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RESEARCH ARTICLE



Urban ecojustice education: Transformative learning outcomes with high school service learners

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ABSTRACT

This case study investigated the outcomes of an environmental service learning program that incorporated pedagogical components taught within the transformative learning and environmental justice frameworks at an urban ecoliteracy and environmental justice center in Albany, New York. Authors conducted participant observation and gathered data from surveys, semi-structured interviews, focus groups, and journaling with high school, college student, and community stakeholders in an Ecojustice Summer Youth Employment Program. In the short-term, service learners adopted enhanced pro-environmental behaviors, an heightened awareness of community environmental issues, and an increased interest in civic engagement, with multiple participants returning for consecutive service periods. Transformative learning outcomes were documented in relation to affirming/changes in longer-term academic, life, and career paths. This research contributes to the field of experiential environmental education that advocates for a better understanding of the outcomes of pedagogies that emphasize social justice youth development, issues of power and justice, and the enhancement of social action and critical consciousness.

KEYWORDS

transformative learning; service learning; environmental justice; experiential environmental education; civic engagement; urban agriculture

Introduction

The framework of transformative learning (TL) can be applied by educational program facilitators to design better programming in support of the desired outcomes of experiential environmental education (EE) and service learning, which itself is a form of TL (Knollenberg et al., 2014). Research on meaningfully designed environmental service learning programs has shown they have the capacity to be supportive of TL outcomes as they provide opportunities to incorporate transformative components, including experiential environmental education, engagement with social and environmental justice discourses, group discussions, individual critical reflection (journaling and debriefing), group problem solving and collaboration, social action and advocacy, and intercultural experiences (Mezirow, 1997; Schneller & Coburn, 2018; Taylor, 2008).

While prior research has documented the outcomes of TL and environmental service learning in both formal and informal settings on learners and the communities they serve, there is sparse evaluation of the participant, community, and environmental outcomes of extracurricular service learning programs taught within an environmental justice (EJ) framework. As such, this qualitative case study research worked to document the outcomes for high school service learners engaged in an Ecojustice Summer Youth Employment Program in Albany, New York, and to better understand the extent to which

experiential environmental education designed within the EJ Framework has the potential to be transformative and meaningful to high school participants from underserved communities. We recognize that these intersectional experiences represent pedagogies outside of the realm of inquiry for traditional environmental educators, and present potentially uncomfortable and complex areas of engagement for both educators and participants; however, at the same time, such approaches might deeply resonate with youth while also representing spaces where growth can occur. The place-based ecojustice program we investigated is unique in content, context, and theoretical design, and is an ongoing collaboration between the Radix Ecological Sustainability Center, college professors, and college student mentors enrolled in The State University of New York at Albany (SUNY Albany) Sociology class. The programming emphasizes community-based sustainability solutions, and facilitates TL pedagogies that incorporate service learning, experiential EE approaches, community-youth driven plans of action to address food security and food apartheid (impoverished neighborhoods that lack healthy food options/access due to human-created segregation), and facilitates urban agriculture projects taught within the framework of EJ. The program incorporates Urban Ecosystem Justice concepts which merge “the fields of urban ecology, environmental justice, and urban environmental education, [and] promotes building fair, accessible, and mutually beneficial relationships between citizens and the soils, water, atmospheres, and biodiversity in their cities (Kellogg, 2022, p. 1). The programming and outcomes are designed to foster transformative self-actualization, in addition to positive community outcomes. The literature review below highlights studies within various educational subfields and the novel framework and programming through which the program under investigation facilitated its youth programming.

Within the field of EE a long-running pattern by program designers includes efforts to depoliticize the pedagogy, working to disconnect the social and political from the environmental, resulting in an inauthentic practice that more closely resembles the natural sciences, taught in a classroom or in the field, at times situating students outside of themselves and their (sometimes urban) communities. This depoliticization of EE has been present in the US for quite some time, yet EE in the Global South has always been quite political (Gaudiano & Quintanilla, 2012). While the decontextualized pedagogy has shown mixed results in retaining students’ attention and their desire to engage (longer-term) with EE, it is obtusely dismissive of the intersectional realities that are inherently intertwined with economic, political, cultural, and social components, as well as (and more importantly) the lived experiences of learners (Fritz, 2017). Critics of the field have called for EE with more emphasis on social justice youth development to address issues of power and justice, and the enhancement of social action and critical consciousness (Bowers, 2001; Ginwright & Cammarota, 2002; Gruenewald, 2003). Further, Peloso (2007) argued that EJ concepts should be incorporated within the primary and secondary school scientific literacy curriculum. For instance, urban EE that works to address and better understand contextualized social elements such as high asthma rates and exposure to lead among youth in EJ communities, disproportionate environmental burdens placed on low-income people of color, lack of urban green space, etc., can better retain attention and generate enthusiasm, as well as more fairly foster “a critical understanding of the environment within the context of human political and social actions” (Peloso, 2007, p. 1). This pedagogical approach - for both students living under the burden of environmental injustices and students who are not (both rural and urban) - can be implemented by incorporating students’ surroundings and communities to yield a holistic EE. This “place-based education” or “critical pedagogy of place” can be instrumental for developing student enthusiasm and interest, but also for fostering a critical consciousness (Delia & Krasny, 2017; Gruenewald & Smith, 2008; Sobel, 2003). Place-based education relates where one *is* to how one “got there,” and brings in one’s immediate surroundings to explain how the two are related. For example, Peloso noted that “Environmental justice education in urban schools must address the local issues of injustice that surround the school, and in many cases include the school building” (Peloso, 2007, p. 2). This seemingly radical departure from traditional EE moves toward incorporating the lived experiences of the learner, heightening opportunities for experiential EE that can be taught outside of a traditional classroom – a critical EE is inherently experiential and ties curriculum to a “place.”

The multiplicity of outcomes of place-based education has been widely documented for youth in both rural and urban settings (Chang, 2015; DeFelice et al., 2014; Gray & Birrell, 2015; Schneller, et al., 2021; Tidball & Krasny, 2011), with studies exploring EE delivered through a diversity of pedagogies. More

innovative place-based EE programming taught within the EJ framework has shown positive outcomes related to students' enthusiasm and ownership of community issues. Prior research by Loh et al. (2002) documented outcomes of AirBeat in Roxbury, Massachusetts – a program that was intergenerational, spanned a breadth of communities, and incorporated material, intellectual, advocacy, and emotional resources to solve health issues related to traffic/auto emissions and poor urban air quality. The program was educational from both a scientific and social perspective and built upon the philosophy that “youth are often the most impassioned and articulate spokespeople for community issues” (Loh, et al., 2002, p. 299). Authors noted that “the youth themselves became active members of the project team” (p. 300), with their passion originating from the project design. This outcome transcended traditional Behaviorist Theories that situate young people as inactive recipients of concrete, static “knowledge,” possibly stripping young people of agency.

Much of the research within urban Garden Based Learning (GBL) pedagogies has been conducted to better understand student outcomes related to academics, self-esteem/confidence, and independence. Within the advent of formal urban GBL programs in secondary education, the active engagement that comes with GBL has been shown to increase student motivation and may lead to an increased future chance of students seeking further training and employment related to the skills acquired (Ruiz-Gallardo, et al., 2013). In a similar vein, Murphy's (2003) findings from two years of evaluative research in Berkeley, California, with Martin Luther King Jr. Middle School's Edible Schoolyard curriculum, found increases in student grade point averages and higher grades in math and science among urban students from diverse cultural backgrounds, who also demonstrated a greater understanding of garden cycles and overall ecological literacy when compared to a control group. Murphy reported that psychosocial adjustment improved significantly, coupled with treatment group students voluntarily changing their diets by eating more fruits and vegetables. In relation to informal urban EE programs, Delia and Krasny (2017), through their research with an agriculture youth intern program in Brooklyn, New York - the food justice organization East New York Farms! (ENYF) - sought to better understand the programmatic features of EE, including physical settings and social interactions “that afford opportunities for positive youth development in ways that are responsive and relevant to urban young people of color” (p. 2). Authors explained that as youth become “civically-engaged,” the farm space itself becomes more beneficial and nurturing for youth, thus supporting self-efficacy, competencies, and a “feedback loop in which youth afforded opportunities to develop assets through contributing to their community in turn create affordances for additional youth and adults” (p. 1). They ultimately proposed that “urban environmental education, rooted in a context of authentic care demonstrated by adult leaders and peers, provides affordances for positive youth development and the development of critical consciousness” (p. 2).

Building on the empirical research findings above, and the current gaps in the literature related to the multiplicity of outcomes of environmental service learning taught within the EJ framework, the research questions that guided this effort included the following:

1. Which aspects of Radix's urban ecoliteracy program are most transformative or meaningful in affecting high school service learners' academic or career interests, awareness of environmental issues, social and environmental justice, and [or] commitment to civic engagement and pro-environmental behaviors?
2. What are the community stakeholder perceptions of high school service learners and the social, community, or environmental outcomes of student engagement in the community?

Methods

Description and design principles of Radix's urban ecoliteracy programming

The Radix center was the first independent EE entity in Albany's South End, built in 2009 on a vacant lot sold to the center by Albany County, and is supported by grants from the State Department of Environmental Conservation (DEC), the US Environmental Protection Agency, the City of Albany,

among others. The Education Director (founder) and Co-founder both possess Doctorate degrees, with the center hosting three more full-time staff (and 12 seasonal AmeriCorps service learners) dedicated to EE, urban agriculture and food security initiatives, and bioremediation efforts. Radix maintains a one-acre demonstration site of regenerative tools and technologies that promote intersectional activism and access around matters of equity, urban ecology, climate, food, and health (Radix, 2022). Facilities and programs include a classroom, the Community Compost Initiative, greenhouse/bioshelter, rainwater collection, aquaponic system, living machine, wind and solar power, organic gardens with fruit, herb, vegetable, microgreens, and mushroom production, pollinator gardens, apiculture, vermicomposting, and micro-livestock (chickens and ducks) (Figure 1).

High school service learners participating in Radix's Ecojustice Summer Youth Employment Program, in collaboration with professors and students enrolled in a SUNY Albany Sociology course, were immersed in social and EJ issues found in the urban South End community, formally identified by the NYDEC as an Environmental Justice Community in 2003 (NYSDEC, 2003). In order for the high school service learners and their college mentors to better understand the complexities and concepts related to food apartheid and social and environmental injustices in their community, they engaged in two months of formal classroom learning (environmental justice/studies), environmental service learning, and participatory action research that involved students mapping community environmental amenities and insults (Hill, 2003; Shepard et. al., 2002). Other programmatic components included students and mentors managing the urban organic farm and Community Compost Initiative, organic food distribution via Radix's Community Supported Agriculture (CSA) program, teaching EE programming for elementary and middle school students, and participation in nutritional/cooking workshops with representatives from the Cornell Cooperative Extension/Capital Region Eat Smart Program. Participants were also treated to a guest visit by US Senator Schumer (on the importance of pollinators), Aaron Mair, the former national President of the Sierra Club, visits to Albany environmental justice NGOs, construction of the Climates of Inequality exhibit¹, writing letters to local decision makers, and field trips to food pantries/ Missions, regional historical sites, and a diversity of rural and urban farms in the region to learn about sustainable agriculture and resiliency. Students also hiked, kayaked to bald eagle nesting sites, and built and launched pollution remediation infrastructure into the Hudson River (an EPA designated PCB Superfund Site).



Figure 1. Areal image of the Radix Ecological Sustainability Center in Albany, NY.

Initially, students in the Ecojustice Summer Youth Employment Program are placed at Radix by the City of Albany with the option to return for a second summer program. While our data collection was conducted during the summer programming, some of the high school service learners begin working after school at Radix (during the formal school year), and complete about 60 hrs. total (16 hrs./mo.). Regardless of season, high school service learners are paid \$11 USD/hr. by the City of Albany. Interestingly (and unexpectedly), of the students we interviewed, two had worked at Radix for at least one prior summer, with seven part-time after-school workers later attending as full-time summer service learners in 2019. Additionally, three of the high school service learners we interviewed attended a local high school that requires all graduating seniors to complete at least 100 hours of community service—many of which were completed at Radix in the after-school or summer programs. Most, but not all of the high school service learners lived in NY State-identified EJ Communities, which were designated as such due to low income and minority population proximity to federally designated Superfund sites and industrial infrastructure such as gas fired power plants, a former incinerator, and diesel truck, railroad, energy/oil, sewage, and solid waste management activities conducted at the Port of Albany (also located 1 mi. from Radix). In the City of Albany, 22.9% of citizens live below the poverty line, more than twice the national average (census.gov, 2019). More than 40,000 people in Albany County live under “Food Apartheid,” affecting the city’s Black community at a rate of more than 26% and over 22% for those who identify as Latinx – compared to the national average of 15%. Albany’s South End is more than 70% African-American (Bierend, 2018). Lack of financial resources creates barriers to transportation, time, and materials needed to pursue EE, making Radix’s programming unique as a centrally-located urban ecological literacy and environmental justice center, providing much needed resources for this underserved community.

Qualitative data collection and analysis

Our case study research methods worked to triangulate both the sources and methods (Table 1) to better understand and evaluate the outcomes for teen service learners and college participants, the environment, and EJ community stakeholders (Creswell, 2013). All data collection efforts discussed below were conducted by trained independent social science researchers unaffiliated with Radix and the delivery of the educational programming. We utilized purposeful sampling (Creswell, 2013) conducting seven semi-structured interviews with community stakeholders (in-person, in offices, and via

Table 1. Overview of data collection.

Source	Methods	Emphasis
14 High school service learners ^a Average age 15 7 Male 6 Female 1 non-binary	Pre-program online surveys, post-program semi-structured interviews and focus group, journaling, debriefs & discussion, participant observation	Former and newfound knowledge of environmental and EJ issues; former and newly adopted pro-environmental behaviors; transformative and meaningful service projects; further interest in civic engagement, education, and career opportunities related to programming
11 College student mentors Average age 21 2 Male 8 Female 1 non-binary	Pre and post-course semi-structured interviews and focus group, debriefs & discussion, participant observation	Former and newfound knowledge of environmental and EJ issues; former and newly adopted pro-environmental behaviors; transformative and meaningful service projects; further interest in civic engagement, education, and career opportunities related to programming
7 Community stakeholders representing organization that directly interacted with the EE center and their diversity of educators and service learners.	Semi-structured interviews	Nature of coordination with high school service learners and college students; opinions of service learners; community and environmental outcomes of service projects; desire to work with service learners in the future

^aFour of these service learners participated in Radix’s formal *Ecojustice Summer Youth Employment Program* prior to 2019, when most of the data for this research was gathered.

Zoom) who worked directly with the service learners and college students. High school service learners completed pre-program surveys or interviews, either in-person, online (Qualtrics), or on paper. At the completion of the summer programming all teens participated in a 45 min. semi-structured interview on site at Radix, one 45 min. focus group, and submitted their written program journal for analysis. A total of 11 college mentor respondents completed 45 min. pre-program semi-structured interviews, as well as post-program semi-structured interviews and one 45 min. focus group, on site at Radix. This manuscript presents findings/outcomes related to the high school service learners, with research findings related to outcomes for college student mentors presented elsewhere (forthcoming).

Researchers incorporated participant observation (attending/participating in every work, classroom, and field trip day) into the data collection methods in order to better understand the program and evaluate the interactions between service learners, college mentors, facilitators, community members, and the natural environment (Creswell, 2013; Decrop, 2004). Data collection and analysis was based on the philosophical theory of interpretivism (Decrop, 2004), which suggests a co-operative and interactive relationship between the researchers and the objects of investigation. While the quantity of information gathered is important, quality and richness are paramount: “All aspects of observation are considered to be worthwhile: the interpretive inquirer watches, listens, feels, asks, records and examines (Decrop, 2004, p. 157).”

Pre and post-program semi-structured interview data and high school service learner journals were transcribed to word processing software from digital voice recorders, then coded for the identification of thematic trends (Creswell, 2013). Creswell's (2013) approach organizes and prepares the data for analysis via reading transcriptions for meaning; data coding (identifying representative categories and thematic trends); presenting results using detailed discussion of several interconnected themes; and interpretation and analysis: “What were the lessons learned?” The findings below incorporate descriptive narratives of participant responses and quote charts, both of which have proven useful as a low-inference data analysis techniques for describing research findings (Schneller, 2008). Identifying deviant cases and discrepant information helped to validate findings (Creswell, 2013). “The prevalence or lack of discrepant information therefore allows for greater insights into the credibility of perceived patterns of phenomena identified” (Schneller, 2008, p. 297). Type 1 tabulations, as prescribed by Silverman (2006), are also presented; percentages were tabulated for some of the survey responses, semi-structured interview data, and focus groups to more accurately report the frequency of responses.

Findings

The broader findings from high school service learners are presented below; however, we first discuss the unique challenges of engaging urban high school student participants in an intensive agricultural program that worked to enhance community food security. Initially, many participants espoused a hesitancy to engage with dirt, as many were told (for years) “not to play with the urban dirt,” often for very good reasons, as some soil in Albany's South End community is in fact contaminated with lead, PCBs, and toxic incinerator ash. This is not to say that all urban soils are contaminated, and in fact, one of the broader longer-term goals of Radix is to cultivate healthy (touchable) urban living soils. It did however become apparent that upon exiting the program, youth retained a better understanding of the differences between contaminated dirt and living soils/systems that support organic agriculture. With this in mind we also note that most participants had low expectations and were hesitant upon entering the program, related in part to their lack of experience working in intensive urban agriculture and environmental protection efforts: only one of the college mentors was majoring in an environmentally related field, and among high school service learners, while 43% (6/14) had studied the environment in high school, on average only 20.3% of this learning was either hands-on or outdoors. An additional challenge included some college mentors having preconceived negative perceptions of Albany's South End EJ community where many of the high school service learners lived and volunteered. However, during post-program interviews, both groups described their experiences at Radix as mostly positive. In terms of areas for improvement...all of the high school service learners discussed during focus groups and interviews that they would have liked more opportunities to kayak, with one high school service learner explaining that

they would have been better off working as a camp counselor -the City of Albany did not address the fact that the student was not interested in scientific or agricultural programs.

Positive outcomes during post-program interviews included one 14-year-old high school service learner who stated: “I’ve learned way more than I thought. I didn’t think working in this place would be fun because there’s dirt and bugs, but I met some new faces, and had some new experiences that I probably wouldn’t have experienced.” Another student (a recent immigrant from Burma) who completed a total of two summer programs at the EE center, as well as 60 hours of after-school work during the school year recollected:

I didn’t know anything, or have any skills when I got here...but I learned new skills and new things about the environment. When you do a little thing, you can save big things, and I got interested in it. In Burma my mom had 100 acres, so farming was really big, and she didn’t have to buy vegetables. She told me it was a little suffering, because it was in the sun, but then you love it—and once I got it— it took me in— and I like vegetables and knowing what I’m growing. Going to the grocery store, you have no idea how they grow it, and what they spray. Here you know what you’re growing...it is *your* vegetable. And when I have my own house, I might have a garden.

Transformative and meaningful aspects of the ecojustice summer youth employment program

During post-program semi-structured interviews and focus groups the high school service learners discussed meaningful aspects of the program, and field trips that resonated with them. All of the high school service learners described kayaking near bald eagle nesting sites as one of their favorite activities, as many had never been kayaking, and described the activities’ benefits in terms of team building and a bolstered sense of comradery between teens and their college-aged mentors. Additionally, 50% (7/14) described the field trip and associated experiences at the rural, Black-owned Soul Fire Farm (working throughout Albany’s South End to increase food security and alleviate food apartheid) as a major influence, as discussed in the descriptive narrative below. The descriptive narrative chart below (Table 2) details additional responses from high school service learners.

The visit to Soul Fire Farm was very meaningful, because they got not just into the science of farming, but the spirituality of it, where instead of just “taking,” you’re also giving back at the same time. And you’re understanding your needs, not just through the biological aspects, but the spiritual. They used different methods practiced by ancestors before them, and they spent months on that land, using different methods of farming. For example, there were different garden beds, and each garden bed was like here at Radix, but there were ones that had different methods. There was one on a hillside, and the indigenous tribes used that hillside method so that runoff water would drip down and the plants would get moisturized, and it wouldn’t move the soil (high school service learner personal communication, 2019).

Programmatic influences on participant academic and career interests

During post-program semi-structured interviews and focus groups the majority of high school service learners explained that they would have liked to have spent more time working with their college mentors, and further discussed the importance of working daily with an ethnically diverse group of college students, especially in relation to providing youth with a better understanding of the college experience and related life transitions. This was of particular importance, due to the fact that pre-program data showed that all of the high school service learners stated that they planned to attend college after high school; however, during post-program semi-structured interviews, 71% (10/14) students stated that their experiences at Radix were meaningful enough that they wanted to now pursue majors/minors in environmental studies. Students described wanting to initially pursue degrees in the health-related professions, but now interested in incorporating public health, with a specific focus on epidemiology and human exposure to toxins. Similarly, one graduating senior initially interested in studying psychology stated their newfound interest in, and intention to pursue environmental law. One student described their experiences in the program as reinforcing of their initial desire to study marine biology, and was later accepted to the University of Southern Maine with a full merit-based academic scholarship. A student entering their Junior year discussed intentions to combine their initial passion for drama with a newfound interest in social and environmental justice:



Table 2. High School service learner outcomes - descriptive narratives.

Environmental Issues Awareness	Social and Environmental Justice Awareness.	Transformative or Meaningful Program Components
<p>I learned the term “food desert.” I had never heard of it before, and I didn’t think we were in a food desert, because there’s so many stores around here. But there’s a lot of “fake food” or food not from the Earth that’s not very healthy... there’s not a lot of options.</p> <p>The program helped me see more of the ecological side, how nature and anything as simple as a plant can interact with humans and give a positive effect and sometimes a negative effect, even if it’s not intended. Like [invasive] Milfoil plants that clean out the rivers, but they absorb way too many nutrients.</p> <p>Old abandoned buildings—how even though they’re abandoned, they’re not kept up, and lead bleeds into the soil, which contaminates it and affects the ability for soil to be renewed, and if a person wants to grow food there, they don’t have that accessibility.³</p> <p>These issues were all new to me, because I didn’t know about any of them—I always knew there was air pollution, but I never knew how much hidden stuff there was, like the train station that just sits there, and how much pollution comes off that in the South End, and how many people are affected by it, breathing-wise. That really stood out to me! I saw a lot of trash, and I saw broken-down buildings. There were so many red X’s, and so much garbage all over the place—it was really bad when we were doing the photo mapping activity. And I learned the skies are actually really bad—we went to the planetarium, and they told us that we actually have a really bad sky view because there’s so much bad pollution. I realized: “Wow, I’ve never really seen stars like that... if I could see stars like that, I would try to change anything.”</p> <p>I like learning interesting facts overall. I had never learned about compost before this and I thought all trash would just go in the dumpster, and people would come pick it up. I never knew even that chickens ate their own eggs... everything is new to me! So I was kinda shocked, but then got used to it. And the pollution and littering—those are the main two things that I’m seeing a lot, and the incinerator—they could’ve built it somewhere else, but why in the city, where we already have so many cars and so much pollution?</p>	<p>EJ is the impact to communities over a specific thing, for example, how there’s this incinerator, causing a lot of people to have asthma, where if it was taken care of properly, the asthma rates would go down. It affects people differently because certain people have the chance to move, and other people have no choice because of income... they’re more susceptible to be affected by something like that because of race, ethnicity, low income, all these different traits.</p> <p>There’s more minorities here, and most people here are not high-income, so because of race, culture, money, and class they are treated differently.</p> <p>I just think about how the areas treated... why is down here different than the nicer parts of the city?... Environmental injustices... why? Albany’s South End is looked down upon—races who can’t afford houses—a lower-income community. Money-wise, the City puts all the pollution down here because they already look at it as a bad place.</p> <p>It’s when something in the environment isn’t equally stable, like when a certain group is getting more than another group. It could be a certain race, where you live, it could be what school you go to. It could be anything where lower income families are getting a disproportionate amount of equality for certain things... clean air, free garbage disposal, clean water, and good food.</p> <p>It’s like social classes and equal rights. Because in the uptown, they have a lot of opportunities, like health benefits, and food, stores, and stuff. Here, they don’t have that much... it’s very unequal. This place is abandoned by the government, and they left it hanging, and they just focused on uptown.</p> <p>Before I thought it was just fighting for the environment, but now I know it’s way bigger than that. It’s not just fighting for the plants and nature and trees, it’s fighting for everyone, like the social aspect of it, with humans’ too, and how to fight for harmony between them. This is a low-income neighborhood. Radix is a huge urban ecosystem, so they’re trying to combine this low-income neighborhood with something that is rich and living... I guess they’re trying to change how people view this place. Access to fresh foods that they might not be able to afford... and an opportunity to learn.</p> <p>For me, it’s more about sustainability, and giving people better access to the same resources as others. Resources like transportation, spaces like this [Radix], equal access to fresh produce, just making it less <i>disproportionate</i>... is the word.</p> <p>I think the food injustice issue is something that’s really important to me, personally, as it’s something I see pretty much on a daily basis here at Radix... it’s something that I want to address. And in my future career, and environmental justice, I believe that’s the path I’m going toward when it comes to climate change and environmental studies.</p>	<p>Oh, the chickens [laughs] because I’ve never seen a place like this around here—it’s kinda ghetto around here... it’s just a place that really doesn’t have that many resources—and just seeing this farm [at Radix] was surprising, that we actually have something in this community that’s pretty useful for the environment. And I finally held a chicken for the first time [laughs]. I like working with animals... and kayaking. Soul Fire Farm... it’s definitely big, so I like that. But also, I like that it’s Black-owned... that was nice too. I still enjoy being at Radix, but when you see something owned by a person of color, it’s like “Oh! That’s interesting!” because you don’t really see that a lot.</p> <p>We went to the Mission, and I think it’d be really fun to work there because we talked to the chef and it’s nice to see how he feels when he helps people, and I want to feel that too... like, to help people.</p> <p>Kayaking was so fun, and going to see the waterfall... what other summer job gets to do that? But another meaningful day was Soul Fire Farm. It was a different way of looking at it all... to see how other people eat the food, or take the food, and not taking more than a third of it. I would work at Soul Fire Farm, because that place is just so nice, the woman there is super nice, and I wouldn’t be surprised if everybody there was nice. It was just a great environment, and I really connected with nature [there]. The lady was really spiritual, and I thought that was pretty cool. I was thinking, “I want to be spiritual when I get older.” She basically considered the land as a being, like a human. And you have to treat it well and respect it.</p> <p>The visit to Soul Fire Farm was meaningful to me. I thought some mentees didn’t like the spiritual thing, but I do, because my religion is Buddhist, and we believe in afterlife, reincarnation, karma... so I liked the spiritual aspects: “If you take something, you give something.” That’s the nature of life. You can’t just take everything from nature and not give back. Working with college students and visiting other community farms, watering, chickens, weeding, and engaging with other people and doing things that will help the Earth. It’s like a process, a cycle... it’s cool. We went to other city farms and I also liked the Soul Fire Farm visit... it’s just different. Not because of the spiritual aspect, but because the way they did stuff was really cool, and how they gave back to the community. They packed up fresh foods and just sent them out to people who needed them!</p> <p>Radix gardens and definitely more of the sustainability stuff, because sustainability is something that I never really looked into before. We talked about living sustainably, and cleaner, more efficiently. Our boss last year would carry around mason jars so that she wouldn’t use plastics... stuff like that really piqued my interest. I cut back on sodas when I go out, and I bought a reusable bamboo kitchen set so I don’t use plastic forks when I go out... I always keep a set on me.</p>

INTERVIEWER: Before you entered the program this summer, did you want to go to college?

STUDENT: Yes, I want to study the dramatic arts.

INTERVIEWER: Do you still want to go to college? And if so, has your work at Radix in any way affected what you want to study in high school or college...or not at all?

STUDENT: Yes, I also want to minor in environmental justice. It seems really cool because I could push everything into each other, and advocate for the environment and for people my color. I feel like since I volunteered at Radix and the SNUG [anti-gun violence] program, it has made me a very big advocate for Black, lower-income people in Albany's South End.

One student that had just graduated high school and completed one Radix summer program, two year-long after school programs, and was later hired as a paid intern at Radix, discussed how the program had affected their academic path, and their eventual acceptance to a regional university, where they were initially interested in music engineering, but now also double majoring in Environmental Science:

The program made me want to get more involved in the community, seeing and learning about what we have to do for our environment...that made me want to be more involved, and seeing what I can do. Environmental science degrees allow you to make some big changes regarding how people care for our planet. When we put those floating bioremediation islands out, last year on the Hudson River, and I saw how many pollutants are in the river, that definitely was a foot in my face. It's terrible, the pollution in the river...it's disgusting.

During our interview with a 21-year-old who completed Radix's summer program in 2014, we learned the extent to which the experience influenced their academic and career path. This former service learner also continued to volunteer at college with an urban garden and food security initiative, and now works for *Our Climate*, mobilizing youth for climate advocacy, and facilitated a letter writing workshop (to elected officials) for Radix's high school and college students during the summer of 2019:

I think Radix had the biggest influence, to be honest, because I loved the idea of sustainable planning, and trying to incorporate more green spaces in cities, and in neighborhoods. And I think Radix's programming is exactly what sparked that interest. And that's why my major is Environmental Planning, and I took a lot of urban planning classes, as well.

Enhanced awareness of environmental issues, social and environmental justice, and commitment to civic engagement and pro-environmental behaviors

Pre-program data showed that 21% (3/14) of the high school service learners considered themselves "environmentalists;" however, during post-program semi-structured interviews, 57% (8/14) now considered themselves "environmentalists," with 21% (3/14) responding with "maybe," wanting to be more *committed to the environment* before labeling themselves as such. Pre-program data also showed that 57% (8/14) had heard the term "Environmental Justice," with only 7% (1/14) able to accurately describe the term. During post-program semi-structured interviews, 71% (10/14) of high school service learners could accurately describe the environmental justice framework, as well as its causes and implications. While [Table 2](#) incorporates more descriptive narratives from the service learners, the exchange below highlights the newfound insights of one service learner entering their senior year in high school, perspectives specifically related to food security, and environmental and social justice conflicts in Albany's South End and beyond:

INTERVIEWER: Were there any activities you did this summer that inspired you?

STUDENT: I think visiting Soul Fire Farm, because we talked about how the environment affects different people and groups, you know, the whole thing of environmental justice, and having food available to different people, and having food deserts in Albany's South End.

INTERVIEWER: Did you know the term "Environmental Justice" before you started working at Radix?

STUDENT: No, I didn't.

INTERVIEWER: What if someone said to you “I’ve heard this term ‘Environmental Justice,’ I don’t get it. What does it mean?” What would you say to them?

STUDENT: I’d say it’s advocating for people who are really affected by their environment, because of political or economic injustices inflicted towards them, because of their class, and people of color.

INTERVIEWER: Is that something you would like to stay engaged and working on, after this summer?

STUDENT: Yes, I want to work with NGOs, maybe as an environmental lawyer.² I think working with indigenous groups of people would be interesting. I follow Leonardo DiCaprio on Instagram, and he posted a story about the people protecting the Amazon Rainforest, and that really interested me. It’s so important. They’re being treated terribly for money...because of greed.

During post-program semi-structured interviews high school service learners answered the following question: “What pressing environmental and/or community issues do you know about in Albany’s South End that you would like to work/volunteer to remedy?” Responses included students who found joy in (and a further desire) to provide the community with fresh foods that they might not otherwise be able to access/afford, a desire to remedy the lack of composting and recycling opportunities, lack of publicly accessible trash receptacles/litter in the South End, combined sewage overflow/runoff into the Hudson River, climate change, food deserts, invasive species, air pollution from the Port of Albany’s industrial activities, blight, lead contamination in water/soils, and equitable access to environmental amenities and green spaces. Related to these issues, students described their ability/attempts to address these threats, mostly via *new* pro-environmental behavior changes within their homes, including constructing a small garden at home (1), beginning to compost at home (10), start recycling (1), picking up litter/urging friends not to litter (6), water/energy conservation (2), purchasing of reusable cups/utensils/shopping bags (5), with 85% (12/14) engaging in intergenerational learning, urging their family members to practice similar pro-environmental behaviors. The following account describes one student’s efforts to educate their family and advocate for pro-environmental behavior changes:

INTERVIEWER: Did you start practicing any new environmental behaviors since you started the program, in your household, your family, your life?

STUDENT: We don’t buy plastic bottles anymore. We don’t drink anything from plastic bottles.

INTERVIEWER: And that’s new...why is that?

STUDENT: Because even if you recycle it, it’s of lesser value than when you bought it. It’s better to just have reusable bottles, for example. And we try to compost any rotten food, and created a little place in our backyard so it just turns into fresh dirt. We use those bags that you can reuse at the grocery store, instead of plastic bags.

INTERVIEWER: And are these new activities that you asked your family to start practicing since you started the program?

STUDENT: Yes.

INTERVIEWER: Was your family receptive to these changes?

STUDENT: At first they were a bit confused, but then I explained to them how it can really affect the environment, and slowly but surely, they were into it!

In terms of findings related to enhanced commitment to civic engagement/volunteerism, survey and interview data showed that 64% (9/14) of the high school student service learners were already predisposed to volunteering before arriving at Radix, throughout Albany’s South End for a diversity of stakeholders, either altruistically, or to satisfy high school graduation requirements. Academic responsibilities, sports, familial duties, and their already extensive volunteer commitment to Radix limited their ability to volunteer additional time; however, during post-program semi-structured interviews (at the end of the summer) high school service learners made verbal commitments (or expressed interest) in volunteering additional time to assist urban agricultural initiatives that help to alleviate social justice issues related to community food security, specifically, at Radix, Soul Fire Farm, a diversity of other community farms, and their High School Garden Clubs. Our 2020 follow-up data showed that five of the 2019

summer service learners later returned to work and volunteer at Radix during the 2019/2020 school year, which was unfortunately cut short mid-March, 2020 by the Covid-19 pandemic. Additionally, one student described how their experiences at Radix better prepared them for additional formal volunteer work with the Boys and Girls Club: “I volunteered there because I had experience with kids, because during the school year we have groups come to Radix from youth organizations, so that definitely gave me the confidence to even try volunteering with the Boys and Girls club.” Below, one student described their newfound interest in social justice and volunteering with The Mission, a religion-based stakeholder located one city block from Radix:

I want to volunteer at the Mission. I like the fact that they have the one-year program that helps you get on your feet, and gives you money and housing until you get a job and are able to take care of yourself. There’s no real grocery stores around here. All we have is these corner stores that don’t have good quality food. So I feel like Radix and The Mission really help out. They give out fresh food, instead of getting processed food from the corner stores, or going far...and they give us food scraps for the chickens [at Radix]!

Community stakeholder perceptions of Radix’s educational programming and high school service learners

Semi-structured interviews with seven community stakeholder organizations triangulated insights about Radix’s educational programming and the work of high school service learners and college students [Table 3](#). Community stakeholder organizations visit and use Radix in a variety of ways, as some are Albany school teachers who bring elementary aged children for experiential EE, while others facilitate workshops for Radix’s service learners and college students regarding sustainability and social justice initiatives throughout the region. Of the seven stakeholders we interviewed, all expressed positive opinions, including representatives from the Cornell Co-Operative Extension and an Albany elementary grade STEM district supervisor. Both espoused similar sentiments regarding the importance of Radix for the underserved community, and the opportunities afforded for high school service learners and the elementary aged students with whom they interact. Other stakeholders discussed the benefits of knowledge sharing provided by the high school service learners with Albany community youth; high school service learners also function as mentors to younger students who visit Radix throughout the year, and show them compassion, care, and understanding. The Director from AVillage Inc., an Albany South End EJ advocacy

Table 3. Community stakeholder descriptive narratives.

Radix has the expertise, they have more available labor than we have, they’re really an important part of the whole development process in Albany’s South End. The idea that you can take a piece of land and do something interesting with it - use it as a teaching tool, and people come back and look for more of that...we hope to do a lot more like that this year. So the impact is partly on the environment, seeing more spaces with vegetables and flowers than weeds and gravel - and part of it is the number of people in the community who become engaged. (Director of AVillage Inc., personal communication)
Radix is very active in trying to engage children in Albany’s South End in what would be a thing that more children in rural settings experience. Why we specifically like partnering with Radix is that I don’t want children thinking that they have to leave the city to do this kind of work – it is right there! High school mentors took [community] children into the animal area, they harvested eggs, they shoveled compost, they doodled around in the aquaponic area, and had an exposure experience with the high school students acting as the facilitators in a very one-on-one or two-on-one situation. (Albany STEM District Supervisor for Elementary Schools, personal communication)
My overall impression is that it’s just an eye-opening experience for the high school students, something that they have never been a part of...to see how to grow food, learn about sustainable farming, and it’s something that they would probably have no reference to if Radix wasn’t here. People have a perception about kids in Albany’s South End...who they are. And when you really spend time with them and do something that is creative, empowering to them...you see a totally different side from what peoples’ perception are. And I think that Radix recognizes that, and they help people to see that good side. (Cornell Co-Operative Extension, personal communication)
Even if one of [our students] was there, let’s say they were there for a week and they hated it, and they weren’t appropriate or whatever, but somewhere along the way they’ll remember that there was someone at Radix who cared about them and gave them a chance. (Director of the Childrens’ Café, personal communication)
I really think everything that Radix is doing is really awesome. I think that they started the movement of young people and people in general getting connected to the community... I would say that our farm looks to Radix’s urban agricultural program as a model to grow into, too. So, we definitely think they’re an awesome program, and, you know, we want to help in any way we can. (Executive Director and Farm Manager at Tivoli Lake Preserve and Farm Inc.)

NGO working extensively with Radix center service learners on a diversity of community initiatives, has since become more invested in Radix's mission and stated their intention to expand their collaborative work in the future.

Discussion & recommendations

In part, the purpose of our evaluative case study research included working to better understand the outcomes of an innovative ecojustice service learning program for high school students, taught at an urban ecological literacy EE center, that incorporated a suite of components within the frameworks of TL and EJ. We witnessed and documented a diversity of pedagogical approaches and experiences - engagement with social and EJ discourse, group discussions, individual critical reflection, group problem solving and collaboration with college mentors, experiential social action and advocacy, place-based education and teaching, outdoor education, and intercultural experiences - whose outcomes pointed to meaningful transformations for service learners (similar to those described by Mezirow, 1997). Transformative outcomes were further evinced by the urban service learners' ability to overcome challenges, such as their initial hesitancy to engage with dirt, gardening, and environmental problems. We recognize here that this challenge may represent one potential unexpected extension of Sobel's concept of "ecophobia" (Sobel, 1999), whereby we documented a unique manifestation of the phenomenon within urban youth - an initial disengagement due to fear of ecological problems and the natural world, feelings of being overwhelmed, or limited self-efficacy. We documented accounts - similar to those described by Loh et al. (2002) and Delia and Krasny (2017) - of enhanced pro-environmental behaviors, further interest in volunteerism and civic engagement (and multiple stints as Radix service learners), awareness of environmental justice and environmental issues, intergenerational learning, and collateral learning, in this case, a desire to pursue future engagement and a longer-term interest in environmental studies/careers. According to Dewey (1938), of utmost importance - educators should strive to design pedagogies supportive of *collateral learning*: meaningful experiences for participants that result in the pursuit of desirable future experiences and behaviors. An unexpected finding in this regard included three students who discussed their desire to further pursue the spirituality behind their food justice experiences, possibly an avenue worth exploring in-depth during future research endeavors.

As service learners engaged with the history of injustices and the current inequities in their own backyards, they grew their passion for civic engagement as well as their desire to remedy injustices. From a skills perspective, our findings parallel those of Ruiz-Gallardo et al. (2013), who documented how GBL pedagogies have the potential to increase motivation and lead to an increased chance of seeking further training and employment related to the skills acquired. Our findings showed that challenges were overcome, as the initially hesitant service learners became more skilled in performing hands-on civic engagement (in an urban agricultural setting) and experienced how the urban ecology and human community was positively affected, all while gaining a better understanding of sustainable agriculture, food apartheid, and environmental justice. These outcomes are important for advancing the programs facilitated by the community stakeholders we interviewed, who were generally supportive of the youth programs and Radix's mission. From a logistical perspective, students expressed an interest in expanding their volunteerism with the organizations introduced to them during their service at Radix, suggesting that such programs not only generate TL, but also directly connect students to future civic engagement and employment opportunities that might have positive outcomes for strengthening community food security, environmental protection, social capital... and student resumes.

The positive outcomes above contribute to a bigger picture in terms of demonstrating the possibilities for the evolution of urban EE for high school aged learners, as well as teacher practices that might ultimately contribute to addressing ongoing injustices, and sustaining resiliency and thriving communities. While admittedly complex and painful topics, age appropriate experiential EE designed within the EJ Framework has the potential to resonate with youth, and be distinctly transformational and meaningful to participants from underserved communities. In contrast, from a programmatic design perspective, we note that more formal and institutionalized EE advents at times exist in isolated classroom spaces and field sites (nature), disconnected from the lived experiences of students, and disengaged from the

realities of multiple historical community phenomenon. As such, depoliticized and decontextualized EE has the potential to *not* support learners as whole beings – as people residing in communities that carry with them environmental attitudes/perceptions, but also potential physical, social, and structural burdens related to where they live. To become more holistic in this sense, educators should consider the incorporation of the learner *within* their contextualized environment, and ask the question: “What are we educating *towards*?” This sentiment was expressed by Peloso (2007) who advocated for an EE with a greater emphasis on social justice youth development, addressing power and justice, and engagement with social action and critical consciousness. For students living amongst environmental injustices (which are sometimes also very rural), educators who consciously incorporate students’ surroundings and facilitate a more attuned place-based pedagogy, could provide enhanced avenues for potentially bolstering student enthusiasm, interest in civic engagement, and critical consciousness.

Here we advocate for enhanced pre-service and in-service teacher inquiries into EJ, so that urban environmental educators not only have the necessary theoretical background, but also feel more comfortable with what Haraway (2016) has coined “staying with the trouble,” noting that when educators and students move outside of comfort zones, real growth can occur. The very real discomfort of grappling with racism and inequality (often with no easy solutions), and the process of overcoming injustices and creating resiliency, includes becoming more comfortable with complexity and uncertainty. In the context of the work we are describing this is not a traditional role for environmental educators, yet to progress, we must also become social educators equally familiar with topics related to systemic racism, injustice, and inequitable economic systems, as we are with soil processes, aquatic life, and the conservation of biodiversity; a broader skillset is needed. As such, urban environmental educators should explore the intersection of urban ecology and issues of social justice, with this intersectional environmentalism the foundation for their pedagogical platform (Thomas, 2022). More precisely, educators must better develop a sense of familiarity and reciprocity between the soil, water, air, and non-human life, with where their students live, and then understand how these components relate to matters of equity, access, race, class, and justice. Teaching urban ecology through this justice oriented lens can help to make these connections more explicit, thus demonstrating to youth how these broader systemic issues are intertwined, and most importantly, bringing EE to marginalized populations and those who have historically been left behind by EE programs.

Notes

1. Albany’s incinerator/gas fired power plant portion of the exhibit, *The Empire’s Backyard: Power and Pollution in Sheridan Hollow* is part of the Humanities Action Lab – *Climates of Inequality: Stories of Environmental Justice* (2021).
2. This student is now pursuing a college degree in Environmental Law, with two more studying Biology, and one in Marine Ecology.
3. The City of Albany has 289 buildings designated as abandoned and unsafe for habitation or first responders to respond to fires (Fries, 2017).

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References

- Bierend, D. (2018, November 11). Americans of color are largely excluded from producing and eating fresh food. <https://newfoodeconomy.org/food-apartheids-farming-interview>
- Bowers, C. A. (2001). *Educating for eco-justice and community*. The University of Georgia Press.
- Census.gov. (2019). Albany City. <https://www.census.gov/quickfacts/fact/table/>
- Chang, M. (2015). *Communicating environmental science through art: Scope, applications, and research agenda*. ProQuest Dissertations Publishing.
- Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Sage Publications.
- Decrop, A. (2004). Trustworthiness in qualitative tourism research. In J. Phillimore & L. Goodson (Eds.), *Qualitative research in tourism: Ontologies, epistemologies and methodologies* (pp. 156–169). Routledge.

- DeFelice, A., Adams, J. D., Branco, B., & Pieroni, P. (2014). Engaging underrepresented high school students in an urban environmental and geoscience place-based curriculum. *Journal of Geoscience Education*, 62(1), 49–60. <https://doi.org/10.5408/12-400.1>
- Delia, J., & Krasny, M. E. (2017). Cultivating positive youth development, critical consciousness, and authentic care in urban environmental education. *Frontiers in Psychology*, 8, 2340–2340. <https://doi.org/10.3389/fpsyg.2017.02340>
- Dewey, J. (1938). *Experience and education*. Macmillan.
- Fries, A. (2017, March 21). 'X' marks sore spot for residents near Albany vacant homes. <https://www.php#taboola-7>
- Fritz, N. (2017). How does an environmental based service-learning project in a non-science classroom affect student's values and motivate them to be better stewards? [Theses and dissertations]. Hamline School of Education Student Capstone. https://digitalcommons.hamline.edu/hse_all/4360
- Ginwright, S., & Cammarota, J. (2002). New terrain in youth development: The promise of a social justice approach. *Social Justice*, 29(4), 82–96.
- Gaudiano, E. J. G., & Quintanilla, J. C. P. (2012). El perfil de la educación ambiental en América Latina y el Caribe: Un corte transversal en el marco del Decenio de la Educación para el Desarrollo Sustentable. *Pesquisa em Educação Ambiental*, 5(1), 27–45. <https://doi.org/10.18675/2177-580X.vol5.n1.p27-45>
- Gray, T., & Birrell, C. (2015). Touched by the Earth: A Place-based outdoor learning programme incorporating the arts. *Journal of Adventure Education and Outdoor Learning*, 15(4), 330–349. <https://doi.org/10.1080/14729679.2015.1035293>
- Gruenewald, D. A. (2003). The best of both worlds: A critical pedagogy of place. *Educational Researcher*, 32(4), 3–12. <https://doi.org/10.3102/0013189X032004003>
- Gruenewald, D. A., & Smith, G. A. (2008). *Place-based education in the global age*. Lawrence Erlbaum Associates.
- Haraway, D. J. (2016). *Staying with the trouble: Making Kin in the Chthulucene (experimental futures)*. Duke University Press Books.
- Hill, R. J. (2003). Environmental justice: Environmental adult education at the confluence of oppressions. *New Directions for Adult and Continuing Education*, 99, 27–38. <https://doi.org/10.1002/ace.107>
- Humanities Action Lab: Climates of Inequality. (2021). *The Empire's backyard: Power and pollution in Sheridan Hollow*. Rutgers University. <https://climatesofinequality.org/project/the-empires-backyard-power-and-pollution-in-sheridan-hollow/>
- Kellogg, S. (2022). *Urban ecosystem justice: Strategies for equitable sustainability and ecological literacy in the city*. Routledge.
- Knollenberg, W., McGehee, N. G., Boley, B. B., & Clemmons, D. (2014). Motivation-based transformative learning and potential volunteer tourists: Facilitating more sustainable outcomes. *Journal of Sustainable Tourism*, 22(6), 922–941. <https://doi.org/10.1080/09669582.2014.902065>
- Loh, P., Sugerman-Brozan, J., Standrick, W., Noiles, D., & Archibald, C. (2002). From asthma to AirBeat: Community-driven monitoring of fine particles and black carbon in Roxbury, Massachusetts. *Environmental Health Perspectives*, 110(suppl 2), 297–301. <https://doi.org/10.1289/ehp.02110s2297>
- Mezirow, J. (1997). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education*, 74, 5–12.
- Murphy, J. M. (2003). Education for sustainability: Findings from the evaluation study of the Edible Schoolyard. *The Center for Ecoliteracy*. <http://www.ecoliteracy.org/publications/pdf/ESYFindings-DrMurphy.pdf>
- Peloso, J. (2007). *Environmental justice education: Empowering students to become environmental citizens*. PennGSE Perspectives on Urban Education. University of Pennsylvania. Graduate School of Education. <https://urbanedjournal.gse.upenn.edu/>
- Radix Ecological Sustainability Center. (2022). <https://radixcenter.org/>
- Ruiz-Gallardo, J.-R., Verde, A., & Valdés, A. (2013). Garden-based learning: An experience with “at risk” secondary education students. *The Journal of Environmental Education*, 44(4), 252–270. <https://doi.org/10.1080/00958964.2013.786669>
- Schneller, A. J. (2008). Environmental service learning: Outcomes of innovative pedagogy in Baja California Sur, Mexico. *Environmental Education Research*, 14(3), 291–307. <https://doi.org/10.1080/13504620802192418>
- Schneller, A. J., & Coburn, S. (2018). For-profit environmental voluntourism in Costa Rica: Teen volunteer, host community and environmental outcomes. *Journal of Sustainable Tourism*, 26(5), 832–851. <https://doi.org/10.1080/09669582.2017.1421200>
- Schneller, A. J., Harrison, L. M., Adelman, J., & Post, S. (2021). Environmental art in the Hudson River Watershed: Outcomes of place-based experiential environmental education. *Applied Environmental Education and Communication*, 20(1) 19–33. <https://doi.org/10.1080/1533015X.2019.1617805>
- Shepard, P., Northridge, M., Prakash, S., & Stover, G. (2002). Preface: Advancing environmental justice through community-based participatory research. *Environmental Health Perspectives*, 110(suppl 2), 139–140. <https://doi.org/10.1289/ehp.02110s2139>
- Silverman, D. (2006). *Interpreting qualitative analysis*. Sage.
- Sobel, D. (1999). *Beyond ecophobia: Reclaiming the heart in nature education*. The Orion Society.
- Sobel, D. (2003). *Place-based education: Connecting classrooms and communities*. Nature Literacy Monograph Series #4 The Orion Society.
- Taylor, E. W. (2008). Transformative learning theory. *New Directions for Adult and Continuing Education*, 2008(119), 5–15. <https://doi.org/10.1002/ace.301>
- Thomas, L. (2022). *The intersectional environmentalist: How to dismantle systems of oppression to protect people and the planet*. Voracious.
- Tidball, K. G., & Krasny, M. E. (2011). Toward an ecology of environmental education and learning. *Ecosphere (Washington, D.C.)*, 2(2), art21–17. <https://doi.org/10.1890/ES10-00153.1>