Weaving Formal Teacher Education with Non-Formal Environmental Education

Making a Career Transition

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Covid-19 changes everything. As I tried to work on revisions to my chapter, I continued the non-formal education process I was engaging in environmental education. I found the call by Greta Thunberg (Thunberg et al., 2018) for action on the climate crisis echoed in webinars and Zoom meetings held by environmental groups who were also addressing the global pandemic and pointing out the connections. In July 2018, Greta told her father, "If we have two years left before the emissions curve has to go down, something has to start happening now, and by next spring something must have happened. Something huge and totally unexpected" (p. 429). Well, something huge did happen within two years, including emissions going down with the worldwide shut down of polluting factories and transportation following the totally unexpected global pandemic in the first months of 2020. The challenge will be to not go back:

> Historically, pandemics have forced humans to break with the past and imagine their world anew. This one is no different. It is a portal, a gateway between one world and the next. We can choose to walk through it, dragging the carcasses of our prejudice and hatred, our avarice, our data banks and dead ideas, our dead rivers and smoky skies behind us. Or we can walk through lightly, with little luggage, ready to imagine another world. And ready to fight for it. (Roy, 2020)

So what does this mean for my self-study of my transition from teaching teachers in a formal education setting (university) to becoming an environmental educator in nonformal and informal education settings (community)?

On the one hand, in the face of the health crisis combined with the climate crisis, my little self-study-in-progress wonders whether it should be taken seriously – is this even the best use of my time now? On the other hand, citizens and leaders alike are suffering from a lack of scientific literacy, both about coronavirus and its mechanisms and about the climate crisis. Maybe working on ways of increasing scientific literacy outside of formal education settings can justify the time it takes. And so with that potential, I proceed.

I have just retired from a career of teaching early childhood teachers (preservice and in-service) and of teaching teachers to teach teachers (doctoral), although I continue in a volunteer capacity with a statewide early childhood research and development center serving practitioners. In the formal education program and in the statewide center, we strive to develop early childhood teachers who will use inclusive, play-based, integrated science, math, and literacy pedagogy, to develop engineering and scientific habits of mind in both teachers and students, adaptable for variations in

race, class, ability, home language, and other characteristics.

The metaphor of textiles in the Castle 13 theme reminded me of the early childhood curriculum in New Zealand, Te Whariki, introduced to me at Castle 7 by Mayo et al. (2008): "Whariki means weaving. The metaphor of weaving is used to show holism in learning, as a whariki or mat is created for all to stand on" (p. 240). Te Whariki is woven from principles and strands. The warp of the mat I will be weaving in my transition comes from the principles of my pedagogical skills for inclusive practice of my formal teacher education career. I am now gathering the strands of new content and new pedagogy in non-formal and informal environmental education to provide the woof, to weave in a new way.

Objectives

My overall objective in my transition to environmental educator is to find ways to educate people, particularly young children, so that they will know, come to love, and therefore protect their environment. During this transition, I will be engaging in self-study to discover, in the context of ongoing environmental degradation for which we and the next generation must soon find solutions, how to equip myself to contribute principles and content outside of formal education settings. The aim of this report is to document what I have learned so far about the path I have chosen to my next stage.

Conceptual Context

I am a teacher. I was a built-in babysitter in my family of origin, 7 years older than my next of 4 siblings, and I shared my love of the outdoors with my sister and brothers from their earliest years. We still love to go out into nature when we get together as aging adults now. And I expect to be a teacher, and to love nature, until the end of my life. But my formal teacher education professor job has now ended, and I look forward to a new career as a community- based environmental educator.

To guide my transition out of teacher education and into environmental education, I look to the rich examples in the S-STEP literature of those who have documented their major transitions into and through teacher education (Bullock & Ritter, 2011; Dinkelman et al., 2006; Kitchen, 2005; Richards & Fletcher, 2019; Wood & Borg, 2010). Even more apt are the self-studies of those who have become novices in new fields (Ardra Cole (1998) tapdancing; Dawn Garbett (2008) horseback riding; Melanie Shoffner (2016) immersing into a new discipline) to enrich their teacher education. Can their experiences provide maps I can read backwards as I move out of teacher education into environmental education?

To guide the transition of my pedagogy out of formal education and into the community, I look to the long traditions of non-formal and informal education. Gravitating to the science end of environmental education, I follow the National Science Teaching Association (NSTA), who recognized the value of non-formal and informal education with their recent name change (from Teachers to Teaching). They cited the National Research Council (NRC) (2010) report, *Surrounded by science: Learning science in informal environments*:

A great deal of science learning, often unacknowledged, takes place outside school in museums, libraries, nature centers, after-school programs, amateur science clubs, and

even during conversations at the dinner table. Collectively, these kinds of settings are often referred to as informal learning environments. (p. 1)

Even within a formal university setting, I have found inspiration from programs engaged in the formal education of non-formal education, such as leisure services (e.g., Scholl & Gulwadi, 2015) or outdoor education (e.g., North, 2015).

And for new content to master, outside of the natural and social sciences of the academy, I look to scientists such as Alexander Von Humboldt, Charles Darwin, Aldo Leopold, E.O. Wilson; and environmental essayists such as Terry Tempest Williams and Edward Abbey. To learn from those who are actively working to improve the natural world, I look to environmental organizations such as The Nature Conservancy, Sierra Club, and Audubon Society; and public agencies such as the National Conservation Training Center of the U. S. Fish and Wildlife Service, and more locally, county (inside US states) conservation districts.

As I immerse myself more deeply in this literature, I find over and over again some kind of reference to a rationale for educating children and others about the environment, said as well as anyone else by David Attenborough, a natural historian known for his BBC documentaries, among other achievements: "No one will protect what they don't care about; and no one will care about what they have never experienced'' (https://eco-age.com/news/david-attenboroughs-best-quotes). Aldo Leopold's daughter, Estella Leopold, an emeritus professor of biology at the University of Washington, applied that sentiment specifically to the next generation:

> You can't fall in love with something you don't know, and if you know nature, it's very likely, in such an intriguing environment, that you'll get to love it, you'll get to like it …. And if we don't have young people becoming familiar with nature, who's going to defend it? Who's going to defend it out there in the legislatures, in the boonies. (https://www.wpr.org/new-aldo-leopold-memorial-connects-legacy-future-generations-family-says)

Tying into the quotations from the prologue, for the greater societal transition through the portal that the pandemic has opened, to commit to preventing emissions to rising to past levels, that is, to prevent the global economy from just going back to the pre-pandemic norm, hearts and minds will need to be won over to engaging the climate crisis as seriously as the health crisis. There may not be time, but the defense of the environment may rest with getting as many people as possible to fall in love with nature. It seems overwhelming and even quixotic, but as a teacher I hope to find a path to contribute to this winning of hearts and minds, starting with getting to know as much as I need to understand the task at hand.

Methods

Guided by the list of characteristics from Mena and Russell (2017), I have undertaken a self-study of my transition from formal to non-formal education. It is

1. initiated and focused by the individual, myself, studying my transition from formal to non-

formal education;

2. aimed at improvement and development of new knowledge for my new practice of environmental education, crossing disciplinary boundaries;

3. undertaken interactively and in collaboration with others;

Just months into my retirement from the university, I have not been carrying out my self-study as collaboratively as I did "selves"-studies when in the university. So far in this self-study, I have been working primarily alone except for the writing of this paper, for which I have received critical feedback from 4 colleagues with whom I am working as a critical friend on other self-studies. In the meantime, I have been apprenticing myself to new colleagues that I am meeting in the non-formal settings I have joined. As we collaborate on projects aimed at improving our environmental education efforts, I am looking for ways they may already engage in reflective practices, ready to share my self-study practices and adapt theirs to improve my own.

4. using multiple research methods;

Autobiographical methods are called for (Bullough & Pinnegar, 2001), but given the socio-cultural context of the climate crisis, methods proper to auto-ethnography (Mitchell, 2016) are engaged, with a constant comparative process of analyzing as data are collected, to guide further collection of data. Inspired years ago by the work of Manke and Allender (2006) on artifact analysis, and more recently by object inquiry (Pillay et al., 2017), I focused on binoculars to open an object-self dialogue to reveal social constructions of my self through this transition.

5. demonstrating methodological rigor and trustworthiness by using a variety of data sources to be able to triangulate while drawing conclusions from what, so far, are autobiographical sources. Submitting data and analysis for systematic scrutiny and critique to collegial friends is on the agenda for this ongoing transition; at this point it consists of email exchanges of feedback on my drafts of this paper, which have led to further analysis and redrafting. Data sources comprised notes during my own learning experiences, journal entries, and an object inquiry.

I have taken detailed notes while engaged in community-based environmental education events. These included, but were not limited to, monthly webinars from the Monarch Joint Venture from US Fish and Wildlife Service (USFWS) and other USFWS webinars; monthly local Audubon Society meetings and occasional bird walks and citizen science bird counts with highly experienced members; local Sierra Club film showings, sometimes followed by expert panelists in discussion; informative talks by the naturalist at a local nature center, sometimes while kayaking or hiking; advocacy groups working on clean water issues; and public lectures on environmental topics, sometimes at the public library or the arts center, but sometimes in a university building.

I did three kinds of reflective writing, commonly called journaling, but not systematic enough to be

daily or otherwise scheduled. I made handwritten entries in two journals, one that captures occasional reflections after engaging in community-based environmental education events, and another for reflections on narrative sources (books, articles, video). These journal entries, together with reflections targeted at writing this paper, contributed to the third kind of journaling, electronic "one-pagers" (Mayo et al., 2008), 27 so far. Sometimes the one-pagers are more like reflective journal entries, i.e., first-order data. But other times they are a first level of analysis, reflecting on the journal reflections and capturing insights that contribute to, if not constitute, findings.

A more focused reflection was an object-inquiry, a discussion I carried on with a pair of binoculars, using prompts from Manke and Allender (2006) and following the steps laid out by Samaras (2011). The discussion was captured in a first-order data one-pager.

I had hoped to revise my original paper to include my first delivery of environmental education for preschoolers, apprenticed to an Audubon Society member who designed a "Budding Birder" program. And I also had signed up for a Master Conservationist certificate program being given at a local nature center. Both were canceled as the global pandemic took hold. The plan now is to re-engage if these programs survive to the other side of the health crisis.

Outcomes

As I attended community-based environmental education events, reviewed notes taken during the events, took notes while I read in mostly non-academic journals and books and websites, and reflected in one or another of my journals, I found in my dialogues with myself that I reached recalibration points (East et al., 2009), that is, places where an understanding emerged, sometimes as an "aha," other times a fine-tuning of awareness. At this early stage in my transition (a few months past full retirement), I hesitate to draw conclusions. However, I can share a few of these recalibration points.

1. "Wanderfahring" in Educating Myself to be an Environmental Educator

Whereas so far this self-study has lacked the usual collaboration of my previous self-studies, I have been a collaborator on two other current self-studies. While in discussion about one of these studies, I introduced the authors to the concept of "wanderfahring" (East et al., 2009), that is, what might seem to be off-topic digressions, letting the process move us forward rather than pushing toward a specific goal. As I described it to them, I suddenly recognized that my own process in learning to be an environmental educator so far was in stark contrast to the strictly laid out programs of study my undergraduate and master's students followed (not even any electives!) and to a certain extent my doctoral students as well. I have been wandering near and far, without a map, but getting to know the terrain, letting it lead me. In a way not unlike themes emerging from qualitative analysis of data, seemingly unrelated events resonate with other events and become critical moments in my education. For instance, what I thought was a purely recreational bird walk, my first as a new Audubon Society member, ended up with my first educator opportunities, to help with a "Budding Birders" program for preschoolers, and to help design a bird exhibit for children at the local arboretum (as noted, both on hold due to covid-19). Another recreational event for paddling on local waterways turned into a water quality advocacy opportunity that intersected with two other unrelated events I had attended for building advocacy knowledge and skills.

Recalibration point one: trust the process. To return to the weaving metaphor of the conference

theme, I have started out with the warp for my mat that I retained from my teaching career; however, I don't have a pattern that I am following for the woof. As I was beginning data analysis, I visited a textile exhibit in a major art museum and was struck by a mat-sized piece in which the warp consisted of non-textile found objects. That piece of art speaks to my current approach to weaving in how I am learning from my non-formal and informal environmental education. I do some wool-gathering from texts for one strand, then pick up some techniques from a guided nature walk for another section, and maybe some tree roots like the Ojibwe used in birch bark canoes, and add some feathers from my immersion in the Audubon Society. Maybe a pattern will emerge, or maybe I will start to be more intentional about what I add next and where. I am quite certain that it will be very different from the Harris Tweed-like weaver's patterns of regulations and standards such as those I followed in my formal teacher education work. I am revisiting the idea of bricolage from my constructivist college education (Levi-Strauss, 1966), but as refreshed and applied in tourism studies, "a reflexive collage in writing" (O'Regan, 2015, p. 465).

2. Define your Terms: Formal vs. Non-Formal or Informal

My working definition of formal education was education that takes place in an institutional setting, specifically a school of some sort with a curriculum of some sort, generally toward an end point such as a degree. My working definition of non-formal was education that did not meet that definition, and I used it interchangeably with informal education, as used by NRC (2010). I had in mind an exercise I gave my preservice teachers in the past to help them get in touch with the kind of play-based learning I hoped they would support as early childhood educators. I had them think of one of the best learning experiences they had had anywhere in any part of their lives, one where they really learned something they personally wanted to learn. The usual result was that the class generated a large list of outside-of-school venues, learning skills more than facts. I challenged them to find ways to reproduce those circumstances in their own teaching, despite being bound by classroom walls and assessible curricula that tempted one to just teach to the test.

As I embarked on a variety of community-based environmental education opportunities for myself, I had expected to find contrasts with the formal education I used to deliver as a university-based professor. Instead, going through my notes from the wide variety of events, I found it difficult to sort the characteristics of the events into formal vs. non-formal binary categories. I already knew that setting or place would not necessarily be a distinguishing feature, because as a professor I sometimes took my class out to community sites, and conversely, community organizations could rent spaces on campus. However, I fully expected that curriculum, especially with accountability for mastering it, would distinguish formal from non-formal.

And then I learned about Master Conservationist and Master Naturalist (and was reminded of Master Gardener) courses of study, delivered outside of school settings by county conservationists and others, some with and some without formal teaching credentials, resulting in certificates when the required curriculum was successfully completed. These are not the diplomas or licenses or certifications or endorsements that my teaching at the university prepared students to receive, and they may or may not have any implications for future employment. However, they are not the opposite of formal education in any simple sense.

Recalibration point two: both/and, not either/or. As my work goes forward, I am building a continuum, with the formal end anchored by my former career as a teacher educator in a university, and a range of other learning opportunities stretching off to the other end. As I continue to discover more community-based opportunities and continue to read in the less academic literature I am

encountering, I hope to tease out more distinguishing features, with closer attention to variations in pedagogical methods. My model of weaving my mat with a firm foundation of the warp being my former university pedagogical techniques has been challenged. I think my mat will have both formal and nonformal pedagogy and formal and nonformal content, in both warp and woof.

3. Learning to see Non-Formal or Informal Education and how to do it is like Learning to use Binoculars

My object-inquiry with my binoculars could be a whole paper in itself, and is far from finished, as I learn more about arts-based inquiry and using artifacts in self-study. Having been convinced about the power of objects to make future scientists fall in love with science (Turkle, 2008), I decided to try object-inquiry in my self-study. I was especially encouraged by the fact that the authors of *Object Medleys* (Pillay et al., 2017) took inspiration from Turkle as well.

When choosing an object to capture my transition to environmental education, I immediately went to my binoculars. They seemed to be another good example of both/and: a tool for use in formal science but also common in outdoor recreation. They are a critical tool for citizen science, as in the Christmas bird count I did with the Audubon Society, to report the data to the Cornell University Lab of Ornithology. Citizen science by its very nature is both/and! I had lots to say about my binoculars – where, and when, and why, and with whom I got them, and so on. But the prompt, "tell it what you think it is saying, and listen for the response" (Manke & Allender, 2006, p. 263) gave me pause. Listening to an inanimate object is hard! I thought I heard, "Be flexible"; "Adjust as needed"; "Narrow the breadth of vision to deepen the distant detail. This is either/or – you have to choose either the wide-angle (context) or the close up (focus)."

Recalibration point three: For now I am choosing a wide-angle, while I learn the skills necessary for whatever focus I find, and as I wanderfahr, remaining flexible, keeping open the options for what that focus will be.

Implications

This work in progress has few firm findings as yet, but the recalibration moments that have emerged so far encourage me to continue the study. In this "for future research" section, I have a number of directions in which this ongoing work may take me. I hope to develop a narrative of transition that will invite additions to and critiques from others going through a similar transition (either at retirement from formal education or in a mid-career departure from formal education and/or teacher education). I also hope to identify pedagogical principles from teacher education that I can use in community-based environmental education, but equally important, to identify educational methods with proven effectiveness in non-formal education that could be of use to renew teacher education pedagogy. For myself, I want to apply the skills I developed, with the support of self-study, as a teacher educator, and develop new ones to increase my pedagogical content knowledge in nature.

And yet I am momentarily paralyzed by both the speed and destructiveness of the global pandemic, presaging the speed and destructiveness of the climate crisis, if the warnings of the scientific community – and of next generation activists like Greta Thunberg -- continue to be ignored. And then I get moving again, looking for the places that I can apply the formal education skills and knowledge I already have to the need to win hearts and minds to the task of defending the environment on the other side of the portal that the pandemic has opened. And as I engage, I need to continue self-study

to reflectively adapt my old skills and knowledge to the new skills and knowledge needed for the task.

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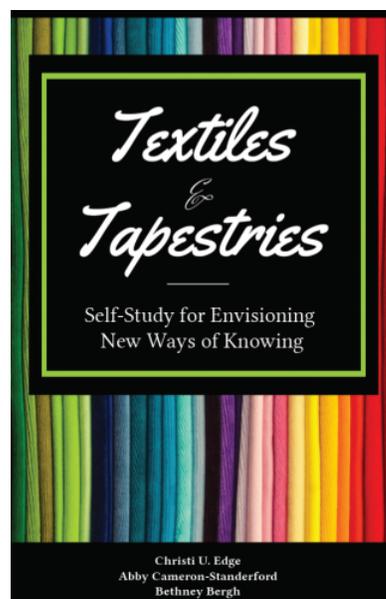
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