science Education*! We (Mike Mueller and Deborah Tippins) are excited about the conversations that will continue to draw together the fields of environmental education and science education. While many people already acknowledge the relationship between these two fields, these fields have continued to flourish largely independent of one another. Perhaps there was a hubris in the field of science education by positivistic scholars during the twentieth century and before modern times, but this arrogance has given way to the importance of environmental education as integral to the future of children everywhere. Perhaps environmental education was largely seen as a way of engaging children outside of schools when school science tended to emphasize classrooms. But this has given way to the ecological and environmental sciences as an important part of the curriculum of schools around the world, not to mention some related fields of experiential education, adventure education, and outdoor or place-based education involving learning outside of the typical classroom. Perhaps environmental education has focused more attention on the life span of children through adult life and peoples' relationships with nature, whereas science education has emphasized teaching children about the "scientific method", what professional scientists do, how to emulate scientific work, and, most importantly but often lost, how to use science to make informed choices. Science education has largely been devoid of teaching children to respect nature inasmuch as they are taught to organize, categorize, and manage it. In contrast, ethnoscience and the traditional ecological knowledge of many Aboriginal and indigenous peoples that deemphasizes classifying and managing organisms is also relevant to science education. When acknowledged more fully, the key distinctions between discourses of environmental education and science education are beginning to wane. Although there are dissident traditions in both of these educational fields, the underlying philosophies for environmental and science education are more congruent than divergent. For example, consider the hegemony that largely follows western and largely positivistic science in school science. In many places around the world, this hegemony has been mediated with the advent of highly contextualized science

education for solving local issues. In Accra, Ghana, for example, science education is more aligned with environmental education in that students are learning science to wrestle with ecological problems in the local context, but this was only after Ghanaian science educators began to take back a largely British-influenced method of teaching science (Mueller and Bentley 2009). In Malawi and Thailand, we also see examples of science education taught in ways that are largely contextualized by local issues (Glasson 2014). Today science curriculum worldwide seems to be moving towards these trends.

At the same time, let's acknowledge the difficulties inherent in bridging the two rivers of environmental education and science education until these two rivers begin to meet in confluence. There are associated tensions anytime two major fields of study begin to come together. For a long time, for example, schools of education with teacher certification programs have housed the majority of science education programs at the university, whereas environmental education may or may not be located within colleges of education. Often these environmental programs are located in schools or colleges in the sciences, conservation, tourism, or natural resources. The majority of science education happens in K-12 schools, whereas there is a smaller part acknowledged as "informal science education" that embodies museum, library, institution, aquarium, and so forth. Although we prefer the term "free-choice learning" or just "science education", the field of science-education-that-happens-in-the-larger-educational-milieu has been largely deemphasized or ignored until more recently (40 years). With the exception of Rousseau, most of the educational philosophers largely deemphasized or ignored the importance of nature in education. It took movers and shakers such as Emerson, Thoreau, and even Darwin to really foster the conversation with other more contemporary scholars such as Muir, McClintock, Leopold, and Carson. The emergence of the environmental movement in education and science education, more specifically, has taken the legacy of time and "pushing against the grain."

This era is here now and largely embraced and embodied by a critical mass of folks in environmental education and science education. We may see the confluence of schools and colleges at the university with many countries' focus on creating environmental literacy standards and norms. Not that this is the best direction for environmental literacy, but it is happening. For example, in the state of Alaska, USA, there is a new set of environmental literacy standards and a policy document, but very few schools and policymakers have done much with these standards. They may not even know what to do with these standards and how environmental literacy ought to be integrated in programs in and out of schools. This is where the compelling conversations of teachers, graduate students, and scholars across the globe will affect change in a major way through both local and international policy, theory, research, and practice. But it will also require a broader more encompassing view of education.

There are plenty of tensions that can be found in the everyday lives of children and their teachers in schools, local neighborhoods, and global corporations as they face the challenging issues situated within nature. As Derek Hodson notes,

We need to revitalize education in the home, in the workplace, and in community centers and through advertising and public notices. We need to mobilize effective education through leisure activities; through the print and broadcast media, the Internet, and social networking media; through movies, theater, literature, music and dance; and through examples set by prominent members of the community. Unprecedented levels of cooperation, support and collaboration will be necessary among national and local governments, environmental groups, formal and informal educational institutions, the business and industrial sector, trade unions, cultural and community organizations, youth groups, voluntary organizations, schools and families. Through all these outlets, we need to focus very directly on how we live and how we should live in the future if we really want to establish and maintain a more equitable and socially just society and an environmentally sustainable lifestyle (2014, p. viii).

This is where conversations that begin to sand the rough corners of the “adjectival educations” and the proliferation of educational subfields that potentially work against the interdisciplinary and cross-hybrid learning goals of bridging environmental and science education really matter.

We want to encourage environmental discourses in science education from a broad range of international perspectives and holistic contributions to the advancement of this project, from fields such as science education, environmental education, outdoor education, experiential education, place-based education, community-centered education, culturally-responsive education, democratic education, sustainability education, health education, Aboriginal and indigenous education, critical pedagogy, social justice education, ecopedagogy, ecojustice education, humane education, imaginative education, social learning, problem-based learning, and so forth. There exists internal relationships within any given discourse (i.e., discourse of sustainability) but any discourse always exists in relation to others (i.e., discourse of globalization). Thus, we envision conversations where ideas and thoughts are exchanged among discourses that may reflect unique forms of representation, habits of language, or culturally and historically located meanings. This book series recognizes the grand challenges of wrestling with the situated tensions between cultural and natural systems and the ways that age-old perspectives in environmental and science education will change as the result of reexamining topics that have long been relevant to these fields become reexamined discourses. David Abram (2010) notes: “whenever the wild diversity of experience is twisted into a simple opposition between what’s good and what’s bad, whenever the heterogeneous multiplicity of life is polarized into a battle between a pure Good and pure Evil, then the Earth itself is bound to suffer at our hands” (p. 304). Thus, we must never forget to include a full diversity of voices for Earth.

We envision books for this series that uphold traditions while also challenging dualisms that were originally created to articulate particular environmental worldviews. We invite authors to contribute counter narratives which challenge the ideology of unrestrained instrumentalism where humans dominate over nature, growth is equated with progress and resources are judged in terms of their value to humans. Consistent with an ecojustice philosophy, we seek empirical research and narratives which highlight the interdependence of humans and nature, the rights of all entities, including both human and non-human species, and recognize the inherent value of diversity, complexity, integrity, and uncertainty. An ecojustice philosophy serves to deescalate the crisis narratives of gloom and doom

apparently motivating individuals into action, and calls for a more holistic approach to teaching science that depends on the health of the individual, community and the environment; we see the heightened sense of awareness around the confluence of these global discourses.

In a recent book on the future of science education in the USA, the authors and contributors to *Assessing Schools for Generation R (Responsibility): A Guide for Legislation and School Policy in Science Education* argue for a more holistic metric for considering and measuring the effectiveness of schools and education more generally (Mueller et al. 2014). In this book, there are chapters on critical media literacy, assessing interdependent responsibility of youth, character development, socioscientific issues and reasoning, community service and engagement, environmental schools, elementary environmental education and nature clubs, teaching Earth smarts, digital technologies, partnerships with government agencies focused on the environment, game camps, geospatial technologies, cultural studies, environmental studies, climate change, free-choice learning, global relationships, environmental monitoring programs, education policy, the national standards, special needs students, and holistic science education. These topics and more will generate the conversations necessary to take science and environmental education to the next generation of students. Hopefully, the next generation of youth will barely notice the difference!

Citizen science, youth activism, and responsibility, to name a few, can become important and significant ways of reconceptualizing the ways that schools are organized, and the ideological roots of multi-layered phenomena such as curriculum and policy. There is now the need to recognize the tensions that exist between humans and nonhumans, but almost as important, the physical environments within the Earth, space, solar system, and the cosmos. We need to begin shifting to a cosmos mindset where our actions here on Earth are seen as relevant to consequences elsewhere in the solar system and beyond. Perhaps this sounds crazy but what we are emphasizing for this book series is the absurd, the illogical, the unconventional in addition to traditional stories, morals and ethics embedded in school science and the larger ecosystems. Conversations and new perspectives on the significance of ecojustice, defensible environmentalism within environmental and science education, and free-choice learning are just a few of the really great topics that we hope will generate nuanced understandings, and inspire action, relationship-building, hope, outrage, and transformation. Potential topics orbit the way people engage in activities in schools and communities throughout their lifetime, including the ways in which these activities bring about balance in our lives, bodies, and minds. Other contributions to the series might analyze heightened cultural attunement, geographic awareness and humility, space and place, and environmental messaging. Dancing, yoga, kayaking, photography, gardening, karate, fishing, mountain climbing, surfing, cooking, music, and other cultural arts may play a part in this project of ecological discourse. Authors might consider how the cosmos surrounding this planet Earth, the depths of the ocean, and things on the scale of the Nano are relevant to this ecological discourse. We anticipate that the mediation of science education and

environmental education is just as important to this conversation as much as nurturance. We look forward to books that ask questions and generate new meanings and provoke inquiry, research methodologies, and ecological pedagogy of relevance to educators worldwide.

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EcoJustice, Citizen Science and Youth Activism  
Situating Tensions for Science Education

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