

Life Paths to Leading Systems-Level Change: Higher Education's Pitfalls and Potential

Roslynn Brain McCann,¹ Kaitlyn Spangler,² and Andrew Millison³

Abstract

Global protests calling for accelerated climate change action, social justice, and racial equity have been shifting long-standing conversations and policies from local to national scales. Yet many activists can become psychologically drained by the frustration and loss of hope in fighting against structural oppression. This study was comprised of semi-structured qualitative interviews spanning across the United States with 25 leaders and practitioners in permaculture design, a solutions-based ecological design framework to enact positive, systems-level environmental and social change. The objective was to better understand their life paths toward such work. The research showed that higher education is not adequately preparing individuals for engaging in systems-level change, and it is also not accessible to many looking to pursue this work. Given these institutional inadequacies, transdisciplinary programs and practical applications of systems-level frameworks remain underdeveloped and underutilized. There is a need for inclusive, hands-on, solutions-based frameworks that can confront the growing and complex contemporary concerns and can be integrated throughout academic programs and institutional structures. Higher education must serve a more central role in promoting transformative change to help current and future generations move away from degenerative patterns of environmental and social destruction and toward a more socially just and environmentally regenerated planet.

Keywords: burnout; ecological design; permaculture; regenerative; silo effect; transdisciplinary

Introduction

According to the National Oceanic and Atmospheric Administration (NOAA), the Northern Hemisphere experienced its hottest summer on record in 2020 (Bateman, 2020). The year also saw 22 extreme weather disaster events with losses exceeding \$1 billion in the US; between 1980 and 2019, the annual average number of extreme weather events was 6.6 (NOAA, 2021). These accelerating impacts of climate change worsen al-

ready widening social inequities, such as access to safe and culturally appropriate food, water, shelter, health care, and a sense of community (Levy & Patz, 2015). Growing concerns about these impacts have motivated personal and societal feelings of intense worry and responsibility (Bouman et al., 2020) while highlighting the urgency of rapid, large-scale action.

Engaging in permaculture design is one pathway for responding to the accelerating and worrisome impacts

of climate change. The term and concept of permaculture were developed in Australia in the 1970s as a solutions-based design framework guided by ethics and principles that aim to be in synergy rather than disharmony with nature (Fadaee, 2019). In particular, permaculture design aims to mimic the functions and resilience of natural ecosystems to promote biodiversity and reduce negative impacts of human existence on sustainable and just living (Morel et al., 2019; Spangler et al., 2021). The

Department of Environment and Society, Utah State University, ¹Moab, Utah, USA; ²Logan, Utah, USA.

³Department of Horticulture, Oregon State University, Corvallis, Oregon, USA.

principles and practices used in permaculture are drawn from the traditional ecological knowledge of Indigenous peoples, combined with modern scientific understanding, technological advances, and place-based field experience across many disciplines (Luna et al., 2018). It is being taught and used by practitioners and community leaders globally.

Three main ethics are woven throughout the permaculture design process: care for the earth, care for people, and return/share the surplus (Brain et al., 2018; Luna et al., 2018). Such ethics provide a framework for guiding our actions and reflecting on our choices as we work toward individual, societal, and ecosystem well-being. The concept of self-regulation through the third ethic teaches that, for humanity as an ethical species, our behaviors and choices do matter. This emphasizes a shared responsibility to limit consumption and seek forms of production and technology that satisfy basic needs while providing the greatest positive impacts on broader ecological and social systems (Brain et al., 2018). It is with this understanding of the permaculture design framework that this study identified and interviewed permaculture leaders around the United States to better understand their life paths and motivations to engage in socio-environmental activism; it also looked at the role of academia in promoting and inhibiting such work.

Life Paths and Motivations to Socio-Environmental Activism

Many of those engaged in environmental leadership find themselves actively fighting for human and environmental rights. Activists are described as having deep levels of passion and commitment, along with

a higher awareness of structural oppression (Lowan-Trudeau, 2016). Moreover, activists embrace “consciousness in an unconscious world” (Kovan & Dirkx, 2003, p. 107), and a determination to remedy conditions others may not.

Various studies have shed light on the life experiences that foreshadow and predict engagement in environmental activism. Childhood appreciative outdoor activities (e.g., hiking) (Ewert et al., 2005; Wells & Lekies, 2006), consumptive outdoor activities (e.g., fishing) (Ewert et al., 2005), environmental education (Chawla, 1999), media exposure (Ewert et al., 2005), as well as witnessing negative environmental events (Chawla, 1999; Ewert et al., 2005) have been identified as strong predictors of socio-environmental careers. Those engaged in these careers are also often motivated by altruistic concerns about impacts on future generations and vulnerable populations (Howell & Allen, 2017; Wolf, 2011), concerns about natural ecosystems (Clark et al., 2003), financial savings and frugality (Fawcett & Killip, 2014; Fujii, 2006), health benefits (Brain & Stapp, 2013; Passafaro et al., 2014), simplicity goals (Shaw & Newholm, 2002), and establishing a positive reputation with others (Noppers et al., 2014).

Unfortunately, due to the emotional labor invested in activism work that often accompanies socio-environmental careers, feeling hopeless, overwhelmed, and discouraged can culminate in burnout (Goodwin & Pfaff, 2001; Hochschild, 1983; Kovan & Dirkx, 2003). Burnout is defined as “a state or process of mental exhaustion” (Schaufeli & Buunk, 2002, p. 383) and “the end result of a process in which idealistic and highly committed people lose their spirit”

(Pines, 1994, p. 381). Burnout is considered among the highest barriers to sustaining social movements for positive change (Cox, 2011; Pigni, 2013). Furthermore, activist burnout is often intertwined with the failures and injustices of US education systems, particularly the “related corporatization of P-12 and higher education, the deprofessionalization of teachers, the racial and economic resegregation of schools ... among others” (Gorski & Chen, 2015, p. 402).

Barriers to Systems-Level Change in Higher Academia

Although education can help motivate careers in socio-environmental leadership (Chawla, 1999), several barriers continue to inhibit both access to and opportunities within educational institutions toward such careers. First, higher education institutions have been found to perpetuate programmatic barriers for marginalized students, such as students of color (Banks & Dohy, 2019; Templeton et al., 2016) or refugees (Lambrechts, 2020) and fail to promote flexibility and inclusion for nontraditional learners (Schuetze & Slowey, 2002). In addition, they may not appropriately consider class inequality in recruitment and retention of students (Alon, 2009). These exclusionary practices limit the diversity of students that can access these institutions, let alone express power, autonomy, or feelings of belonging.

In addition to such inequity, the siloed nature of higher academia’s infrastructure and values can limit systems-level cognition of students, faculty, and staff to address major environmental issues. In reference to the Land Grant Extension system, Hill and Seger (2018) report “our system-wide culture of autonomy and entrepreneurship can often lead

to a silo effect—a general lack of cooperation and integration of information” (p.65). Barriers to integration have included faculty resistance to alternative ideas, faculty turf battles, skepticism regarding credibility of research methods and findings from other departments, lack of pedagogical models for successful interdisciplinarity, and difficulty in funding interdisciplinary work (Anft, 2017; Boyko et al., 2015; Klein, 2005). The silo effect is augmented by the promotion and tenure structure and its focus on individual achievement (Furst-Bowe, 2011). This includes the notion that publishing in journals with high-impact factors is most favorable, yet the highest-impact journals often favor disciplines that have long, stand-alone histories (Boyko et al., 2015; Petts et al., 2008).

This study provides insights into influential factors toward environmental leadership and barriers experienced in a siloed and exclusionary academic environment regarding preparedness to engage in socio-environmental change (Bridle et al., 2013; Holley, 2017; Lyall & Meagher, 2012; Repko, 2008; Styron, 2013). Students are placing pressure on schools to move away from siloed specializations, and those graduating with niche integrated degrees are more likely to obtain higher impact careers (Anft, 2017; Cooper, 2012). Benefits of interdisciplinarity, as compared to singular disciplines, include: 1.) a higher level of competence in synthesizing information and applying diverse skills, and solving complex problems; 2.) enhanced creativity, innovation, and synergy through collaboration and teamwork; and 3.) higher-order metacognitive skills, such as critical thinking and the ability to view problems through multiple lenses

(Ashby & Exeter, 2019; Haynes, 2017; Holley, 2017). Such benefits can help build the skills and knowledge required to enter into and sustain socio-environmental careers. However, without adequate preparation, the heightened challenges associated with leading systems-level change may result in burnout.

A better understanding of the motivations and barriers to engaging in and sustaining systems-level socio-environmental changes can help identify successful pathways forward in preparing students to address complex environmental issues. In this vein, this research addressed two questions: 1.) What are the life paths of permaculture leaders enacting systems-level change across the United States, and 2.) how do their academic experiences relate to their permaculture career trajectories? This study provided insights into influential factors in advancing environmental leadership and the barriers to appropriate preparation for engagement in socio-environmental change experienced in siloed and exclusionary academic environments, in this case, through application of the permaculture design framework.

Materials and Methods

Data Collection

This study was drawn from semi-structured interviews with 25 purposefully selected permaculture leaders across the United States. The study design, semi-structured interview guide, informed consent, and participant contacts were all vetted with a panel of experts and approved through the Institutional Review Board (IRB). Study participants were intentionally chosen to meet the following criteria: 1.) experience as

lead teacher at a permaculture institute, 2.) experience teaching the globally recognized permaculture design certificate, and 3.) recognition as a well-known practitioner in the field (verified by the Permaculture Institute Inc.). Additional participants were included through snowball sampling until a point of saturation—25 participants representing a range of geographic areas across the United States—had been reached. Ultimately, five women and 20 men from 11 different states (and the District of Columbia) were interviewed, representing 22 distinct permaculture organizations. Participants included one Native American (tribal affiliation not included to maintain anonymity), two Mexican-Americans, one Lebanese-American, and 21 Whites.

Each interview was conducted at a location preferred by the participant and lasted between 30 minutes and 1.5 hours. Hatch’s (2002) recommendations for conducting successful qualitative interviews were followed during the interviewing process, including establishing respect, paying attention, and encouraging participants throughout. To address credibility and bias two techniques were used. First, prior to collecting data for this study, the primary researcher constructed a subjectivity statement documenting the potential for bias in the data collection process. This included former engagement in a permaculture design certificate, running a permaculture initiative at a major Land Grant institution, and serving on the board for the Permaculture Institute Inc. Second, journaling was used to document the researchers’ feelings immediately following the participant interviews; journals were published in the form of a publicly shared university permaculture blog.

Data Analysis

All interviews were transcribed verbatim with Otter.ai software and qualitatively coded using ATLAS.ti to enhance the efficiency of processing and sorting text. The qualitative coding process employed a combination of both closed and open codes. Major themes noted during the interview and transcription process informed the initial coding scheme, and subsequent emergent themes were added throughout (Saldana, 2016). One team member performed the coding process, but weekly group meetings provided an opportunity to examine and reassess thematic concepts and code definitions (Nowell et al., 2017). Ambiguities in the coding approach were resolved among group members by updating and clarifying the codebook, leading to a consensus on major themes and convergences of the data (Basis, 2003). Relevant codes included themes such as personal coming of age, academic training, and personal turning points toward permaculture, and these codes were summarized and synthesized across interviews to identify the common themes.

Results

Activism and Academic Shortfalls

Two main themes emerged regarding life paths and academic experiences: 1.) the importance of political and social activism along permaculture leaders' life paths, and 2.) shortfalls and frustrations with academic experiences, particularly the lack of interdisciplinary training and resources. Life paths toward permaculture were intertwined with personal coming of age experiences involving hands-on job experiences, political activism, and/or feelings of frustration or being a "misfit" among their family or community.

Many of the participants had held prior skilled jobs in fields such as construction, natural building, or landscaping before their exposure to permaculture. Such jobs were cited as building blocks to their current work because they provided tangible experiences and knowledge of handiwork not often taught in mainstream K-12 or adult education. Engagement in sociopolitical protests and exposure to environmental degradation and corruption, such as mountaintop removal and coal mining, were also common drivers toward a deeper connection to environmentalist movements and a concern for a sustainable future. These drivers led to frustration with the current political system and a desire to seek long-term solutions. As one person noted:

I was born into this work as an activist, as a global justice activist, and I sort of spent a lot of my early '20s traveling around the world protesting the World Trade Organization, the G8 [Group of 8], FTAA [Free Trade Area of the Americas], you know, locking down, getting arrested, organizers for this disobedience, doing guerrilla gardens, and all these things. And so, it was really this challenging realization to consider that...we actually kind of need to be more professional. We need to actually create more of a business structure around permaculture, not for the sake of, let's make tons of profit, but for the sake of, let's actually be real to providing a path that meets the needs of most people right now. And especially working-class people who don't care about all of our idealism, when they just want to make sure they have food on the table. At the end of the day, they want to make sure that they're not going to get arrested and deported... And so my idealist side started to kind of

wane a little bit, and this more practical part of me sort of came to the surface.

These activism experiences led some to feel overwhelmed by the scale of change they were fighting for and the power of those they were fighting against. In fighting for social justice, one participant met a "wall of police officers" firing tear gas, which was "that moment where something inside me changed."

Another person noted:

We were fighting for global justice, and then at the same time being met with militarized force, like tanks, tasers, rubber bullets, gases, riot gear. The system needs to change, but when you try to change it through street protest, we're really going up against the largest military in the world that's treating its citizens like the enemy. And that was also a wake-up call of just how difficult change can be made through those methods.

For the majority of participants, higher education experiences were insufficient at providing relevant resources for their desired career and life paths. The siloed nature of university departments and courses were common threads of discouragement, indicating a lack of critical systems-level thinking. This gap in interdisciplinarity pushed some to abandon and even seek to "unlearn" what they had gained through their higher education experiences; they described their university as a "factory for accountants and engineers" rather than an actual "institution of higher learning ... for people coming together to learn and think."

Furthermore, academic classes were not successful in teaching tangible, practical skills such as natural

building, construction, or small business management. One person, lamenting that several college graduates seek employment at their permaculture organization (a working farm) each year, but lack the physical skills and experience to do so, stated:

One of my critiques of universities is that people don't seem to be world ready when they come out of their programs. ... Actually, I get people all the time who are like, "Oh, I graduated from such and such university with a degree in ecology"... or something like that. They can't find a job anywhere. And then they call me up, "Hey, can I work on your crew?" And I'm like, "You went from all that time and energy and investment and learning in school, and you want to come work for me, basically, digging ditches and moving soil and mulch and compost and hauling gravel and the hard work that it takes to actually build something?" So, it's funny because I'm the kid who never went to college, and, now, I own this company, and the students want to come [and work] because they're just not world ready.

Participants who had discovered permaculture design during their college pursuit either became more frustrated with the lack of interdisciplinarity or found ways to weave their coursework together to pursue a unique interdisciplinary degree. One participant described their experience as "a free-form kind of independent study.... But I wasn't learning any permaculture. I was [independently] reading all the permaculture books, and my advisor was helping me figure out how to turn that into credits. If I had a good advisor, I might have made it there." But instead, this person left college and went

to work on a permaculture farm. In a similar vein, another participant stated, "I would have been thrilled to just go to a college where there was permaculture learning on the ground; that would have been great. This just didn't exist. And kind of still doesn't, really, to the level that I was hoping for." To counteract these negative experiences and exposures, many described a "postgraduate education" outside of academia involving exposure to and engagement with permaculture that was significantly more impactful for them.

In a few instances, academic training was a guiding path toward permaculture and exposed them to critical thinking and interdisciplinarity. However, this positive path was generally driven by the desires and ingenuity of the student to create an alternative path within their higher education degree—a path that involved a high level of flexibility and adaptation to their needs and interests. As one person with a positive academic degree experience described: "[E]ven the math and science classes the students basically taught. It really taught me that you can learn anything you want to learn and need to learn." Another participant explained: "I took an ecological design course before I learned permaculture. My degree is sustainable design. So, I've learned from a lot of different design traditions that aren't permaculture."

Being exposed formally to the practice and theory of permaculture in a university setting allowed some to engage with it in their graduate research and beyond into their career. This was evident for one participant whose college undergraduate experience included an advanced permaculture class. From this exposure, this participant wove "all the rest of my studies in college around sup-

portive topics with permaculture, and then I got my master's degree there as well." These positive experiences highlight that select institutions are upholding integrated education and facilitating hands-on experience, although there are few such institutions, and most are small.

Permaculture Pathways and Systems-Level Change

Building from prior political and social activism and despite academic frustrations, permaculture became a transformative framework for many of the leaders interviewed. Permaculture provided the interdisciplinary, systems-level way of thinking that the higher education system had failed to provide or encourage. Learning about permaculture served often as a turning point in their lives and helped set them on their current career pathways.

The turning point toward a career in permaculture for most leaders involved an exposure to a Permaculture Design Course (PDC) or a related experience (e.g., working on a permaculture farm while studying abroad) where they could learn permaculture ethics and principles and apply them directly. Within these transformative experiences, permaculture was described as an approach and framework that "had been missing" up until that point in their lives—it was a pivotal moment where the exposure to permaculture provided them with tools, language, and something to be passionate about. One person described this process in more detail:

I don't think I could have articulated it then in those early years, but after the permaculture class, I was able to articulate it. I think it was motivating me, as I was sick of being part of the problem. And college really enabled me to

articulate problems well, but at least from the track I took, I didn't feel I was getting many paths to solutions. So, I was pretty hungry for that.

Another stated:

That's what's so unique about permaculture to me as a systems-thinker, and how to encapsulate all of these elements. Those principles and ethics give you the toolbox of how to make change in the smallest way. And that's what makes it; that's why I'm passionate about it.

Permaculture provided a "new way of seeing" and a way to bring together life stories in a meaningful way. Some people then built on their PDC or other permaculture experiences to fill a void they noticed hadn't been filled, such as creating urban or social permaculture initiatives. One Indigenous permaculture leader noted issues of access to higher education for diverse and marginalized populations and described how the permaculture framework was applied to help lift their community out of degenerative cycles of systemic oppression. This process was described as follows:

A lot of what we're really promoting as an institute is really a long-term societal change, and bad habits that we've developed in our own communities are going to take a while to heal from. A lot of our students are really impacted by trauma, historical trauma of living on reservations....But I think for many students, they're able to have a support network of their own families and within our organization to know that we're able to do things if we choose so; we're able to not just spend our time in front of a TV or...in a way where

we're not being ... useful. Part of it is to have young people start questioning their own lives, which is hard. It's a hard thing to do, to be able to look at yourself and say, Who am I? What do I have to look forward to? So, in permaculture design and in our programs, we've tried to have students reflect on that. And to really gain a larger sense of their place in this world that we're living in.

Discussion

This research unveiled individuals enacting systems-level change through permaculture design, even in their formative years, showing them to be integrative thinkers. Access to higher education was identified as a barrier, and those who did engage in higher education felt "frustrated," "lost," and "hopeless" in its siloed structure. Their life paths to enacting systems-level change through permaculture were steeped in environmental activism, as well as involvement in hands-on job training and experiences. Exposure to protests and environmental degradation motivated feelings of frustration and concern for the future, as well as a desire to be part of the solution. Permaculture design provided a needed solutions-based framework for positive change, helping move participants beyond activist burnout. Their academic training, however, provided minimal solutions and experience with hands-on skills for addressing systemic issues such as climate change and political oppression. Those who did feel positively toward their academic experiences had the ability to take ownership of their classes and the flexibility to work across disciplinary boundaries.

For study participants, permaculture served as an interdisciplinary tool to articulate a new way of seeing and

thinking that was not easily accessible in their educational experiences. These individuals struggled with a sense of belonging in conventional higher education and created their own interdisciplinary paths, engaging in permaculture in diverse yet overlapping ways: building life skills in dropouts and graduates without any hands-on experience (e.g., offering permaculture landscaping job skills trainings), enhancing women's empowerment (e.g., applying permaculture design to building female leadership skills), counteracting systemic oppression (e.g., helping Indigenous youth break away from degenerative patterns fed through colonialism), advocating policy (e.g., shifting city-wide gray water and green infrastructure policies), advancing eco-friendly agriculture (e.g., transitioning large-scale farms to regenerative agricultural and agroforestry systems), advocating for global research initiatives (e.g., developing research-based solutions to draw down greenhouse gases in the atmosphere), and more.

These life paths and experiences exemplify how the permaculture design framework, with principles ranging from "integrate rather than segregate" to "design from patterns to details" (Brain & Thomas, 2013, p. 3), offers potential for diverse and meaningful change, particularly by allowing those experiencing activist burnout to apply a solutions-based framework in furthering their efforts toward enacting systems-level change. Sustainability frameworks like permaculture could assist higher education in shifting toward transdisciplinarity and help incorporate practical application of course content.

Transdisciplinarity is achieved when knowledge is no longer attributable to a specific field, and it often

actively involves collaboration with community and other stakeholders to co-construct knowledge (Choi & Pak, 2006; Holley, 2017; Lattuca et al., 2004). Some universities are already taking steps in this direction. For example, the University of Tasmania has developed a “breadth unit” program as a priority initiative for curriculum renewal, allowing hands-on student experience and applying transdisciplinary approaches to complex challenges (or wicked problems) (Osborne & Dibben, 2017). Furthermore, all breadth units are created through collaborative teams of lecturers working across multiple departments and are accessible to off- or on-campus students.

Every undergraduate student is required to build breadth unit options into their degree to incorporate purposefully selected topics to prepare students for the wicked problems they would face upon graduation. Two examples of these units include: Confronting Sustainability and Living with Cultural Diversity. The units must focus on real-world issues that are appropriate for all students irrespective of discipline. According to Osborne and Dibben (2017), “this, in turn, would better address student employability (i.e., job readiness) and improve the student experience through enhanced curriculum diversity” (p. 27). Such breadth units also integrate the need for a transdisciplinary perspective to address all contemporary issues. The University of Tasmania provides a hopeful model, yet this example is more of an exception than a norm. Given that higher academic institutions are not adequately empowering students toward leading systems-level change, the potential for such transdisciplinary support and empowerment remains untapped.

Conclusion

Given the common experiences of activism burnout and the siloed effect of higher education as a precursor, this study points toward the need to promote inclusive, interdisciplinary, hands-on, solutions-based frameworks in academic institutions. The systems-level, solutions-based nature of permaculture design provides a framework to help improve the shortcomings in academia. For higher education, there is a need to critically examine: 1.) silos within and across their institutional framework, 2.) exclusionary barriers for marginalized or nontraditional students, and 3.) the inadequacy of the ways they (dis)empower students toward agency in their education (Anft, 2017; Gravett & Kinchin, 2020; Templeton et al., 2016).

Rather than put the onus on the student to navigate disciplinary silos and other barriers, the institution itself should promote and support transdisciplinary pathways. Higher education must serve a more central role in promoting transformative change to help current and future generations move away from degenerative patterns of environmental and social destruction and toward a more socially just and environmentally regenerated planet.

Acknowledgments

The authors wish to thank all participants for the depth and knowledge they provided in the interview process. Special gratitude is extended to Jason Gerhardt of Real Earth Design and the Permaculture Institute Inc. for bringing improved clarity and purpose to this article.

Funding Information

No funding was received for this project.

Author Disclosure Statement

No competing financial interests exist.

References

- Alon, S. (2009). The evolution of class inequality in higher education: Competition, exclusion, and adaptation. *American Sociological Review*, 74(5), 731–755.
- Anft, M. (2017). Breaking professional schools out of their silos. *Chronicle of Higher Education*, 63(35), A8–A12.
- Ashby, I., & Exter, M. (2019). Designing for interdisciplinarity in higher education: Considerations for instructional designers. *TechTrends: Linking Research & Practice to Improve Learning*, 63(2), 202–208.
- Banks, T., & Dohy, J. (2019). Mitigating barriers to persistence: A review of efforts to improve retention and graduation rates for students of color in higher education. *Higher Education Studies*, 9(1), 118–131.
- Basit, T. (2003). Manual or electronic? The role of coding in qualitative data analysis. *Educational Research*, 45(2), 143–154.
- Bateman, J. (2020). *Northern Hemisphere just had its hottest summer on record*. National Oceanic and Atmospheric Administration. <https://www.noaa.gov/news/northern-hemisphere-just-had-its-hottest-summer-on-record>
- Boyko, C. T., MacKenzie, A. R., & Leung, H. (2015). In spite of our own best interests: Lessons from an interdisciplinary project on urban sustainability. *Journal of Geography in Higher Education*, 39(2), 206–219.
- Bouman, T., Verschoor, M., Albers, C. J., Böhm, G., Fisher, S. D., et al. (2020). When worry about climate change leads to climate action: How

- values, worry and personal responsibility relate to various climate actions. *Global Environmental Change*, 62, 102061. <https://doi.org/10.1016/j.gloenvcha.2020.102061>
- Brain, R., Lynch, J., & Adams, J. (2018). Mitigating projected impacts of climate change and building resiliency through permaculture. In P. R. Lachapelle & D. Albrecht (Eds.), *Addressing Climate Change at the Community Level in the United States* (pp. 117-135). Routledge.
- Brain, R., & Stapp, J. (2013). Biking as an alternative mode of transportation. *Utah State University Extension Fact Sheet*. Sustainability/2012/https://digitalcommons.usu.edu/extension_curall/1551
- Brain, R., & Thomas, B. (2013). Permaculture. *Utah State University Extension Fact Sheet*. Sustainability/2013/https://digitalcommons.usu.edu/envs_facpub/890
- Bridle, H., Vrieling, A., Cardillo, M., Araya, Y., & Hinojosa, L. (2013). Preparing for an interdisciplinary future: A perspective from early career researchers. *Futures*, 53, 22-32.
- Chawla, L. (1999). Life paths into effective environmental action. *Journal of Environmental Education*, 31(1), 15-26.
- Choi, B., & Pak, A. (2006). Multidisciplinarity, interdisciplinarity and transdisciplinarity in health research, services, education and policy: Definitions, objectives, and evidence of effectiveness. *Clinical and Investigative Medicine*, 29, 351-364.
- Clark, C., Kitchen, M., & Moore, M. (2003). Internal and external influences on pro-environmental behavior: Participation in a green electricity program. *Journal of Environmental Psychology*, 23, 237-246.
- Cooper, G. (2012). A disciplinary matter critical sociology, academic governance and interdisciplinarity. *Sociology*, 47(1), 74-89.
- Cox, L. (2011). How do we keep going? Activist burnout and sustainability in social movements. *Helsinki: Into-ebooks*. http://mural.maynoothuniversity.ie/2815/1/LC_How_do_we_keep_going.pdf
- Ewert, A., Place, G., & Sibthorp, J. (2005). Early-life outdoor experiences and an individual's environmental attitudes. *Leisure Sciences*, 27, 225-239.
- Fadaee, S. (2019). The permaculture movement in India: A social movement with southern characteristics. *Social Movement Studies*, 18(6), 720-734. <https://doi.org/10.1080/14742837.2019.1628732>
- Fawcett, T., & Killip, G. (2014). Anatomy of low carbon retrofits: Evidence from owner-occupied superhomes. *Building Research and Information*, 42, 434-445.
- Fujii, S. (2006). Environmental concern, attitude toward frugality, and ease of behaviors as determinants of pro-environmental behavioral intentions. *Journal of Environmental Psychology*, 26, 262-268.
- Furst-Bowe, J. (2011). Systems thinking: Critical to quality improvement in higher education. *Quality Approaches in Higher Education*, 2(2), 2-4.
- Goodwin, J., & Pfaff, S. (2001). Emotion work in high-risk social movements: Managing fear in the U.S. and East German civil rights movements. In J. Goodwin, J. Jasper, & F. Polletta (Eds.), *Passionate Politics: Emotions and Social Movements* (pp. 282-302). University of Chicago Press.
- Gorski, P. C., & Chen, C. (2015). "Frayed all over:" The causes and consequences of activist burnout among social justice education activists. *Educational Studies*, 51(5), 385-405. <https://doi.org/10.1080/00131946.2015.1075989>
- Gravett, K., & Kinchin, I. M. (2020). Referencing and empowerment: Exploring barriers to agency in the higher education student experience. *Teaching in Higher Education*, 25(1), 84-97.
- Hatch, J. A. (2002). *Doing qualitative research in education settings*. State University of New York Press.
- Haynes, A. (2017). In support of disciplinarity in teaching sociology: Reflections from Ireland. *Teaching Sociology*, 45(1), 54-64.
- Hill, P., & Seger, J. (2018). *We've tried that before: 500 years of Extension wisdom*. eXtension Foundation.
- Hochschild, A. (1983). Comment on Kemper's "Social constructionist and positivist approaches to the sociology of education." *American Journal of Sociology*, 89, 432-434.
- Holley, K. (2017). Interdisciplinary curriculum and learning in higher education. *Oxford Research Encyclopedia of Education*, 1-23.
- Howell, R., & Allen, S. (2017). People and planet: Values, motivations, and formative influences of individuals acting to mitigate climate change. *Environmental Values*, 26, 131-155.
- Klein, J. (2005). Integrative learning and interdisciplinary studies. *Peer Review*, 8-10.
- Kovan, J., & Dirks, J. (2003). "Being called awake": The role of transformative learning in the lives of environmental activists. *Adult Education Quarterly*, 53, 99-118.
- Lambrechts, A. A. (2020). The super-disadvantaged in higher education: Barriers to access for refugee background students in England. *Higher Education*, 80(5), 803-822.

- Lattuca, L., Voigt, L., & Fath, K. (2004). Does interdisciplinarity promote learning? Theoretical support and researchable questions. *The Review of Higher Education*, 28(1), 23–48.
- Levy, B. S., & Patz, J. A. (2015). Climate change, human rights, and social justice. *Annals of Global Health*, 81(3), 310. <https://doi.org/10.1016/j.aogh.2015.08.008>
- Lowan-Trudeau, G. (2016). A rose by any other name: Repressive tolerance, burnout and hope in the New West. *Canadian Journal of Environmental Education*, 21, 57–71.
- Luna, J. M., Dávila, E. R., & Reynoso-Morris, A. (2018). Pedagogy of permaculture and food justice. *The Journal of Educational Foundations*, 31(1 & 2), 57–85.
- Lyall, C., & Meagher, L. (2012). A masterclass in interdisciplinarity: Research into practice in training the next generation of interdisciplinary researchers. *Futures*, 44(6), 608–617.
- Morel, K., Léger, F., & Ferguson, R. S. (2019). Permaculture. In *Encyclopedia of Ecology* (pp. 559–567). Elsevier. <https://doi.org/10.1016/B978-0-12-409548-9.10598-6>
- National Oceanic and Atmospheric Administration (NOAA). (2021, January 8). 2020 U.S. billion-dollar weather and climate disasters in historical context. News & Features. <https://www.climate.gov/news-features/blogs/beyond-data/2020-us-billion-dollar-weather-and-climate-disasters-historical>
- Noppers, E., Keizer, K., Bolderdijk, J., & Steg, L. (2014). The adoption of sustainable innovations: Driven by symbolic and environmental motives. *Global Environmental Change*, 25, 52–62.
- Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, 16(1), 1–13.
- Osborne, J., & Dibben, M. (2017). Over the edge of the wild: Lessons of discovery through developing transdisciplinary (breadth) units in blended courses. *Journal of Open, Flexible & Distance Learning*, 21(1), 25–34.
- Passafaro, P., Rimano, A., Piccini, M., Metastasio, R., Gambardella, et al. (2014). The bicycle and the city: Desires and emotions versus attitudes, habits and norms. *Journal of Environmental Psychology*, 38, 76–83.
- Petts, J., Owens, S., & Bulkeley, H. (2008). Crossing boundaries: Interdisciplinarity in the context of urban environments. *Geoforum*, 39, 593–601.
- Pigni, A. (2013, July 17). *Practising mindfulness at the checkpoint*. Open Democracy. Transformation. <https://www.opendemocracy.net/en/transformation/practising-mindfulness-at-checkpoint/>
- Pines, A. (1994). Burnout in political activism: An existential perspective. *Journal of Health and Human Resources Administration*, 164, 381–394.
- Repko, A. (2008). *Interdisciplinary research: Process and theory*. SAGE Publications, Inc.
- Saldana, J. (2016). An introduction to codes and coding. In J. Saldana (Ed.), *The Coding Manual for Qualitative Researchers* (pp. 1–40). SAGE Publications, Inc.
- Schaufeli, W., & Buunk, B. (2002). Burnout: An overview of 25 years of research and theorizing. In M. Schabracq, J. Winnubst, & C. Cooper (Eds.), *The handbook of work and health psychology* (pp. 383–425). Wiley.
- Shaw, D., & Newholm, T. (2002). Voluntary simplicity and the ethics of consumption. *Psychology and Marketing*, 19, 167–185.
- Schuetze, H. G., & Slowey, M. (2002). Participation and exclusion: A comparative analysis of non-traditional students and lifelong learners in higher education. *Higher Education*, 44, 309–327.
- Spangler, K., McCann, R. B., & Ferguson, R. S. (2021) (Re-)Defining permaculture: Perspectives of permaculture teachers and practitioners across the United States. *Sustainability* 13, 5413. <https://doi.org/10.3390/su13105413>
- Styron, R. (2013). Interdisciplinary education: A reflection of the real world. *Systemics, Cybernetics and Informatics*, 11(9), 47–52.
- Templeton, E., Love, B., Davis, B. H., & Davis Jr., M. (2016). Illusion of inclusion: University policies that perpetuate exclusion of students of color. *Journal Committed to Social Change on Race and Ethnicity*, 2(1), 88–115.
- Wells, N., & Lekies, K. (2006). Nature and the life course: Pathways from childhood nature experiences to adult environmentalism. *Children, Youth and Environments*, 16(1), 1–25.
- Wolf, J. (2011). Ecological citizenship as public engagement with climate change. In L. Whitmarsh, S. O'Neill, & I. Lorenzoni (Eds.), *Engaging the public with climate change: Behavior change and communication* (pp. 120–137). Earthscan.

Address correspondence to:
Roslynn Brain McCann
Department of Environment
and Society
Utah State University
125 W 200S
Moab, UT 84532
USA

E-mail: roslynn.mccann@usu.edu