

Permaculture in Higher Education:
Opportunities and Challenges

by

Kat Zimmer
B.A., University of Victoria, 2013

A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of

MASTER OF ARTS

in the School of Environmental Studies

© Kat Zimmer, 2016
University of Victoria

All rights reserved. This thesis may not be reproduced in whole or in part, by photocopy
or other means, without the permission of the author.

Supervisory Committee

Permaculture in Higher Education:
Opportunities and Challenges

by

Kat Zimmer
B.A., University of Victoria, 2013

Supervisory Committee

Dr. Duncan Taylor, School of Environmental Studies
Supervisor

Dr. James Rowe, School of Environmental Studies
Departmental Member

Abstract

Supervisory Committee

Dr. Duncan Taylor, School of Environmental Studies

Supervisor

Dr. James Rowe, School of Environmental Studies

Departmental Member

There is growing agreement that integrative “whole person” approaches promoting transformative learning are important aspects of sustainability education. Increasingly, universities are using permaculture in teaching sustainability. Permaculture is an ecological design methodology for meeting human needs while increasing ecosystem health. This study investigates the implications of integrating permaculture into university sustainability curricula. Following “movement-relevant” research, this study also seeks to provide useful information to the permaculture movement about the challenges and opportunities posed by integration with academia. An interpretive approach was utilized, involving participant observation and interviews with students and instructors who had participated in permaculture courses at universities. The study finds that educational partnerships between the permaculture movement and academia can be mutually beneficial, advancing goals of both parties related to student engagement, enhancement of curricula, and the practice of sustainability. In particular, permaculture courses offer significant opportunities for advancing an integrative, “whole person” approach supporting transformative sustainability learning.

Keywords: sustainability, education, permaculture, transformative learning

Table of Contents

| | |
|---|------------|
| Supervisory Committee..... | ii |
| Abstract..... | iii |
| Table of Contents..... | iv |
| List of Figures..... | v |
| Acknowledgements..... | vi |
| Chapter 1: Introduction..... | 1 |
| 1. My research journey | |
| 1.1 The role of higher education in sustainability | |
| 1.2 Permaculture in higher education | |
| 1.3 Research questions and objectives | |
| 1.4 Methodology | |
| 1.4.1 Development of research questions | |
| 1.4.2 Participant selection | |
| 1.4.3 Interviews | |
| 1.4.4 Participant observation | |
| 1.4.5 Analysis | |
| 1.5 Key findings | |
| 1.5.1 Implications for the permaculture movement | |
| 1.5.2 Implications for academia | |
| 1.6 Limitations of the research | |
| 1.6.1 Transferability | |
| 1.6.2 Participant selection | |
| Chapter 2: Setting the context..... | 19 |
| 2. Introduction | |
| 2.1 Permaculture: History and relationship to higher education | |
| 2.1.1 A historical separation from academia | |
| 2.1.2 Permaculture in higher education: A growing trend | |
| 2.2 Permaculture and transformative learning in higher education | |
| 2.2.1 From transmission to transformation | |
| 2.2.2 Engaging the whole person in transformative learning | |
| 2.2.3 Integration: Head, heart and hand | |
| 2.3 Pedagogies for Transformative Sustainability Learning | |
| 2.3.1 Experiential learning | |
| 2.3.2 Community-based learning | |
| 2.3.3 Place-based learning | |
| 2.4 Conclusion | |
| Chapter 3: Implications for the permaculture movement..... | 37 |
| 3. Introduction | |
| 3.1 Working with academic institutions | |
| 3.1.1 Benefits and opportunities | |
| 3.1.2 Challenges and limitations | |

| | |
|---|------------|
| 3.1.3 Facilitating factors | |
| 3.2 Teaching the PDC | |
| 3.2.1 Benefits and opportunities | |
| 3.2.2 Challenges and limitations | |
| 3.3 Permaculture theory and practice | |
| 3.3.1 Benefits and opportunities | |
| 3.3.2 Concerns and drawbacks | |
| 3.4 Movement goals and strategies | |
| 3.4.1 Benefits and opportunities | |
| 3.4.2 Challenges and limitations | |
| 3.5 Discussion | |
| 3.5.1 Authority and knowledge production | |
| 3.5.2 Tradeoffs—is it worth it? | |
| 3.5.3 Thinking like a permaculture designer | |
| 3.6 Conclusion | |
| Chapter 4: Implications for academia..... | 74 |
| 4. Introduction | |
| 4.1 Benefits and opportunities for students | |
| 4.2 Benefits and opportunities for academic institutions | |
| 4.3 Benefits and opportunities for environmental and sustainability education | |
| 4.3.1 Head: “A new way of seeing” | |
| 4.3.1.1 Interdisciplinary whole systems approach | |
| 4.3.1.2 Design as a process for analysis and action | |
| 4.3.1.3 Solutions and positive vision | |
| 4.3.2 Hands: “It prepares us for the real world” | |
| 4.3.2.1 Experiential learning | |
| 4.3.2.2 Real-world skills and application | |
| 4.3.3 Heart: “It really opened people up” | |
| 4.3.3.1 Ethics and values | |
| 4.3.3.2 Community-based learning | |
| 4.3.3.3 Activating passion and potential | |
| 4.4 Discussion | |
| 4.4.1 Possibility | |
| 4.4.2 Transformation | |
| 4.4.3 Connection | |
| 4.5 Limitations | |
| 4.5.1 Limited longer term impacts and learning opportunities | |
| 4.5.2 Limited accessibility and diversity | |
| 4.5.3 Limited critical analysis of historical and political factors | |
| 4.6 Conclusion | |
| Chapter 5: Conclusion..... | 114 |
| 5. Toward mutually beneficial relationships | |
| Bibliography..... | 119 |
| Appendix A: Interview Questions..... | 133 |

List of Figures

- Figure 1:** The three permaculture ethics, Care of Earth, Care of People, and Fair Share, with David Holmgren’s twelve main principles.....15
- Figure 2:** Approximate number of PDCs offered for credit by year, Canada & the U.S..18
- Figure 3:** Geographical distribution of permaculture courses at post-secondary institutions in Canada & the U.S.....19
- Figure 4:** Academic programs & departments offering permaculture courses.....20

Acknowledgements

First and foremost, I would like to thank my supervisory committee, Dr. Duncan Taylor and Dr. James Rowe, for offering constant guidance and encouragement as this project developed during my undergraduate studies, and throughout the research process.

Gratitude is due also to Brandy Gallagher, O.U.R. Ecovillage, Kirk Schwartz, MediaNet, the School of Environmental Studies, and my graduate peers for their many contributions to this project and its outcomes. To all of the students and instructors who took the time to participate in this research, and to welcome me into your schools and homes, you are the true authors of these stories. I am deeply grateful for all that you have offered—this research would not be what it is without your contributions. To my parents and my partner Marc, thank you for always believing in me and supporting me unconditionally.

Chapter 1: Introduction

If we were to be frank about where we are in the world today, we have an education system that is largely preparing students for a world that doesn't exist. Or at least, will not exist for much longer. And if we really want to come to grips with the reality of the twenty-first century, we need to...completely redesign the ways that we meet our basic needs: food, water, shelter, energy, waste management... in ways that not only reduce impact, but rather, facilitate ecological health. So that said, I think permaculture in higher learning is probably the most important course students can take, given our present moment in history.

-Prof. Matthew¹

1. My research journey

The interconnected challenges of climate change, resource depletion, degradation of ecosystems, and pollutants detectable in virtually every corner of the world present a social and ecological crisis on a truly planetary scale. These problems are compounded by the spectre of resource conflicts, the erosion of democratic institutions, economic instability, and rising inequality. As an undergraduate student in Environmental Studies, I became acutely aware of the vastness of these challenges at a time in my life when, according to dominant societal narratives, I was to be “figuring myself out” in preparation for the successful career that supposedly awaited me after graduation. But faced with this context of turbulence and uncertainty, I felt ill-equipped, overwhelmed, and unsure of what to do next. I knew how to talk critically about the problems, but I felt I lacked the skills or agency required to really make a difference. I struggled to articulate an answer when peers would ask, “It’s too late, the world is doomed. What can we really do about it, and why should we bother trying?” I have shared countless conversations over the years with other students who have experienced similar struggles. Living in times of uncertainty and ecological decline can be highly destabilizing and breed anxiety, paralysis, and fear (Clayton, Manning, & Hodge, 2014; Sterling, 2010; Maniates, 2013;

¹ Pseudonyms were used for all interview participants.

² Regarding sustainable development, *Our Common Future* (1987) asks, “How are individuals in the real

O'Hara, 2006; Curtis, 2012). The work of Joanna Macy (1991) and others strives to acknowledge and respond to this “eco-despair.”

In my own educational journey, I was afforded the opportunity to take a Permaculture Design Course (PDC) for Directed Study credit toward my undergraduate degree. The two-week residential course at O.U.R. Ecovillage in Shawnigan Lake, B.C. was, for me, a transformative experience immersed in nature and community. I emerged with a different perspective on the challenges ahead: one that saw the possibility that by designing systems with observation and intention, humans could meet our needs while regenerating ecosystems rather than destroying them. Developing relationships with people who were working on inspiring, solution-oriented projects instilled in me a new sense of motivation. The more I spoke with others who had taken PDCs, the more I realized that this powerful shift was a common experience. The more I spoke with university students, the more I could sense a burgeoning of student interest in and demand for permaculture education.

Faculty in my home department, the School of Environmental Studies, showed increasing interest too. As they sought feedback from current and former students on how to strengthen their programs, I became convinced that permaculture education could offer something unique and impactful to the curriculum. Alongside the development of my Master's research, I have had the great fortune to be involved in establishing the first undergraduate permaculture courses offered by the School. Having developed many relationships with active members of the permaculture movement, and hearing their hopes and concerns about engaging with institutions, I wanted to understand what this engagement could mean for them too. Hence, I acknowledge my stake in this research,

both in my desire to help facilitate relationships between the movement and academia that are mutually beneficial for all concerned, and in my belief that this engagement holds great significance for education and action toward a more sustainable world.

1.1 The role of higher education in sustainability

Sustainability is a highly complex and contested concept (Owens, 2011; Iyer-Raniga & Treloar, 2000). The Brundtland Report, *Our Common Future* (WCED, 1987), popularized an understanding of sustainability as meeting the basic subsistence needs of current and future generations. This rather vague definition has faced much criticism over the years. Taylor and Taylor (2007) suggest this definition misses critical elements: “Sustainability is a function of a system’s ability to meet its needs and maintain health, wholeness and resilience,” they write, “human needs are more than simply material needs for food, shelter, and safety: they are also emotional, intellectual and spiritual needs—for meaning and belonging, for relationship to both community and nature” (p. 10). Sterling (2001) has suggested that critical components of sustainability include human rights, peace, active citizenship, participatory democracy, conservation, and ecological, social, and economic justice; these dispositions are linked with an ecological worldview that acknowledges interdependence and interconnection. This fuller range of needs and elements is the basis for my understanding of sustainability, and my evaluation of the current and potential role of higher education in pursuing it.

What is the current role of higher education in this age of crisis and uncertainty and what should it be? Cortese (1995) points out that universities “have the unique freedom to develop new ideas, comment on society, and engage in bold experiments, as well as to contribute to the creation of new knowledge” (p. 5). Academic institutions hold a critical

role in skill development among society's younger generations. They have historically been hubs of independent thought and political activism, making important contributions to North American anti-war, feminist, and civil rights movements in the twentieth century. Bronson (2005) reminds us that higher education remains "one of the only spaces of resistance available in society where critical inquiry is still possible, where people are routinely afforded the time and resources required to interrogate the status quo..." (p. 2). It should therefore be at the forefront of a sustainability transition.

Unfortunately, it seems that much of the teaching and research that goes on in universities only reinforces ways of thinking and acting that compound existing social and environmental crises (Cortese, 2003; Gliszinski, 2007; Orr, 1994; O'Sullivan, Morell, & O'Connor, 2002). Universities are where the specialists of most unsustainable industries are trained (M'Gonigle & Stark, 2006). The well-educated citizens of industrialized countries have the biggest ecological footprint and contribute most to environmental problems (Wright, 2013; Orr, 2011). The growth and development of academic knowledge has historically depended on and reproduced unsustainable structures of a technical, economic, political, and military nature (Carp, 2013).

How did higher education become a driver of unsustainability? Orr (1994) points to the rising cost of education, corporate dependence, lack of administrative leadership, departmentalization and specialization, and a dominant belief in technical progress leading to a failure to recognize dangerous aspects of technology. Faced with a context of massive budget cuts, in which graduates struggle to find jobs and pay off student debt, universities are increasingly compelled to justify their significance and the cost of education in instrumental and utilitarian terms, aligned with the neoliberal logic of a

competitive globalized economy (Collini, 2012). A university education is produced as a means of gaining a competitive job market advantage by delivering skills, techniques and attitudes.

The deepening neoliberalization of cultures and institutions is an impediment to education that meaningfully addresses sustainability. It has been argued that environmental and sustainability education (ESE) has failed to make a significant impact in terms of a response to environmental challenges over the last several decades (Saylan & Blumstein, 2011; Orr, 2011; Sterling 2001). This relative lack of impact has been cited as evidence for the need to move toward a new “sustainable education paradigm” that is transformative at the individual and societal level (Sterling, 2001). In order for universities to be important sites of transition, Slaughter (2011) argues the missions, entrenched pedagogies, curricula, and modes of inquiry in higher education must be radically shifted. New ways of thinking about teaching and learning are necessary.

Education is no guarantee of decency, prudence, or wisdom. More of the same kind of education will only compound our problems...It is not education that will save us, but education of a certain kind. (Orr, 1994, p. 8)

Rethinking this process involves looking at the practical theory of education itself—pedagogy. Innovative educational approaches are clearly needed in the face of unprecedented global environmental challenges. There is a growing consensus that inter- and transdisciplinary approaches fostering systems thinking are critical for addressing environmental challenges and should be essential components of ESE (Warburton, 2003; Gardner & Kelly, 2008; Orr, 2011; Brundiers, Wick, & Redman, 2010; Allen-Gil, Stelljes, & Borysova, 2009; Sydow, 2012). However, a growing body of literature has identified the need for an even deeper shift toward models of ESE that promote

transformative learning, which involves a deep, structural change in how learners see the world and their place in it (Mezirow, 1997; O’Sullivan et al., 2002). To support transformative learning in ESE, a growing number of researchers assert that a “whole person” approach that addresses cognitive development, motivational growth, emotions, and experiential activities is key (Sterling, 2001; O’Hara, 2006; Podger, Mustakova-Possardt & Reid, 2010; Parks, 2011; Todesco, 2012). Connecting these domains of learning requires pedagogies that are integrative, place-based, and community-engaged (Allen-Gil, Stelljes, & Borysova, 2009; Brundiars, Weik, & Redman, 2010; O’Sullivan, 2008; Sipos, Battisti, & Grimm, 2008; Esbjorn-Hargens, Reams, & Gunnlaugson, 2010).

1.2 Permaculture in higher education

In what may be understood as part of a trend toward new learning modalities in ESE, universities are increasingly engaging with permaculture education on campus.

Permaculture has been described as an effort to provision food, fibre and energy using “consciously designed ecosystems, which mimic patterns and relationships found in nature” (Holmgren, 2002, p. 2). Permaculture design integrates systems thinking with practice, using an ecological design methodology based on a set of principles and ethics to design productive, integrated systems for sustainable living. The Permaculture Design Course (PDC) is an internationally recognized, semi-standardized 72-hour course that culminates in the granting of a Permaculture Design Certificate. Many Canadian and American post-secondary institutions have offered a full PDC for academic credit, and many more have offered PDCs through non-credit, online, and study-abroad programmes (Zimmer, 2013). Permaculture demonstration projects and courses that integrate

permaculture concepts have also become quite common. Two professors who have been involved in teaching permaculture at a university point out:

As student demand for a new approach rises, colleges and universities will have to provide a new and innovative core education for all students that includes subject areas in renewable energy, natural building, ecological economics, sustainable agriculture, water management, natural history, thermodynamics, and social equality. There are few tried and tested models on how to develop a curriculum in higher education that focuses on sustainable design (Gundersen & O'Day, 2009, p. 176).

Because permaculture is a widely-accepted model for ecological design that has been tested and applied successfully for well over three decades, with principles that are easily assimilated and a standardized curriculum that is easily translated into a university course, Gundersen and O'Day suggest its educational model is "tailor-made" for academic institutions seeking to respond to current crises in sustainability.

1.3 Research questions and objectives

Claims about permaculture's implications for higher education are promising, but must be more substantively investigated. Furthermore, as the movement has developed very much outside of academia, I suggest there is value in considering what this growing integration means for the permaculture world as well. Therefore, this research asks what benefits, opportunities, challenges, and limitations are posed by this integration. I investigate these implications from two broad angles: In Chapter 3, I investigate implications of this integration for the permaculture world: for instructors, for teaching the PDC, for permaculture theory and practice, and for the movement's broader goals. In Chapter 4, I turn toward implications for the academic world: for students, for universities, and for the practice of ESE.

1.4 Methodology

I used an interpretive, qualitative approach including interviews and participant

observation. A semi-structured interview format allowed for the generation of rich descriptions of context and experience, and the exploration of emergent subjects that were meaningful to participants. The use of multiple methods is suggested as a means of bolstering validity in qualitative research (Glaser and Strauss, 1967; Patton, 1980), as has member checking. Lincoln & Guba (1985) argue that member checking is “the most crucial technique for establishing credibility” (p. 314, as cited in Cho & Trent, 2006). For this reason, I invited all interview participants to provide feedback on my interpretations and analysis of the data once my first thesis draft was completed.

Such incorporation of feedback is congruent with what Bevington and Dixon (2007) call “movement-relevant” research, which also informs my methodology as this study seeks to understand implications of academic integration for the permaculture movement. Such research aims to provide “useable knowledge for those seeking social change” (Flacks, 2004, p. 138). It “involves dynamic engagement with movements in the formulation, production, refinement, and application of the research” (Bevington & Dixon, 2007, p. 190). This also aligns with an assumption of interpretive research: that the researcher holds knowledge and experiences that are valuable to the inquiry process (Flood, 2010; van Manen, 1990). My prior personal experiences with the movement, with taking a PDC for university credit, and with being involved in a process to establish a PDC in my academic department shaped my overall research design and analysis. It is my position that my closeness with the movement does not undermine my ability to provide unbiased results. As Bevington and Dixon point out,

Social movement scholars need not and in fact should not aspire to be detached from movements. Instead, the researcher’s connection to the movement provides important incentives to produce more ‘objective’ research to ensure that the researcher is providing those movements with the best possible information.

Indeed, the engaged researcher has more of a stake in producing accurate findings than one with no stake in the movement (p. 192).

1.4.1 Development of interview questions

My studies of the ESE literature and my involvement in conversations in my own academic department about a potential new course on permaculture were important in developing and refining my questions related to education and academia. To formulate research questions with the potential to generate useful findings for the permaculture movement (Bevington & Dixon, 2007), I began by examining discussions taking place in the movement. Since taking a PDC in 2012, I have been involved in various discussions with instructors and practitioners. Listening to their issues of concern, their stories of hotly debated subjects at various permaculture convergences, and in some cases their own experiences of exploring or developing relationships with academic institutions, was an important starting point for developing my research objectives. I am grateful to the two permaculture instructors and members of my research committee who reviewed my questions and provided feedback in advance of my data collection.

My questions also evolved over time as I encountered new information. Reading online permaculture forums and *Permaculture Design Magazine*, the flagship magazine of the movement, helped me keep my finger on the pulse of movement discussions before, during, and after my interviews. Informal conversations with participants and my interviews also offered critical insights into current discussions and ideas being generated in the movement. A full list of interview questions is included in Appendix 1.

1.4.2 Participant selection

I used purposive sampling, choosing a combination of criterion-based sampling to facilitate comparisons, stratified sampling to illustrate particular characteristics of various

subgroups, and snowball sampling to identify other interview candidates with the help of participants (Patton, 1990). I sought individuals who had instructed or been enrolled in a permaculture design course (PDC) for academic credit at a university or college. I found most instructors via internet searches, contacting them via their public email addresses. Four instructors were recommended to me by other participants. Ten students were referred by their instructors. I also met one student by coincidence through a friend.

With two major groups in the study—students and instructors—I felt that interviewing a significant number in each group was important. I also wanted to speak to participants with diverse backgrounds and a wide spectrum of relationships to the academic realm. This meant that several additional people were invited to participate toward the end of the data collection period. As permaculture practice is closely linked with the landscape, I also aimed toward geographic diversity by visiting three different regions. I traveled to Oregon, Colorado, and the four northeastern states of Vermont, New Hampshire, New York, and Massachusetts. Focusing in these regions allowed me to concentrate my efforts in areas where several instructors and institutions with relatively established programs could be visited in a short amount of time. Because I was aware of only two institutions in Canada that had offered for-credit PDCs, I only interviewed one Canadian instructor. All other participants were residing in the US at the time.

Students The student group included eleven participants from five post-secondary institutions. The vast majority appeared to be aged 20-30. This included two current students of for-credit PDCs and nine alumni who had taken a PDC for credit within the past 1-3 years. One was not a post-secondary student but rather a Facilities staff member.

Instructors The instructor group included seventeen participants. All appeared to be aged 30-60. Combined, the group had experience teaching permaculture in at least 19 post-secondary institutions. Most had taught the course in either Environmental Studies or agricultural programs. All were active in the permaculture network in some way, most commonly as teachers, designers, consultants, organizers, or association/guild members. Ten were currently teaching at the same institution where they had taught the PDC, most commonly as sessional instructors, adjunct professors, or staff. Four were tenured or tenure-track faculty. Thirteen had experience teaching PDCs outside of academia. Fourteen had taught a PDC for academic credit, and two had taught introductory-level academic permaculture courses. Four instructors had also been a student of an academic PDC; arranged as graduate-level independent studies or included in largely student-directed programs. Because our conversations were primarily focused on their teaching experiences, they will be referred to as “instructors”; however, their experiences as students are included where appropriate.

Gender composition The instructor group included eight women and nine men. I was surprised by the ease with which I found female instructors. Though anecdotal reports, survey data, and my own observations of various PDCs suggest that women are at least as likely—if not more likely—to be involved in permaculture as men, the movement has been criticized for the tendency of higher-status teaching and leadership roles to be held by men, while lower-status, often unpaid roles are disproportionately held by women (Ferguson & Lovell, 2015; Olson-Ramanujan, 2013; Moyles, 2015). When it became apparent that potential female participants were more numerous, I made efforts to actively recruit male students. I included every male who agreed to participate, but in the

end only four male students participated, compared with seven females. However, with such a small sample size and the absence of statistics on gender composition of the PDCs in question, I cannot say whether this was a direct result of a broader trend.

Racial and ethnic composition I also asked several instructors for assistance with recruiting students of colour. One identified as Latina; one identified as African American; two identified as international students from Nepal; and seven were Caucasian. Despite an active search, I did not find any people of colour who had taught an academic PDC. I interviewed one Indigenous instructor who had tried to collaborate with an institution to establish an academic course, but eventually gave up when the institution stopped pursuing it.

1.4.3 Interviews

I interviewed 28 participants from October to December 2014, mostly through individual in-person interviews. I also conducted two group interviews, five Skype interviews, one email interview, and one telephone interview. These were conducted with participants I had met during my travels but had not had time to interview; participants who were not located in the regions I visited; and students who were referred to me after I had interviewed their instructors. Interviews lasted 25-90 minutes and were conducted in a semi-structured format. Field notes were taken before and after the interviews. All interview data were transcribed using ExpressScribe software.

1.4.4 Participant observation

During my travels for data collection, I was regularly immersed in academic and movement spaces where I engaged in many informal discussions on this topic. This allowed me to solicit feedback from the permaculture movement throughout my data

collection. A number of interview participants graciously offered me tours of their campus permaculture gardens, and in several cases instructors invited me to their personal homes and neighbourhoods to see their own design installations. I toured several farms, urban homesteads, and an ecovillage that expressed utilization of permaculture methodologies, and stayed overnight at the homes or cooperative communities of people connected to the movement. I was invited to attend academic permaculture classes and garden work sessions at four institutions, and I interviewed several people for a personal video project on the topic which, while separate from my academic research, allowed me to observe and interact with a much larger number of students. Their responses and actions exhibited much of the same excitement and sentiment of my research interviews. I also attended a four-day retreat for permaculture teachers and organizers, where I co-facilitated a discussion on the topic, generating important ideas and feedback on my research.

1.4.5 Analysis

I recorded broad emerging patterns and personal reflections in my field notes, using these themes and the topics of my interview questions to develop a series of initial codes. In Microsoft Word, I conducted open coding using these initial constructed codes as well as a series of new codes emerging out of the data (Glaser & Strauss, 1967). I applied meaning condensation (Kvale, 2007) by highlighting coded sections of text and summarizing the concept in a memo with the addition of my own reflections. These memos were classified under categories that related directly to each key topic of interest. Transcripts and summaries were reviewed extensively and repetitively to facilitate comparison, which helped to shed light on emergent patterns and relationships.

1.5 Key findings

My findings are organized here in two sections corresponding with Chapters 3 and 4, respectively: implications for permaculture, and implications for academia.

1.5.1 Implications for the permaculture movement

Many participants felt integration of permaculture and academia was a good strategy or even necessary to help achieve an urgently needed societal movement toward sustainability. Fourteen of the seventeen instructors were, on the whole, very enthusiastic and usually excited about this growing integration. The others were not opposed, but voiced stronger concerns or questions about academic linkages as an overall movement strategy. Even for them, however, spreading knowledge of permaculture still seemed to be the most important goal, and working with academia was considered a valuable way to pursue this. Participants also felt academia could offer more rigor, scientific research, and documentation standards to permaculture, and encourage its expansion into a wide variety of fields. In working with institutions, instructors found several aspects that were also valuable for their own career development, for their economic livelihoods, or for curriculum development. Most felt it was ultimately worthwhile to teach at higher-education institutions.

However, there were a number of pertinent concerns related to maintaining the primacy of community-based practice and knowledge production, maintaining the integrity of the PDC curriculum, and ensuring that permaculture was being taught and represented by those with sufficient practical experience and qualifications. Key challenges faced by instructors in working with institutions included lack of funding or administrative support, dealing with a large and slow bureaucracy, and teaching the PDC

in their preferred way. Many of these challenges were addressed with the help of strong student demand, support from departments or individual champions inside the institution, and regional initiatives and accessible teaching sites in the broader community.

I suggest that questions concerning control and authority in knowledge production and teaching are at the root of concerns regarding the integration of permaculture with academia. Given an abundance of risks, challenges, opportunities, and benefits at multiple scales, I found that many instructors saw their situations in terms of tradeoffs, and they frequently used permaculture concepts and principles in analyzing these tradeoffs. Usually, this led them to view working with institutions as worth the effort. Following their lead, I suggest several permaculture concepts and principles that can help instructors weigh these costs and benefits, and understand how the permaculture movement can design mutually beneficial relationships with academia. When designed with intention and thoughtful observation, such relationships could play an important part in the movement's strategy for achieving its goals. To assist in such a process, movement discussions to identify areas of agreement regarding acceptable practices and approaches, as well as activities that should be discouraged, may be useful at this time. Critically, the movement must above all maintain a dynamic independent existence that is community-based, accessible, and relevant to diverse communities, in particular those communities whose access to higher education is limited.

1.5.2 Implications for academia

I found that the unique pedagogical approaches of permaculture education offered significant opportunities for advancing integrative and transformative ESE in higher education. Based on Sipos et al.'s (2008) organizing principle of "head, hands, and

heart,” I show how permaculture education meaningfully engages the cognitive/intellectual, physical/psychomotor, and affective/motivational domains of learning to support the emergence of Transformative Sustainability Learning. The integrative approach of permaculture education aligns well with emerging best practices encapsulated in the “head, hands, and heart” model. Because experiential, community-engaged, skill-based, and interdisciplinary systems approaches are considered by instructors to be essential aspects of permaculture education, offering permaculture courses in academia can help move ESE in the direction of the transformative level of learning required for real movement toward sustainability (Sterling, 2001).

I discuss the significance of the “head, hands, and heart” working together in the context of permaculture education using the concepts of *possibility*, *transformation*, and *connection*. The educational experience seemed to expand students’ sense of possibility in terms of their own individual abilities and actions, and in terms of larger collective or physical changes. I engage Mezirow’s (1997) conceptions of Transformative Learning (TL) in suggesting that various aspects of the courses also provided opportunities for transformational experiences. Congruent with permaculture’s focus on interconnectivity, I suggest it was not any particular element, but rather the connections between multiple elements—individual motivations, feelings, and actions; engagement with others; and connections with natural systems—that seemed to allow transformation and new possibilities to emerge. Furthermore, permaculture education connected process-oriented, intrinsically motivated educational experiences with more outcome-oriented, instrumental values (via the granting of a “marketable” certificate) (Sterling, 2010).

While the bulk of these findings are concerned with pedagogical implications for

ESE specifically, participants also identified a range of benefits and opportunities for various academic stakeholders in integrating permaculture education. For students, the major perceived benefit was increased accessibility of permaculture courses. For academic institutions as a whole, perceived benefits include increased societal relevance and marketability to potential students, enhanced relationships with the broader community, and sustainability-oriented changes in campus culture and spaces.

There were several key limitations with the model of offering PDCs at academic institutions. Students often perceived few opportunities to learn or implement permaculture after the course was over. Also, although this model increased accessibility of permaculture education for students in university, and provided an experience that was usually more diverse than other courses, this was limited by the inaccessibility of higher education to large portions of the population. Lastly, critical engagement with dominant social structures and the continuing effects of historical colonization, dispossession, and other postcolonial concerns may be limited in PDCs. I suggest permaculture education could greatly benefit from academic access to, and engagement with, critical literature and pedagogies such as political ecology (Robbins, 2004), critical ecoliteracy (Turner & Donnelly, 2013), ecopedagogy (Kahn, 2010), and eco-justice education (Bowers, 2002; Martusewicz, Edmundson, & Lupinacci, 2011).

Academic institutions should consider permaculture education as a potentially valuable educational framework that supports needed transformative learning in ESE. Permaculture can be a useful way to meaningfully engage the head, hands, and hearts of students, providing an example of Transformative Sustainability Learning (Sipos et al., 2008) in practice. Integrating permaculture while maintaining the integrity of its

curriculum will require flexibility, commitment, openness, and potentially a critical examination of broader institutional priorities. If institutions are up to the task, I suggest such integration has the potential to help move them meaningfully toward sustainability goals. Experimentation in applying permaculture to a variety of educational initiatives and academic fields at universities has the potential to broaden its impact. However, any educational initiative should include the meaningful and sustained involvement of permaculture designers and teachers with sufficient experience and qualifications.

1.6 Limitations of the research

1.6.1 Transferability

As I only interviewed twenty-eight participants, it is difficult to extrapolate or generalize the findings. However, my goal is not to generate law-like statements or establish functional relationships (van Manen, 1990). Instead, as a qualitative study, of concern is the degree to which these findings are transferrable to other contexts. My goal is to provide critical insights to other practitioners and researchers (while describing in full my own context and assumptions), and it is a matter of their own judgment whether such insights are useful or transferrable to their own situations.

1.6.2 Participant selection

The snowball sampling method also posed critical limitations to participant selection: ten of eleven students were reached through their current or former instructors, who were also participants. It is reasonable to expect that students who had already developed good relationships with their instructors were more likely to be contacted by them or agree to be interviewed. As such, their positive course experiences may not be representative of the average experience of their classmates.

Chapter 2: Setting the context

2. Introduction

In this chapter, I provide an explanation of permaculture and discuss its history of development outside of academia. I briefly map the growing trend of its integration into higher education, which is primarily occurring in fields related to environmental sustainability and horticulture. I discuss how the permaculture framework fits with and contributes to current theory and practice in environmental and sustainability education (ESE), in particular through transformative, experiential, community-based, and place-based learning. I introduce the organizing principle of “head, heart, and hands” (Sipos et al., 2008) used in my analysis of permaculture’s contributions to Transformative Sustainability Learning.

2.1 Permaculture: History and relationship to higher education

Permaculture as it is known today was first developed in the 1970s by Bill Mollison and David Holmgren in Australia. Permaculture, a combination of “permanent agriculture” or “permanent culture,” was originally conceived as a response to the growing interrelated crises of pollution, soil degradation, and fossil fuel depletion, which directly threatened the human population (Holmgren, 2002). Many ideas and techniques in permaculture originated in systems developed over millennia by different cultures. Its modern roots can be found in the keyline design approach of P.A. Yeomans, the “natural farming” of Masanobu Fukuoka (1975), and the ecological agriculture of Sepp Holzer in Austria.

The word “permaculture” tends to defy one single definition because it has grown from an original focus on agriculture to address broader issues (Rhodes, 2012). The term has been used to refer simultaneously to a design system, an international movement, a

worldview, and a set of associated practices or techniques, leading to debate over its parameters (Ferguson & Lovell, 2014). However, core to all understandings of permaculture is that it is grounded in a foundation of core ethics: *Care of Earth, Care of People, and Fair Share*. Combining this ethical approach with systems thinking, permaculture follows a set of ecological design principles that draw from the sciences of ecology, landscape geography, and ethnobiology to design systems that meet human needs while increasing ecosystem health (Holmgren, 2002). The set of principles used varies based on the designer.

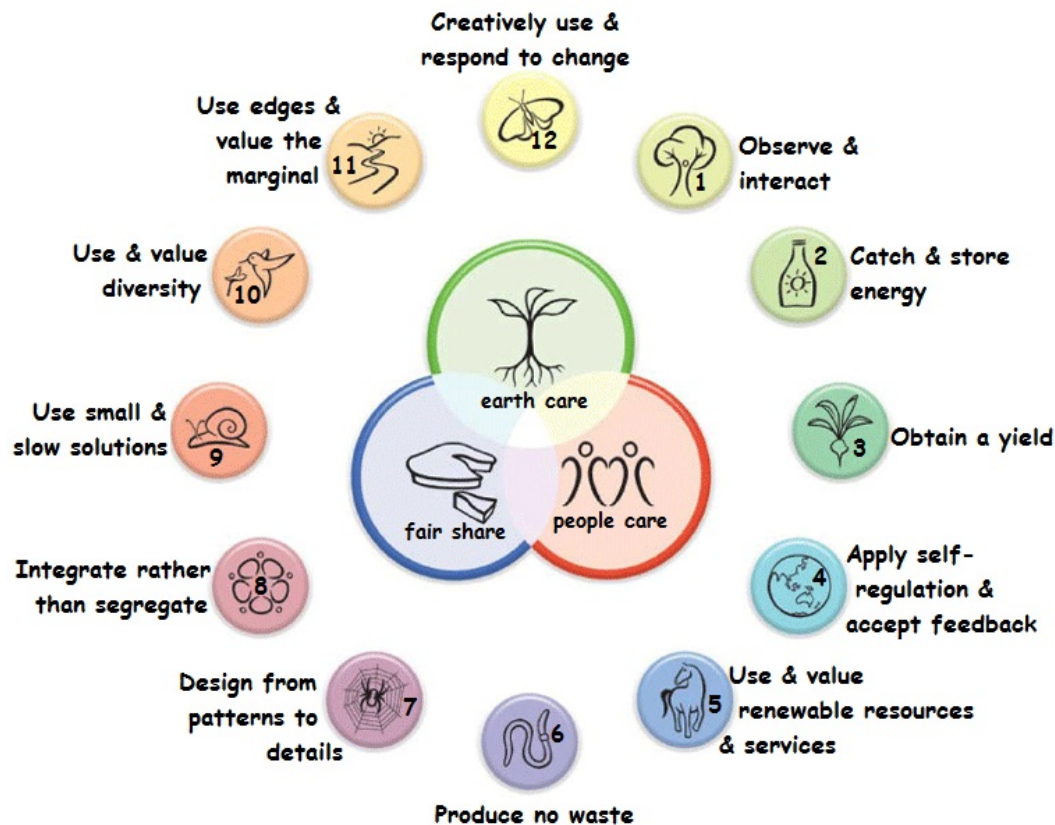


Figure 1: The three permaculture ethics, *Care of Earth, Care of People, and Fair Share*, with David Holmgren's twelve main principles (Nurturegreen.wordpress.com, 2013)

Permaculture may be considered a framework for linking different practices and movements such as regenerative agriculture, agroforestry, ecological design, and

appropriate technology (Ferguson & Lovell, 2014). Strategies include minimizing waste and inputs of human labour, resources, water, and energy, while maximizing yields. The focus is less on what or how many individual elements are present, and more on the quality and quantity of beneficial relationships between the elements. As such, the principles are not specific to natural systems; they can also be applied to human systems as a tool for community collaboration. This allows for the bridging of diverse fields such as land stewardship, food, energy, building, economics, ecology, appropriate technology, modern science, traditional wisdom, decision making, community, health, and social justice.

2.1.1 A historical separation from academia

Permaculture originated in academia: Mollison taught at the University of Tasmania, where Holmgren was his student. In 1982, permaculture was introduced to North America through a course taught by Mollison at the Evergreen State College in Washington (Carey, 2005). The permaculture framework called for research that crossed disciplinary boundaries, which may have contributed to the mixed and largely negative initial response in academia (Veteto & Lockyer, 2008). There would not be a widespread adoption of sustainability concepts in higher education until after the publishing of the Brundtland Report in 1987. Scott (2010) suggests the absence of sustainability concepts in academia likely contributed to permaculture's isolation.

Movement members have also actively distanced themselves from academia. Permaculture literature has often criticized academic institutions and researchers for linkages with corporate interests, conservatism, failure of vision, and failure to appreciate

its inter- and transdisciplinary approach (Ferguson & Lovell, 2014; Mollison & Holmgren, 1978; Mollison 1979; Holmgren 2002). Ferguson and Lovell (2014) write:

The portrayal of the scientific community as homogenous, too slow, or altogether reactionary helped create a charismatic populist message in the early years of permaculture. While this approach may have been important in rapidly disseminating permaculture and creating an international movement, it now limits the value of permaculture by rendering it more difficult to interface with the larger community of researchers, institutions, and movements, addressing the project of agroecological transition (p. 19).

A lack of integration of contemporary scientific developments; the persistence of idiosyncratic or misleading terminology; and overreaching and oversimplifying claims made without dedication to systematic multisite assessment have been cited (Ferguson & Lovell, 2014; Harper, 2013; Scott, 2010). Systematic reviews found that substantive assessment of permaculture is essentially absent from peer-reviewed literature, and recent permaculture literature does not often cite scientific research or employ experimental design and statistical analysis (Scott, 2010; Ferguson & Lovell, 2014). Claims made about the productivity of some perennial systems exceed what has been documented in the literature and have sometimes been justified through misapplication of ecological principles (Ferguson & Lovell, 2014). However, the number of scholarly publications on permaculture is growing quickly in a wide variety of disciplines, suggesting that permaculture is becoming more integrated with research (Ferguson & Lovell, 2014). Jacke and Toensmeier (2005) have been cited as an important example of growing efforts to combine the action-oriented and anecdotal focus of permaculture practice with a more rigorous approach to empirical testing (Scott, 2010; Ferguson & Lovell, 2014).

While its lack of organization and institutionalization compared to similar movements may have also limited political mobilization and coordination of action

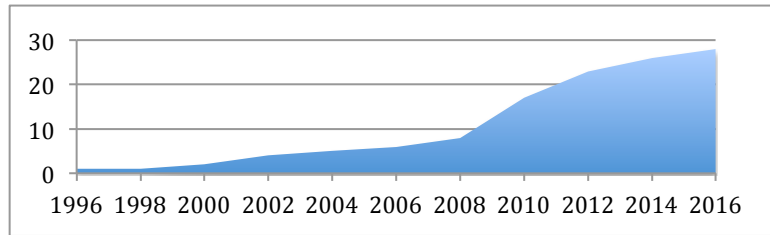
beyond the local level (Ferguson & Lovell, 2014), the accessibility of permaculture education in the popular realm may have contributed to its rapid growth. Indeed, in the past thirty years it has been a major trend in popular education for sustainable living (Mollison 2004; Holmgren 2002). Veteto and Lockyer (2008) argue that permaculture should remain on the margins of large-scale initiatives because the bioregionally organized, horizontal network would suffer in such a top-down context.

2.1.2 Permaculture in higher education: A growing trend

Despite suggestions by some that permaculture should remain on the edge of institutional spaces, it is becoming increasingly common as a component of ESE in higher education. I identified post-secondary institutions offering permaculture education through personal communication, interviews, emails to program administrators and faculty, and internet searches of academic catalogs and course schedules. Though I endeavoured to be meticulous, these findings should not be considered exhaustive but rather are intended to offer a snapshot of this phenomenon, locating it generally in place, time, and context.

As of January 2016, 35 post-secondary institutions in Canada and the US were identified as having offered a permaculture design certificate or program for academic credit. About half of these institutions also offered permaculture educational opportunities via other credit courses with permaculture as a topic or major focus or via non-credit PDCs. At least 26 other institutions were identified as having offered either a non-credit PDC, or other credit courses with permaculture as a topic or major focus. I charted the year in which a PDC for credit was first offered at the 26 institutions for which this information was available. As Figure 2 illustrates, the number of PDCs offered for academic credit has begun to rise more quickly within the past decade:

Figure 2: Approximate number of PDCs offered for credit by year, Canada & the U.S.



The growth of this trend was also sensed by participants. In particular, there was a strong sense that interest in permaculture had been growing in recent years, with many participants noting strong student demand and lengthy waitlists for the academic permaculture courses. Several participants cited a significant increase in permaculture teachers; the rise of the Internet as a vast resource of permaculture information; shifts in administrative interest at academic institutions; or a broader trend of growing popular concern and academic focus on sustainability and food systems within the past ten years.

As Figure 3 illustrates, the integration of permaculture in higher education is much more common in the U.S. than in Canada. The region of greatest prevalence for this trend was the Northeastern U.S., followed by the Pacific Northwest, including southern British Columbia. In my conversations with permaculture teachers, these regions seemed to be perceived as strong hubs for teaching and organizing. Regional institutions including University of British Columbia, Royal Roads University, Langara College, Capilano University, North Island College, University of Victoria, Camosun College, and Simon Fraser University have offered permaculture courses in some form.

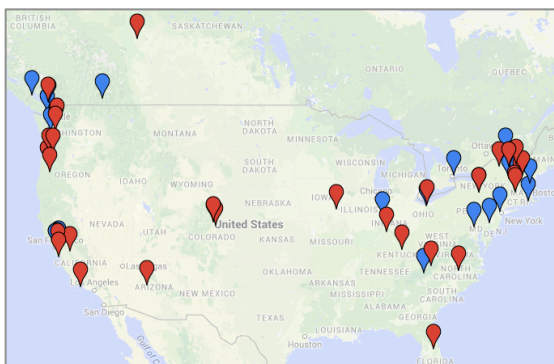


Figure 3: Geographical distribution of permaculture courses at post-secondary institutions in Canada & the U.S.

Red = PDCs and permaculture programs for credit

Blue = Non-credit PDCs at academic institutions and non-PDC permaculture courses for credit

The PDC is offered for credit by a wide range of institutions, the most common being large public research or land grant universities and small private institutions. As Figure 4 illustrates, permaculture education is associated with a diverse array of fields, the most common being Environment & Sustainability, followed by Farming & Horticulture.

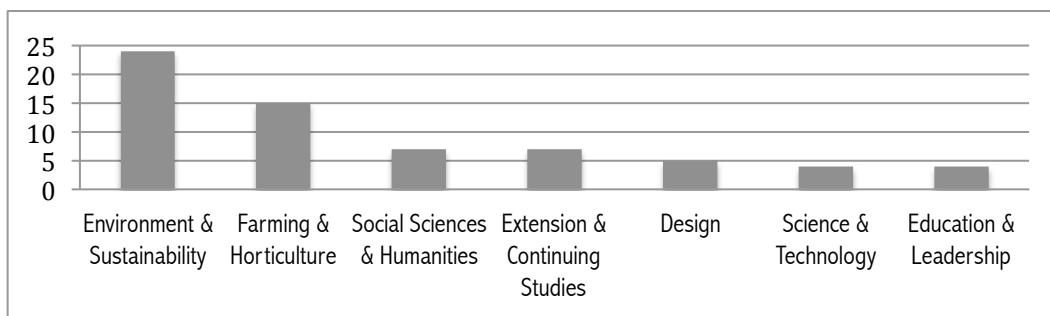


Figure 4: Academic programs & departments offering permaculture courses

The most common model for integrating the standard 72-hour PDC curriculum is a semester-based two-course series. Intensive courses of two to seven weeks (often off-campus) are also quite common. In some cases, the full PDC is offered through a single course using an online format or a combination of regular classes with three-hour labs or intensive weekend days. In rare cases the PDC is offered over three or more courses.

The PDC is offered over a highly distributed range of academic levels, including graduate studies. Most are open to students from a variety of fields and do not have pre-requisites; where these exist, they include Junior standing or courses in Math, English, Sciences, or Environmental Studies. Most courses are general electives, but several are required program components or are approved electives meeting requirements.

2.2 Permaculture and transformative learning in higher education

Permaculture's infiltration into higher education, most commonly through environmental and sustainability fields, raises the question of how the permaculture framework fits with and contributes to current theory and practice in environmental and sustainability

education (ESE). Many permaculture educators and writers have suggested that permaculture offers the potential for transformative learning (Dawborn & Smith, 2011; Lebo, 2012; Battisti, 2008; Seeds Sustainability Consulting, n.d.; GaiaCraft, n.d.). The transformational power of permaculture on a personal level has been recognized by students as well (Johnson, 2010). Bill Mollison's journey in formulating the concept of permaculture, which involved a fundamental change in his change of reference, has been described as a process of transformative learning, and other permaculture educators comment that they frequently observe students undergoing similar transformative learning experiences (Lebo, 2012).

Here, I discuss the significance of transformative learning in ESE, and how this can be achieved through integrative approaches to pedagogy. I outline the framework of Transformative Sustainability Learning (Sipos et al., 2008), which articulates an integrative and transformative vision for ESE using the organizing framework of "head, heart, and hands" used in my analysis in Chapter 4. I discuss how permaculture education reflects key aspects of Transformative Sustainability Learning (TSL), including experiential, community-based, and place-based learning.

2.2.1 From transmission to transformation

The multi-dimensional spectrum of literature on ESE reflects broader debates between behaviourism and constructivism, process and outcome, and transmission and transformation (Sterling, 2010). Some approaches have been criticized for not fully offering the transformative departure from modernist education that is needed in the world today. For example, the discourse on Education for Sustainable Development (ESD) has been linked with a prescriptive behaviouralist approach, didactic forms of

teaching, and a utilitarian view of education as a tool to achieve defined societal goals or targets (Sterling, 2010; Holder, 2013; Kopnina, 2013). Instead of teaching students how to think for themselves, some argue its expert-driven approach teaches them what to think by disseminating the idea that there are environmentally correct beliefs that must be taken up (Jickling, 1994; Bonnett, 2004).² Behaviouralist and psychological approaches neglect the collective and political dimensions of problems and possibilities (Hayward, 2012). Sterling (2001) argues such approaches only promote “first-order learning”: the emphasis is on information transmission, and lacks examination of basic values and thought processes.

While an instrumental view stresses purpose, outcomes, and effectiveness—what education is *for*—an intrinsic or emancipatory view stresses process and the quality of experience in teaching and learning—what education *is* (Sterling, 2010). Friere (1985) described this as one of the radical differences between education as a dominating and dehumanizing task and education as a humanistic and liberating task. The difference, he said, was a view of the learner as a passive receptacle to be “filled” by the expert’s knowledge, versus knowledge production as a reflexive process (Friere, 1970). When education is viewed as a means for students to develop their own potential and become

² Regarding sustainable development, *Our Common Future* (1987) asks, “How are individuals in the real world to be persuaded or made to act in the common interest? The answer lies partly in education, institutional development, and law enforcement” (p. 46). Similarly, UNESCO (1988) views environmental education as promoting “training, at various levels, of the personnel needed for the rational management of the environment in the view of achieving sustainable development” (p. 6). Jickling (1994) suggests this has led many educators to assume their role is to advance a particular agenda and set of behaviours (one that may also require the use of coercion). Kopnina (2013) argues that environmental ethics and deep green environmental perspectives are marginalized in the Mid-DESD review (UNESCO, 2009), the 2012 UNEP report, and the ESDebate, an online debate about ESD among environmental education experts initiated by The International Union for Conservation of Nature (IUCN) as well as in priority areas set forth by key financiers of sustainable development such as the IMF and the World Bank. Kopnina suggests several recent ESD articles including studies of elementary curriculum in Iceland (Jóhannesson et al., 2011) and Sweden (Ärlemalm-Hagsér & Sandberg, 2011) “emphasize the economic and social development, with environmental protection coming as last, and only as it is relevant to human interests” (p. 613). Anthropocentric bias, according to Scott and Gough (2004), is a characteristic of the ESD discourse.

critically participating members of society, write Wals and Jickling (2002), the possibility of a sustainable society comes into view. Without this, they say, sustainability is unthinkable. For Sterling (2001), reflexivity or critical reflection on one's assumptions constitutes second-order learning. Sterling sees a place for both first- and second-order learning in building the conditions for third-order learning: a state of paradigm change engaging the whole person and the whole institution (Sterling, 2001; Sterling, 2003). Such learning happens "when we are able to see things differently. It is creative, and involves a deep awareness of alternative worldviews and ways of doing things...it is this *transformative* level of learning, both at individual and whole society levels, that radical movement towards sustainability requires" (Sterling, 2001, p. 15).

2.2.2 Engaging the whole person in transformative learning

Transformative learning (TL) involves a critical examination of one's assumptions and the assumptions of others, resulting in a fundamental change in one's frame of reference (Mezirow, 1997). The questioning and adjusting of one's worldview in the context of new knowledge is called perspective transformation (Mezirow, 1995). Though TL is never a guaranteed occurrence, "when circumstances permit, transformative learners move toward a frame of reference that is more inclusive, discriminating, self-reflective, and integrative of experience" (Mezirow, 1997, p. 5). Transformative education as characterized by Mezirow (1997) is learner-centred and participatory, involving group deliberation and self-directed learning, in which the teacher moves toward the role of facilitator. In contrast to the "banking concept" of knowledge transmission (Friere, 1970), this social constructivist³ pedagogy posits that interactive environments result in better

³ Constructivist learning theory, largely credited to the work of Jean Piaget, posits that learning is a continuous process in which learners construct knowledge actively through an interaction between their

learning and more potential for transformation through open deliberation (Jonassen, 1994; Mezirow, 1995). A common underlying assumption of TL is that transformative group learning can lead to individual and social change (Cranton, 1994). Mezirow's constructivist theory of TL has provided the major epistemological backdrop since the establishment of the field in the late 1970s (Gunnlaugson, 2005; Kegan, 1994).

In recent decades, scholar-practitioners have moved toward outlining more integrative and holistic perspectives on TL (Gunnlaugson, 2005). TL has been expanded to include an ecological consciousness, engaging the whole person through action, reason, reflection, thought, and passion (O'Sullivan, 1999). Integrative learning opens learners to multiple ways of knowing, by engaging cognitive, intuitive, somatic, aesthetic, emotional, and spiritual knowledge; many see this valuing of a wider knowledge spectrum as essential for the creation of a more sustainable future (Wals, 2010; Palmer & Zajonc, 2011; Astin & Astin, 2010, Esbjorn-Hargens, Reams, & Gunnlaugson, 2010). Podger, Mustakova-Possardt, and Reid (2009) argue a "whole person" approach is necessary because socially responsible action requires the integration of moral motivation and systemic critical thinking. While education has traditionally focused on the cognitive domain, holding the necessary knowledge and skills is not enough to ensure sustainable action: ESE must involve values, attitudes, and capacities for collaboration (Bloom & Krathwol, 1956; Shephard, 2008; Chalkley, 2006). Glasser (2004) suggests that to bring a more sustainable world into being, education must promote "emotional maturity" (p. 143) through the integration of reason and emotion. Bateson's (1972) concept of the "ecology of the mind" underscored the inseparability of deep human emotion from consciousness

experiences and their existing ideas, as opposed to being passively absorbed (Sjoberg, 2008; Taber, 2006; Labudde, 2008).

and rationality, showing how ecological knowledge has cognitive and emotional aspects. Drawing on Bateson's work, Rojas (2009) proposes an "ecology of knowledge" in which personal experience, metaphor, and ideals are essential components of pedagogical design as a complement to empirical evidence and peer review. An integration of these multiple forms of learning, says Sterling (2001), can produce a truly "sustainable education": he argues that learning which sustains the "whole person—spirit, heart, head, and hands" (p. 12) is required for radical movement toward sustainability.

2.2.3 Integration: Head, heart and hand

The motto of Swiss pedagogue and educational reformer Johann Heinrich Pestalozzi (1746-1827) was that education is a matter of the head, heart, and hand (Brühlmeier, 2010). This holistic concept has long influenced educational thinkers (Higgins, 2009) and consensus is emerging that ESE should include these three "capacity-building pathways" (Brundiers, Wiek, & Redman, 2012, p. 310; Bloom, Masia, & Krathwohl, 1964; Orr, 2002; Sipos et al., 2008). In the early twentieth century, the linking of cognitive and experiential learning emerged through the work of progressive educators such as Dewey and Montessori. Such learner-centred, holistic pedagogies stemming from constructivist learning theory have remained on the margins of the modern education system. However, they have gained significant traction in ESE in recent decades as the importance of pedagogy in supporting deep learning and change is increasingly acknowledged.

In line with these developments and with calls for a "whole person" approach, I draw on the organizing principle of "head, heart, and hands" at the centre of Sipos et al.'s (2008) conception of Transformative Sustainability Learning (TSL). TSL brings together TL and sustainability education. Imagined as a distinct pedagogy as well as a planning

and evaluation tool, “TSL is a series of learning objectives corresponding to cognitive (head), psychomotor (hands) and affective (heart) domains of learning that facilitate personal experience for participants resulting in profound changes in knowledge, skills and attitudes related to enhancing ecological, social and economic justice” (Sipos et al., 2008, p. 69). Such education engages the head through critical reflection and perspective transformation, using transdisciplinary approaches that encourage systems thinking and understanding of sustainability concepts. It engages the hands through experiential, applied, and skill-based learning. Indeed, learning can be enhanced by problem-based, cooperative, active learning environments that enable self-direction (Kolb & Kolb, 2005; Bruner, 1960; Rogers, 1969).

The “heart” domain engages emotions and values, as well as students’ motivation to learn (Bloom & Krathwol, 1956; Beard, Clegg, & Smith, 2007). “Heart” has been described as a matter of “*spirit*—the passions that animate or move us; *moral sense or conscience*—the values, ideals and attitudes that guide us; and *being*—the kind of person we are, or wish to be, in the world” (Doyle & Smith 1999, p. 34-35). In ESE, affective outcomes can be new values, ethics, and commitments related to environmental justice (Shephard, 2008). Warburton (2003) argues that deep learning for sustainability must be interest-led: it is dependent on students’ internal motivation and engagement with a topic. Dewey (1916) argued that learners require engagement in meaningful real-world experiences that personally interest and motivate them; such care is critical for affective learning (Battisti, Passmore, & Sipos, 2008). Kolb and Kolb (2005) suggest that interest and positive feelings are central to effective learning. Positive emotional experiences can be transformational, broadening modes of acting and thinking (Fredrickson, 2003).

2.3 Pedagogies for Transformative Sustainability Learning

The transdisciplinary TSL framework aims to unify and thus strengthen various pedagogical models for ESE that integrate some of these elements but are often viewed as discrete, limiting their transformative potential (Sipos et al., 2008). These models allow for the emergence of experiential, community-based, and place-based learning, though major shifts in university structures are required (Moore, 2005). Based on core themes arising from my interviews, these three interlinked areas of pedagogical scholarship that relate to TSL emerged as the most relevant in placing my research and framing results. Because of permaculture's multidimensional nature, I recognized early on in the process that I would need a way to synthesize my broad reaching ESE-related findings. The integrative organizing principle of "head, heart, and hands" recognizes that each of these areas of focus represents a broad base of scholarship that contributes unique and important dimensions to transformative learning in ESE. I discuss each in greater detail here.

2.3.1 Experiential learning

Permaculture education typically includes a strong focus on experiential learning. The European Permaculture Teachers Partnership's Teachers' Handbook (2004) provides a framework for active educational approaches that are participatory and self-directed, that focus on real-world problem solving, and that stimulate motivation to learn. The Handbook (2004) explicitly engages Kolb's (1984) Experiential Learning Theory (ELT) and his work on distinct learning styles. Largely derived from the work of Dewey (Miettinen, 2000; Quay, 2003), ELT posits that new knowledge is constructed based on the learner's existing beliefs, knowledge, and previous experiences, in contrast to

transmissive modes of learning (Kolb, 1984). Experiential learning “involves the integrated functioning of the total person—thinking, feeling, perceiving, and behaving” (Kolb & Kolb, 2005, p. 194). ELT conceives of learning in terms of process, rather than outcomes: it is the creation of knowledge through active engagement. Experimentation, concrete experience, and critical reflection and examination of experience are essential to the process (Kolb, 1984; Kolb & Fry, 1975). While teaching practices that encourage reflection are essential to ELT, joint reflection in communication with others is a critical aspect of challenging one’s assumptions in TL (Mezirow, 1991). Meaningful learning does not happen through every experience, but rather through those that are relevant to the real lived experiences of learners (Glennon, 2004; Ord, 2009).

2.3.2 Community-based learning

In TSL, community-based learning presents opportunities to engage the affective domain of learning through collaborative group work, community service, and the development of a learning community (Sipos, 2009). Permaculture is centred on a community-based learning model of adult education, involving the development of learning communities. “Learning communities” are generally characterized by the intentional building of shared culture and community through developing mutually-shared values and caring interpersonal relationships (Larrivee, 2000). In higher education, they can enable effective interdisciplinary place-based collaborative learning (Dodge & Kendall, 2004). Goals articulated for learning communities in an ESE context include valuing of diversity, use of democratic and participatory approaches, teachers acting as collaborators and co-learners in student self-directed learning, and development of skills in communication and team-based cooperation (Rojas, 2009; Medrick, 2013). One study of

permaculture education demonstrated that students engaged in transformative learning by participating in guided reflection in a learning community (Battisti, 2008).

Service learning is another example of community-based learning. Gundersen and O'Day (2009) suggest that permaculture's project-based approach lends itself to service learning, as the PDC includes a design project in which students typically prepare a design for a community client. They write that the development of a three-acre permaculture demonstration site provided a significant opportunity for connection between their university and the surrounding community, strengthening community bonds and providing opportunities for students to interact with community members. Community and university collaboration for experiential learning, often through problem-solving and project-based work, can provide place-based, collaborative experiences that encourage participatory initiatives, grassroots activism, and a sense of community engagement (McKenzie, 2008; Wals, 2010; Ellis & Weekes, 2008; Ostrander, 2004; Palmer & Zajonc, 2011).

2.3.3 Place-based learning

Gundersen and O'Day (2009) write that the permaculture project at Pacific University has "paved the path for an integrated place-based curriculum that uses the local landscape and community as a context for learning" (p. 176). Resources for permaculture teachers such as the European Permaculture Teachers Partnership's Teachers' Handbook (2004) also draw from place-based learning. Founded in the work of progressives such as Dewey, the aim of place-based learning is "to ground learning in local phenomena and students' lived experience" through connection to the outside world (Smith, 2002, p. 586). Gruenewald (2003) writes that "places are fundamentally pedagogical because they

are contexts for human perception and for participation with the phenomenal, ecological, and cultural world” (p. 645). Teachers act as guides and co-learners, while students are active creators of knowledge, working on real-world problems and engaging with the surrounding community (Smith, 2002).

Pedagogy of place can involve teaching in nature through conventional outdoor education and experiential learning, which can promote a connection between students and their immediate surroundings and intensify the teaching experience (Lewicki, 1998; Foran, 2005). For centuries, nature has been considered as a significant educational site. Learning in nature is widely recognized as helping to foster environmental stewardship (Orr, 1994; O’Sullivan et. al, 2002; Stone & Barlow, 2005). Tapping into the restorative powers of nature can help in the creation of sustainable communities and relationships (Louv, 2011; Naess, 1995). Berry (1988) and Abram (1996) suggest humans have lost our ability to listen to our surroundings through perspectives that view nature as, in Abram’s words, “inert, mechanical, and determinate” (p. 71). He argues that denial of humans’ connection to ecology has led to exploitation and destruction of places.

In addition to outdoor and nature-based learning, permaculture education also commonly utilizes gardens as sites of instruction. At Portland State University, permaculture courses are core components of the Garden-Based Education graduate program in Leadership for Sustainability Education. Several educational thinkers including Comenius, Rousseau, Pestalozzi, Froebel, Montessori, and Dewey considered gardens to be important learning sites (Higgins, 2009; Subramaniam, 2002). In garden-based learning, “the garden is the foundation for integrated learning, in and across disciplines, through active, engaging, real-world experiences” (Desmond, Grieshop, &

Subramaniam, 2002, p. 7). Garden-based learning has become a major trend in K-12 schools, with a wealth of studies (see Williams & Dixon, 2013) showing its positive impact on development that addresses self-concept, motivation, environmental attitude, empathy, increased food literacy, and formation of community.

2.4 Conclusion

Though the permaculture movement has historically distanced itself from academia, in recent years permaculture has become strongly established in environmental and sustainability education in institutions of higher learning across the continent. The use of experiential, community-based, and place-based pedagogies in permaculture education reflects key aspects of Transformative Sustainability Learning (TSL). This suggests that permaculture may provide a useful framework for studying the emergence of transformative learning in ESE.

Chapter 3: Implications for the permaculture movement

3. Introduction

In this chapter, I ask what implications integration with academia holds for permaculture—the people, the practices, and the broader movement. Following the aims of what Bevington and Dixon (2007) call “movement-relevant” research, the overarching goal of this chapter is to generate useful findings that have the potential to be applied by the permaculture community. As discussed in the previous chapter, there is a history in the movement of active distancing from academia and criticism of its siloed approach, a perceived slow pace of change, conservatism, and links with corporate interests (Ferguson & Lovell, 2014; Mollison & Holmgren, 1978; Mollison 1979; Holmgren 2004). Several instructors cited continued movement controversy over the idea of working with academic institutions—and the tactical strategy of engaging the “mainstream” in general. Yet, in recent decades there has been an expansion of academic research that may be more relevant to the movement in fields such as agroecology and agroforestry. Given that permaculture is becoming more common in academic teaching as well—and will likely continue to expand in this realm—my conversations with movement members contributes here to an analysis of what these changes may mean for the permaculture movement, and what considerations or actions it might take in response.

Instructors were asked about their experiences working with institutions to offer permaculture courses, including the challenges they had encountered. Instructors shared key factors that had helped the overall process, ways they had addressed many of the challenges, and their advice for others working on similar projects. Those who had taught PDCs both inside and outside of universities were asked to compare these experiences.

With slight variations in wording, all instructors and students were also asked: “What implications do you think that integration with academia has for permaculture instructors, teaching the PDC, permaculture theory and practice, or the movement’s broader goals?” For each of these four aspects, findings are organized into sections presenting the perceived benefits and opportunities of academic integration, as well as the challenges and limitations or concerns. The delineation of these four interlinked categories conveys that myriad benefits and drawbacks operate at different scales of analysis.

Many participants felt integration of permaculture and academia was a good strategy or even necessary to help achieve urgently needed societal movement toward sustainability. Fourteen of the seventeen instructors were, on the whole, very enthusiastic and usually excited about this growing integration. The others were not opposed, but voiced stronger concerns or questions about academic linkages as an overall movement strategy. Even for them, however, spreading knowledge of permaculture still seemed to be the most important goal, in light of growing social-ecological crises.

I suggest that questions concerning control and authority in knowledge production and teaching are at the root of concerns regarding the integration of permaculture with academia. Given an abundance of risks, challenges, opportunities, and benefits at multiple scales, I found that many instructors saw their situations in terms of tradeoffs, and they frequently used permaculture concepts and principles in analyzing these tradeoffs. Usually, this led them to view working with institutions as worth the effort. Following their lead, I suggest several permaculture concepts and principles that can help instructors weigh these costs and benefits, and understand how the permaculture movement can design mutually beneficial relationships with academia.

3.1 Working with academic institutions

In this section, I discuss instructors' views on the experience of collaborating with academic institutions. This included navigating the process of establishing new courses and the implications this had for their own professional work. Most instructors noted key advantages and benefits they had received through working with an academic institution. However, several challenges and limitations were experienced as well. I also discuss key factors that assisted instructors in this process, and in overcoming some of the challenges.

3.1.1 Benefits and opportunities

The four main benefits and opportunities of working with institutions were various degrees of economic security, reduced workloads, access to university resources, and broader career-related benefits of affiliation with an institution.

While only two or three instructors felt they were paid well at institutions—a topic to be discussed in greater detail below—economic security was often considered to be an advantage. The value of most positions seemed to be in the *regularity* of paycheques, and the (often hard-won) health benefits—rare assets for most small business-owning teachers. Prof. Grant noted his regular part-time position had afforded him the financial means to buy land for his permaculture projects, as well as the free time needed to work on those projects. While some felt the workload was not necessarily lighter, just different, two felt strongly that it was more sustainable compared to their independent careers. For Prof. Danielle, working with an institution was worth the low pay because she received a secure income “without all that headache” of organizing an independent course:

So. Much. Work. And you never know if it's going to run or not. Here, that's all built in. The space is built in. The registration is built in. The marketing is built in. The student audience...certainly I have to do curriculum planning and guest lectures, but I have a budget for that now, which is nice.

Others echoed her appreciation of support with marketing, which seemed to be an activity few enjoyed. Excellent internet search engine optimization for courses, funding for high profile guest speakers, and access to digital production services were also welcomed.

It was evident that some could see how different elements of their positions made the whole more valuable than the sum of its parts. Prof. Grant explained that teaching one university course only made sense because several elements were “nested” together, including benefits, a research collaboration with a professor, and a pre-existing job at the institution. Prof. Mark described how he had stacked course time in the field together with a private design contract, allowing him to spend extra time onsite without having to bill the client.

Six instructors spoke of broader career-oriented opportunities and connections gained. Some felt it allowed them to keep pace with their professional peers or dialogue with other professors about curriculum. Two expressed an appreciation of being held to a higher degree of accountability and having their claims “checked” by university students, whom Prof. Matthew described as “ostensibly the most up to date with the things they’re studying.” Prof. Grant felt that teaching in the university had made him “a better teacher”: “I’ve gotten to work with people who leverage research in a really proactive and positive way...and it’s made me question the assumptions I have.”

Similarly, a few talked about leveraging their university experience and connections to secure more projects and work with institutions. Prof. Mark felt he had gained more “mobility”: “In the wide world, my affiliation with [name of university] is *way* more valuable than affiliation with any permaculture institution...it means you’ve been vetted by the system.” Taking a holistic view of these various factors, a large

majority of instructors seemed to feel that working with institutions had ultimately benefited their careers or livelihoods.

3.1.2 Challenges and limitations

Perceived challenges and limitations to working with institutions included low remuneration, insufficient funding, bureaucratic inertia and decision making, loss of control, politics and professional impacts, and lack of understanding or discomfort with permaculture among administrators.

A sustainable level of remuneration was important to instructors, some who perceived a broader decline in paid opportunities for permaculture teachers. But most who had held adjunct or temporary academic positions viewed the pay as mediocre, less lucrative than design work, or even “horrific.” Prof. Cathy declined an invitation to teach at a college when she calculated that she would essentially be earning minimum wage. At best, Prof. Helen felt she had been paid quite well, but lived too far from the university for the commitment to seem worthwhile. At worst, I heard first and second hand accounts of instructors willing to teach for free or very little, while a different faculty of record for the course was paid. Often, hiring policies and budgetary constraints allowed little room for hiring and paying new instructors. Temporary grants or complex funding schemes were needed to pay several instructors’ salaries, contributing to job insecurity. Two relied on income generated through online courses to indirectly fund their on-campus courses. If enrolment dropped for external reasons, instructors whose pay was tied to it suffered financially in the same way they might in the independent market. This made it hard for some to move up the ladder, get health benefits, refine their courses, or make longer term plans. Prof. Grant summed up a common sentiment: “It’s not really a career.”

Funding was certainly the greatest perceived limitation for offering courses at institutions. I also found this to be true in my own experience getting a course approved at my school. In many cases, courses that had been offered multiple times still faced an uncertain future. I was surprised by how insecure many courses were at institutions that, from the outside, seemed to have truly embraced permaculture as part of their educational offerings. Prof. Dana talked about a steady stream of interested students arriving at her institution, which had gained a reputation for permaculture but had no program in place to support them. She described the funding as “like a stack of cards...it’s not deeply engrained in the university.” In some cases, there was little support for instructors’ home departments due to other institutional priorities, limiting the potential for field trips, research, campus demonstration sites, or collaboration. In two cases, lack of funding necessitated the creation of an off-campus or Continuing Studies course, which made it financially inaccessible for some students. Some instructors had to pay guest teachers out of pocket, trade for guest sessions, or teach alone—which most felt was challenging or disagreeable as a pedagogical approach. Two instructors addressed the lack of funding for a Teaching Assistant by negotiating unpaid internships with former students.

Rigid institutional approaches to decision-making seemed to be perceived as a key barrier to securing more permanent support for the courses. Twelve instructors described feelings of frustration or confusion about the slow pace of change, the “minutiae” of bureaucracy, policies that seemed illogical, liability concerns, “conservative” attitudes, and decision-making processes that were closed to outside view. Working against the inertia and resistance of the “elephant” required endurance and perseverance. It seemed that larger institutions posed more challenges to bureaucratic navigation and course

approval. As Prof. Shannon put it, “in a big bureaucracy they just have rules to stand in for relationship.” Prof. Mark pointed out how even people in established positions across the university had to find ways to contend with its cumbersome structure:

It’s just this machine, with all these rules and limitations. To find the leverage points, and that’s what I do, I find the pivot points...every office you go into, basically everybody’s just finding loopholes of how to do stuff. Everybody’s just loophole navigators.

For people who generally seemed to see themselves as highly independent or critical of the status quo, being subject to these constraints and directives was clearly difficult. Prof. Cathy preferred the model of offering Directed Study credit to individual students who pursued PDCs outside of universities. After teaching at one institution, she declined an offer to teach at a different college because she felt liability policies would inhibit her from leading simple outdoor activities: “I didn’t want to lose my independence. So that’s why I turned it down, partly the money and partly the amount of bureaucratic control.” In many stories, I could sense discomfort with the forfeiture of control in working with institutions. In a nod to the principle *Use edges and value the marginal*, three shared that they liked being on the “fringe” of their institution, even if it was less secure, because it allowed some distance. In Prof. Olivia’s words,

What I see is that as things become absorbed into the institution you get much less *freedom*...you have more security and stability but you’re also sort of set in stone. That edge is a great place to be if you can maintain...if you get too close to the centre you get absorbed into the centre. How do you manage to float that edge?

Fortunately, being on the edge by having a limited academic background did not seem to be an issue in most cases. While six who had taught at institutions did not hold graduate degrees, only one noted that this had presented hiring barriers. Though most of the department was supportive and confident in his teaching abilities, this led to questioning

of Prof. Grant's credentials and blocking of approval for his course by two professors: "It was like, who is this person thinking they can teach? It's ironic, because having a PhD doesn't mean you know how to teach—and I've actually studied and trained as a teacher." However, tenured faculty were also not immune to institutional politics and the professional risks involved in experimentation. Prof. Olivia relayed a story of damaged reputation and lost opportunities, having been perceived not to have gone "through the proper channels" at her institution in sparking a new permaculture educational initiative.

About six instructors felt that while their departments had been supportive, building interest beyond this was challenging. Two noted that their administrators were initially uncomfortable with the idea of offering a certificate they did not understand. There were concerns about misconceptions of permaculture among "higher-ups" leading to disinterest in developing campus permaculture sites. Several felt permaculture was hard to explain or define: in Prof. Helen's words, "We speak a different language. And that is an impediment." Others felt a lack of credible research and documentation in permaculture caused administrators to be skeptical.

Interdisciplinary and hands-on approaches to teaching that were highly valued by instructors were also noted as possibly leading to pushback. Interestingly, though several noted a recent trend toward such approaches in universities, the same individuals said administrators had showed discomfort with the strong focus on these approaches in their proposed courses. Prof. Wendy shared why she felt it was "a harder sell":

In some sense, higher education wants to see itself as white collar—like my grandparents had to toil and slave and do all this manual labour. And higher education is about moving beyond that. Like that's how you achieve success in a modern society. There's a kind of weird dichotomy that exists in higher education about, we're above that kind of learning.

3.1.3 Facilitating factors

About half of the instructors faced formidable challenges in getting courses approved at their institutions, or in maintaining the courses in subsequent years. The most important factor for success toward this goal seemed to be student demand. Other critical factors included having pre-existing relationships, a staff or faculty champion, a supportive department or campus, a progressive culture in the surrounding area, an accessible teaching site, and creative funding schemes.

Strong student demand for permaculture courses was evidenced in the majority of cases. Several instructors and students talked about long waitlists for courses—to the point that, in a few schools, students faced challenges in registering for them. Wider student demand for sustainable agriculture, program requirements, and word of mouth reputation for the course or instructor were noted as contributing to demand. Several instructors stated that course feedback had been “off the charts” or the “highest ratings” in the department. Though it was not possible to corroborate such reports, all of the students noted a strong reputation or demand, or expressed high regard for their instructors, often describing them as highly knowledgeable and skilled teachers, active in their field, or encouraging of students. Instructors instead attributed the strong reviews to the compelling nature of the material or to their teaching methods that included more hands-on learning, local application, and student self-direction.

Several felt that universities were drawn in by the fact that permaculture was “trendy” or offered the ability to provide certification, potentially helping them market themselves and attract students. Some felt that even if institutions were uninterested in permaculture, they had to listen to students to some degree. As Prof. Grant noted,

“Ninety-five per cent definitely recommended it and wanted it to be a permanent course. We had overwhelming support, and people can't ignore that. In the end, the students pay the bills.” In at least five cases, I was told that direct student pressure had been critical to establishing the first course.

Most instructors seemed to feel that pre-existing relationships or prior work done by others had been essential to getting courses approved. Many felt it was important to find “allies” in the institution that could help in securing resources, navigating bureaucracy, and building support. Twelve instructors already had such relationships; several had already worked or gone to school at the institution. Instructors with fewer pre-existing relationships had a more difficult time. Nine spoke of “visionaries” or “forward thinking” faculty and department heads who saw the value in the permaculture system, “went to bat” for the instructors, or were willing to take risks and seek creative solutions to barriers. In several cases, the instructors themselves were the main champions. Creativity, perseverance, patience, flexibility, and a collaborative personality were deemed important qualities for such an undertaking. Having a strong, established reputation and experience as a teacher were essential for many.

Support from “receptive,” “innovative,” and “flexible” departments was quite common. Ten instructors, as well as several students, pointed to an “open minded” campus or departmental culture that in many cases was already supportive of field-based learning, community engagement, or sustainability. Two instructors talked about how they intentionally aligned proposed courses with broader strategic institutional objectives related to these themes. They felt that timing had been important: at their institutions strategic planning was underway or had recently been completed, and it was a good time

to propose a new approach that aligned with stated goals and a larger trend toward more interdisciplinary, practical, and skill-based learning.

About half of the instructors pointed to a broader culture in the community or region. There was a sense that institutional support was easier to build in areas perceived as having progressive political leanings, a history of nontraditional education, a strong agricultural sector, high awareness of permaculture or organic methods, or several established permaculture sites or instructors nearby. Ten instructors and some students noted that having an accessible teaching site on campus or within walking distance had been a major factor in offering a quality course.

Funding for guest instructors, course websites, field trips, and often the instructor's own salary came from sustainability grants from student groups or university departments, course materials fees, or revenue generated via online courses or Continuing Studies offerings. Opening up the course to adult learners in the community was an important funding model for at least one course. Funding for installation of campus demonstration sites also came from private community donors. At most institutions, the path to approval involved offering a pilot "Special Topics"-type course that often did not involve a full PDC, in order to establish proof of concept.

3.2 Teaching the PDC

In this section, I discuss instructors' experiences teaching the PDC in an academic environment as compared to an independent PDC. Only four instructors who had experienced PDCs outside of institutions noted benefits uniquely offered by the academic realm to the experiences of teaching and learning in a PDC. Instructors tended to perceive more drawbacks to teaching and learning in the academic environment than advantages.

3.2.1 Benefits and opportunities

The key benefit in teaching the PDC, noted by two instructors, was that the university environment led to a strengthened curriculum. When questions were raised about the integrity of Prof. Grant's teaching material, the problem became the solution: he was granted paid time to develop a curriculum fully supported by referenced works. Having a budget also allowed Prof. Dana to develop stronger curricula: "that's so great, because I've been able to create things... Sometimes you're just trying to make ends meet, so you don't have time to innovate." She explained how she had been able to design functional interconnection between the curricula, assignments, and hands-on projects of her university course and her independent course. She felt this benefited both courses:

Working on that edge, you can craft experiences that are more real. And there's all kinds of learning happening. There's just such a win from every angle. Now I'm in the process of merging those two worlds. There's a lot they can learn from each other.

3.2.2 Challenges and limitations

Instructors faced a number of limitations in teaching the PDC the way they wished. Funding and scheduling constraints, less student diversity, a more formal teacher-student relationship, and differences in how students approached the courses were noted as leading to a less "rich" or "dynamic" experience for themselves or for students.

Because academic schedules were more firm than the constraints of a PDC, some instructors lamented having to cut out some content that was good, but non-essential. This often meant that hands-on learning—strongly considered by instructors to be a critical component of permaculture education—was more limited than in an independent PDC. For three instructors, smaller class sizes—noted by several as an important characteristic—required negotiation or compromise.

Four people noted that the academic PDC was more homogenous in terms of age, perspective, or economic status than a regular PDC, leading to less interaction between students and others with different backgrounds. In a field that strongly articulates the importance of diversity, this was seen by some as a weakness. As Prof. Grant pointed out,

There's always this question of what audience you want to reach. If you get to go to college it's a big privilege, and there's a lot of leverage potentially there. And at least for me, it needs to be balanced with community members and low income people, a whole different range of students.

Having a diversity of teachers in a PDC was considered critical by a large majority of instructors, but budgetary constraints meant they were often limited in inviting guests or in a few cases had to teach alone. This was seen as challenging for the instructor and a drawback for students, who were exposed to fewer perspectives. Some tried to mitigate this through exposing students to films and books produced by other teachers.

Four instructors disliked how the academic environment constrained their relationships with students and created a “very different vibe” in the course. Instructors spoke of expectations of “technocratic” behaviour and more “sterile” or “formal” relationships. A few felt that despite their efforts to mitigate the professor-student power dynamic, the academic environment inevitably resulted in a more distanced relationship with students: as Prof. Ross remarked, “just the paradigm of teaching and learning is so fundamentally different.” Some expressed how the ability to build community among students, and between students and teachers, was higher in an independent PDC, where in Prof. Danielle’s words, things were “more like summer camp”: “they're like ‘BFFs’ after the course...whereas in the university setting, people don’t really talk to each other.”

With stressed out students juggling several courses and often jobs, four instructors felt students were unable to dedicate as much energy to the course as a regular PDC.

Some felt there were always a small number who came just for the credit, or because they thought it would be easy, and were less engaged in the material. If students were only stepping out of the conventional PowerPoint-laden academic environment for a small part of their week, some instructors expressed skepticism about their ability to make an impact. In Prof. Matthew's words, "For some, and probably more than I'd like to admit, it's just another class...the feedback is like, 'this class changed my life,' but how many people actually act on it and carry it forward into their lives?" Because university students were often at a different stage in their lives than students of independent PDCs—who were often landowners—some topics did not "hit home as hard" and had to be approached in a more analytical or hypothetical way. As Prof. Helen put it, students who sought out independent PDCs "tend to be much more 'self-directed learners'...which as an educator I find to create a more dynamic and engaging experience for all concerned."

However, there was a sense overall that the differences of academic courses did not negate their value. As Prof. Wendy told me, "The permaculture that I fell in love with or that I really think is valuable, I think that still exists in how we teach it here." Prof. Mark saw a benefit in that each course could have a unique emphasis tailored to the context and interest of students: independent PDCs might focus more on community and social topics, while academic courses tended to have more of a science focus. Prof. William echoed a common sentiment that offering a course to university students was worth these tradeoffs:

Even if it's not our ideal situation all the time, I think that's a tradeoff. If it's not as groovy and fun as we'd like it to be, but we're hitting the mark, and we're making it transformative in different ways and we're engaging people and getting them excited about permaculture, that's awesome.

3.3 Permaculture theory and practice

Permaculture theory and practice can benefit from integration with academia, according to most instructors. However, several instructors shared concerns they or others in the movement held about how the integration of permaculture into academia might negatively impact the development of permaculture theory and practice.

3.3.1 Benefits and opportunities

The four main strengths for permaculture theory and practice were increased rigor and integrity, expansion of permaculture research and documentation, evolution of ideas and expansion into new fields, and increased visibility and understanding of permaculture.

Three quarters of instructors expressed feelings that permaculture could benefit from more rigor and professional standards. Most of these respondents expressed feelings that interaction with academia could help to bring more rigor and integrity to the teaching and application of permaculture through scientific inquiry and critical thinking. Two felt affiliation of their courses with an institution offered an air of “basic legitimacy” or “security” to potential students, though they were unconvinced about the validity of such a measure. However, several did feel that permaculture had gained a reputation for the repetition of information—“stories on top of stories”—without critical evaluation and testing of claims. Though Prof. Grant felt that stories were an effective teaching method, “that doesn't substitute for...framing things in such a way that are based off really good science.” He felt the pressure to include more research in his university teaching was ultimately very beneficial. He explained how the publishing of a peer-reviewed paper on permaculture had been “a huge step” that had made his own job “a lot easier”:

The more times we can mention it and have it in there, it's really bringing more to the table. I don't think it's about proving ourselves to somebody, I think that's what

people get turned off by, like ‘I don’t need to prove myself to the scientists.’ I hope people can come around to see there’s actually really beneficial partnerships here.

Several instructors expressed a desire for more research, documentation, and integration of the latest science in the application of permaculture. By citing scientific studies that support its claims, Prof. Michael felt the word “permaculture” would gain more meaning and credibility and the movement would be strengthened. Some celebrated a perceived rise in graduate research about permaculture, and noted that the permaculture community could benefit from the engagement of students in documentation and evaluation of projects. One student noted how campus demonstration projects could allow opportunities for long term experimentation without the pressure to produce significant food or income. However, some instructors who welcomed more research were also skeptical about the need for more academic “proof” in order to know things they felt were already apparent, or to take critically needed steps toward sustainability. As Prof. Matthew pointed out, “All these things sure we could unendingly study...but is further study really what we need, or is action actually what we need?”

Several respondents felt it was time for permaculture to move beyond its historical focus on agriculture and land management strategies into what Prof. Matthew called “the frontiers of permaculture,” such as business, education, health, policy, decision making, engineering, or architecture. Ten people expressed excitement that offering permaculture education in academia could help move this forward, and change how work was done in diverse fields. Prof. Dana spoke of a librarian at her very large university who initiated several sustainability initiatives through the library after taking her PDC: “what I’ve noticed is as you expose the idea of permaculture to different people, it develops permaculture in other ways...and I think that’s really starting to happen, *that’s* what I’m

really excited about.” Many students explained how they planned to apply permaculture to their own fields. Several suggested that offering permaculture education in universities could broaden its scope and make it more accessible to new ways of teaching, new fields of application, or new kinds of audiences. Two students agreed that new perspectives could be brought to permaculture from, in Oliver’s words, the “huge resource of forward thinking and creative individuals that you find in a college setting—people who can contribute to the field and the body of knowledge.”

Certainly, enhanced visibility and exposure was the area of strongest agreement. Nearly all respondents expressed feelings that universities and colleges offered an opportunity for permaculture to reach a wider audience. Instructors and students alike spoke of the opportunity for “thousands” and even “millions” of young minds to find out about permaculture by accessing a course or hands-on workshop at their institution, or by walking past campus permaculture gardens every day. Some felt that students simply knowing there was a campus permaculture garden—even if they did not know what this meant—could be a benefit, though several remained skeptical about how many students would really “go deeper” in education or genuine understanding of permaculture. Others noted that physical implementation and courses on campus could also create “fingers of connection” leading to more understanding and interest among their own colleagues and university staff, as well as residents of the wider community. Prof. Helen was thrilled about plans to implement permaculture designs at the residences of two top university administrators: “*That’s* the impact we’re looking for!” She felt the project at her own institution would continue to have an impact over time, even if PDCs were discontinued. A few instructors talked about how permaculture had become “infused into the very

landscape” or “part of the culture and part of the language” of their institutions. Several talked with excitement about how campus permaculture projects had made the front page news in their communities; one made national headlines by winning a prestigious White House award.⁴

In particular, the opportunity to reach young people at an important stage in their lives was mentioned by many. Prof. Danielle described this using the principle *Catch and store energy*, which encourages practitioners to embrace opportunities to harness available resources:

The way I see colleges and universities is they're like a *huge* capture moment. You have all these people that have dedicated time to learning, and *mostly* they're younger students and they're idealistic sponges. So we've got this awesome catch and store opportunity to inoculate peoples' minds and skill sets... We have this opportunity to interface in this way. In this moment. This very fertile moment.

Simon, a student, felt that “getting the college kids when they're most moldable and ready to go” allowed more time in their adult lives to spread the movement: “If we can be doing this at the college level when they have the time and the energy... I think that's a much better model to start to pursue.” A few instructors felt that offering permaculture education in university could reach a young audience who otherwise might not have known about it or been able to access it. As Prof. William explained,

I think it gets more people exposed to permaculture that wouldn't be otherwise. Because at this point in their lives, they're not going to go do a PDC necessarily. It's really rare... so if nothing else, we have planted the seed in these hundreds and hundreds of people that have done them through higher ed situations.

This was evidenced in how students themselves learned of it. Eight said they had not heard of permaculture until they encountered the course as an option at their school. The other three had encountered it outside of academia and wanted to learn more, but did not

⁴ The Franklin Permaculture Garden at UMass Amherst, which was built on a quarter acre lawn outside a campus dining hall, won first place in the White House Campus Champions of Change Challenge in 2012.

do so until they had the option to take a university PDC due to its affordability, convenience, or fit with their schedules.

3.3.2 Concerns and drawbacks

Concerns and drawbacks for permaculture theory and practice included co-optation, watering down of the curriculum, courses being offered by unqualified instructors, academization of permaculture knowledge, and misrepresentation of permaculture.

Four instructors talked about concerns in the network that permaculture could be co-opted in the academic environment. However, two of these instructors were not personally convinced of this threat and so did not elaborate. On the other hand, Prof. Cathy told me she felt the academic world is “going to eat permaculture for lunch”:

I think it's much to their benefit if they can bring in permaculture. It might get things on track. But more likely, they'll just co-opt it. And, you know, flavour something with permaculture. I don't have a lot of faith that they're going to remain true to the essence of it.

There did seem to be some concerns that embedding oneself further into the institution could lead to reduced independence or ability for criticism. Interestingly, however, this contrasted with my own experience of the instructors: most who could be considered “more deeply embedded” were, in fact, some of the strongest critics of “the man,” while several who were operating very much outside of institutions were less critical.

Expressed more strongly was that several shared concerns they felt or had heard from others that the PDC could be “watered down” by faculty who did not fully understand permaculture or were determined to make it fit into a single academic course. Four shared personal anecdotes about professors who were going to be paid to teach a course about permaculture without having sufficient training in it. In two cases, when this was discovered, the respondents themselves joined the courses as guest teachers to ensure

the integrity of the curriculum was maintained. In another case, the professor allegedly offered “sham” permaculture design certificates to his students without really following the curriculum. Concerns about treatment of permaculture by professors as “just another subject” to add to their list were echoed more broadly. Prof. Shannon linked this with a broader problem she saw in academia around “this construction of what knowledge is, how we know something”:

I have a lot of concerns about faculty picking up a book and then teaching their students permaculture...there's just a level of ignorance and I think hubris to some degree or arrogance about, I'm at the top of the heap knowledge-wise, and people can't tell me what to do.

Prof. Matthew shared related concerns that the “academization” of permaculture knowledge could draw attention towards the work of elite experts, and away from the grassroots. He echoed broader feelings that academia was ultimately limiting for permaculture’s on-the-ground focus:

This is again where I celebrate permaculture's role outside of the academy. Because I do *not* think permaculture should be taught by people who've spent their entire lives in school to pursue terminal degrees...permaculture cannot be taught from an academic perspective. It needs to be taught from a place of practice.

Most instructors felt strongly that departments should look outside of the institution to guidance from local permaculture experts with a significant body of practice who were “actually living and breathing it.” They felt that taking the time to consult the permaculture community, sit in on PDCs, and do careful research about the teaching credentials of potential educators was very important. In particular, Prof. Ross stressed the importance of permaculture teachers themselves consulting the community in advance, to ensure that the market could support a new course. Others echoed this

sensitivity to the negative impact that new academic courses could have on the ability of local independent teachers to maintain a sustainable livelihood.

There was a sense that quick integration of permaculture projects and courses without sufficient observation and planning could ultimately be damaging. Several instructors shared concerns that misunderstandings of permaculture in institutions could result in it being misrepresented as simply a form of agriculture or otherwise. Prof. Danielle had been involved in installing a permaculture garden on campus cautioned against such an approach, due to the transitory nature of colleges. Initially excited students would eventually graduate and move on, potentially leaving an insufficiently maintained garden and giving permaculture “a bad name.”

These various concerns did not seem to be shared by students, who tended to have much less knowledge of the permaculture network and its historical separation from academia. When I explained that its re-integration was controversial for some, most appeared unconvinced of the potential threats this might pose, often redirecting the conversation to the opportunities it presented. Simon, a student, analyzed this using the principle *Apply regulation and accept feedback*:

I think a lot has changed since David and Bill started this movement...the whole sense of permaculture is to apply and accept feedback...It's been almost 30 years or more since that decision was first made, and I think it's important to accept the feedback that this is successful, and people are loving it and having a lot of fun. And maybe it's time to reconsider the idea of bringing permaculture back into the higher education system.

3.4 Movement goals and strategies

Instructors and students alike expressed wide agreement that major societal changes were necessary in order to move toward a more regenerative human existence. This shared basis of understanding forms a central driving force for permaculture's broader mission,

inherent in the ethics *Care of Earth*, *Care of People*, and *Fair share*. This larger project was described by instructors in various ways, such as “looking at whole systems,” “creat[ing] new culture,” “chang[ing] the world,” and even “working on a revolution.” It was very clear that most respondents felt personally compelled to work toward these goals, and had already spent time pondering what impact integration of permaculture with academia could have in relation to the broader aim of addressing the growing ecological crisis. While many instructors expressed hope in this regard, there was skepticism about the overall impact this strategy could have in moving toward that goal.

3.4.1 Benefits and opportunities

A majority of respondents were hopeful that through the energy of student movements or the percolation of permaculture knowledge into the world through graduates of higher education, “universities have the potential to be a catalyst of change,” and could help “move things forward a lot quicker.” Echoing a common feeling that the planet was in an ecological emergency, Prof. William felt that working with universities was a tactical approach that made sense:

We're seeing it as an ally. People are here to learn, they're looking at all their possibilities. The world's changing really fast, we need all hands on deck with good solutions, and here's this group of people that want to learn...

Some felt that despite the risks, stronger relationships between permaculture and academia were critically necessary. Prof. Olivia felt it was important that as many students took college programs in permaculture as possible because “we have to get it out there” into the minds of

managers, people that are making decisions. They went to college, right? So, if in college, at least *some* of them get information about sustainability and permaculture, then they're going to have that information going into their decision.

And that's a really important thing if we're going to be able to turn this corner and make this change we need to make.

Criticizing the traditional approach to offering PDCs, Prof. Ross felt becoming “embedded” in academic institutions was “precisely the kind of dance we need to take...I think just working by yourself in some wooded place in the boonies where you're running your own PDC might be easy but it's not life-changing. It's not society-changing.”

I talked with several instructors about permaculture's historical split with academia, and divergences of opinion in the community about the tactical value of working with “the mainstream.” Most celebrated its existence and evolution outside of the academic world, and wished to see this continue. However, several instructors shared their views that much had changed since the founding of the practice—in universities and in the permaculture world—and that it was time to look at bringing the two back together. Regarding early positions in permaculture that “used to rip” on the university, Prof. Helen said: “I don't think of it as either/or...a *lot* of people just hold to that. That's old stuff...let's be present with what's going on now.” Her view was that as long as the ethics and truth were adhered to, permaculture should interact with the mainstream: “I always say, teach to anybody who's going to listen.” Citing earlier movement debates over changes to the format of the PDC, Prof. William pointed out that with *any* change, there would be differences of opinion.

Speaking to concerns in the movement that permaculture could “get the lifeblood sucked out of it somehow,” Prof. Wendy expressed hopefulness that the strategy of working within academia held potential for broader institutional transformation in alignment with the goals of movement members:

Instead of permaculture being changed by universities, I think perhaps universities might be changed in a positive way by what permaculture can bring. You can sit outside an institution you don't think is doing a good job and complain and throw stones, and say it's terrible. Or you can embed yourself in that organization and get to know its heart and what it thinks is important. And figure out ways to change it from the inside out. Become part of that system and see how it can benefit from what you have to offer.

Prof. Mark expressed feelings that permaculture in universities signaled a new stage of existence for the movement. He suggested that resistance to working with institutions was not based on thorough observation of the current state of global affairs:

We're too far gone to create an independent free standing system. The universities are not crumbling, they're getting bigger. So permaculture in a university represents the more expansive colonization of the mycelial web. You want to see what the exponential growth of permaculture looks like when the system takes a leap to the next level of organization? This is what it looks like. To think that permaculture should exist in completely freestanding organizations is a lovely concept. But I don't think it honestly deals with the fact that these organizations *are* here and they're not going away. They're very resilient. It's just one more niche.

3.4.2 Challenges and limitations

Most instructors expressed feelings that permaculture and academia had fundamentally different goals. This led to skepticism that despite the potential of universities as catalysts, significant changes in academia or society resulting from integration were unlikely. Three instructors therefore questioned academic linkages as an overall strategy for the movement and its members.

A few instructors expressed that permaculture did not need universities to fulfill its mission, and that they could possibly detract from it. There was a sense that the siloed and anonymous institutional setting made universities ill-suited to approaching interdisciplinary problems and developing the “real relationships” that permaculture required. Some instructors saw institutions as teaching conformity, tunnel vision, or

compartmentalized thinking: “a troubling issue for our times.” Regarding the educational mission of the academy, Prof. Benjamin said:

It's to continue running the kind of society that we're currently on a collision course with. So in order for permaculture to really become part of the DNA of the academic system, I think the academic system would have to be fundamentally rethought and restructured.

However, there was a sense among many that universities were not up to this task—that “this thing that’s bigger than ourselves” was much bigger than universities were interested or ready to take on. As Prof. Olivia pointed out, “It’s just really hard to change a system that’s so entrenched. You can change the colour or the surface of it. But the system itself is really hard to actually change.” She echoed broader feelings that the overall strategy of working toward such fundamental changes in universities was not well-matched to the level of urgency characterizing the unfolding global ecological crisis. A few instructors directly challenged, in the words of Prof. Matthew, “the whole validity of institutional learning at its core.” Three questioned whether even pursuing a university degree was the best choice for people intending to make a livelihood in permaculture. The “golden handcuffs” and “unethical” levels of student debt were compared to what could happen if, in Prof. Cathy’s words, “all those university students took PDCs and came over to our world”:

Is [academia] going to change the world? I don't think so. Is permaculture going to change the world? It could, if people really learned it and wanted it to. I don't think universities have that potential. They're just a big institution, they're not bad. But we're in an emergency! We're in a crisis! And you know, they want to keep their whole thing running. They have to, really. I think all those kids should drop out, if they could put the amount of money they're spending on university into something that's really going to change the planet, that's what we need to do. And staying out of debt, by the way, is one of the important permaculture ideas.

3.5 Discussion

In this chapter, I asked what implications integration with academia holds for permaculture. Here, I discuss my findings and the issues they raise in relation to the broader context and trends of permaculture in higher education. In analyzing my conversations with instructors, three recurring themes emerged. The first is a broader issue surrounding the construction of knowledge: I suggest that questions of what counts as knowledge, and who has the authority to produce knowledge, are at the root of concerns regarding the (re)integration of permaculture with academia. Given the valid concerns and criticisms of movement members surrounding this matter, I contend that a second key theme of tradeoffs offers an appropriate frame of reference for understanding what implications academic integration presents for various nodes of the movement. Finally, following the example of many interviewees, I suggest that analysis of the situation through a permaculture lens can be a useful way to weigh these costs and benefits. Thinking like a permaculture designer may help instructors understand how they might approach relationships with universities and colleges in a way that encourages maximum benefits for all concerned. I would also like to suggest that this approach might assist the broader movement in understanding how relationships with academia could be beneficial. In light of the urgency of addressing the ecological crisis, such relationships could play an important part in the movement's strategy for achieving its goals.

3.5.1 Authority and knowledge production

A majority of instructors expressed knowledge of concerns or skepticism in the broader permaculture network about the prospect of integration with academia. Most held reservations about the system of formalized academic education in general, and there

were feelings that permaculture should remain an “outlier” with a strong existence outside of academia. Instructors seemed to feel the air of credibility gained through affiliation with an institution, though an advantage, did not make PDCs inherently more valuable or legitimate. Criticisms about integration as an overall strategy for permaculture centred around questions of power and control in knowledge production and sharing, the academization of community-generated knowledge, and the “hubris” of faculty teaching without the proper permaculture credentials. In these criticisms, I interpreted a deeper sense of tension between academic or expert knowledge, and the practice-based ways of knowing and learning through “on the ground” connection to people and land.

In the permaculture world, community-based learning and experiential learning in nature are highly valued. Despite broader trends in higher education toward embracing these approaches, institutional pushback on instructors’ proposed courses suggests they are still devalued in favour of the cognitive, specialized, and didactic modes of knowledge production and transmission that have historically characterized academia. In comparing instructors’ experiences, I developed a sense that larger public institutions were more concerned with gaining distinction through producing specialized research and moving large numbers of students through their systems in a streamlined and economical fashion, and less interested in accommodating the particular needs of a PDC or trying to really understand permaculture: in Prof. Shannon’s words, “it’s weird, it’s hippy.” On the other hand, community colleges and smaller liberal arts institutions often seemed to be more flexible and attuned to the requirements of a quality PDC, perhaps because they experienced less pressure to attract prestigious research grants and prominent faculty or

had stronger commitments to experiential and holistic learning. Given that engaged learning approaches are often considered to be essential aspects of permaculture education, faculty should consult and ideally make efforts to hire experienced local permaculture teachers, and teachers should remain firm in communicating and integrating experiential and community-based approaches into courses.

Similarly, while enhanced integration of scientific research and rigorous documentation techniques was considered a benefit, there were mixed feelings about the degree to which research was needed to achieve movement objectives. Though many instructors welcomed further research and scientific inquiry, it was clear that many felt important steps could and should be taken without waiting for more research proof. Instructors tended to place primary emphasis on action based on experiential knowledge of place. As Jasanoff (1993) writes, “too much science sometimes overwhelms the capacity to act...More information may, to begin with, simply create more grounds for argument...there are signs that, at least aspects of the climate-change problem are in danger today of being studied to death in this fashion” (p. 29).

Given that movement members have historically identified modern conventional agriculture as a primary problem to which permaculture is intended to respond (Mollison & Holmgren, 1978), it is understandable that suspicion of expert-driven, high-tech solutions is very prevalent in the movement. One has only to look at the failure of the green revolution to solve hunger, and to the legion of environmental problems it created through the heavy use of pesticides and fertilizers, to grasp the limitations of reliance on top-down, universalized approaches to agriculture. Jasanoff (1993) suggests these failures

can be understood through the consideration of “what was not studied, what went unexplored or under-explored” in green revolution research:

The individual life experiences, or even the collective local knowledge of the groups that science was going to help, whose problem of hunger science was going to solve, never figured in the scientific agenda setting. You will recognize that the implicit hierarchy that the green revolution scientists established is the hierarchy that dominates our western scientific sensibility that some approaches to understanding nature are superior to others. In this hierarchy, not surprisingly, it is the basic physical and biological sciences that occupy the top of the ladder...Much lower down, usually disappearing from the frame of inquiry completely, are the unsystematized, or non-professionalized ways of knowing nature that are characteristic of the people often living closest to environmental problems. (p. 29)

In recent decades, however, a recognition of the limitations of expert-led approaches in resource management has led to more collaborative “adaptive co-management” approaches that integrate the knowledge of resource-dependent communities as well as policy-makers (Sterling, 2010). This, argues Sterling, constitutes “a fundamental break with conventional methodologies associated with Western resource management science which emphasizes the role of the expert, universally applicable and decontextualized knowledge, and control” (p. 519; Gunderson & Holling, 2002). Responsible land management and agroecological transition call for the recentering of the role of “subjugated knowledges” (Foucault, 1980) such as Indigenous knowledge and non-Western science. Indeed, as Turnbull (2000) points out, “the kind of knowledge system we call Western science depends on a variety of social, technical and literary devices and strategies—assemblages which move and engage local knowledge” (p. 20).

If certain areas of academic research and policymaking are shifting toward the embrace of complexity and the validation of local knowledge, the permaculture movement would appear to be a fitting partner in work that pertains to social-ecological systems. Agroecology, cultural ecology, agricultural anthropology, historical ecology,

ethnoecology, and political ecology have all been identified as potential mutually beneficial avenues of research (Veteto & Lockyer, 2008; Ferguson & Lovell, 2014). Ferguson and Lovell (2014) write that the high level of abstraction in permaculture's articulation invites investigation from a variety of analytical and methodological traditions into the diversity of permaculture's benefits, including quality of life. They note that permaculture's position outside of large institutions suggests opportunities for participatory action research and the mobilization of popular inquiry. I agree that such methodologies could provide appropriate context for important permaculture research that also aligns with the movement's ethics.

On the whole, however, the salience of concerns about permaculture's integration with academia must be understood relative to other current movement concerns. Several instructors suggested that other emerging trends were causing more contention in the network, such as the rise of online PDCs and stories of inadequate PDCs being offered by teachers without sufficient experience. I heard concerns about the "permaculture elite" drawing attention away from innovative work happening in the Global South, the white male-dominated teaching realm, and the problem of who gets to decide the nature and extent of standards for teaching the PDC. This suggests that the tension surrounding the production and privileging of "expert" knowledge may actually underlie many of the movement's current debates. It is my feeling that such spirited debates are a sign of health in the movement. The power of academia in influencing claims to knowledge or authority in the movement should continue to be openly critiqued and examined, but without paralyzing active experimentation with the academic realm.

3.5.2 Tradeoffs—is it worth it?

One question that initially lay beneath the surface—but came into sharper focus over time—was simply this: is it worth it? Given all of the challenges and potential risks of integration with academia, I wanted to know if instructors felt it was ultimately worth it for themselves or the movement to work within academic institutions. Instructors clearly found aspects that were valuable for their careers, curriculum development, the informed evolution of permaculture practice, and the growth of the movement. But when it came to the experience of teaching and learning permaculture at institutions, there seemed to be mainly drawbacks compared to independent PDCs.

By and large, however, many instructors seemed to feel that even if teaching in academia was not as dynamic or fun as a regular PDC, it was still worthwhile as an educational experience and for related benefits this afforded. Prof. Grant shared why he felt this way: “Mostly I feel like it is worth it. Because I know the few experiences that I had in college where I got to step out of the normal paradigm were really transformative.” In broad strokes, I came to feel that many saw their situations and the implications for the movement in terms of calculated tradeoffs that were worth the effort.

3.5.3 Thinking like a permaculture designer

As evidenced throughout this chapter, instructors and students alike often used core permaculture concepts or principles in their analysis of this topic. I suggest that keeping design in mind can help instructors weigh the costs and benefits to decide if the tradeoffs are worth it. More broadly, given that this trend only shows signs of further expansion, I suggest that the movement use permaculture concepts and principles to understand how it can design mutually beneficial relationships with academia. Each instance of this

integration will be unique in its own challenges, opportunities, and wider context, and I am in alignment with the view of many instructors that a diversity of different approaches to integration is desirable. Development of guidelines for working with universities would require critical movement discussions and collaboration beyond the scope of this study. Therefore, rather than offering specific recommendations of what ought to be done, I highlight here some of the most relevant concepts and principles that emerged in my conversations that can help in approaching such circumstances as they arise.

Mutually beneficial relationships Many expressed feelings that permaculture and academia both had something to offer the other. Four referenced a recent *Permaculture Activist* article by Steve Gabriel (2014), who argued that permaculture and academia need each other. Like Gabriel, many felt by bringing the two together, academia could supply needed rigor, science, and research to permaculture, while permaculture could bring important teaching methods to academia. Their assertions on this broad level strongly influenced my overall feeling that since permaculture is, at its core, about designing mutually beneficial relationships, it makes sense that this should be applied in how the movement approaches academia.

At a different scale, building relationships over time with allies in academia was considered to be highly important to getting courses approved. I also found this to be true in my own experience working to get a permaculture course approved at my institution. Such longer-term relationships contributed to rapport and understanding among sympathetic faculty, fueling their dedication to persuading higher level administrators to direct more university resources toward meeting the needs of a quality PDC.

Thinking in systems Many instructors felt it was important to keep the bigger picture in mind, and not let the details of bureaucracy detract from what many considered to be the larger mission of getting more people involved in permaculture. Taking a holistic view could help identify what some called “leverage points” in the system, such as student demand, staff and faculty champions, existing relationships, stated campus priorities, creative funding schemes, or the “trendiness” of permaculture. Understanding the whole as greater than the sum of its parts usually also made teaching positions seem economically more worthwhile. For the majority of instructors who taught regularly in academia, this seemed to be viewed more as one element contributing unique functions in a larger ecology of work they did.

Each element performs many functions Building on the previous concept, instructors found various ways to stack multiple functions into their roles in institutions. Some used their university positions as an opportunity to improve their existing curriculum, conduct research with particular faculty, or enhance their other initiatives outside of the university.

Niches Several instructors discussed having found a “niche” in being involved in permaculture in an academic context. The concept of finding and creating new niches often appears in discussions in PDCs and permaculture convergences around sustainable livelihood and creating a diversified, small-scale, local economy. As one instructor saw it, “it’s just one more niche—a niche that gives me an advantage.”

Use edges and value the marginal Referring to the way higher biodiversity tends to be found where two or more ecosystems meet, a common saying in the movement is “The action is on the edge.” Instructors often did not mind being on the margins of their

institutions. Even though it was often less secure, some saw an opportunity to use this “edge effect” to encourage creativity and innovation, but also maintain independence. In several cases, instructors were able to design functional interconnections between academic courses and their existing design initiatives and courses outside the university. As Prof. Dana pointed out, all sides could benefit from a higher diversity of perspectives when students interfaced with other hubs of activity in the community.

Diversity Many instructors noted their university courses were less diverse than a regular PDC, a weakness of this approach. A key consideration (discussed further in Ch. 4) is that this trend will likely not help the movement toward greater diversity but rather move it in the opposite direction. What leverage points exist for making permaculture education available to a more diverse audience in academia? How can teachers encourage a wider diversity of students in PDCs outside of academia in order to balance this trend?

Catch and store energy Instructors and students alike saw a key opportunity to connect with students at a critical life stage, when they have the time and energy to learn. While permaculture in higher education may not support the growth of racial, socioeconomic, or age diversity, in the next chapter I discuss how this trend is certainly making permaculture education more accessible to the university student audience.

Scaling up Movement discussions about how to scale up and make a greater impact are common. In my experience, common also are outside conceptions that permaculture is primarily about gardening techniques, and lacks potency for responding to systemic political and economic issues. Arguably the greatest perceived benefit for permaculture in academic integration was enhanced uptake and understanding in the world. It was clear many respondents felt institutions offered this opportunity, and that

permaculture should expand further in this realm. Beyond getting the initial PDC approved, many had become involved in further initiatives to increase enrollment and permanence of the course, create new programs or demonstration projects with a permaculture focus, or share what they had learned so that other universities and student groups could take on similar projects. Several expressed desires for stronger linking of movement members involved in academia, so that they could learn from other models, share research, or search for campus permaculture groups and projects. In particular, several expressed hopes that my own research could help strengthen coordination in such a network, and grow permaculture's reach in academia.

Small and slow solutions Due to the glacial pace of change and lack of understanding about permaculture in institutions, instructors stressed the need to persevere over long periods of time to make desired changes. They tended to feel it was more fruitful or feasible to start with a small, well-managed pilot initiative, allowing them to build outward from a strong reputation and foundation of support. For this reason, I suggest that while permaculture may be a “hot topic” spurring excitement and quick decision making when strong student demand is demonstrated, it is probably wise to take extra time to consult movement members and develop an informed vision for how new permaculture educational offerings can best be designed for the unique context of each school. This can help mitigate negative effects such as damaging misconceptions of permaculture when campus gardens are not properly planned for the long term.

Accelerate succession and evolution The opportunities in academic linkages for expanding permaculture-relevant research, critically assessing and refining permaculture ideas, and widening its application to new challenges and professional fields were

perceived as key benefits. After four decades of existence—and changes in academia—some instructors seemed to view academic integration as a new successional stage for permaculture. Described by Prof. Mark as “a leap to the next level of organization,” this was seen by many as a sign of permaculture’s success and further expansion—and largely unstoppable. Whether movement members welcome it or not, permaculture is now firmly entrenched in academia. The question is no longer “should we be working with universities?” but “*how* should we be working with universities?”

Apply self-regulation and accept feedback Some felt that in order to get out ahead of the advancing trend and plan for this succession appropriately, specific standards or guidelines for working with universities should be developed. However, there were diverging feelings on this matter; this is a question that would need to be taken up by the movement at large. There was much stronger agreement among instructors that universities and faculty should not proceed with offering permaculture courses without engaging input from the local permaculture community. This suggests that whether or not formal guidelines are developed, regional permaculture networks may want to consider holding focused discussions to identify areas of agreement regarding acceptable practices or approaches to academic integration, as well as activities that should be discouraged.

3.6 Conclusion

As a contemporary social movement, it is essential that the permaculture movement remains strong, independent, and accessible to diverse audiences outside of academia. Ferguson and Lovell (2015) suggest permaculture’s “ground up” model of change, which has historically favoured direct intervention and largely eschewed institutional engagement, appears to be a strategy to avoid co-optation and suppression. However,

they write, “Low levels of institutionalization may also constrain capacity for program development, systematic tracking of outcomes, and engagement with potential allies” (p. 42). Its vulnerability to insularity, they argue, reduces the movement’s ability to influence institutions and communities.

My findings suggest that though limitations exist, relationships with academia present significant opportunities for the permaculture movement to scale up and make a greater impact in the wider world. When viewed through the lens of permaculture concepts and principles that are important to movement members, careful design and observation can help to maximize the mutual benefits of integration with academia and mitigate many potential risks and drawbacks. Sincere efforts must be made to ensure the integrity of the permaculture curriculum is maintained, and that regional permaculture teachers are consulted in, and largely lead, the creation of academic courses. Through a foundation of meaningful engagement, functional interconnections with academia can be approached as one element in a diversity of tactics and strategies for progress toward permaculture’s goals of societal transformation and ecological flourishing.

Chapter 4: Implications for academia

4. Introduction

In this chapter, I discuss the academic implications of integrating permaculture into university curricula. What opportunities and limitations does this integration pose for students, universities, and the practice of sustainability education? While the bulk of these findings are concerned with implications for ESE specifically, there were benefits for students and academic institutions as well. For students, the key benefit is increased accessibility of permaculture courses. For universities, opportunities include increased societal relevance and marketability to potential students, enhanced relationships with the broader community, and transformation of campus culture and spaces.

I found that permaculture education offered significant opportunities for advancing integrative and transformative ESE in higher education. Experiential, community-engaged, place-based, and interdisciplinary systems approaches were considered to be core aspects of permaculture education, paving a path toward the transformative level of learning needed in ESE. I use the organizing principle of “head, hands, and heart” (Sipos et al., 2008, p. 69) to show how contributions of permaculture education to the cognitive/intellectual, physical/psychomotor, and affective/motivational domains of learning allow for an integrative “whole person” approach to education that supports transformative learning (Sterling, 2001, p. 12).

I discuss the significance of these three learning domains working together in the context of permaculture education using the concepts of *possibility*, *transformation*, and *connection*. The experience seemed to expand students’ sense of possibility in terms of their own abilities and actions, and in terms of larger collective changes. I engage the

work of Mezirow (1995, 1997) in suggesting that various aspects of the courses also provided opportunities for transformative learning. I suggest it was not any particular element, but rather the connections between multiple elements—individual motivations, feelings, and actions; engagement with others; and connections with natural systems—that seemed to allow transformation and new possibilities to emerge. Furthermore, permaculture education connected process-oriented, intrinsic values of a quality educational experience (via integrative pedagogy) with more outcome-oriented, instrumental values of education (via the granting of a “marketable” certificate) (Sterling, 2010).

There were several key limitations with the model of offering PDCs at academic institutions. Students often perceived few opportunities to learn or implement permaculture after the course was over. Also, diversity was limited by the inaccessibility of higher education to large portions of the population. Lastly, critical engagement with dominant social structures and the continuing effects of historical colonization, dispossession, and other postcolonial concerns may be limited in PDCs. I suggest several areas of critical literature and pedagogy that may benefit permaculture education.

4.1 Benefits and opportunities for students

I wanted to know what direct implications there were for students in taking the PDC at an institution as opposed to taking an independent PDC. One of the strongest overall themes that emerged in interviews with students and instructors was that offering permaculture courses in universities and colleges made them accessible to students who would not necessarily have taken them otherwise.

As noted in the previous chapter, eight students had not heard of permaculture until they encountered the course as an option at their school. Some felt they might not have found out about permaculture otherwise. Three students had encountered permaculture outside of academia and wanted to learn more, but did not do so until they had the option to take a university PDC due to its affordability, convenience, or fit with their schedules. Several students said that not having to pay extra for the course was a deciding factor for them. A majority of students and instructors felt it made sense to get the experience “under your belt” while it was easily available and included in university tuition; some pointed out that this made the course eligible for financial aid. Individually-arranged directed studies were mentioned as a way to get credit for taking a PDC, but some said paying for the course in addition to paying for academic credit was financially prohibitive, or noted difficulties in finding an independent course that did not conflict with students’ schedules. Instructors and students alike pointed to the convenience of offering the course right on campus, allowing students to walk to class. The accessibility of this model seemed to be significant for students who often do not have vehicles, or who spend the summer working and cannot take two weeks off for a residential PDC.

4.2 Benefits and opportunities for academic institutions

I asked students and instructors what impacts they felt permaculture education had made at their school, and what implications they thought such integration had for higher education in general. Noted benefits and opportunities included increased societal relevance and marketability to potential students, enhanced relationships with the broader community, and transformation of campus culture and spaces.

Some instructors were excited that this could enhance academia's role in equipping the next generation to face society's challenges. Prof. Grant felt permaculture's widespread uptake in the popular realm and its success in getting people excited could be helpful because the academic world often struggled to see its theories and concepts adopted in practice. The focus on hands-on, integrative, and team-based learning and design were, in Prof. Olivia's words, "everything the liberal arts colleges are thinking they want to do right now." A key area noted in particular by longer-serving adjunct and tenured faculty was that permaculture could, in Prof. Wendy's words, help institutions "be who we say we want to be" in terms of their value statements and the "the larger outcomes for higher education":

The LEAP report has a list of the 10 skills employers want: things like communication skills, problem-solving, critical thinking. That list of skills are the types of things you learn in a PDC. Because it's about problem solving, and systems thinking, and communication, because there tends to be some group and partner work. Whatever you decide to do, the skills you learn in that course, and the perspective you gain, are the types of skills and knowledge and attitudes that we all say in higher education, and employers, and global organizations, that we want our young people to embody.

Generally, instructors felt permaculture was an excellent way to meet curriculum objectives and teach about sustainability or ecology to students from many different disciplines, offering an opportunity for students to be engaged, do meaningful research, or gain valuable experience. Two shared that by bringing in the ecological design process or applied environmental learning of permaculture, two environmental departments had filled gaps between stated outcomes of their programs and what they offered in reality.

Ten instructors and five students expressed feelings that offering permaculture courses could also increase the appeal or marketability of institutions to potential students. Pointing to pressures for innovation in higher education due to rising student

debt and a recent trend in universities seeking shorter-term certificates to generate revenue, Prof. Olivia felt the PDC would be a perfect fit. Instructors and students at one institution noted how the installation projects added to “how the college wants to be perceived.” In Prof. Wendy’s words, “When they get up to give a speech, and they're talking about engaged learning and what we do differently, it’s these kinds of examples that they bring up and that they’re proud of.” Simon believed his university’s president could see strategic value in permaculture for their school:

When she saw how excited the students were, that made her jazzed. She's obviously running a business. And when she sees results like that, and she can market it, it looks good for the university, it looks good for the students, and it could increase enrollment and awareness of what the university is doing.

A few people seemed to be more skeptical, expressing feelings that institutional interest in permaculture stemmed mainly from its usefulness as a marketing tool. With a rise in student interest in food issues and agriculture in general, and permaculture in particular, some felt that universities could see there was a market for it. At two universities, participants said students were choosing their institution over others because of the permaculture programs. A few instructors felt institutions that did not get “up with the times” and embrace these trends would be hurt in the long run in terms of enrollment.

Several people felt the permaculture offerings had helped to strengthen relationships between the campus and the broader community. About half of the instructors shared stories of how this had occurred, usually through students doing final design projects for real clients in the community, or through hosting shared work parties to install gardens or build infrastructure. There was a sense that community members were excited to see and get involved in student projects, in some cases donating materials. Prof. Wendy felt opening the PDC to community members offered a way for

her institution to challenge “that sort of town-gown relationship, that dichotomy that can exist, and demonstrate that they have those relationships.” Prof. Olivia felt the permaculture garden she’d helped to create had become a hub for community connection:

By making that spark, all the stuff was here, all the people were here, but by connecting them through these projects, all these people are now a community around these issues that didn’t exist before. It’s grown into quite a robust, active group of people doing stuff in the community.

Nearly all of the students and a majority of instructors said they had seen physical changes occur on campus as a result of the permaculture offerings and often their own hard work. These changes included gardens, natural buildings, energy retrofits, and plans for a food forest and a “hyper-local café.” Five instructors had been able to build on the initial course to develop other courses in sustainability or capstone experiences, or to begin introducing discussion of permaculture into the overall program curriculum.

About half the students said they felt there had been attitudinal or cultural changes at their institutions, visible in a rise in demand for local food or a shift in the college’s attitude toward gardening. At four schools, I heard how there had been shifts in the ways teachers, librarians, and facilities or physical plant staff approached their work after taking the course. Todd, a campus landscaper who had taken the PDC, noted, “At a day to day level, it’s influenced how the landscape crew thinks about what they should be doing.” Prof. Gordon said admissions counselors and a faculty head had taken the course because students were saying they were coming to the school to learn permaculture. A few spoke with excitement about permaculture designs being created for the homes of the Chancellor and the President at two universities. Prof. Gordon felt it was a benefit to his university that the president could see value in the designs presented to him:

I had him as a client to my students' design projects on campus. He had a lot of stake in it and looked at it this way: these students are doing design work that we pay people to do. There's some really good stuff there. I want copies, and I want to forward that on to our campus planners and architects.

Several people expressed hopes or expectations for what this could contribute to campuses more generally. These included opportunities to retrofit infrastructure, encouragement to “walk the walk” when it came to sustainability, or campus-wide ecological regeneration that people from all disciplines could interact with.

Though this was not directly noted by participants, I came to feel that institutions could also benefit from hiring highly skilled teachers of the PDC. Permaculture teachers undergo significant practice-based training. Students held their instructors in very high esteem, valuing that they had ample real-world experience, connections, and projects to participate in. Instructors tended to have very high standards for teaching quality and demonstrated strong commitments to experiential and engaged learning; the impact of these approaches for students will be discussed below.

4.3 Benefits and opportunities for environmental and sustainability education

Here, I discuss my findings in relation to the contributions of permaculture to higher learning. I wanted to understand what unique elements or functions permaculture offered to environmental and sustainability programs. I wanted to know what drew students to the course, what they got out of it, and what implications it had for their own lives.

Seven instructors talked about how permaculture offered a very different “paradigm” compared to conventional approaches to thinking, teaching, or acting in the world. I understood this in light of Capra’s (1982) conception of paradigms as “a new vision of reality; a fundamental change in our thoughts, perceptions, and values” (p. 16). Some said what made permaculture different from other courses or ecological design

systems was that it comes with its own pedagogy: its principles and ethics are used to design the learning environment, and this encourages nontraditional teaching methods. Rojas (2009) has argued that “educating sustainability leaders requires an ecology of knowledge that considers that the content of education and the process of learning that content, shape each other, and in fact are inseparable” (p. 132). Though the experiential, community-engaged, skill-based, and interdisciplinary approaches discussed below are becoming increasingly common in higher education, these were frequently perceived as setting the permaculture courses apart from others. Perhaps a major distinction here is that these approaches were generally seen as essential for teaching permaculture, rather than as optional add-ons, as sometimes appears to be the case in ESE.

In presenting my data, I use the organizing principle of “head, hands, and heart” (Sipos et al., 2008, p. 69) to show how permaculture education supports integrative and transformative learning. The cognitive domain or “head” is engaged via the concepts, interdisciplinary frameworks, analytical processes, and systems orientation put forth in permaculture, which can offer a new perspective or way of seeing the world. The physical domain or “hands” is engaged through methods in permaculture that emphasize experiential, skill-based, and applied real-world learning. Finally, the affective/motivational domain or “heart” is engaged through an emphasis on community-based learning, relationship building, and providing space for students to develop passions related to sustainability or aspirations for future life pathways.

4.3.1 Head: “A new way of seeing”

One of the strongest themes across nearly all of my interviews was that permaculture offered a new way of seeing and thinking—a “lens” or “state of mind”—through which

one could look at many different issues or aspects of life. All of the students shared examples of how learning permaculture had changed the way they looked at the world. The three major aspects of permaculture noted as contributing to this different perspective were its interdisciplinary whole systems approach, its design process, and its focus on solutions and positive vision.

4.3.1.1 Interdisciplinary whole systems approach

All of the instructors pointed to the value of permaculture's interdisciplinary, whole systems perspective, based on an ecological understanding of the world as a web of relationships linking social and biophysical systems. Several felt the applicability of this approach to many different contexts and its focus on the relationships between elements was unique. Students saw value in the course because it was able to tie together other things they were learning, acting in Prof. Angie's words as "a holistic hub." Krysta felt the systems view was very useful because it allowed one "to step back and see the whole picture and not be overwhelmed by it, but still see it for the parts and the whole at the same time." Alexa shared that this perspective had influenced the way she now looks at the land and her own research in sustainable forestry. Several people felt it was valuable that the courses drew students from a diversity of disciplines; Prof. Grant felt this resulted in good interdisciplinary dialogue and offered opportunities for students to bring systems thinking back to their own fields. Most students and some instructors expressed feelings that even if students did not fully understand or continue to pursue education in permaculture, its systems framework and language would be useful later in life.

4.3.1.2 Design as a process for analysis & action

Most people pointed to permaculture's design process as a key contributor to changes in peoples' mindsets and as a valuable aspect that made it different from other courses. Ten people talked about permaculture as a systematic framework, analytical process, or "toolkit" for solving problems or making decisions. Elements of the design process noted as helpful included analysis and assessment, goals articulation, critical and long term thinking, and use of design principles based on observation and mimicry of nature. Several people stressed that this process was "not a prescription," but rather "a way of thinking about knowledge" or "a way of thinking about how to find the answer."

Some said they felt students developed a different skill set through this framework for design and evaluation in decision making. Prof. Wendy felt it was valuable to teach this process to students because it was flexible: "We don't know what the problems are going to look like three years from now, so we need to have some kind of process that we can apply in a couple of different settings." Similarly, five people felt permaculture's encouragement of long term thinking was essential for the development of appropriate ecological strategies. A key idea that people seemed to find compelling was the operating framework of designing regenerative systems, as opposed to trying to make current ways of doing things more sustainable. Todd explained it this way: "There's a lot of things that aren't worth sustaining. Like our gasoline consumption—let's not sustain that. Implicit in the word sustainability is only the idea of sustaining things, not improving them. Whereas reinvesting the surplus allows things to get better."

Several students talked about how they had been able to use these analytical tools in other aspects of their lives. About half felt having a methodical, step-by-step process

was useful for approaching “such a large topic” or for organizing their thoughts more generally. Oliver described using the principles in his “everyday thinking”:

I find myself thinking a lot about stacking functions when I’m planning for school. Like, what can I bring so I can get this done and don’t have to bring something else? So just more efficient. And the idea of slow and simple solutions: making sure you observe correctly before you do anything. I think those are just practical lessons and really smart things to think about in your everyday life. I’d say the whole mindset really encourages you to step back and look at things in a different light that you wouldn’t have otherwise.

Similarly, six instructors suggested permaculture resonated with people because it was anchored in common sense. Speaking about the design principles, Prof. Dana said, “I think when people hear it, they’re like, this just makes sense to me—it’s something they already kind of knew. I think permaculture’s done a good job articulating and kind of packaging this whole idea.” Others agreed that though much of it was old wisdom, having the common vocabulary was helpful. Prof. Angie felt this allowed people to “speak the same language...that’s a bridge builder right there.”

4.3.1.3 Focus on solutions and positive vision

Despite this space for critique, there was a strong sense that permaculture was distinct because it was fundamentally solution-oriented. Prof. Dana described the movement as something “to be *for*, and a part of.” It was widely felt that students were drawn by this encouragement toward positive or “forward thinking and productive” attitudes.

Ten instructors expressed feelings that the course played an important role in offering a positive, proactive response to environmental challenges amid a dominant context of “doom and gloom.” Five who taught the course in Environmental Studies departments shared concerns that students were leaving other environmental courses feeling hopeless, fearful, or unmotivated. Krysta, an Environmental Studies student, said

learning what humans were doing wrong without having discussions of practical actions people could take to change things had left her feeling “drained” and “just totally overwhelmed by that kind of human existence.” Prof. Shannon told of a high school teacher who was struggling to teach environmental material “without getting them super depressed.” When she spoke about permaculture to his class, he was so excited at how the students were “lit up” by the discussions that he took a PDC and a teacher training, and began teaching it on a regular basis. She said things were similar for the senior undergraduates in the PDC she taught at her university:

The students are *ravenous* for this. For solutions. I've found them to be just *ecstatic*. My reviews for this class were off-scale. Some of the best they've ever had. I think not necessarily because I'm such an outstanding teacher, but because the topic was *so* compelling. And such a *balm* on their poor souls around studying what's wrong with the world for four freakin' years. And now we're going to send you out into the world to figure out how you're going to make a difference, but basically with very little guidance or skills. So that was really striking to me, *how* much they were jumping around screaming 'I love this course, it was the best thing that ever happened to me,' and 'this is the *best* course on this campus, and *every, every* incoming freshman should take it,' and all this hyperbole. And I've experienced every time I teach it how life changing it is for people.

Several students shared how this had impacted them personally. As Simon explained, “It’s a great breath of fresh air when you're 18 or 20 years old and everything seems doomed. It’s showing people are doing something. Something good.” Allie seemed to feel this had impacted her mental well-being and her sense of the possible:

My happiness levels have increased substantially. I feel as though I’m satisfied more easily. It’s changed my philosophy and how I want to engage in the world. It’s brought me more tranquility and feelings of solution-oriented thinking instead of spinning around in a state of despair. I feel things are workable and doable.

There was a strong sense that perspectives shifted in seeing firsthand the “tangible results” of permaculture locally or abroad. Several shared examples of being inspired by its use as a tool for reviving local food production; for revegetation of degraded forests;

or for community self-sufficiency in the face of government oppression. “It helped heaps during the massive flood we had,” Allie said, “It saved houses. That feels huge to me.”

4.3.2 Hands: “it prepares us for the real world”

A key aspect that many people felt drew students and helped stimulate excitement was that courses involved real-world engagement through experiential and applied learning. There was a sense that this project-based model provided opportunities for students to build skills and connections relevant to their career interests.

4.3.2.1 Experiential learning

Almost all of the instructors specifically stressed the importance of teaching and learning by doing: they felt it was essential that permaculture education involve hands-on and outdoor experiences. Several students talked about how this hands-on element appealed to them, and three instructors felt this focus made the course distinct from most other traditional university courses or design systems.

Several people felt immersion in different settings and seeing systems firsthand was important in helping students understand permaculture. Simon’s field-based PDC, where his class visited communities working to address significant environmental issues, was “probably the most powerful experience I’d ever had up to that point”:

It’s one thing to be aware of the issues and be taught that we need to fix this. But it’s another thing to see it. Seeing it was really when I decided I was committed to this. And I was going to pursue this avenue of education and informing others. It made it real. It made it not even a choice anymore. Like, this needs to happen. Rather than, permaculture's fun and I like to draw designs.

Half of the students said they were drawn to the course at least partly because of the opportunity to learn about growing food, and this was echoed by instructors. Allie appreciated the effects of combining intellectual discussions with “body-based”

implementation: “I found myself re-connecting with the land and my food sources in a new way. An entirely new wave of connection has emerged that I previously hadn’t held with my food and the local flora and fauna.” Others also noted a greater connection with nature or food. Scott shared what the most meaningful part of the course was for him:

It was when I really discovered the importance of growing your own food. And how powerful that is. Reconnecting with nature and realizing how incredibly we rely on nature and how we take it for granted. And just the importance of that connection. Recognizing it and growing it was really important and powerful. And that’s what pushed me to go work on a farm. Because I love it, I love getting my hands dirty and eating really good food.

Some people spoke of the power of what Prof. Howard called “nature as teacher”: learning from and in nature seemed to have a different impact for students and provided opportunities for deeper connection. Prof. Grant felt being “in this classroom in the woods” allowed students to relax and open up into meaningful conversation.

4.3.2.2 Real-world skills and application

Students and instructors alike felt that for permaculture or the PDC to be really meaningful, real-world implementation was needed. An aspect many people felt was valuable was the course’s focus on real-world application and building practical skills.

Several people pointed to the project-based learning as a key aspect of this skill building. A requirement of every PDC is a project in which students create and present a permaculture design for a site or group. Ten instructors and nearly every student said students in their courses created designs for a real campus site or community client. In several cases, these designs were at least partially implemented. At three institutions, students had opportunities to present their designs to the Board of Trustees, campus landscaping managers, or university presidents, which was often met with excitement and feedback. Several instructors saw the value of this in impacting students’ sense of their

own ability to make a difference. Prof. Howard saw this as an outcome of his students' year-long garden design and installation project, which grew into a major campus initiative that won a national award. He said most of these students were now doing rewarding work related to permaculture and sustainability. Prof. Dana felt there was a "richness" to community project learning in that it was "not just some kind of exercise, but it has potential for creating change." Prof. Michael's students were doing design work for the local municipality, "a real client who has money to spend, and needs specific advice and recommendations." There was a sense that students felt this was meaningful: Allie redesigned her whole campus, and was excited at how this was different from other school projects because of its "potential to be actualized":

I felt our designs weren't just another project, they were well-thought-out plans the university looks at and considers as viable future options for improving the campus. That work really built my confidence in moving beyond being a student.

In some cases, multi-year learning opportunities had been created. Prof. Olivia told of a capstone student who developed a summer camp, designing a permaculture-based curriculum and training instructors. At one college, four students were excited to tell me about their projects, proudly touring me around campus where these had been implemented. Oliver collaborated with the manager of a campus eatery to implement the outdoor seating in his design, and was in the process of budgeting for further implementation. Jess was involved in designing two new campus buildings, later helping to construct one with natural materials and getting hired by the college for sustainability work. Miranda designed a garden for a central location outside the dining hall. She met with granters, dining hall staff, and the college president, integrating their needs and perspectives into an original design. She included her own creative additions, chose the

plants, and prepared a budget. She said this helped her understand how much effort was needed to bring even small projects into reality: “it really changes your mindset when you actually have to make it work.” Petra went on to work for two summers in the campus garden, implementing designs and giving tours. Oliver felt this benefited students by providing opportunities get involved in moving the college toward its sustainability targets: “it really affords students a lot of interesting ways to take part. Not only in terms of classes but also having a lasting impact on the school.”

Seven students expressed feelings that the certificate would be a valuable asset in securing employment. The same four students agreed that the certificate attracted them:

Miranda: When my friend came out of this class she had this certificate. And it made me feel like she was one step closer to being out in the real world with something that made her marketable. And not only was it something that she loved and enjoyed, and that I loved hearing about, but it was something *useful*...

Petra: Yeah, that’s what drew me. Because having a certificate on hand is like receiving a degree. It adds to your feeling of accomplishment and satisfaction.

Oliver: I also agree, hearing that it was a certificate course, that’s something you have on paper, was really appealing. It’s a marketable, tangible skill that you can put out—especially in an environmental field.

Others also described the certificate as a “resume builder” for environmental jobs or as being able to “open doors” by communicating specific skills to potential employers.

Simon was able to transfer this training directly into a newly chosen field: after taking the PDC in university, he took a teacher training course and continued to practice his skills.

When invited to teach permaculture at a nearby university, he asked if the students might be satisfied with a workshop series. He said they were “adamant” about getting the full PDC: “I think they want the tangibility of it—a signed piece of paper that says, I’m certified. I’ve been trained. Rather than saying I’ve been to workshops. I think it’s just nice to be able to prove it, and have validity.” Several instructors also pointed to the

certificate as a motivator or as being helpful for future careers. Prof. Grant shared how it had helped him secure certain jobs, including his current university teaching position.

4.3.3 Heart: “it really opened people up”

The permaculture courses also engaged the affective and motivational domains of learning. Key aspects that students and instructors saw as distinct and impactful were a focus on ethics and values and a community-oriented approach, which encouraged deeper social connection. The courses spurred excitement for learning, often helping students identify their own passions or vocational directions.

4.3.3.1 Ethics and values

Five people felt students had few opportunities to talk about ethics and values in other courses, and some felt this aspect of the courses resonated with students. Prof. Grant spoke of labs frequently getting cut short because students wanted to discuss “pretty edgy topics” or criticisms of things they were learning in other classes:

I'm always surprised at how excited students are to have that conversation, and to keep having that conversation, and to start with talking about values and the ethics as a launchpad for everything else we do. And it's such an edge because I don't feel like in college you're often asked—especially in scientific disciplines—what you feel about this, or is this right or wrong...

Often, students participated in individual or group-based reflective activities. Prof. Ross felt discussing what people deeply cared about in their hearts was essential in constructing the different culture envisioned in permaculture. Others voiced similar sentiments, yet three stated that other design systems, disciplines, or approaches to sustainability lacked an ethical stance. Todd felt that while the permaculture framework was not necessary to talk about ethics, the principles were “like a checks and balance system” to ensure actions were in line with one's ethics.

4.3.3.2 Community-based learning

A commonly noted aspect of the courses was a focus on relationship building and interaction through community-oriented learning. Six students said this was a valuable element that they had not experienced before in a university class, and a few instructors said they'd received similar feedback.

Instructors tended to feel quite strongly that since permaculture was about relationships and, in Prof. Cathy's words, "creating new culture," it was important for the course to encourage community building. For Prof. Ross, a measure of quality was the extent to which one was "able to develop deep intimate relationships between students, and between students and the landscape" because "unless you're eating with each other, and digging with each other, and mudding on the wall together, you're not going to develop the ethical position required for fundamental global change." For several instructors, this meant keeping the course relatively small. Several people felt the nontraditional teaching methods of PDCs, such as holding hands, sitting in circles, interpersonal "check-ins," shared meals, poetry and storytelling, group exercises, and team-based projects, made the course more collaborative, personal, and interactive. Prof. Danielle saw this as building community among students: "All the students say I do *not* know *anyone's* names in any of my other classes, and I know everyone's name in this class." Prof. Matthew suggested immersion in community was perhaps the most potent part of the course; this created space for conversations over meals and an "intensive collaborative atmosphere" where students were providing inspiration to each other. Simon felt every course should have a retreat-style element for the spiritual experience and group bonding aspect. In Prof. Michael's words, "When you have dinner together

every time you meet, and also spend this intense weekend together, it changes the whole dynamic of the class a lot.”

One commonly mentioned difference was the teacher-student relationship. Prof. William said he had incorporated some of the participatory teaching approaches of PDCs into his other courses because he felt they were effective:

It puts people at ease, it puts us all on a more level playing field where you're not the teacher at the lectern, you're the facilitator. And we're all learners. I learn a *ton* from students. And I think they know that—they're bringing new material, new resources, new technology—I don't know it all. So they have a chance to be that more knowledgeable Other in the room. And that's valuable.

I experienced this collaborative, close-knit dynamic several times when I was invited to sit in on lectures or join outdoor class activities. There seemed to be a high level of interaction and mutual respect between students and instructors. Allie and Pam appreciated that their instructors had projects in which they could be engaged beyond the course. Prof. Mark brought students to his own project sites so they would understand him as someone who lived in that reality day to day. In several cases, students and instructors had developed ongoing working relationships or mentorships.

This community orientation was visible in how several instructors seemed to envision permaculture education: web-like, interactive, and diverse like an ecosystem. Prof. Danielle saw the diversity of interactions created through field trips, guest teachers, community clients, and student presentations as “modeled after nature”: “it's very much participatory, it's a web, it's a team leadership project—I think that's really different and really empowering for students.” Most instructors expressed feelings that team teaching was essential so that students could be exposed to a diversity of perspectives. Most had found ways to incorporate this “ecology of instructors” into the university PDCs. Prof.

William brought in campus faculty and staff, which he felt allowed students to “see them in a really different light” as people who were active in sustainability. Prof. Wendy felt bringing in guest speakers enlivened the course and allowed students to build relationships with regional experts that they could continue to be connected with. Describing his vision as “networks of people that are cross-pollinating,” Prof. Matthew opened some sessions to the public. Other instructors helped connect students and community members of all ages through shared work parties. They felt this interaction was valuable for all involved because it diversified the learning opportunities.

At five institutions, the permaculture courses were open to community members or staff and faculty of the school. Six instructors and five students viewed this intergenerational mix as a strength, leading to a “really rich dialogue” or a “more healthy course.” Three instructors felt it changed the whole group dynamic and benefited both younger students and older community members, allowing both age groups to learn from each other and build relationships. Regarding community members, Prof. Wendy said:

They've been at this sustainability thing for a long time, and they're still passionate, but some of them are discouraged. So to sit with these students who are so vibrant and passionate and they're like, when you get ready to put the thing down, I'm there. I'll pick it up and start running with it again.

Simon felt this was powerful because it united people of diverse ages and backgrounds; many of his current friends were significantly older than him, something he felt would not have happened otherwise. Three other students agreed:

Petra: There are community members who know a *lot* more than we do. Or, maybe not, and we have different expertise, and we share it. You never notice there is an age difference. You feel like you're involved in the community. Like you're one of the members in the community and learning with them...

Jess: We had potlucks every class, it was just like a community of closely-knit people studying something together, helping each other out. Whatever permaculture stands for is what you're learning from the community...

Oliver: Yeah, I definitely think the community aspect of the class was really what set it apart from any other class I've taken here. Different demographics, people of different backgrounds coming in, is really what made it different. You know, I'm 19...people that are retired, they grew up on farms—they come with a lot of different skills and a lot of different experiences. A lot of different stories.

The PDC could also be an opportunity for cross-cultural dialogue and relationship building. Prof. Angie taught a PDC that brought Indigenous and settler students together. In her view, being challenged to look at and dialogue with each other, though difficult and heavy at times, provided opportunities for healing. Many students, she said, continued on with the work and maintained deep relationships with each other for years afterward:

I think the energy in that container created something that was meaningful. And something got planted in each and everyone's heart, that memory of being there, the memories forged there are lifelong...we were woven together.

4.3.3.3 Activating passion and potential

A common theme was that the courses helped students discover new passions or make decisions about their own life pathways. Five people felt the PDC was useful as a introductory survey course, exposing students to a wide array of topics or skill domains in sustainability, allowing them time to “dig deeper” into areas they were particularly excited about in their further studies. Prof. Wendy felt the course connected peoples' multiple passions together in a way that helped them see the direction they wanted to go. A few instructors talked about the importance of making sustainability education fun, and inciting a lifelong desire for practice and continued learning. I frequently felt this sense of excitement and engagement among students when I was invited to participate in class activities or to spend time with students at campus gardens. This interest and thirst for learning was apparent among students I interviewed as well:

Miranda: At the end of most classes you get a grade, and you kind of throw all that knowledge out the window. But in this case I think we all ended the class going, oh my god! There's so much more we need to learn! We're just treading in this pond, we haven't even realized how deep it is, so that was really interesting, realizing that this is going to be a lifelong lesson, really.

Oliver: I wasn't the most excited about this class at the beginning. But as it started I really saw how different it was. And how interesting what we were doing was, and the way it was kind of changing my thought process. It eventually became the class I liked by far the most, and the ideas were the most exciting.

Prof. Olivia, a tenured professor, shared how permaculture had shaped her own story of development as an educator. She recalled memories of excited, energetic kindergarteners showing up in her courses many years later as young adults who appeared to have lost this excitement for learning. This led to an exploration of how teaching could stimulate intrinsic motivation and interest in learning. She began using the permaculture process to design supportive learning environments and launched a sustainability charter school, hiring teachers who had training in permaculture because it intentionally connected the subject of sustainability with the methods used to teach it.

Many participants talked about how their permaculture experiences had provided them with inspiration or stimulated their own personal motivations. Often, this was related to seeing or being engaged in positive actions, particularly in the context of community. In Prof. Cathy's words, "It's a social movement. And that's maybe its greatest promise, is to get people involved and engaged in making change." Through permaculture, Prof. Howard said he'd found his "niche" in community organizing. I heard stories of how growing awareness and education in permaculture had spurred engagement on several campuses. In some cases students launched permaculture clubs, advocated for certain courses or food choices in dining halls, or pressured top administration to allow physical transformation of spaces. There was a sense, too, that

permaculture's encouragement to question existing systems could create friction. Prof. Howard felt this had been needed on his campus, though he said students experienced pushback from the university. Two students expressed excitement in applying permaculture to specific political projects; this suggested the framework also held relevance in their minds for collective political action.

All of the students talked about how they had applied their permaculture education in their own lives. Nine had either gone on to further their training, or shared their hopes to take more courses or get more involved in local permaculture activities. Seven students had pursued work on farms or further design implementation in gardens. Two were hired for campus sustainability jobs, one started a permaculture student group, one became involved in the regional permaculture network and started teaching permaculture, and one pursued research in sustainable forestry. Eight instructors told personal stories of students who had taken their PDCs and gone on to launch permaculture groups or public gardens, or pursue careers as permaculture teachers, landscape designers, farmers, natural builders, timber framers, urban planners, environmental educators, or university sustainability staff. In some cases, PDC alumni were hired by instructors as teaching assistants, receiving mentored apprenticeships in teaching. One of Prof. Dana's students pursued a new interest in aquaculture after their tour of the campus lab, becoming a lead research assistant who gave her class the same tour the following year. Scott shared how his intensive field course in permaculture had impacted the direction of his own journey:

I can name that course as a major turning point in my life to direct me toward what I'm doing now, what my interests are...[permaculture] gave me a whole, I don't want to say purpose, but a real drive and kind of a direction. A lot of kids go to college to find that direction. So I just think providing that option at this time is really crucial.

4.4 Discussion

As my findings relate primarily to the implications of permaculture's integration for the practice of ESE, I consider here more deeply the significance of these findings in particular. Listening to students' and instructors' stories of their experiences with permaculture education, I came to feel the connections between the learning domains of head, hands, and heart opened up new possibilities from the perspective of students, and the possibility for transformative learning to take place. To synthesize this topic, which encompasses many interwoven elements, I would like to suggest as a framework three overarching themes. I illustrate my discussion of the implications for ESE using the concepts of *possibility*, *transformation*, and *connection* to show how the domains of head, hands, and heart work together in the context of permaculture education to support transformative learning.

4.4.1 Possibility

In the words of Harry Boyte, perhaps our greatest task in these uncertain times is “to create a culture that allows you to believe that change is possible” (quoted in Curtis, 2012). One of the most noteworthy aspects of the integration of permaculture into academia, whether implicitly or explicitly expressed, seemed to be the way it allowed new or previously unseen possibilities to come into view. In the first place, this integration made it possible for students who otherwise might never have taken a PDC to access the course. When they did, the experience seemed to expand students' sense of possibility in terms of their own individual abilities and actions, and in terms of larger collective or physical changes.

Students' stories of feeling hopeless and overwhelmed reminded me of feelings I

have personally struggled with, and countless conversations I have had with my own peers. Some of their statements were reminiscent of previous research I had done with students in Environmental Studies (Shaw, Dempsey, & Zimmer, 2015), in which a major theme was that students often felt lost or overwhelmed at the scale of environmental challenges, not knowing where to begin. Curtis (2012) has argued that higher education institutions can and must be engaged with the task of addressing the “pervasive lack of faith in social change” by providing experiential opportunities for students to engage with democracy, social change, and civic agency. She writes, “it is irresponsible to teach young people today about ecological and social crises without simultaneously giving them the opportunity to develop capacities for collective agency. Their need ‘to make a difference’ as they learn about the dimensions and depth of the crises we face is acute” (p. 356). The sense that permaculture courses spurred inspiration, excitement, and energy was universal, and this often seemed to revolve around the idea of “what we can do.” As Prof. Michael explained, in contrast to other courses, “The permaculture course is the place where there's hope. You know, from a student perspective. We can *do* stuff. Instead of dwelling on all the things that are *wrong*, here's something we can actively do.” Several others also said they felt the course gave students a sense of hope.

As one instructor alluded to, there are difficulties with the concept of hope. Turning toward hope, in the view of author Derrick Jensen (2006), may serve those in power by rendering one powerless: “To hope for some result means you have given up any agency concerning it...When we realize the degree of agency we actually do have, we no longer have to ‘hope’ at all. We simply do the work...when hope dies, action begins.” However, for students in this study, hope seemed to emerge out of action. The active stance of

designing and implementing solutions seemed to be empowering for students. In his work on public narrative, Ganz (2007) argues that “hope is specific”: a key element of hope and strategy is articulating “a credible vision of *how to get from here to there.*” Todd illustrated how careful observation of specific details and a larger design vision changed his sense of the possible when it came to a local environmental challenge:

What I really found from permaculture was a sense of hope. Because when I thought about the water in this state, I was unaware of how much water we could get off of hard surfaces. We have enough water on this campus to provide for all our needs. It’s not a matter of not having enough water, which is a much more despairing idea, but only a matter of use. Which is incredibly hopeful. So it’s really brought a sense that the solutions are there, it’s just a matter of using them.

As Moision and Suoranta (2007) point out, “Hope is the most fundamental dimension of any human activity—especially education—that is connected to change (see Fromm, 1968), and it almost always has two sides to it: the individual and the social” (p. 238).

Changes in students’ sense of self-efficacy were usually tied to what they had accomplished, or felt they could accomplish. Taking a design project from an initial idea to implementation, often leading to real physical changes on campus or in the community, helped students build confidence, skills, and a sense of their own power. Seeing that smaller-scale changes were possible, and that they could contribute meaningfully to them, often led students to consider further possibilities in terms of their own careers or educational pathways.

Another key element that seemed to expand students’ sense of the possible was collaboration and community building. Curtis (2012) argues that hopefulness with regard to collective action is tied to movement from an isolated, “largely privatized self” toward becoming “a public self with an enlarged sense of belonging, accountability, and shared possibility” (p. 368). Team-based projects, group reflective exercises and “check-ins,”

potluck meals, and opportunities for fun and laughter were some of the shared experiences participants pointed to as opportunities for bonding or finding one's niche in the group. Critical to a sense of collective possibility, says Curtis, is in Ganz's words "a dialogue of the heart" that "helps surface emotions that otherwise paralyze and stymie collective action, emotions like fear, self-doubt, and isolation" (p. 368). Having opportunities for deeper conversations about emotions and ethics connected what individual persons cared about to a wider set of values held in common with others, creating the possibility for relationship building and perhaps the motivation to act. The sense of community created in the courses certainly seemed to be one of the most enduring, impactful aspects overall.

4.4.2 Transformation

In shifting students' perspectives in terms of the possibility for positive change, the permaculture courses could be understood as supporting the emergence of transformative learning (TL). TL is viewed by many as an essential component of environmental and sustainability education, and as an inseparable part of a wider process of societal transformation (Sterling, 2001; Kegan, 2000; O'Sullivan et al., 2002). Many instructors and students described the courses with terms like "transformative," "life changing," "powerful," or "profound." Listening to their personal stories, I had no doubt that these experiences had been highly meaningful, and that in many cases it seemed there were changes in the lives of both students and instructors that had lasted long after their PDCs ended. I do feel a key ingredient in this was a readiness among students for change. Perhaps the courses served as a tipping point in their own ongoing processes of personal change. Several spoke of students seeking out the experience out of dissatisfaction with

their current education. In Prof. Grant's view, it was "a certain type of student" that was "looking for this type of education" already. A group of college students I spoke with agreed that they were already fairly engaged on campus when they made the decision to take the course. Furthermore, though there were indications that certain course experiences may have provided opportunities for TL, it is not possible for me to fully understand whether or to what extent this interior process indeed took place for any particular student. To the extent that this is possible, my interpretations here engage Mezirow's (1995, 1997) conceptions of TL, and applications of his work to Transformative Sustainability Learning (TSL) (Sipos et al., 2008).

There seemed to be many aspects of the permaculture experience that touched different people in different ways. Some described a distinct experience—what Prof. Howard called an "ah ha moment"—where students saw a system firsthand or were introduced to a concept that suddenly caused them to see things in a different light. More commonly, however, several people seemed to locate the transformative aspect in a more gradual shift in mindset. Often the critical shift was toward a more solution-oriented perspective. In the earlier quote from Todd about water availability, one can see how his point of view changed through reflection on his earlier assumptions. Such critical reflection on one's assumptions is essential to transforming one's frame of reference and can result in significant personal transformations (Mezirow, 1997).

Some seemed to locate the transformation primarily in a perspectival shift toward whole systems thinking. Reflecting on the relationships between different components of a forest revealed patterns that Krysta could now recognize in everyday life:

It's a collaboration between the trees, and the fungi, and the birds, and the mammals, and all these things, and it's all so interconnected. And then to relate that

to the larger ecosystem of our culture—to be able to recognize the patterns in that template, and then to see them in the microcosm and the macrocosm—that was really useful for me.

Krysta’s experience could be understood as a change in a habit of mind. According to Mezirow (1997), habits of mind are “broad, abstract, orienting, habitual ways of thinking, feeling, and acting” (p. 5) and tend to be more enduring than points of view. Together, habits of mind and points of view make up one’s frame of reference; transformative learning is constituted by the process of effecting change in this frame of reference through critical reflection (Mezirow, 1997). Students’ reflections on their own thought processes, and understandings of permaculture as a way of “thinking about knowledge” reflect an important cognitive outcome called metacognition, or thinking about thinking. Galt et al. (2013) argue that metacognition, which involves self-critical reflection and assessment, allowing one to situate and change one’s own cognitive processes, is a critical foundation for personal and societal transformation.

To enable critically reflective thought, Mezirow (1997) noted that education should involve interaction, group deliberation, and participation in social action, in which instructors take on the role of facilitators and “learners become increasingly adept at learning from each other and at helping each other learn in problem-solving groups” (p. 10). As illustrated in this chapter, these teaching methods formed the foundation of permaculture courses. Prof. Howard’s course, which utilized these participatory methods, led into a major student garden project on campus:

It was super empowering because they saw it go from a grass lawn to something incredible that they created, a huge transformation physically. And for them, emotionally and mentally as well. It shifts this thinking that we're very limited, we can't, we can only do so much. But we have the potential to make everything around us better. So it's really about personal transformation.

While in cases like these, personal transformations seemed to be linked with involvement in physical transformations of places, others seemed to feel the field-based experiences that provided extended immersion in community were essential for deep change to occur. There was a sense that the “intensive collaborative atmosphere” described by Prof. Matthew activated emotional and even spiritual dimensions of learning through action-oriented group processes and community bonding.

Emergence of TL through various interconnecting elements of the course experience is congruent with Mezirow’s (1997) assertion that there are cognitive, emotional, and behavioural components to one’s frame of reference. Sipos et al. (2008) suggest that when course designs integrate “head, hands, and heart” they “exhibit the emergent property that we have termed TSL, learning that facilitates personal experience for participants resulting in profound changes in knowledge, skills and attitudes” (p. 74). This insight supports an understanding of the changes experienced by students. Several seemed to perceive shifts in their own lives in terms of a combination of changes in the inner realm—thought processes, attitudes, self-perceptions, or beliefs—with changes in day-to-day lifestyle choices and outward engagement. Prof. Howard saw this change as a “spiritual thing” that could diffuse into all aspects of life, including individual actions, relationships with others, and connection with nature:

It’s our connection to the earth, and it gets into how we live. It’s completely transformed my entire life. And now I’m growing teas, and making teas, and inviting people over and having tea with people. It’s a whole way of living, it’s a lifestyle thing. Slowly permaculture infiltrates the entire life if you let it.

4.4.3 Connection

As Prof. Howard’s words suggest, the ability to connect so many different dimensions of being was one of the most salient features of how permaculture was taught and

experienced. Congruent with permaculture approaches, it was not any particular element, but rather the relationships between multiple elements—individual motivations, feelings, and actions; engagement with others; and connections with natural systems—that seemed to allow TL to emerge. Some seemed to feel a synergistic effect was created by the PDC in its entirety; in Prof. Gordon’s words, “its power is in its wholeness.” The concept of “wholeness” featured frequently in participants’ responses as they talked about the PDC, the permaculture methodology, and the impacts in multiple dimensions of their own lives. Prof. Wendy’s words illustrate how the PDC contributed to “whole person” learning:

It’s *very* much being outside, engaged with what you're doing...there is some intellectual work, but it’s a lot about engaging your body, engaging your heart, and being a whole person, which is what many in higher education view as the ultimate purpose of a liberal education.

Participants’ descriptions of courses aligned closely with the TSL learning objectives laid out in Sipos et al. (2008), including: “head”-based objectives of cognitive engagement, transdisciplinary curriculum, critical and systems thinking, understanding of global citizenship and sustainability; “hands”-based objectives of experiential and applied learning, conflict resolution, service learning, and a collaborative and participatory learning environment; and “heart”-based objectives of empowerment, creativity, fun, values-focused thinking, inclusivity, and place-based learning. In particular, learning and teaching methods discussed by participants that have been recognized as encouraging affective learning included discussion, peer involvement, problem-based learning, expert engagement, perspective sharing via reflection, leadership education, diversity education, and community work and service learning (see Shephard, 2008).

Through these methods and others, the courses provided opportunities for students to connect their values with their actions. Glasser (2004) has suggested that pedagogy for

sustainability must activate students' concerns and help make their actions more consistent with those concerns through principled action. The power of ethical and values-based discussions seemed to expand through the linking of these reflections with students' actions in the world. Often, this led students to connect with their own passions and motivations. Pointing to insights of Dewey (1897), Kolb and Kolb (2005) suggest that "linking educational experiences to the learner's interests kindles intrinsic motivation and increases learning effectiveness. Under the proper educational conditions, a spark of intrinsic interest can be nurtured into a flame of committed life purpose" (p. 209). Podger et al. (2010) suggest that service learning is core to a "whole person" approach to sustainability learning because it can cultivate moral motivation through increased social and cultural awareness, motivation to learn, and sense of civic responsibility, which together contribute to personal understandings of life purpose or meaning. The element of collaborating with residents or organizations of the wider community to produce designs, which was so powerful for students, might be understood in this context.

Similarly, students developed stronger connections with the natural world through outdoor experiences in nature and gardens. School gardens were an important feature of Pestalozzi's attempts to integrate head, heart and hands in education (Zhai, 2015). In my study, gardens were also key places to gather diverse groups together, allowing students to connect with faculty, community members, and each other. Place-based and community-engaged learning can help reconnect learners emotionally to their environment and can encourage a sense of collaborative action (Ellis & Weekes, 2008; Ostrander, 2004; Palmer & Zajonc, 2011; Saylan & Blumstein, 2011).

Indeed, students also developed deeper connections with other students, with

instructors, and with the broader community. Kolb and Kolb (2005) point out that experiential learning can be enhanced when space is made for spontaneous conversation, and when learners “feel that they are members of a learning community who are known and respected by faculty and colleagues and whose experience is taken seriously, a space ‘where everybody knows your name’” (p. 207). This type of environment seemed to characterize the classroom for many participants. Instructors’ visions of permaculture education as mimicking an ecosystem reflects Rojas’s (2009) conception of an “ecology of knowledge,” which involves integrative learning environments (p. 131). Considering the scope and complexity of environmental problems, Rojas argues for a “community of learners” approach, mobilizing instructional teams representing a wide diversity of backgrounds, with a primary assumption that diversity in the classroom “is the most precious learning resource” (p. 140). Indeed, participants saw significant value in connecting learners from diverse age groups in and outside of the classroom. This is congruent with Smith’s (2002) insight that both learners and communities benefit from such place-based learning, in which students actively engage and solve problems in the real world, and community members are included in the classroom. The intensification of social isolation by age group, writes Curtis (2012), “creates a huge, and I believe under-recognized corrosive demoralization for young and old alike...we find surprisingly powerful synergies around public work that are an indication of the deeply felt need for intergenerational solidarity” (p. 369-370).

While such learner-centred pedagogies tend to represent an intrinsic view of education, many participants also placed important outcome-oriented value in the courses. Such instrumental views were evident in some instructors’ framings of the

importance of teaching students about permaculture or sustainability (eg., “so that they help us to be successful and to meet some of these big challenges that we have”). Beliefs that the PDC would enhance the “marketability” of students and of academic institutions illuminate how the instrumental view of education in ESD advances a globalized form of economic development (Holder, 2013), ultimately serving neoliberal economic interests (Jickling, 2003; Sauv , Berryman, & Brunelle, 2007). Agrawal (2005) has discussed how particular practices and modes of thought lead to the development of different “environmental subjects” (p. 162); this arises in perceptions of sustainability knowledge as a strategic tool for market participation, and sustainability-savvy graduates as “resources to invest in” (Giacomelli, Travisi, & Nava, 2003, p. 12). This was reflected in the PDC’s role in influencing students’ conceptions of themselves as “marketable.” Holder (2013) argues that the development of particular individualized skills leads to an individualist agenda of achievement as opposed to a collective focus.

While such risks exist, Sterling (2010) argues an instrumental approach complements more intrinsically motivated education because it is stronger on real-world orientation and on reflecting the urgency of ecological crisis. Together, he says, they build the conditions for engagement of the whole person and the whole institution (Sterling, 2001). The opportunity for permaculture to contribute to this integrative paradigm was evidenced in participants’ suggestions of its role in the transformation of campus culture and spaces, and in strengthening community-university relationships.

4.5 Limitations

In this section, I discuss limitations and barriers for students and the academic context that were identified with the courses. These include limited impacts and longer term

opportunities for students; limited accessibility and diversity of courses; and limited critical discussion of historical and political factors.

4.5.1 Limited longer term impacts and learning opportunities

The central limitation identified by students was simply that they wanted more opportunities to learn or implement permaculture, and often they perceived these to be limited. About half the students wanted more field-based learning during the course, which was often constrained by funding or academic scheduling. Nine students wanted to see greater impacts on campus from the permaculture activities. Students felt these were limited by slow bureaucratic decision making, limited funding, or difficulties in sustaining student efforts due to the transitory nature of campuses and the tendency of courses to be populated by students who were already close to graduation. This limited implementation could lead to frustration or disappointment.

A majority of students said they wanted more opportunities to continue learning and practicing permaculture after the course was over. Some faced difficulties finding ways to practice it in their own lives because they were not landowners, or there were few accessible opportunities to stay involved or take follow-up courses on campus or in the community. This is reflective of a commonly discussed experience of PDC graduates known as the “permaculture pit” (Walker, 1998). When students arrive at the end of a high-impact PDC, largely going their separate ways and returning to their day-to-day lives, they can encounter feelings of confusion, doubt, or uncertainty in how to apply their new understandings or maintain the energy felt in the course. For students in universities, which tend to be transitory places, the feeling of rootedness in a community or landscape can be particularly challenging to access. In particular, the semester-based

school system poses challenges to the long term orientation of permaculture design and implementation. Students' abilities to develop connections with instructors, with their community projects, and with other regional actors during the course seemed to be an important way to mitigate this phenomenon. This suggests that proactive succession planning for follow-up courses on campus or in the community would be beneficial.

4.5.2 Limited accessibility and diversity

A few instructors stressed the importance of making extra efforts to keep permaculture education accessible to people of diverse racial, ethnic, and socioeconomic backgrounds. However, the permaculture classes I observed appeared to be overwhelmingly of European descent. I discussed this lack of diversity with Pam, an African American student. In her perspective, demographics seemed to be the most obvious factor: "I live in a state that is less than 5% African American...and that's true of my time here in America. So I guess it has to do with where I chose to live, with the demographics the way it is..." To an extent, I do believe that demographics played a role in the overwhelming "whiteness" of the places and people I visited. I chose research locations based on geography and proximity of institutions of interest, without considering that New England, rural Oregon, and Boulder, Colorado are known to be fairly racially and ethnically homogenous (U.S. Census Bureau, 2011).

However, I believe economic disparity is a major factor in this lack of diversity. Minorities and persons from poorer households face a wide range of barriers to higher education. Black, Hispanic, and Native American households have historically faced higher levels of poverty than White households (U.S. Census Bureau, n.d.).⁵ Integration

⁵ Since all but one institution studied in this project were located in the US, only US statistics were used.

of permaculture in academia may have increased accessibility of permaculture education for university students, and provided a course experience that was usually more diverse in comparison to other courses students took. Yet this accessibility is fundamentally limited by the fact that higher education itself is inaccessible to large portions of the population. I also came to feel the courses were sometimes situated in a way that unintentionally contributed to further filtering of post-secondary students based on socioeconomic status. For example, two students who took an international field course in permaculture pointed to the cost of the trip as a significant financial barrier for many. I also noticed that courses were often located in private, liberal arts-based programs, which tend to be less accessible than a community college model. Though socioeconomic barriers to permaculture education in academic institutions were only discussed by three instructors, throughout the course of my research I came to feel that this is a key limitation to the model of integrating permaculture into higher education.

4.5.3 Limited critical analysis of historical and political factors

I have witnessed many conversations in PDCs, at permaculture regional gatherings, and among movement members informally that critically engage differentials of power, ongoing legacies of colonial histories, racism, and dispossession. Yet, such topics were largely absent from participants' reflections about the PDC experience in an academic context beyond ethics and general critiques of cultural narratives and practices. Granted, these specific topics were not a defined focus of my questions, but I was left wondering about the extent to which such conversations occurred in university PDCs. Responses generally upheld Western notions of private property and land ownership, and the history

of colonial dispossession of Indigenous peoples was never mentioned in participants' reflections on how the topic of regional landscapes was approached in their courses.

Critical confrontation with dominant social structures and the continuing effects of historical colonization, dispossession, and other postcolonial concerns have great significance to the teaching of environmental issues (Fassbinder, 2012; Turner & Donnelly, 2013) and should be key components of ESE in universities. Yet these topics may be limited in PDCs (academic or otherwise), where emphasis often lands on technical, localized, and futures-oriented matters. Ferguson and Lovell (2015) have identified this tendency as an issue in the broader permaculture movement:

The emphasis on individual responsibility, and the proposed abandonment of existing civic and civil institutions, provide uneasy parallels with neoliberalism... Like other versions of localism and voluntarism, these aspects of permaculture threaten to engender a depoliticized naiveté concerning the scale of responses needed to address global and regional crises.

Though these topics may not feature strongly in many academic permaculture courses as they are currently constructed, the permaculture framework has great potential for providing this important educational piece to ESE at universities. Permaculture approaches such as critique of cultural narratives, questioning of existing systems, particular understandings of ecological systems, use of ecology as a metaphor, and discussions of social, economic, and intergenerational justice (Mollison, 2004) are congruent with many tenets and practices of critical ecoliteracy (Turner, 2011 in Turner & Donnelly, 2013), ecopedagogy (Kahn, 2010), and eco-justice pedagogy (Bowers, 2002; Martusewicz, Edmundson, & Lupinacci, 2011). In particular, there are many rich areas of interest shared by permaculture and eco-justice pedagogy. These include the use of ecology as a "root metaphor"; recovery of the non-commodified aspects of community

through critiques of consumerism; environmental racism and discrimination in siting of toxic waste disposal; teaching of ecological design principles to regenerate skills, relationships, and intergenerational knowledge for self-reliant living; and responsibility to future generations through expansion of relationships that enrich community and self-limitation of technological advances that uphold industrialism (Bowers, 2002). Turner and Donnelly (2013) suggest environmental education should engage with the insights of critical cultural theorists, ecofeminists, and environmental philosophers and discourse scholars. It is my view that permaculture education could greatly benefit from academic access to, and critical engagement with, such literature.

4.6 Conclusion

The benefits and opportunities of integrating permaculture for the academic realm are many. In particular, an integrative “whole person” approach to education that connects multiple domains of domains of learning, and that connects the various dimensions of our shared socio-ecological challenges, makes possible the emergence of transformative sustainability learning. The integration of PDCs in academia not only invites, but arguably necessitates, a kind of education that exists in stark contrast to conventional modes of teaching and learning in higher education. Because experiential, community-engaged, skill-based, and interdisciplinary systems approaches are considered by instructors to be essential aspects of permaculture education rather than optional add-ons, which often appears to be the case in ESE, offering permaculture courses in academia can help move ESE in the direction of the transformative level of learning required for real movement toward sustainability (Sterling, 2001). This approach represents an implicit

critique of status quo education models and in many cases, fills a lacuna in university ESE, a strong argument for permaculture's integration.

Yet as the cost of higher education continues to rise, it will become increasingly exclusive for economically marginalized communities. This calls into question the potential of higher education's integration of permaculture to truly transform the social inequities of the global ecological crisis, which tend to affect disadvantaged communities the most. The limitations identified here raise important questions that should be addressed in order to strengthen this model. Permaculture's whole systems design perspective may supply useful tools for addressing gaps in this regard. This can only further enhance the genuine promise permaculture clearly holds for environmental and sustainability education, and for individual, collective, and institutional transformation.

Chapter 5: Conclusion

5. Toward mutually beneficial relationships

In our collective ecological predicament, the challenge of education has arguably never been greater. Universities and colleges will continue to play an important role in shaping the conditions in which a more sustainable future could emerge. “Higher education has first and foremost something to do with creating possibilities,” write Wals & Jickling (2002), “These possibilities arise when universities promote the exploration, evaluation, and critique of emerging ideas and the creative contribution to their development” (p. 230). ESE programs can and will shape the intellectual and moral development of students, influencing students’ sense of who they are and who they can be in the context of environmental challenges; these identities play an important role in the actions they take (Myers & Beringer, 2010). It is therefore imperative that academic institutions actively explore, assess, and experiment with emerging ESE approaches that support more deep learning, involving holistic insight as well as high levels of engagement and motivation to learn (Warburton, 2003).

For this reason, academic institutions should direct attention toward the potential of permaculture education for offering more integrative and transformative ESE, and for helping to move toward their stated sustainability-oriented goals. This will require the flexibility, commitment, and openness of faculty and administrators to different approaches to teaching and curriculum design. These findings suggest that to really take such commitments seriously, broad-scale institutional priorities in terms of resource allocation and funding will need to be examined and, in many cases, re-imagined. Efforts must be made to maintain the integrity of the permaculture curriculum: what is taught,

and how. However, I also suggest permaculture education can and should exist in a diversity of forms in higher education. Creative experimentation in applying permaculture to a variety of educational initiatives and academic fields at universities can widen its accessibility and uptake by more diverse audiences, whether they are undergraduates, faculty, campus staff, or residents of the broader community. Such experimentation and expansion in higher education, coupled with development of stronger links with permaculture initiatives in the broader community, could help to address limitations perceived by students in taking their permaculture education further.

To strengthen the overall approach suggested by this model, it is critical that regional permaculture designers and teachers with sufficient experience and qualifications are consulted in and largely lead the design and delivery of academic permaculture courses. Regional networks may want to consider holding focused discussions to identify areas of agreement regarding acceptable practices or approaches to academic integration, as well as activities that should be discouraged, so that they can respond with a degree of alignment in the event of efforts by academic institutions to develop permaculture courses. Given that this trend only shows signs of further expansion, I suggest that the movement use permaculture concepts and principles to understand how it can design mutually beneficial relationships with academia. Careful observation and design can potentially help mitigate many of the concerns and risks noted in this study, while strengthening aspects of permaculture through increased rigor, documentation, and engagement with both critical literature and scientific research. At the same time, community-based application that is steeped in physical experience of place must remain the dominant form of knowledge generation and provide the

framework for teaching and learning permaculture. Therefore, the permaculture movement must above all maintain a dynamic existence independent of higher education that is accessible and relevant to a wide diversity of communities.

This research also underscores the need for independent permaculture education to take accessibility and diversity more seriously because questions are raised by the apparent lack of racial, ethnic, and socioeconomic diversity in this educational trend. This is likely a function of the restricted accessibility of higher education in general, as members of ethnic and racial minority populations and lower-income households tend to face extra socioeconomic barriers to higher education. Therefore, integrating permaculture into higher education may serve to reinforce existing inequalities in access to permaculture education and a lack of diversity in the movement. Despite the importance placed on diversity in permaculture, in one survey Ferguson and Lovell (2015) found that 447 of 493 (90.6%) of Canadian and U.S. respondents involved with permaculture identified as White/Caucasian and were largely of intermediate to high socioeconomic status. Their research pointed to racial disparities with regard to the ways people participate in permaculture, with participation as a practitioner appearing to be constrained by access to resources and “positively and significantly correlated with age, male gender, college education, and homeownership.” Unfortunately, marginalized communities tend to be most affected by issues such as climate change, ecological degradation, and pollution, and arguably most in need of access to the solution-based tools and technologies of permaculture.

Yet as Pam, an African American student pointed out, “It’s hard to *seek out* diversity.” Ferguson (2014) has argued that enhancing diversity in the movement is

critical, but that current approaches need to be shifted “from a *recruitment* paradigm to a *relevance* paradigm” (p. 5). Rather than trying to recruit more persons of colour and wondering why they don’t show up, he underscored the importance of listening, asking instead, “What are we doing to be relevant and welcoming to communities of colour?” (p. 6). One proactive strategy practiced outside the university by Prof. Angie was to offer discounts or full scholarships to Indigenous students of PDCs. This is a model that could be adopted easily in PDCs, and would likely have significant impacts for accessibility and diversity. While academic integration—in particular with more affordable community colleges—offers potential for the movement to reach new and more diverse audiences, the more rigid constraints of course registration and tuition in academia afford instructors less autonomy than independently-run PDCs in terms of offering flexible payment options and full scholarships for students of colour.

This study revealed several areas that warrant future research and inquiry at different scales of analysis. A more in-depth phenomenological study that follows a smaller number of participants would be better suited to an exploration of the complexities and highly personal process of transformative learning. Though I was able to interview a range of students in that some were still enrolled in the course, and others had taken the course between 1-3 years prior to the study (without noticeable differences in their responses in terms of the impact of the course) multiple interviews with each student over a longer time scale would allow greater understanding of the extent to which transformative personal changes “stuck” over the long term.

As this study did not look at the specifics of the PDC curriculum, individual faculties that are interested in developing a model for integration—particularly in

Environment, Agriculture, and Design-based fields—would benefit from studies that compare permaculture concepts and curriculum components with existing curricula to understand how it may complement or fulfill gaps in particular programs.

Finally, my interviews revealed a need for further research related to developing communication and resource networks for academic teaching and research. Several permaculture instructors expressed interest in making connections with others teaching in academia for critical discussion and direct sharing of lessons learned, innovative projects, and academic PDC curricula. Additional areas for further work suggested by participants were: mapping different program integration models for the PDC, mapping campus permaculture demonstration projects across North America, and identifying research needs of the permaculture community that could be filled by academic student projects.

This study identified numerous opportunities that integration presents to both the permaculture movement and academia. Perhaps the most promising findings are the contributions permaculture can offer to ESE as a framework for integrative and transformative learning. Though challenges and limitations exist, I suggest these can be mitigated to an extent through thoughtful analysis, assessment, and design. The movement and universities may have fundamentally different approaches, and integration may not lead to broader transformations in either arena. However, since permaculture's initial divergence away from academia, major changes have occurred in both—and the global ecological crisis has only worsened. In light of the urgency called for in these times, perhaps permaculture and academia need each other more than ever.

Bibliography

- Abram, D. (1996). *The spell of the sensuous*. New York: Vintage.
- Agrawal, A. (2005). *Environmentality: Technologies of government and the making of subjects*. Durham: Duke University Press.
- Allen-Gil, S., Stelljes, L., & Borysova, O. (2009). Preface. In S. Allen-Gil, L. Stelljes, & O. Borysova (Eds.), *Addressing global environmental security through innovative educational curricula* (pp. xiii-xiv). Dordrecht, Netherlands: Springer. doi: 10.1007/978-1-4020-9314-2
- Ärlemalm-Hagsér, E., & Sandberg, A. (2011). Sustainable development in early childhood education: Inservice students' comprehension of the concept. *Environmental Education Research, 17*(2), 187–200.
- Astin, A., & Astin, H. (2010). *Cultivating the spirit: How college can enhance students' inner lives*. San Francisco, CA: Jossey-Bass.
- Bateson, G. (1972). *Steps to an ecology of mind*. New York: Ballantine Books.
- Battisti, B. (2008). *Permaculture in higher education: teaching sustainability through action learning* (Doctoral dissertation). Retrieved from ProQuest Dissertations. (3336219).
- Battisti, B.T., Passmore, C., & Sipos, Y. (2008). Action learning for sustainable agriculture: Transformation through guided reflection. *NACTA Journal, 52*(2), 23-31.
- Beard, C., Clegg, S., & Smith, K. (2007). Acknowledging the affective in higher education. *British Educational Research Journal, 33*(2), 235-52.
- Bell, A., & Russell, C. (2000). Beyond human, beyond words: Anthropocentrism, critical pedagogy, and the poststructuralist turn. *Canadian Journal of Education, 25*(3), 188–203.
- Berry, T. (1988). *The dream of the Earth*. San Francisco: Sierra Club Books.
- Bevington, D., & Dixon, C. (2007). Movement-relevant theory: Rethinking social movement scholarship and activism. *Social Movement Studies, 4*(3), 185-208. doi:10.1080/14742830500329838
- Bloom, B.S. & Krathwol, D.R. (1956). *Taxonomy of educational objectives: The classification of educational goals*. New York, NY: David McKay & Co.
- Bloom, B.S., Masia, B.B., & Krathwohl, D.R. (1964). Taxonomy of educational

- objectives (Two volumes: The affective domain & The cognitive domain). New York, NY: David McKay & Co.
- Bonnett, M. (2004). *Retrieving nature: Education for a post-humanist age*. Cornwall, UK: Blackwell.
- Bowers, C.A. (2002). Toward an eco-justice pedagogy. *Environmental Education Research*, 8(1), 21-34. doi: 10.1080/13504620120109628
- Bowers, C.A. (2005). Is transformative learning the Trojan horse of western globalization? *Journal of Transformative Education*, 3, 116–125.
- Bronson, M. (2005). Revisioning higher education for the twenty-first century. *ReVision*, 28(2), 3-5.
- Brühlmeier, A. (2010). *Head, heart and hand: Education in the spirit of Pestalozzi*. Cambridge: Sophia Books.
- Brundiers, K., Wieck, A., & Redman, C. (2010). Real-world learning opportunities in sustainability: from classroom into the real world. *International Journal of Sustainability in Higher Education*, 11(4), 308-324.
- Bruner, J.S. (1960). *The process of education*. Cambridge, MA: Harvard University Press.
- Capra, F. (1982). *The turning point*. Bantam Books: Toronto.
- Carey, W. (2005). A permaculture remembrance. *Permaculture Activist*, 57, 9.
- Carp, R.M. (2013). Toward a resilient academy. In L.F. Johnston (Ed.), *Higher education for sustainability: Cases, challenges, and opportunities from across the curriculum* (pp. 223-237). New York: Routledge.
- Chalkley, B. (2006). Education for sustainable development: continuation. *Journal of Geography in Higher Education*, 30(2), 235-236.
- Cho, J., & Trent, A. (2006). Validity in qualitative research revisited. *Qualitative Research*, 6(3), 319-340.
- Clayfield, R. & Skye. (1994). *Manual for teaching permaculture creatively*. Earthcare Education.
- Clayton, S., Manning, C.M., & Hodge, C. (2014). *Beyond storms & droughts: The psychological impacts of climate change*. Washington, DC: American Psychological Association and ecoAmerica. Retrieved from <http://ecoamerica.org/wp->

content/uploads/2014/06/eA_Beyond_Storms_and_Droughts_Psych_Impacts_of_Climate_Change.pdf

- Collini, S. (2012). *What are universities for?* London: Penguin Books.
- Cortese, A.D. (2003, March-May). The critical role of higher education in creating a sustainable future. *Planning for Higher Education*, 15-22.
- Cortese, T. (1995). The role of higher education in achieving a sustainable society. President's Council on Sustainable Development. *Public linkage, dialogue and education task force. Workshop on the principles of sustainability in higher education*. Second Nature Publications, Medford, MA
- Cranton, P. (1994). *Understanding and promoting transformative learning: A guide for educators of adults*. San Francisco: Jossey-Bass.
- Curtis, K. (2012). Creating a culture of possibility: A case for engaged pedagogy. *Humanity & Society*, 36, 354-373. doi: 10.1177/0160597612455744
- Dawborn, K., & Smith, C. (2011). *Permaculture pioneers: Stories from the new frontier*. Hepburn, VIC, Australia: Holmgren.
- Desmond, D., Grieshop, J., & Subramaniam, A. (2002). Revisiting garden based learning in basic education: Philosophical roots, historical foundations, best practices and products, impacts, outcomes and future directions. Paris, France: Food and Agriculture Organization/United Nations International Institute for Educational Planning.
- Dewey, J. (1897). My pedagogic creed. *The school journal*, LIV(3), 77–80.
- Dewey, J. (1916). *Democracy and education. An introduction to the philosophy of education*. New York: Free Press.
- Dodge, L. & Kendall, M. (2004). Learning communities. *College Teaching*, 52(4), 150-155. doi:10.3200/CTCH.52.4.150-155
- Doyle, M.E. & Smith, M.K. (1999). *Born and bred—Leadership, heart and informal education*. London: YMCA George Williams College.
- Ellis, G., & Weekes, T. (2008). Making sustainability "real:" Using group-enquiry to promote education for sustainable development. *Environmental Education Research*, 14(4), 482-500.
- Esbjorn-Hargens, S., Reams, J., & Gunnlaugson, O. (Eds.). (2010). *Integral education: New directions for higher learning. SUNY series in integral theory*. Albany, NY: State University of New York Press.

- European Permaculture Teachers' Partnership. (2004). *Teachers' handbook*. Retrieved from <http://permateachers.eu/teachers-manual-toc/>
- Fassbinder, S.D. (2012). Greening education. In Fassbinder, S.D., Nocella, A.J., & Kahn, R. (Eds.), *Greening the academy: Ecopedagogy through the liberal arts* (1st ed.) (pp. 1-21). Rotterdam: Sense Publishers.
- Ferguson, R. (2014). Converging crises, diverging questions: Critical questions for permaculture. *Permaculture Activist*, 93, 3-8.
- Ferguson, R.S., & Lovell, S.T. (2014). Permaculture for agroecology: Design, movement, practice, and worldview. *Agronomy for Sustainable Development*, 34(2), 251-274. doi:10.1007/s13593-013-0181-6
- Ferguson, R.S., & Lovell, S.T. (2015). Grassroots engagement with transition to sustainability: diversity and modes of participation in the international permaculture movement. *Ecology and Society* 20(4), 39. <http://dx.doi.org/10.5751/ES-08048-200439>
- Flacks, R. (2004). Knowledge for what? Thoughts on the state of social movement studies. In J. Goodwin & J. Jasper (Eds.), *Rethinking social movements: Structure, culture, and emotion* (pp. 135–153). Lanham, MD: Rowman & Littlefield.
- Flood, A. (2010). Understanding phenomenology. *Nurse Researcher*, 17(2), 7-15.
- Foran, A. (2005). The experience of pedagogic intensity in outdoor education. *Journal of Experiential Education*, 28(2), 147-163. doi: 10.1177/105382590502800207
- Foucault, M. (1980). *Power/Knowledge: Selected interviews and other writings, 1972–1977*. New York: Pantheon Books.
- Fredrickson, B.L. (2003). Positive emotions and upward spirals in organizations. In K.M. Cameron, J.E. Dutton, & R.E. Quinn (Eds.), *Positive organizational scholarship: Foundations of a new discipline* (pp. 163-175). San Francisco, CA: Berrett-Koehler.
- Friere, P. (1970). *Pedagogy of the oppressed*. New York: Herder and Herder.
- Friere, P. (1985). *The politics of education: Culture, power and liberation*. New York: Bergin and Garvey.
- Fukuoka, M. (1975). *The one-straw revolution*. New York: Rodale Press.
- Gabriel, S. (2014, Autumn). Forming a more perfect union: Why permaculture and academia need each other. *Permaculture Activist*, 93, 37-41.

- Gaiacraft. (n.d.). "2015 Gaiacraft planetary permaculture pilgrimage." Retrieved from <http://gaiacraft.com/pilgrimage/>
- Galt, R.E., Parr, D., Van Soelen Kim, J., Beckett, J., Lickter, M., & Ballard, H. (2013). Transformative food systems education in a land-grant college of agriculture: The importance of learner-centered inquiries. *Agriculture and Human Values*, 30(1), 129-142. doi:10.1007/s10460-012-9384-8
- Gardner, M. & Kelly, U. (Eds.). (2008). *Narrating transformative learning in education*. New York: Palgrave MacMillan.
- Ganz, M. (2008). What is public narrative? Retrieved from <http://grassrootsfund.org/docs/WhatIsPublicNarrative08.pdf>
- Giacomelli, P., Travisi, C., & Nava, M. (2003). Are graduates in environmental sciences potential managers of the environment?: Some problems and examples in the north of Italy. *International Journal of Sustainability in Higher Education*, 4(1), 9–16. doi:10.1108/14676370310455297
- Glaser, B. & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Chicago, IL: Aldine.
- Glaser, H. (2004). Learning our way to a sustainable and desirable world: Ideas inspired by Arne Naess and deep ecology. In P.B. Corcoran & A.E.J. Wals (Eds.), *Higher education and the challenge of sustainability: Problematics, promise and practice*. Kluwer Academic Publishers, Dordrecht, pp. 131-48.
- Glennon, F. (2004). Experiential learning and social justice action: An experiment in the scholarship of teaching and learning. *Teaching Theology and Religion*, 7(1), 30-37.
- Gliszinski, D. J. (2007). Transformative higher education: A meaningful degree of understanding. *Journal of Transformative Education*, 5(4), 317-328.
- Gruenewald, D. A. (2003). Foundations of place: A multidisciplinary framework for place-conscious education. *American Educational Research Journal*, 40(3), 619-654.
- Gundersen, D., & O'Day, T. (2009). Permaculture: a natural systems design approach for teaching sustainability in higher education: Pacific University's B-Street permaculture project. In S. Allen-Gil, L. Stelljes, & O. Borysova (Eds.), *Addressing global environmental security through innovative educational curricula* (pp. 165-177). Dordrecht, Netherlands: Springer.
- Gunderson, L.H., & Holling, C.S. (2002). *Panarchy – Understanding transformations in human and natural systems*. Washington, DC: Island Press.

- Gunnlaugson, O. (2005). Toward integrally informed theories of transformative learning. *Journal of Transformative Education*, 3(4), 331-353.
- Harper, P. (2013). Permaculture: the big rock candy mountain. *The Land* 14, 14-16.
- Hayward, B. (2012). *Children, citizenship and environment: Nurturing a democratic imagination in a changing world*. New York: Routledge.
- Higgins, P. (2009). Into the big wide world: Sustainable experiential education for the 21st century. *Journal of Experiential Education*, 32(1), 44-60. doi: 10.1177/105382590903200105
- Holder, J. (2013). Identifying points of contact and engagement between legal and environmental education. *Journal of Law and Society*, 40(4), 541-569.
- Holmgren, D. (2002). *Permaculture: principles and pathways beyond sustainability*. Hepburn, Australia: Holmgren Design Services.
- Huckle, J. (1993). Environmental education and sustainability: A view from critical theory. In J. Fein (Ed.), *Environmental education: A pathway to sustainability* (pp. 43–68). Melbourne: Deakin University.
- Iyer-Raniga, U. & Treloar, G. (2000). A context for participation in sustainable development. *Environmental Management*, 26(4), 349–361. doi: 10.1007/s002670010092
- Jacke D., & Toensmeier, E. (2005). *Edible forest gardens: ecological design and practice for temperate-climate permaculture*. White River Junction: Chelsea Green.
- Jasanoff, S. (1993). Skinning scientific cats: Role of science in international cooperation over environmental change. *New Statesman*, 6(241), 29.
- Jensen, D. (2006). Beyond hope. Retrieved from <https://orionmagazine.org/article/beyond-hope/>
- Jickling, B. (1994). Why I don't want my children to be educated for sustainable development: Sustainable belief. *Trumpeter*, 11(3). Retrieved from <http://trumpeter.athabasca.ca/index.php/trumpet/article/view/325>
- Jickling, B. (2003). Environmental education and environmental advocacy: revisited. *Journal of Environmental Education*, 34, 20-28.
- Johannesson, I.A., Norodahl, K., Oskarsdottir, G., Palsdottir, A., & Petursdottir, B. (2011). Curriculum analysis and education for sustainable development in Iceland. *Environmental Education Research*, 17(3), 375–391.

- Johnson, M. (2010, February 17). Permaculture course inspires career changes. *Indiana Daily Student*. Retrieved from <http://www.idsnews.com/news/story.aspx?id=73839>
- Johnston, D. & Johnston, L. (2013). Introduction: What's required to take EfS to the next level? In L.F. Johnston (Ed.), *Higher education for sustainability: Cases, challenges, and opportunities from across the curriculum* (pp. 1-8). New York: Routledge.
- Jonassen, D.H. (1994). Thinking technology: Toward a constructivist design model. *Educational Technology*, 34(4): 34–37.
- Kahn, R. (2003). Towards ecopedagogy: Weaving a broad-based pedagogy of liberation for animals, nature, and the oppressed people of the earth. *Journal for Critical Animal Studies*, 1(1).
- Kahn, R. (2010). *Critical pedagogy, ecoliteracy, and planetary crisis*. New York: Peter Lang.
- Kegan, R. (1994). *In over our heads: The mental demands of modern life*. Cambridge, MA: Harvard University Press.
- Kegan, R. (2000). What "form" transforms? A constructive-developmental approach to transformative learning. In J. Mezirow (Ed.), *Learning as transformation: Critical perspectives on a theory in progress* (pp. 35-69). San Francisco, CA: Jossey-Bass.
- Kolb, A.Y., & Kolb, D.A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education*, 4(2), 193-212.
- Kolb, D.A. (1984). *Experiential learning: Experience as the source of learning and development*. New Jersey: Prentice-Hall.
- Kolb, D.A. & Fry, R. (1975). Towards an applied theory of experiential learning. In *Theories of Group Processes*, edited by C. L. Cooper (pp. 33-57). New York: John Wiley.
- Kopnina, H. (2013). Evaluating education for sustainable development (ESD): Using ecocentric and anthropocentric attitudes toward the sustainable development (EAATSD) scale. *Environment, Development and Sustainability*, 15(3), 607–623. doi:10.1007/s10668-012-9395-z
- Kvale, S. (2007). *Doing interviews*. Great Britain: Sage.
- Labudde, P. (2008). The role of constructivism in science education: Yesterday, today

- and tomorrow. In S. Mikelskis-Seifert, U. Ringelband & M. Bruckmann (Eds.), *Four decades of research in science education: From curriculum development to quality improvement* (pp. 139-155). Munster, Germany: Waxmann.
- Larrivee, B. (2000). Creating caring learning communities. *Contemporary Education*, 71(2), 18-21.
- Lebo, N. (2012). Toward ecological literacy: A permaculture approach to junior secondary science. (Doctoral dissertation). Retrieved from http://www.permaculturenews.org/files/Nelson_Lebo_Thesis.pdf
- Lewicki, J. (1998). Cooperative ecology and place: Development of a pedagogy of place curriculum. Westby, WI: Opinion Paper (ERIC Document Reproduction Service No. ED461461).
- Lincoln, Y.S. & Guba, E.G. (1985). *Naturalistic inquiry*. Beverly Hill, CA: Sage.
- Louv, R. (2011). *The nature principle: Human restoration and the end of nature-deficit disorder*. Chapel Hill, N.C.: Algonquin Books.
- Macy, J. (1991). *World as lover, world as self*. Berkeley, CA: Parallax Press.
- Maniates, M. (2013). Teaching for turbulence. In *State of the World 2013: Is sustainability still possible?* (pp. 255-268). Worldwatch Institute. Washington: Island Press.
- Martusewicz, A., Edmundson, J., & Lupinacci, J. (2011). *EcoJustice education: Toward diverse, democratic, and sustainable communities*. New York: Routledge.
- Matthews, J. (2011). Hybrid pedagogies for sustainability education. *Review of Education, Pedagogy, and Cultural Studies*, 33(3), 260–277. doi:10.1080/10714413.2011.585288
- McKenzie, M. (2008). The places of pedagogy or what we can do with culture through intersubjective experiences. *Environmental Education Research*, 14(3), 361-373.
- Medrick, R. (2013). A pedagogy for sustainability education. *Journal of Sustainability Education* 5. Retrieved from http://www.jsedimensions.org/wordpress/content/a-pedagogy-for-sustainability-education_2013_06/
- Mezirow, J. (1991). *Transformative dimensions of adult learning*. San Francisco: Jossey-Bass.
- Mezirow, J. (1995). Transformation theory of adult learning. In M. Welton (Ed.), *In defense of the lifeworld* (pp. 39-70). Albany: State University of New York Press.

- Mezirow, J. (1997). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education*, 74, 5-12.
- M'Gonigle, M. & Starke, J. (2006). Minding place: Toward a (rational) political ecology of the sustainable university. *Society and Space*, 556.
- Miettinen, R. (2000). The concept of experiential learning and John Dewey's theory of reflective thought and action. *International Journal of Lifelong Education*, 19(1), 54-72.
- Moisio, O., & Suoranta, J. (2007). Hope and education in the era of globalization. In K. Roth & I. Gur-Ze'ev (Eds.), *Education in the era of globalization* (pp. 231-245). Dordrecht: Springer. doi:10.1007/978-1-4020-5945-2
- Mollison, B. (1979). *Permaculture two: practical design for town and country in permanent agriculture*. Sisters Creek, Tasmania: Tagari.
- Mollison, B. (2004). *Permaculture: A Designer's Manual*. Sisters Creek, Tasmania: Tagari.
- Mollison, B., & Holmgren, D. (1978). *Permaculture one: a perennial agricultural system for human settlements*. Tyalgum: Tagari.
- Moore, J. 2005. Barriers and pathways to creating sustainability education programs: Moving from rhetoric to reality. *Environmental Education Research*, 11(5), 537-555.
- Myers, O.E., & Beringer, A. (2010). Sustainability in higher education: Psychological research for effective pedagogy. *Canadian Journal of Higher Education*, 40(2), 51-77.
- Naess, A. (1995). The deep ecological movement: Some philosophical aspects. In G. Sessions (Ed.), *Deep ecology for the 21st century*. Boston, MA: Shambala Books.
- O'Hara, M. (2006). In search of the next enlightenment? The challenge for education in uncertain times. *Journal of Transformative Education*, 4(2), 105-117. doi:10.1177/1541344606287920
- Ord, J. (2009). Experiential learning in youth work in the UK: A return to Dewey. *International Journal of Lifelong Education*, 28(4), 493-511.
- Orr, D. (1994). *Earth in mind: On education, environment, and the human prospect*. Washington, DC: Island Press.
- Orr, D. (2002). *The nature of design: Ecology, culture, and human intention*. New York: Oxford University Press.

- Orr, D. (2011). *Hope is an imperative*. Washington, D.C.: Island Press.
- Ostrander, S.A. (2004). Democracy, civic participation, and the university: A comparative study of civic engagement on five campuses. *Nonprofit and Voluntary Sector Quarterly*, 33(1), 74-93.
- O'Sullivan, E. (1999). *Transformative learning: Educational vision for the 21st century*. Toronto, ON: University of Toronto Press.
- O'Sullivan, E. (2008). Notes for a transformative education. In M. Gardner & U. Kelly (Eds.), *Narrating transformative learning in education*. New York: Palgrave MacMillan.
- O'Sullivan, E., Morell, A., & O'Connor, M.A. (Eds.). (2002). *Expanding the boundaries of transformative learning: Essays on theory and praxis*. New York, NY: Palgrave.
- Owens, C. (2011). Contesting sustainability in the Valley of the Grizzly Spirit: Models of justice in environmental conflict and assessment (Doctoral dissertation). Retrieved from <http://summit.sfu.ca/item/12090>
- Palmer, P.J., & Zajonc, A. (2011). *The heart of higher education: A call to renewal, transforming the academy through collegial conversations*. San Francisco, CA: Jossey-Bass.
- Parks, S.D. (2011). Beyond the classroom: Theme dorms, mixing academic and college life. In P. Palmer & A. Zajonc (Eds.), *The heart of education: A call to renewal* (pp. 175-188). San Francisco, CA: Jossey-Bass.
- Patton, M.Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, CA: Sage Publications.
- Permaculture Principles. (2013, September 11). Retrieved from <https://nurturegreen.wordpress.com/2013/09/11/permaculture-principles/>
- Podger, D. M., Mustakova-Possardt, E., & Reid, A. (2009). A whole-person approach to educating for sustainability. *International Journal of Sustainability in Higher Education*, 11(4), 339-352.
- Quay, J. (2003). Experience and participation: Relating theories of learning. *The Journal of Experiential Education*, 26(2), 106-116.
- Rhodes, C. (2012). Feeding and healing the world: through regenerative agriculture and permaculture. *Science Progress*, 95(4), 345-446. doi: 10.3184/003685012X13504990668392

- Robbins, P. (2004). *Political ecology: A critical introduction*. Malden, MA: Blackwell Publications.
- Rogers, C.R. (1969). *Freedom to learn*. Columbus, OH: Merrill.
- Rojas, A. (2009). Towards integration of knowledge through sustainability education and its potential contribution to environmental security. In S. Allen-Gil, L. Stelljes, & O. Borysova (Eds.), *Addressing global environmental security through innovative educational curricula* (pp. 131-152). Dordrecht, Netherlands: Springer. doi 10.1007/978-1-4020-9314-2
- Sauvé, L., Berryman, T., & Brunelle, R. (2007). Three decades of international guidelines for environment-related education: A critical hermeneutic of the United Nations discourse. *Canadian Journal of Environmental Education*, 12, 33–54.
- Saylan, C., & Blumstein, D. (2011). *The failure of environmental education (and how we can fix it)*. Berkeley CA: University of California Press.
- Scott, R. (2010). A critical review of permaculture in the United States. Unpublished paper. Retrieved from <http://robscott.net/2010/>
- Scott, W., & Gough, S. (2004). *Key issues in sustainable development and learning*. London: Routledge.
- Seeds Sustainability Consulting. (n.d.). “Transformative learning.” Retrieved from <http://seedsustainabilityconsulting.com/another/>
- Shaw, K. Dempsey, J. & Zimmer, K. (2015). *Assessing an applied research-based capstone course for Environmental Studies*. Unpublished paper.
- Shephard, K. (2008). Higher education for sustainability: seeking affective learning outcomes. *International Journal of Sustainability in Higher Education*, 9(1), 87-98.
- Sipos, Y. (2009). Non-traditional pedagogies in advanced education: Engaging head, hands & heart for environmental and educational benefit. In S. Allen-Gil, L. Stelljes, & O. Borysova (Eds.), *Addressing global environmental security through innovative educational curricula* (pp. 155-164). Dordrecht: Springer Netherlands. doi:10.1007/978-1-4020-9314-2_15
- Sipos, Y., Battisti, B., & Grimm, K. (2008). Achieving transformative sustainability learning: Engaging heads, hands and heart. *International Journal of Sustainability in Higher Education*, 9(1), 68-86. doi:10.1108/14676370810842193
- Sjoberg, S. (2008). The confusion of constructivism in science education. In S. Mikelskis-Seifert, U. Ringelband & M. Bruckmann (Eds.), *Four decades of research in science education: From curriculum development to quality*

- improvement* (pp. 157-169). Munster, Germany: Waxmann.
- Slaughter, R.A. (2012). Welcome to the anthropocene. *Futures*, 44(2), 119–126. doi:10.1016/j.futures.2011.09.004
- Smith, G. (2002). Place-based education: Learning to be where we are. *The Phi Delta Kappan*, 83(8), 584-594. doi:10.1177/003172170208300806
- Smith, G.A., & Sobel, D. (2010). *Place- and community-based education in schools*. New York, NY: Routledge.
- Sterling, S. (2001). *Sustainable education: Re-visioning learning and change*. Schumacher Briefing No. 6. Bristol, UK: Green Books.
- Sterling, S. (2003). *Whole systems thinking as a basis for paradigm change in education – Explorations in the context of sustainability* (Doctoral dissertation). Retrieved from <http://www.bath.ac.uk/cree/sterling/sterlingthesis.pdf>.
- Sterling, S. (2010). Learning for resilience, or the resilient learner? Towards a necessary reconciliation in a paradigm of sustainable education. *Environmental Education Research*, 16(5/6), 511–528. doi:10.1080/13504622.2010.505427
- Stone, M.K., & Barlow, Z. (Eds.). (2005). *Ecological literacy: Educating our children for a sustainable world*. San Francisco, CA: Sierra Club Books.
- Subramaniam, A. (2002, Summer). Garden-based learning in basic education: A historical review. *Monograph*, 1–11. Retrieved from <https://hort.cals.cornell.edu/sites/hort.cals.cornell.edu/files/shared/documents/Garden-Based-Learning-in-Basic-Education-A-Historical-Review.pdf>
- Sydow, B. (2012). *Sustainability design in higher education: Curriculum, teaching methods, and program integration* (Doctoral dissertation). Retrieved from ProQuest Dissertations. (3509712).
- Taber, K.S. (2006). Beyond constructivism: The Progressive Research Programme into learning science. *Studies in Science Education*, 42(2), 125-184.
- Taylor, D.M. & Taylor, G.M. (2007). The requirements of a sustainable planetary system. *Social Alternatives*, 26(3), 10-16.
- Todesco, T. (2012). *Integrative and transformative learning practices: Engaging the whole person in educating for sustainability*. Retrieved from UVicSpace.
- Turnbull, D. (2000). *Masons, tricksters and cartographers: Comparative studies in the sociology of scientific and Indigenous knowledge*. Amsterdam: Harwood Academic.

- Turner, R. (2011). *Critical ecoliteracy: An interdisciplinary secondary and postsecondary humanities curriculum to cultivate environmental consciousness* (Doctoral dissertation). Retrieved from ProQuest Dissertations.
- Turner, R., & Donnelly, R. (2013). Case studies in critical ecoliteracy: A curriculum for analyzing the social foundations of environmental problems. *Educational Studies, 49*(5), 387.
- UNEP. (2012). *UNEP Annual Report*. Retrieved from <http://hqweb.unep.org/publications/>
- UNESCO. (2009). *Review of contexts and structures for education for sustainable development*. Retrieved from <http://unesdoc.unesco.org/images/0018/001877/187757e.pdf>
- U.S. Census Bureau. (2011). Overview of race and hispanic origin, 2010. Retrieved from <https://www.census.gov/prod/cen2010/briefs/c2010br-02.pdf>
- U.S. Census Bureau. (n.d.). Historical poverty tables. Retrieved from <http://www.census.gov/hhes/www/poverty/data/historical/people.html>
- van Manen, M. (1990). *Researching lived experience: Human science for an action sensitive pedagogy*. Albany, NY: State University of New York Press.
- Veteto, J., & Lockyer, J. (2008). Environmental anthropology engaging permaculture: moving theory and practice toward sustainability. *Culture & Agriculture, 30*(1 & 2), 54-55. doi: 10.1111/j.1556-486X.2008.00007.x
- Walker, J. (1998, Spring). The permaculture “pit” and other post-design dilemmas. *Permaculture Magazine, 17*, 327.
- Wals, A.E.J. (2010, May). Message in a bottle: Learning our way out of unsustainability. Inaugural address held upon accepting a Professorship and UNESCO Chair in Social Learning and Sustainable Development at Wageningen University, Netherlands. Retrieved from <http://groundswellinternational.org/2010/12/14/message-in-a-bottlelearning-our-way-out-of-unsustainability/>
- Wals, A.E.J., & Jickling, B. (2002). “Sustainability” in higher education: From doublethink and newspeak to critical thinking and meaningful learning. *International Journal of Sustainability in Higher Education, 3*(3), 221–232. doi:10.1108/14676370210434688

- Warburton, K. (2003). Deep learning and education for sustainability. *International Journal of Sustainability in Higher Education*, 4(1), 44-56.
doi:10.1108/14676370310455332
- WCED. (1987). *Our common future*. Oxford: Oxford University Press.
- Williams, D.R., & Dixon, P.S. (2013). Impact of garden-based learning on academic outcomes in schools: Synthesis of research between 1990 and 2010. *Review of Educational Research*, 83(2), 211-235.
- Wright, T. (2013). Stepping up to the challenge—The Dalhousie experience. In L.F. Johnston (Ed.), *Higher education for sustainability: Cases, challenges, and opportunities from across the curriculum* (pp. 201-213). New York: Routledge.
- Zhai, J. (2015). *Teaching science in out-of-school settings: Pedagogies for effective learning*. Singapore: Springer Singapore.
- Zimmer, K. (2013). *Permaculture as pedagogy*. Unpublished paper.

Appendix A: Interview Questions

Permaculture Teacher Interview Questions

1. Can you please introduce yourself including your background with teaching permaculture and the university program you taught the PDC through?
2. How did a PDC come to be approved and offered at the school?
 - What was it like working with the school to offer the PDC?
 - How is the PDC certification arranged at the school?
 - How did you acquire the authority to grant certification and were your credentials questioned by the university?
3. On one hand, you have an academic program with its own curriculum, and on the other hand, there is the PDC curriculum with contested standards. As an instructor, what was it like integrating these together?
 - How do you think the particular format of the program helps/hinders its success?
 - What other factors are crucial to offering a quality PDC?
 - What is it about your school in particular that helped this program come into being?
4. Why do you feel this trend is happening in universities now? What role or function is permaculture serving?
 - What sets it apart - why permaculture as opposed to sustainable gardening or agroecology?
 - How was it different from other PDCs you've taught outside the university?
5. What's at stake for permaculture – the practice, the teachers, and the broader movement – in bringing it into these formal academic spaces?
 - What are the benefits and drawbacks of teaching permaculture in a university context? Is it worth it to you as a permaculture teacher?
 - What challenges, limitations or barriers have you encountered in (trying to) offer this course?
6. What advice would you give to another permaculture teacher or professor who is thinking about offering a PDC at a university? What do you wish you knew earlier in the process of establishing the PDC, or what would you have done differently?
7. What's at stake here for universities in adopting this trend? What implications does the integration of permaculture have for universities?
 - What effect, if any, do you think that offering permaculture education has had on your school or the broader community?
8. In your experience, what draws students to the PDC and how do they respond to it – what kinds of feedback have you received or do you keep in touch with students?
 - What features of the PDC are key ingredients for this?

- Why do you think students choose to take the PDC through the university rather than outside of it?
 - How do you feel the experience for students differs in a university setting vs. outside of academia?
9. Are there any questions I should have asked but didn't? Is there anything you want to add that's important to this topic?

Interview Questions – PDC Alumni

1. Can you please introduce yourself and describe the program you took the PDC through?
 - How did you become interested in taking a PDC?
 - What was your experience with permaculture before taking it?
2. How come you chose to take the PDC for credit, rather than outside of a university?
 - What did the academic context contribute to your experience?
3. Have you taken another PDC before or after that course? How do they compare?
 - If you could do it again, would you choose to take the PDC through a university or outside of it?
 - What advice would you give to another student thinking about taking the course?
4. What distinguished the PDC from other environmental courses you've taken?
5. Can you describe how you responded to the experience of the PDC? Did anything happen for you as a result of the course?
 - What features of the PDC do you feel were key ingredients for this?
6. Where there any challenges, barriers or limitations you found in your experience with the course – how it was run at your school, what it was like for students?
7. What do you think is at stake for permaculture in bringing it into more formal academic spaces?
 - What effect do you see this having on the practice of permaculture, the PDC or the broader permaculture movement?
8. What effect do you think offering permaculture courses on campus has had on your school or the broader community?
 - What implications does the integration of permaculture have for sustainability education at universities?
 - Why permaculture in universities now? Why permaculture as opposed to sustainable gardening or agroecology?
9. Is there anything you'd like to add that I didn't ask about?