Epistemological Tensions in a Professional Development Pairing Indigenous Knowledge and Western Science for Ecological Restoration Education

by

Sara J. Krauskopf

A dissertation submitted in partial fulfillment of

the requirements for the degree of

Doctor of Philosophy

(Curriculum & Instruction)

at the

UNIVERSITY OF WISCONSIN-MADISON

2020

Date of final oral examination: 4/22/2020

The dissertation is approved by the following members of the Final Oral Committee:

Noah Weeth Feinstein, Associate Professor, Curriculum & Instruction
Nicole Louie, Assistant Professor, Curriculum & Instruction
Rosemary Russ, Associate Professor, Curriculum & Instruction
Kasey Keeler, Assistant Professor, Civil Society and Community Studies, American Indian Studies

Acknowledgements

I would like to thank the many people who supported and inspired me along my research journey. I may not list every single one of you but know that my long road to writing this publication was assisted by many friends, family and colleagues.

Thank you to the Nature Alliance staff who inspired my work and provided me with complete and utter support. I learned more than I ever anticipated because of your openness, self-critical awareness and inclusiveness. Thank you also to all of the collaborators and participants who were willing to contribute their thoughts and struggles to the development of my dissertation.

Thank you to my advisor, Dr. Noah Weeth Feinstein, for supporting me through this process. You pushed me to focus my thoughts, frame the work in better ways, and hone my writing. Your mentorship made all the difference in the quality of my work. I am grateful for having the chance to learn with you.

Thank you to Dr. Nicole Louie for always knowing the right questions to ask and for helping me refine my research questions, as well as my answers. Thank you to Dr. Kasey Keeler for supporting my learning about appropriate ways to write and speak about the history, culture and Knowledges of Indigenous Peoples. Our conversations helped confirm I am on the right path. Thank you to Dr. Rosemary Russ for pushing me to connect with theory and better understand epistemology. Thank you to all of my professors at the University of Wisconsin-Madison for expanding my horizons and engaging me in critical conversations that supported the development of this work. Thank you to Tom Tegart, who always knew how to answer any question or fix any problem a graduate student might encounter.

Thank you to so many of my colleagues for the many conversations we had and for the critiques you provided of my work. We are in this together--Claire, Drew, Sarah, Jiwon, Charnell, Kimberly, Chelsea, Mary, Katie, Erica, Pallavi and Rachel.

Thank you so much to my family. To my parents who raised me to travel the world and ask questions. To my sister and her family who provided sustenance and diversions. To Sean for his love, daily support and provision of a back-saving standing desk. To Nessa for her insistence that I get away from my work and go outside for walks.

This research was supported by a University of Wisconsin Graduate Fellowship and the Pella Science Education Fellowship. My dissertation was written while working on Ho Chunk land.

Abstract

Education researchers have challenged the field to find approaches to decentralize the dominance of Western ways of thinking about science and science teaching to consider how "multiple knowledges can co-exist...for epistemological equity" (Dei, 2008, p. 8). This work adds to the small number of examples in the literature, particularly in the United States, that help educators grapple with ways to engage with the relationship between Western Science (WS) and Indigenous Knowledge (IK). It focuses on the challenges of designing and conducting PD that provides practicing educators with opportunities to learn from Indigenous communities, discuss ways of knowing, and consider classroom connections.

This study examines the development and implementation of Nature Alliance's Urban Indigenous Professional Development program--a professional learning experience that presents Indigenous perspectives alongside Western ecological restoration education activities. It addresses the question: *How does creating an explicitly Indigenous cultural focus in a science-related PD engage professional developers and participants in grappling with issues of epistemology, race, power and the cultural nature of science?*

To study the design of the PD, I interviewed PD organizers and observed planning meetings for two months. To address participant engagement, I observed the 24-hour PD workshop and interviewed participants. Finally, I conducted a follow-up focus group and individual interviews with PD organizers to capture their reflections. I used grounded theory (Charmaz, 2000) to analyze data, iteratively working with codes that developed to find themes within the issues and tensions encountered.

Events from the workshop exposed ongoing epistemological tensions between WS and IK. My analysis revealed a tendency for PD organizers to present their restoration curriculum, which was written from a Western approach, as culturally neutral, explicitly identifying culture

only for Indigenous approaches to land care. It also demonstrated the need for PD organizers to provide guidance for participants to identify different epistemological perspectives and critique ways they see the Knowledge of Indigenous People represented.

I provide suggestions for ways to recognize and juxtapose the epistemologically Western and Indigenous tracks of the program. Intentionally discussing these differences provides an opportunity for learning with a critical multilogical approach (Kincheloe & Steinberg, 2008).

Notes on Terminology and Indigenous Voice

In my writing, I often use the terms Indigenous and First Nations interchangeably when referencing Indigenous Peoples and Indigenous Knowledges. I use First Nations more often when speaking broadly of a distinct political group, such as the Deer Valley Nation, and Indigenous when I speak of a group of individuals who may not have one common affiliation. Many terms including Native, Native American, American Indian, First Nation and Indigenous are used to refer to the same groups of people and those alternate forms appear when I defer to those who self-identify that way, or if I use the words of others in my writing. I discussed the use of these terms with Indigenous advisors during the research and writing of this dissertation and learned that an evolving discussion exists amongst individuals who identify with these broad set of terms. As Ngati Awa and Ngati Porou scholar Tuhiwai Smith notes, these terms "collectivize many distinct populations" (2012, p. 37) *yet the terms can serve a purpose when discussing the similar past, present and future fate of these groups.*

People have been categorized by race and ethnicity in our society, and those categories often change. As this paper focuses on issues related to racial, tribal and ethnic identity, and to be as transparent as possible about positionality, I will be identifying my participants' chosen self-identity when they are first introduced. Although I wished to recognize the many unique, sovereign political identities of groups and individuals mentioned in my work to fight against the tendency to racialize First Nations people into one homogenous group, this was not entirely possible in order to comply with IRB. In order to maintain anonymity and protect identities and relationships discussed in this volume, it became necessary to create pseudonyms not only for personal names, but also for tribal identities and events related to the focal group and their First Nations collaborators. As a white researcher who recognizes the problematic historical colonization of tribal names, I struggled with the best way to create these pseudonyms. I

recognize that I remove the agency of each tribe to participate and respond to my work in not naming them. In consultation with Indigenous mentors I chose those found in these pages.

The names of the focal group and professional development programs mentioned are pseudonyms to protect the identities of those working for a small organization. Locations mentioned have been obscured for the same reasons.

Relatedly, while race and racism are involved in the issues to be discussed, I am aware that Indigeneity and race are not equivalent. Race is a complex subject and when I use the terms race or racism, I am cognizant of issues of sovereignty that distinguish the plight of Indigenous Peoples from other minoritized groups. This will be discussed in greater detail in this dissertation. I struggled to find a better generalizable term to use when "whiteness" was a significant problem to be discussed and these terms are commonly used to discuss the negative experiences of Indigenous Peoples.

For my dissertation I have sought out and prioritized the perspectives offered by the scholarship of Indigenous authors, both published and oral communications, to inform my writing and analysis of the events that occurred in this study, and I endeavor to help the reader recognize those valued perspectives.

For guidance with Indigenous epistemologies and issues of power and race as they relate to land education and science education, I rely on the work of Indigenous scholars including: Megan Bang (Ojibwe and Italian), Ananda Marin (Choctaw, African American, and European American), Lawrence Curley (Ojibwe and Dine), Adam Kessel (Lakota, Italian, German), Eli S. Suzukovich III (Little Shell Chippewa-Cree), Robin Wall Kimmerer (Citizen Potawatomi Nation), Gregory Cajete (Tewa), Eve Tuck (Unangax and an enrolled member of the Aleut Community of St. Paul Island, Alaska), Sandy Grande (Quechua), Elizabeth McKinley (Māori), Georgina

Stewart (Māori), Beth Leonard (Dené/Athabascan), Ocean Mercier (Mâori), Melinda Webber (Mâori), Leilani Sabzalian (Alutiiq), Linda Tuhiwai Smith (Ngati Awa and Ngati Poro), Kyle Whyte (Citizen Potawatomi Nation), Martin Nakata (Torres Strait Islander), Bryan McKinley Jones Brayboy (Lumbee), Vine Deloria, Jr. (Standing Rock Sioux), Daniel R. Wildcat (Yuchi member of the Muscogee Nation of Oklahoma), Manu Aluli Meyer (Native Hawaiian), Michelle Bishop (Gamilaroi), Brian McInnes (Ojibwe).

For accounts of Indigenous history, I relied on many of the above authors, who often wrote on the impact of history on education for Indigenous peoples, but also on the work of other Indigenous scholars including David Truer (Ojibwe), Patty Loew (Ojibwe), Kurt Peters, (Blackfeet/Powhatan), Debra Valentino (Oneida), Samantha Skenandore (Ho-Chunk), Barbara Blackdeer-MacKenzie (Ho Chunk), Adrienne Keene (Cherokee), and Matika Wilbur (Swinomish and Tulalip).

For consideration of Indigenous views on respectful ways to conduct scientific research, I additionally looked to Kim Tallbear (Sisseton Wahpeton Oyate), Katrina G. Claw (Navajo), Rene L Begay (Navajo), Krystal S. Tsosie (Navajo), Keolu Fox (Native Hawaiian), and Nanibaa' A. Garrison (Navajo).

While this dissertation creates a dichotomy between Western researchers and Indigenous Peoples, I am aware that many people who identify as Indigenous engage in epistemologically Western forms of research. My use of "Western researcher" generalizes the hegemonic tendencies of the field as a whole.

In this paper I am using the terms science and Western Science interchangeably. They refer both to the practices of professionals working in science and to the knowledge base and practices of science as taught in the typical U.S. classroom as mandated by State or National

Standards. I use Western Science in my writing for emphasis and to remind the reader of the hegemonic meaning and Eurocentric origin of the discipline.

The analytical arguments contained in this dissertation are mine and mine alone. I may have misinterpreted what I witnessed, and any errors or misinformation remain associated with me, and should not be attributed to the individuals or organizations discussed.

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Chapter One

Introduction

"Why is science (so called 'Western science') still the only discourse accepted in our institutions (schools, universities, etc.)? Why are no other epistemological discourses accepted in education?" (Adams, Luitel, Afonso, & Taylor, 2008, p. 1006) Schools, science standards and science classrooms in the United States were built within a white, patriarchal, Protestant, middle-class culture and reflect the values of that culture (S. G. Harding, 1994). Measures of academic success were drafted within that framework and those who grow up in cultures outside that framework are often deemed less intelligent and lower achieving because they do not demonstrate success through those measures (Bang, Warren, Rosebery, & Medin, 2012; Kimmerer, 2002; Mutegi, 2013). In a push to make science teaching relevant and accessible to all students, many different pedagogical approaches have been suggested to make science and science teaching more culturally responsive, accessible and equitable for all students (Atwater, 1996; Christopher Emdin, 2013; Mutegi, 2013; Windschitl, Thompson, Braaten, & Stroupe, 2012). However, a disconnect still remains between teachers, who are predominately white and almost universally trained with the hegemonic, decontextualized Western Science (WS) canon and the diverse, epistemologically rich student body they teach (Adams et al., 2008; Atwater, Lance, Woodard, & Johnson, 2013). Teachers working in multicultural classrooms must find ways to connect with all of their students and ensure that they all learn. Researchers have challenged the field to find approaches to decentralize the dominance of Western ways of thinking about science and science teaching to consider how "multiple knowledges can co-exist...for epistemological equity." (Adams et al., 2008; Bang et al., 2012; Carter, 2010; Dei, 2008, p. 8; Kincheloe & Steinberg, 2008). Reaching all students involves not just finding ways for all students to learn the same hegemonic knowledge base and way of thinking, but rather

calls for rethinking the ways we define science and teach the process of investigating and learning about the natural world. What benefit would come from approaching investigations and solving problems using multiple epistemological perspectives? How can professional development programs help educators decenter their Western thinking about what science is and consider other ways of knowing the world?

In this study I focus particularly on the possible role of Indigenous Knowledge (IK) in science education and consider how its inclusion fits into a larger discussion of what it looks like to critically transform education to meet the needs of a diverse student population (B. F. Lewis, Aikenhead, & Cobern, 2001; E. McKinley & Stewart, 2012). Professional development (PD) opportunities for educators that help them consider Indigenous approaches to investigating the natural world could provide ways for educators and those trained in WS to critically examine what and how they teach and to consider changes that may benefit not only students with Indigenous backgrounds, but also students from other marginalized groups and the student body at large.

Training for practicing educators specifically in ecological restoration education may provide such an opportunity for learning and reflection to critically investigate the world through multiple perspectives. The knowledge of Indigenous Peoples is often connected to experience living in intimate relationship with a specific geographical area for many generations (Dei, 2008; E. McKinley & Stewart, 2012). This strong land connection, along with the critical importance of sovereignty, creates a logical opportunity to conduct professional development that focuses on land-based education with Western ecological restoration techniques paired with Indigenous approaches and perspectives on connecting to and caring for the land. This research project

examined ways in which PD organizers and participating educators experienced and considered the role of intersecting epistemologies and knowledge systems with a place-based focus.

Road map

This chapter begins with a review of the relevant research related to ways to help bring WS and IK together in educational settings. Next, I justify the purpose for conducting the research described in this book. I then discuss my theoretical framework and sociocultural approach to my work. Finally, I introduce Nature Alliance (NA), the focal organization of the professional development.

Chapter two discusses my positionality as a researcher and describes my methodology for conducting the research described in this book.

In chapter three, I describe the challenges and tensions that led to the creation of the Urban Indigenous Professional Development (IPD) program, the workshop researched for this study. This includes a description of significant events in NA's history as well as an examination of the mission, vision and goals of the organization and its staff members. I describe how the new urban Indigenous focus added additional burdens to the program and describe epistemological dilemmas that the staff are currently grappling with as their professional development programs evolve over time.

Chapter four focuses on one particular episode that occurred during the Urban IPD workshop that brought up epistemological tensions between WS and IK. I describe in detail the presentation on earthen mounds by a white archaeologist and the public response of a self-identified Indigenous intern working for the NA. I analyze the epistemological differences brought up through the episode and explore the diverse reactions from attendees. The diversity

of reactions raises important questions about how to plan for and conduct difficult conversations about race, power and epistemological differences.

In the final chapter, I summarize my findings and conclusions and discuss implications both for NA and the science education PD field at large. I focus on ways to bring IK and WS into conversation with one another in educational settings. I also discuss considerations for the work PD organizers must do to critically examine their own content and work with multiple epistemologies when designing PD. This then leads into suggestions for thinking about ways to support educators in doing the same work.

Literature Review

This section begins with a review of relevant literature related to the hidden culture of WS, an overview of IK and ways researchers have considered the intersection between the two. Next, I discuss the problems of creating equitable education in science and review different approaches that have been taken in the past to address these challenges. Acknowledging the particular challenges of helping science teachers bring IK into epistemologically WS classrooms, I then review professional development programs that attempted to bring these two areas into conversation along with gaps in the current research. Finally, I provide some background on the utility of focusing on land care and ecological restoration in creating a context for professional development comparing Indigenous and Western perspectives.

The Hidden Culture of Western Science

For most scientists and science educators, the idea of recognizing the cultural nature of science is problematic. Culture includes the routine ways of thinking about and doing things in any community's approach to living including language, literacy, traditions, tool development and practices (Rogoff, 2003). Science is typically described as "objective" and "acultural" (Lee,

Luykx, Buxton, & Shaver, 2007, p. 1285; Loucks-Horsley, Matsumoto, & Loucks-Horsley, 1999; Loucks-Horsley, Stiles, Mundry, Love, & Hewson, 2010) ignoring the demonstrated reality that it has a very specific cultural vocabulary, origin and approach to investigating the world (Aikenhead, 2006; B. A. Brown, 2006; Turnbull, 1997). Science as it is commonly practiced today, arose out of a European, anthropocentric, rational, hierarchical societal structure (Aikenhead, 2006; Hodson, 1999; Kimmerer, 2002; Roberts, 2011) and continues to privilege mainstream, middle class ways of knowing (Warren & Rosebery, 1995). The creation of this *cultural* way of knowing about the world excluded a significant portion of the population by sex, gender, class, race and ethnicity. It created narrow definitions of scientific habits of mind and a universalist, impersonal notion of knowledge stripped of context (Merton, 1973). Science was often used to create and reinforce racial and gender hierarchies that determined who participated in science and what science included (Aikenhead, 2006; S. Harding, 1992; Kimmerer, 2002; Roberts, 2011). This narrow way of investigating the world distinguished the field of science from the other disciplines (Kincheloe, McKinley, Lim, & Barton, 2006; Urban, 2010). Groups whose epistemologies, cultures or experiences resided outside this definition were seen as less intelligent, less able and inferior (Bang et al., 2012; S. Harding, 1992; Kimmerer, 2002).

What is Indigenous Knowledge? How can We Compare it to Western Science?

Indigenous Knowledge (IK) is commonly discussed as the knowledge of Indigenous People accepted as emerging from living in intimate relationship with a specific geographical area (E. McKinley & Stewart, 2012). It is a way of knowing developed by people who have had sustained occupation of a specific geographic place over generations and is therefore associated with a place-based form of learning (Dei, 2008; E. McKinley & Stewart, 2012). Among the groups who possess and develop IK, it forms the basis for culture, agriculture, food preparation,

health care, education and land protection (Mercier & Leonard, 2019; UNESCO, 2003). The cultural systems in which IK operate are dynamic, adaptive and holistic (Mercier & Leonard, 2019; Odora Hoppers, 2011; UNESCO, 2003).

The descriptions of IK in this section come primarily from the publications of Indigenous scholars. Although I will discuss some of the common characteristics and distinctions of IK and Indigenous Knowledge Systems from WS, I will not provide a singular definition or description to avoid essentializing cultures that exist all over the world and are heterogeneous in nature. (Kincheloe & Steinberg, 2008). I also acknowledge that I generally use the singular in referring to IK, as is common in the literature, when in reality IK is heterogeneous. There are many Indigenous Knowledges. This is part of the challenge of writing about this field, as I will describe below.

Comparing WS to IK is inherently challenging. Using a Western social construct as the standard to which any form of knowledge is compared reinforces hegemonic structures (B. F. Lewis et al., 2001; E. McKinley & Stewart, 2012). The broad scope of IK also creates difficulties in comparing it directly to WS, which is bounded and intentionally excludes many components that are integral to IK. Some Indigenous scholars discuss controversies within Indigenous communities who do not wish to directly compare the two areas or consider WS as a subset of IK (E. McKinley & Stewart, 2012; Mercier & Leonard, 2019; Nakata, 2002). Others use different terms like Native Science (Cajete, 2000; Medin & Bang, 2014), Indigenous Science (Marin & Bang, 2015; Whyte, Brewer, & Johnson, 2016) or Traditional Ecological Knowledge (TEK) (Kimmerer, 2002; Mercier & Leonard, 2019; Turnbull, 1997) to set up comparisons. Despite the challenges of making comparisons, many Indigenous and non-Indigenous scholars still engage in discussions of the similarities and differences. Given our existing educational

system, which separates science from other disciplines and generally excludes IK altogether, creating intentional, careful comparisons of WS and IK can be valuable for examining the limits of the current way of science is practiced and taught. Putting the two ideas into conversation can help clarify how science has alienated Indigenous Peoples over time. Educators can use that information to consider how to make science education more inclusive of IK and to expand all students' understanding of the value of looking at the world through multiple lenses. When thinking about ways to transform the educational system, making these complex comparisons reveals important information.

Cajete (2000) described Native Science (his term for IK and IK Systems) as "the collective heritage of human experience with the natural world; in its most essential form, it is a map of natural reality drawn from the experience of thousands of human generations" (p. 3). He asserts that the words "knowledge" and "science" are interchangeable. He describes Native Science traditions as participatory, holistic, spiritual and communal. This contrasts with reductionist Western scientific approaches that often deconstruct phenomena into small components to study them separately and avoid mention of spiritual connections between parts (Deloria Jr. & Wildcat, 2001; Martusewicz, Edmundson, & Lupinacci, 2011).

Particularly relevant in this study, is the difference between the hierarchical nature-culture divide that predominates in WS compared to many IK Systems that see humans, plants and animals as equals, and emphasize the interdependence of all things (Bang & Medin, 2010; Dimick, 2012; S. G. Harding, 1994; Martusewicz et al., 2011; Whyte et al., 2016). Those within an IK system often make decisions based on the idea that plants and animals are relatives to be cared for, not resources for humans to exploit (Kimmerer, 2002; Medin & Bang, 2014; Whyte et al., 2016). Western epistemological separation of humans from nature and the idea that humans

have a right to dominate and exploit nature and its resources "is an untenable epistemological position for many non-dominant communities" (Bang et al., 2012, p. 304). Speaking of items in nature as objects in an impersonal way without recognizing relationships and reciprocity with the natural world is incongruent to Indigenous ways of knowing (Bang et al., 2012; Cajete, 2000; Kimmerer, 2013). Caretaking and cultivating relationships with plants and animals are central protocols within "Indigenous Science" or IK (Whyte et al., 2016). IK views epistemology, motivation and actions for "scientific" investigation as inseparable (Whyte et al., 2016).

IK is generally passed down orally and through apprenticeship from one generation to the next; and while knowledge is transmitted in these ways in WS as well, the field places a high value on written transmission of knowledge with peer review (Kimmerer, 2002; Nakata, 2010; Turnbull, 1997). The Indigenous languages themselves used to transmit this information are interwoven with knowledge and deep understanding (Meyer, 1998). This meaning is often lost when a colonizing language is forced upon Indigenous people for communication (Adams et al., 2008; Kimmerer, 2013).

One of the final areas often discussed in the literature that distinguishes IK from WS is the question of sovereignty and right to self-determination (Bang et al., 2014; Grande, 2009; Sabzalian, 2019; Tuhiwai Smith, 2012). Knowledge in WS is seen as universal and applicable everywhere. IK is often bound to place, and maintaining the rights to live, practice and create knowledge in that place is deeply important to Indigenous Peoples (Bang & Medin, 2010; Grande, 2009; Sabzalian, 2019; Tuck, Marcia, & Kate, 2014). The loss of land and subsequent suppression of Indigenous Peoples' ability to exercise those rights is tied to a deep and storied history--to this day those rights remain in constant jeopardy (Skenandore, in person presentation 2019). Given this study's focus on land and ecological restoration, we cannot study IK without

confronting colonialism, subjugation and oppression (Kincheloe & Steinberg, 2008; Sabzalian, 2019). One should not study IK and consider its position in today's schools without a critical awareness of the historical and contemporary forces that have kept IK out of education to date (Bang et al., 2014; Tuck et al., 2014). Such social justice conversations are integral to considering epistemological equity.

The conflicts that arise between IK and WS in this dissertation research are inseparable from the history of colonization and genocide of people Indigenous to what is now known as the United States. Centuries of conflict led to genocide, displacement and intentional assimilation of hundreds of distinct groups of Indigenous Peoples (Treuer, 2019; Wolfe, 2011). Many systemic attempts at assimilation occurred through educational institutions--government policies isolated children from their families and communities (Blackdeer-Mackenzie, 2018; Loew, DeMain, & Leary, 2013; Peters & Lobo, 2001). These institutions also created classroom textbooks and curriculum that erased all mention of these same groups of people and the atrocities inflicted upon them (Bang et al., 2014; King, 1991; Tuck et al., 2014). To adequately understand this entire history, including U.S. Federal Indian Policy, would require volumes of material and a lifetime of study. As a white researcher, I am only beginning to grasp the full nature and impact of settler-colonialism on our educational system. As necessary, throughout this volume I will provide relevant background information for the reader to understand the sociocultural and historical context of particular conflicts. I implore the reader to consult other firsthand sources and accounts elsewhere to grow their understanding as it relates to this work.

We Need a Different Vision of Science to Achieve Epistemological Equity in Schools

The same norms that exist for WS often prevail in science education (Aikenhead, 2006). In order to create epistemological equity for students in school, especially students who identify

as Indigenous, one must examine the standards and norms in science classrooms and consider ways to support educators to push against those norms to transform their teaching and their curriculum. This section will provide a brief review of different approaches to make science education more equitable and the specific challenges to make it inclusive of multiple epistemologies.

The Framework for the Next Generation Science Standards (NGSS) expects that "by the end of 12th grade, all students have some appreciation of the beauty and wonder of science; possess sufficient knowledge of science and engineering to engage in public discussions on related issues; are careful consumers of scientific and technological information related to their everyday lives; are able to continue to learn about science outside school; and have the skills to enter careers of their choice, including (but not limited to) careers in science, engineering, and technology." (NRC, 2012, p. 1) The NGSS represent a Western approach to conducting science and are often interpreted as a requirement to teach Western scientists' way of thinking in the classroom with a discrete set of knowledge and skills, often with an aim to prepare students for the science career pipeline (Basile & Lopez, 2015; Mutegi, 2011; Philip & Azevedo, 2017). Although the NGSS create some links to math and language arts standards, in general, the natural world and science remain siloed and disconnected from politics, social structure or economics (Parsons & Thompson Dorsey, 2015; Philip & Azevedo, 2017). Current broadly adopted educational reforms using these standards envision the purpose of school science as finding ways to bring all students, regardless of background, into the fold where they are presented with a unified vision of science rather than a diversified understanding of knowledge about the natural world (Basile & Lopez, 2015; Hodson, 1999; Mutegi, 2011).

Many of the reform or Science for All initiatives take a color-blind approach to learning in the name of equity, assuming everyone comes to the table with the same background, learns in the same way and should reach the same end goal (Mutegi, 2011; Parsons & Thompson Dorsey, 2015). This color-blindness privileges normative ways of knowing and discounts those from non-white, middle class backgrounds. "Many science teachers and teacher educators are still educated to view and approach science in isolation of self and social phenomena" (Johnson & Atwater, 2014, p. 90).

Language, culture and context, however, cannot be separated from learning content; student diversity affect who learns, what they learn and how (R. Gutiérrez, 2007; Lynch, 2001; Meyer, 1998). A color-blind, one-size fits all approach to education will be unsuccessful at helping every student learn. Equitable science teaching does not occur when students feel like their identities, communities and ways of knowing are not recognized and legitimized (Bang & Medin, 2010; Mutegi, 2013; Tan & Barton, 2008). Because science instruction is seldom recognized as set of cultural practices, many Students of Color, including Indigenous students, experience a sharp divide between school and their everyday world (Bang et al., 2012; Barton & Tan, 2009; Mutegi, 2013).

White teachers in particular, who make up most of teaching force, struggle to recognize normative standards they operate within and understand sociocultural constructs of race (citation). Multiple theories and approaches pushed for teaching that focused on the experiences, strengths, and assets of non-dominant students to be brought into the classroom as well as an explicit examination of the inequities that exist in schools and the community including Culturally Relevant Pedagogy (G. Ladson-Billings, 1995), culturally responsive pedagogy (Gay, 2002), and culturally sustaining pedagogy (D. Paris, 2012).

Many pedagogical approaches for science education in particular emerged to provide strategies to move beyond one size fits all for science education specifically; these offered ways to bring in some student culture, language and context into the classroom (Barton & Tan, 2009; C Emdin, 2016; Christopher Emdin, 2013; Krajcik, Blumenfeld, Marx, & Soloway, 1994; Warren & Rosebery, 1995; Windschitl & Barton, 2016; Windschitl et al., 2012). These strategies use student Funds of Knowledge (Moll, Amanti, Neff, & Gonzalez, 1992) and to varying degrees build on student strengths, home language and interests from outside the classroom. All of these are used to create engaging contexts for learning science and to support students' abilities to eventually create scientific explanations using familiar and relevant ways of talking about the world. While these pedagogies are more flexible, open-ended and accepting of the different ways in which students learn, the end goal often remains for students to master the WS standards.

Of the aforementioned researchers, Warren and Rosebery (1995), Barton and Tan (2009) and Emdin (2013, 2016) have written about techniques that begin to challenge what counts as knowledge, emphasizing the importance of recognizing strengths and skills students have from home and developing student agency in the classroom that builds on that knowledge.

Many researchers who have significant following in science education and teacher education (Krajcik et al., 1994; Windschitl & Barton, 2016; Windschitl et al., 2012), however, do not promote explicitly critical pedagogies that critique the Western canon. Some of the researchers who developed and promoted these pedagogies have become aware of these tensions. For example, Melissa Braaten, who helped develop one of these widely taught approaches, Ambitious science teaching, wrote:

> Ambitious science teaching runs a risk of ignoring the importance of critical consciousness not only as it pertains to social and cultural contexts for teaching but also as it pertains to canonical science knowledge and practices within the curriculum. (Braaten & Sheth, 2017, p. 159)

The need for teachers to develop critical consciousness refers to Ladson-Billings' 1995 Theory of Culturally Relevant Pedagogy (CRP). As mentioned previously, CRP, and other adaptations, including Culturally Sustaining Pedagogy (Paris and Alim, 2014) emphasize the need for teachers not only to have high expectations for all students and to understand their students' culture, but to also interrogate and critique the curriculum itself and to work with students to investigate and transform inequitable and unjust sociopolitical contexts. Student Funds of Knowledge, student language and culture are not in themselves critical; they serve as tools to teach the canon but fail to explicitly help educators address "broader social and cultural contexts, local disparities and inequitable structures" (Braaten & Sheth, 2017, p. 159).

In 2011, Jomo W. Mutegi proposed a "socially transformative curriculum" approach to science. His methodology, which was directed specifically at African-American children, was strongly influenced by Freire's critical theory of conscientization, praxis and liberation (1970/2005). Unlike most approaches to science teaching and learning, Mutegi goes beyond having students master the standards, and instead grounds teaching and learning in sociopolitical consciousness and critique of those canonical standards, which place limits on what students should learn. The sociopolitical stance for his pedagogy is that education should position African Americans to realize their colonized status, understand how it was maintained, and work to wrest power from their colonizers (p. 304). The social transformative curriculum approach

emphasizes political and social change and regards curricula (and schools in general) as vehicles for social change (Mutegi, 2011).

King described a gradation of ways to bring what she calls "culture-centered knowledge" into curriculum—including invisibilizing, marginalizing, expanding and deciphering (2004). Invisibilizing knowledge ignores non-hegemonic forms of knowledge completely. It erases the historical presence, contributions and perspectives of non-dominant groups altogether. Marginalizing is a weak form of multicultural education, where non-dominant groups are presented but only in distorted, selective ways that represent that group of people as having common goals and experiences to the hegemony (King, 2004). For example, she pointed to textbooks that described the United States as a nation of immigrants, which completely ignored the existence of Indigenous Peoples and denied a discussion of how enslaved Africans came to this country. Expanding knowledge is an additive model, which provides more diverse perspectives by growing the canon to include work and examples from non-hegemonic groups. However, this expansion often does not provide opportunities to critique the hegemonic group and directly compare the different canons (King, 2004). Moving along her continuum she pushed for educators to move past merely adding or expanding curriculum to include more viewpoints in the curriculum, and instead to decipher the knowledge being discussed. "Deciphering knowledge helps people see through the veneer of inclusion to the ways in which diversity or multiculturalism is being manipulated to maintain and justify the status quo" (Ladson-Billings, 2004, p. 55). King encouraged educators to develop material that visibilizes the normative Western canon and confronts its flaws and connections to oppressive histories (2004). This more open and honest way of critiquing cultural knowledge in the curriculum along with pedagogical approaches such as Culturally Relevant Pedagogy (G. Ladson-Billings, 1995)

that call for creating sociopolitical consciousness in students, have been discussed as ways to create more equitable classrooms.

The Importance of Epistemology for Equity

Some science education researchers also challenged the confining limits of the science standards and their hegemonic focus on particular cultural practices and ways of knowing as superior to others.

> At the crux of this tension is a central epistemological question about what "counts" as a legitimate science practice for generating legitimate science knowledge. School science often marginalizes students' ways of knowing particularly among students of color despite a growing body of scholarship countering this practice. (Braaten & Sheth, 2017, p. 156)

Many students do not see themselves as scientists and do not see the value of learning science because they do not see their way of thinking reflected in the classroom (Bang & Medin, 2010; Mutegi, 2013; Tan & Barton, 2008). They perceive science as elite, only for a certain type of person who learns and navigates the world in a particular way. In the past, science education research thought of student epistemology as a naïve knowledge resource brought from home that could be leveraged to change student understanding to more scientific ways of thinking (Hammer & Elby, 2003). This approach viewed students who did not hold Western scientific ways of knowing as deficient and lacking in some way (Bang & Medin, 2010). Epistemologies from outside of science were used to bring students into a normative way of thinking, but only had value as a stepping stone to reach a scientific frame of mind (Aikenhead, 2006; Hammer & Elby, 2003).

To truly create an equitable learning environment for students of color, challenging the predominant purpose of science education as well as "what counts as science" is critical. If the goal for teaching science is to understand and build knowledge about the natural world, then it is valuable to investigate multiple ways of knowing and to learn how multiple cultures see the world, how they collect information, see patterns, transmit knowledge from person to person over generations and pool those collective sensibilities to create a richer understanding of our world (Carter, 2010).

"Epistemology is concerned with providing a philosophical grounding for deciding what kinds of knowledge are possible and how we can ensure that they are both adequate and legitimate" (Crotty, 1998, p. 8). It is a way of understanding and explaining how we know what we know. Ignoring the epistemological underpinnings of WS in science education prevents students from non-Western cultures from engaging and learning to their full potential (Bang et al., 2012; E. McKinley & Stewart, 2012). As Native Hawaiian research Manu Aluli Meyer explained:

> Epistemology, the study of knowledge, is the starting point for any discussion of indigenous [sic] education. It is also a discussion of the priorities and need for identity. Understanding what native [sic] peoples believe about their knowledge origins, priorities, context, and exchange teaches us more about its continuity. Knowing something, then, is a cultural experience that strengthens or fractures culture (Meyer, 1998, p. 22).

Connecting epistemology, and therefore knowledge and ways of knowing, with culture is particularly important. Science is not taught only to help students become Western scientists, but to find ways to understand how the natural world works. There are multiple ways to do this and multiple ways science teachers can help students carry out investigations. There may be times

when WS epistemologies are central, times when it takes a back seat, and times it rides side by side with other ways of seeing the world (S. Harding, 1992). This may require transforming the meaning of "science," or at least transforming the scope of science education, to include knowledge from groups normally outside of the Western system. "Working with other forms of knowledge requires a capacity to first see the boundedness of Western epistemologies and knowledge systems and to then go beyond to other possibilities of knowing and understanding and thereby acting from multiple epistemological viewpoints." (Austin, 2011, p. 169)

Indigenous scholars built on Meyer's conception of epistemology and worked to mobilize community-based knowledge to deepen Indigenous students' community ways of knowing and secondarily to support learning in Western science. Ojibwe and Italian scholar Megan Bang was a leader in this arena. She wanted students to see themselves in the curriculum and push the boundaries of what science could be to include Indigenous epistemological orientations (Bang & Medin, 2010; Bang et al., 2012). She and her colleagues focused in particular on the nature-culture divide that created epistemological divisions between Western and Indigenous ways of interacting with the world. In multiple publications, they investigated ways to teach science using multiple epistemologies in venues outside of the formal science classroom (Bang & Medin, 2010; Bang et al., 2012; Marin & Bang, 2015; Medin & Bang, 2014). In 2010, she and Doug Medin worked with Indigenous community members to create an Indigenous science program for Indigenous students. The program helped students navigate multiple epistemologies and use techniques from WS within Indigenous cultural practices and epistemologies. For example, students learned local plant ecology and plant identification by "recognizing relatives" and learning about medicinal uses for plants. In another program, Bang, Rosebery and Medin (2012) worked with Indigenous students to learn about local stream ecology in a more knowledge-

inclusive way when instructors combined empirical Western data collection techniques with holistic investigations of nature that recognized and elevated Indigenous epistemological and ontological understanding of water as alive, plants as human relatives and the interconnection of everything in the ecosystem. In presenting this way of understanding the natural world for students, there was a *both/and* epistemological approach instead of a divisive *either/or* one. They promoted more complex, dependent relationships among all humans and more-than humans that matched student epistemology and knowledge systems, allowing them to comfortably engage in the investigations. The researchers spoke of the approach helping Indigenous students see the connection of WS to their own lives and reconsider pursuing science careers.

Language also plays an important role in other ways of knowing and understanding how the natural world works, with words and ideas that are often associated with places people live and the cultures where they interact with those spaces (Martusewicz et al., 2011; Meyer, 1998; Wertsch, 1991). A both/and approach to including different epistemologies for science would also include using other languages and practices that incorporate rich descriptions of natural phenomena that are integrally connected to that groups' way of knowing the world. This occurred at Waadookodaading, an Ojibwe language school in Northern Wisconsin (Ryan, Ammann, Paap, Korver, & Supaman, 2019). As one example, they used Ojibwe terms for the stages of sugar formation when taking students to harvest and boil maple sap. Their descriptions of what chemists might describe as "phase changes" do not translate into the English language but help describe and identify stages in the process. Using those terms along with temperature or density measurements provide additional descriptive power of what is happening as sap turns to

syrup. Language and ways of knowing are inseparable from the knowledge passed on to students at this school.

How Do We Do This? Attempts at Teacher PD

Educational research has found that although teachers say they understand the tenets and values of culturally relevant pedagogy (G. Ladson-Billings, 1995) and equitable science teaching, they often struggle to describe how to specifically carry this out in their classroom (Nam, Roehrig, Kern, & Reynolds, 2013; Young, 2010). Science education lacks sufficient research-based exemplars of successfully implemented equitable, culturally relevant practices and science curriculum that recognize multiple epistemologies (Brown, 2017; Howard & Rodriguez-Minkoff, 2017; Lee et al., 2007). The field also lacks sufficient examples of PD that include significant discussion opportunities for educators looking to examine the role of other forms of knowledge, like IK, in the science classroom.

It is important to consider how to help non-Indigenous, and especially white educators, who make up the majority of the teaching force, create pluralistic epistemological learning experiences for diverse groups of Indigenous and non-Indigenous students. Bang's programs, described above, involved Indigenous educators teaching Indigenous science to Indigenous students in non-school-based settings. Non-Indigenous educators require additional training to consider the role of IK in the science classroom as described in these previous examples.

Science teachers often struggle to connect with families and communities from cultures that are different from their own, limiting their access to resources and understandings that would help them improve their teaching for marginalized students (J. C. Brown & Crippen, 2017). This makes it more difficult to connect science to students' lives or to integrate other valuable forms of knowledge into the classroom. "[I]t appears to be crucial that teachers also

develop the capacity to adapt materials to the needs of their students and to the affordances of their local contexts. [However,] we know little of how teachers engage in these complex practices" (Windschitl & Barton, 2016, p. 1125). In the United States, professional learning experiences that help teachers make more positive connections with students' communities, and increase their capacity to create contextually and culturally relevant curricular materials for their students typically occur only for preservice teacher education (Picower, 2013; Zeichner, Bowman, Guillen, & Napolitan, 2016). These are rare for researched in-service programs, especially in science. Professional development is needed to support teachers in an ongoing process of connecting with, understanding and learning to teach students from marginalized communities (Parsons & Thompson Dorsey, 2015). Research should also investigate how this type of PD impacts students of all backgrounds.

A few projects have focused specifically on PD to help educators consider ways to bring IK into the classroom. This expanded the focus from teaching Indigenous knowledge and ways of knowing only for Indigenous students to making it part of what all students would learn, including non-Indigenous students. This created new challenges, especially for the majority non-Indigenous teaching force.

Chinn (2012) wrote a description of a nine-month program she ran in Hawaii with Hawaiian science teachers (she only specifically identifies one teacher as "Native Hawaiian;" the rest are listed as "Hawaiian") to help them better connect WS with Native Hawaiian culture and practices. This program relied on primarily Native Hawaiian "cultural translators" (defined as experts in Hawaiian cultural and/or WS) and community site visits to help teachers develop culturally responsive, place-based lessons focused on ecological monitoring, biorestoration, sustainability practices and other similar activities (p. 5). Chinn used course observations,

participant surveys, written evaluations and submitted lesson plans to conclude that this PD helped teachers better connect to community resources and boosted their confidence to create lessons that integrated WS and Indigenous science (2012). Teachers self-reported increased student engagement in place and culture-based lessons, which included Native Hawaiian stories, language and connections to the environment. The study did not directly observe what happened in individual teachers' classrooms (2012).

New Zealand and Australia require inclusion of Mâori and respectively, Aboriginal and Torres Strait Islander knowledge and cultural practices in the public school system (Baynes, 2016; Elizabeth Ann McKinley & Webber, 2019). A number of researchers studied the impact of professional development programs aimed at helping non-Indigenous educators include these perspectives and practices in their teaching (Baynes, 2016; Bishop, Vass, & Thompson, 2019; Elizabeth Ann McKinley & Webber, 2019; Tolbert, 2015).

Similar to Chinn's study, all of these PD programs helped teachers develop relationships with and learn directly from Indigenous community members. Two of these multi-year PD programs helped educators connect with student families and communities and emphasized building relationships with students (Bishop et al., 2019; Elizabeth Ann McKinley & Webber, 2019). Another provided Indigenous mentors to four individual science teachers who received direct feedback on their classroom instruction (Tolbert, 2015). The time frame of the mentoring interaction was not specified but was part of a larger multi-year initiative that was known to create significant achievement gains for both Mâori and non-Mâori students. Through observation of science teachers' classrooms, mentoring conversations and participant interviews, Tolbert found that mentors helped the focal teachers improve their practice in a number of ways. Mentors helped teachers focus on incidents of racism against Mâori students and develop

classroom instruction relevant to Mâori students' personal experiences and ways of knowing. They also helped build relationships with Mâori students and families and add in instructional complexity that supported their learning (Tolbert, 2015). Tolbert's assumption was that the prioritized program focus on marginalized Mâori students benefited all students, regardless of their background. Adding to findings from Chinn's study, Tolbert found that helping teachers connect and learn directly from Indigenous mentors on a long-term basis helped them not only find useful resources on IK, but also decipher the Western nature of their curriculum (King, 2004). It also helped teachers learn about and become more comfortable working with Indigenous culture, practices and epistemologies.

To ensure a higher probability of change in practice for any PD, educational researchers recommend providing ongoing collaborative reflective work with colleagues outside of the school setting (Darling-Hammond, Hyler, & Gardner, 2017). Participatory Action Research (PAR) with educators of this nature in Australia helped educators reflect on their progress, goals and ongoing needs to find ways to include IK in the science classroom (Baynes, 2016). Teachers found it useful to have ongoing discussions of their practice with science colleagues and Indigenous advisors. PAR helped teachers build a better understanding of the needs of Aboriginal and Torres Strait Islander students as they did critical work to understand more about epistemological differences between themselves and their students (Baynes, 2016). As in Tolbert's mentoring program, the PD provided extended opportunities for educators to reflect on differences in cultural identities between teachers and their Indigenous students. PAR created a space for teachers to openly discuss the challenges of bringing IK into the science curriculum. In early meetings science teachers came to a key realization that including IK was not just for the benefit of Indigenous students in their classrooms, but rather that learning a broader array of

perspectives benefited all students, regardless of background. The study did not go far into implementation but saw the beginning of generative science praxis inclusive of IK (Baynes, 2016).

Many challenges and concerns emerged from the aforementioned PD studies among others looking at how teachers integrate IK into the classroom. For example, researchers found that teachers who made honest attempts at inclusion of IK frequently created an over-simplified or caricatured version of IK that merely uses snippets of language or added on an example from local Indigenous groups into the curriculum (E. McKinley & Stewart, 2012). One frequently employed example used the hângi, a Mâori earthen oven, as a context for launching into science topics (E. McKinley & Stewart, 2012). While using this focus was relevant because it was familiar to many students, teachers did not incorporate culture protocols and practices associated with using the oven into the lesson, dismissing them as irrelevant (E. McKinley & Stewart, 2012, p. 949). This marginalized the cultural knowledge of the Mâori (King, 2004). Educators must be cautious if they choose to use an Indigenous cultural example to teach what is portrayed as universal science knowledge. They must also be careful not to use Indigenous examples in a way that perpetuates incomplete understandings or new harmful stereotypes of a particular cultural group. IK is context-specific and often applicable only in certain spaces (Briggs, 2005). It should not be thought of just as an empirical, practical resource to be "used" by WS to teach the canon (Briggs, 2005; Kimmerer, 2002; E. McKinley & Stewart, 2012), but rather as an approach that disrupts and expands the canon because it brings additional information and perspective to bear on understanding a specific phenomenon.

Often even when non-Indigenous educators recognized the holistic and context-specific, cultural nature of IK, they still struggled with the best way to bring it into their teaching.

Educators often expressed that their own perceived lack of cultural knowledge, both about their own identity and culture, as well as the distinct Indigenous culture they were trying to incorporate, made it challenging them for them to bring IK into their classroom in an effective and meaningful way (Baynes, 2016; Bishop et al., 2019). They questioned their "right" to teach IK if they were not part of the Indigenous community, or raised concerns about creating a caricature of the culture, as described in the previous paragraph, if they merely used examples as just an add-on to their curriculum (Bishop et al., 2019; E. McKinley & Stewart, 2012). Mâori students with strong ties to their own culture felt similarly, and often preferred science teachers keep Mâori examples out of the classroom altogether, especially when included in a way that tokenized or superficially discussed the culture (E. McKinley & Stewart, 2012). Interestingly, in the same study, McKinley and Stewart learned that Mâori students with little connection to their culture appreciated the inclusion of these examples in their science classroom (2012). These nuanced responses highlighted the importance of continuing to ask questions about how, when and to what end educators should include IK in science classrooms.

In all of the above cases, PD aimed to integrate or connect WS with one or two focal Indigenous groups. They did not address student populations that may include a higher diversity of Indigenous backgrounds. With the exception of Chinn and Bang's work, all research also occurred outside of the United States in countries where mandated inclusion of IK provided resources and some administrative support for the work (Baynes, 2016; Elizabeth Ann McKinley & Webber, 2019; Tolbert, 2015). Little research on similar topics has been conducted on PD programs inside the United States.

Land Care as a Context for Learning

It is also important to consider relevant content and context for PD to help educators consider the relationship between IK and WS. As described in many of the examples above, comparing different epistemological and procedural approaches to land care or ecological investigations present logical opportunities for bringing these two ways of knowing together (Bang et al., 2014, 2012; Chinn, 2008, 2012). When conducting a land restoration in the United States, it is necessary to confirm land ownership before making any changes to the landscape. The topic of land ownership intersects with sovereignty and Indigenous rights (Tuck et al., 2014), and therefore brings up one immediate point of discussion between Western and Indigenous perspectives. Western approaches to ecological restoration may use particular scientific protocols such as soil assessment, taxonomic species identification, weather measurement, and fire management (Jordan, Gilpin, & Aber, 1987). This can be connected with and compared to Indigenous approaches to land care. *Reciprocal restoration,* for example, as described by scholar Robin Wall Kimmerer, Citizen Potawatomi Nation "is the mutually reinforcing restoration of land and culture such that repair of ecosystem services contributes to cultural revitalization, and renewal of culture promotes restoration of ecological integrity" (2011, p. 258). Some tools and components may be identical to the Western approach, but reciprocal restoration may also include bringing back species important to traditional Indigenous diets, supporting culturally important keystone species, and revitalization of Traditional Ecological Knowledge including language and spiritual practices (Kimmerer, 2011, p. 259). Comparing the epistemologically distinct "nature as a resource for humans to use and manage" approach of many Western restoration ecologists to the "nature is full of relatives, not resources" approach of many Indigenous Peoples could create rich opportunities for discussion, collaboration and

discussion to work towards the creation of more sustainable communities for all (Whyte et al., 2016).

Study Justification

As mentioned above, the literature does not discuss many examples of PD that provide practicing science teachers with opportunities to increase their familiarity with IK or to consider ways to put IK and WS in conversation with one another in the science classroom. Teachers cannot teach what they do not know, and cannot change the epistemologically Western nature of their classroom if they do not recognize it (G. Howard, 2006). Therefore, to help science education become more inclusive of IK, it would be valuable to provide practicing educators from all backgrounds with more opportunities to learn from Indigenous communities, discuss other ways of knowing, and consider classroom connections. The field needs more research that examines the challenges of designing PD that provides opportunities for this type of learning, reflection and growth. Because most research to date was conducted outside of the United States, intentionally researching U.S.-centered work can unpack the challenges and tensions particular to the history and political context of U.S. relations with First Nations peoples. Educational systems also differ across the U.S. and mandates for inclusion of Knowledges from diverse Indigenous Peoples varies, creating different incentives and support systems for educators to engage in this work.

Research Questions

In this study I examined the development and implementation of one particular professional learning experience in the U.S. that presented Indigenous perspectives alongside Western ecological restoration education activities. It addressed the question:

How does creating an explicitly Indigenous cultural focus in a science-related PD engage professional developers and participants in grappling with issues of epistemology, race, power and the cultural nature of science?

"Professional developers" referred to the staff who plan and conduct the professional development. "Participants" included educators who attended the professional development including K-16 classroom instructors and informal educators.

The overarching research question is broken down into a more focused question addressed in chapter 3:

How does a focus on ecological restoration education with an explicitly Indigenous cultural context create opportunities and tensions for ***professional developers*** *to grapple with issues of epistemology, knowledge, racism and power?*

Learning about the challenges and tensions that led to the creation of a particular PD program and examining the way the staff in a restoration education organization with Western roots changed the composition and structure of their program in collaboration with First Nations' partners, reveals paths for others who work in science education PD who are considering similar programs. It brings out important questions and considerations to design a program where participants have planned opportunities to address epistemological differences in a way that constructively helps them think about their own identity and the impact of their identity on their approach to teaching science-related topics. It also brings out questions for the professional developers themselves to think about their own identity, the epistemological origins of their content, and how to represent different epistemological approaches towards learning about the content. These questions of identity and navigating epistemology are also addressed in the following sub-questions in Chapter 4:

- *What tensions need to be navigated to support educator learning in a science-related PD with an explicitly Indigenous cultural focus?*
- *How do these tensions affect participant learning?*
- *What lessons emerge for PD organizers about what their roles should be to help participants navigate those tensions?*

Not all educators will learn about and navigate epistemological differences in the same way. Understanding how educators from different backgrounds encounter and respond to learning about different ways of knowing is informative to the field as we consider how to improve professional learning focused on inclusion of Indigenous Knowledges and epistemologies. Research that focuses particularly on the tensions white educators experience in comparison to non-Indigenous Educators of Color and Indigenous educators, helps organizers consider the needs of their target audience. PD organizers can design supports to help educators grapple with hurdles related to confronting their personal identity and participation in hegemonic systems. Research into the process PD organizers undergo to create opportunities for participants to have conversations with one another and think about the relationship between WS and IK is part of a larger conversation and concern about how to create equitable science classrooms.

In the remaining sections of this chapter I will describe the theoretical framework for my research and then provide a detailed introduction to the organization that was studied, setting the context for my research.

Theoretical Framework

This study focuses on both an epistemological comparison of WS and IK as well as considerations for how to design and run a PD that helps educators recognize and possibly teach around those similarities and differences. I approached this research through a lens of

sociocultural theory. As mentioned in the literature review, connecting epistemology, and therefore knowledge and ways of knowing, with culture is particularly important. According to sociocultural theory, individual learning and development must be understood in, and cannot be separated from social, cultural-historical context (Rogoff, 2003). When designing a PD, planners must keep the sociocultural context of their content in mind as well as the sociocultural learning journey of their participants. As explained earlier, scientists and science teachers in particular, struggle to recognize how Western cultural norms deeply impact their work. They often do not know or acknowledge the sociocultural reasons behind the historical dominance of WS over other ways of knowing. This study endeavors to expose the epistemological differences between WS and IK within a particular PD context and to examine the way in which those differences arise for both PD organizers and participants.

A PD program that explicitly pairs components of IK with WS provides opportunities for studying epistemological differences. "It could be more productive to continue to hold the notion of IK in tension with the notion of science, as a reminder of science's own cultural origins and limitations" (E. McKinley & Stewart, 2012, p. 551). It is not until one steps outside of a culture that one may gain perspective on it (Rogoff, 2003). Therefore, it may not be until educators from a Western background can see their culture through an Indigenous perspective that they know more about themselves and their subject area. Professional development that helps educators "re-center student epistemologies" (Sheth & Braaten, n.d.) can facilitate productive disciplinary engagement, where educators have to reframe their own ideas about science to come to understand science as a socially constructed, meaning-making activity, with students' experience and ways of knowing as central (Sheth & Braaten, n.d.). This may help educators develop a sociocultural view of science and science learning and allow them to grapple with

ways to be more inclusive of other forms of knowledge that lead to modifications in their content and pedagogy.

Professional development opportunities that allow educators trained in WS to step outside of their own culture to hear from and interact with individuals and communities who have different epistemological approaches may help them recognize and visibilize existing norms and allow them to expand their thinking about ways to approach their teaching. These experiences could help them to find a productive role for other forms of knowledge and ways of exploring the world.

> I believe that we need to continue to create and have these spaces where discussions about inclusive education happen and where we could examine how our own identities around science and as science educators have been shaped by the historical societal structures where we were brought up and educated. I believe in this reflexive examination of our own identities and recognition/reconciliation of our own cultural beliefs about the natural world is where we begin to expand this hybrid space of contextualized science and begin to think about concrete ways of creating inclusive science experiences. (Adams et al., 2008, p. 1009).

Holding more conversations like these can help educators consider criteria for legitimate knowledge and push beyond an assimilationist view of education where culture is used merely as a tool to help students learn the canon (Aikenhead, 2006). In order to bring different ways of knowing into the classroom, teachers need time to experience and reflect on how different epistemologies and ways of knowing fit into their own understanding of science (Baynes, 2016). "It is not a matter of replacing one scientific worldview with another, but it is a matter of creating

a space that allows different epistemologies and corresponding discourses to coexist without one being subjugated or demonized relative to the other" (Adams et al., 2008, p. 1008).

In this study, I examined the different ways in which the staff who developed the PD created opportunities for epistemological comparisons around land and restoration-based topics. One significant focus was how sociocultural contexts were intentionally brought into the PD. There were moments in this study, for example, when PD organizers intentionally discussed historical events or set up comparisons of Indigenous and Western perspectives on a topic. I looked at when, why and how organizers made those decisions and how the learning opportunities played out during the PD workshop. By examining the mediating role of culture and history, I paid attention to whether or not particular PD activities helped participants examine assumptions they hold about Indigenous communities and practices (K. D. Gutiérrez & Vossoughi, 2010).

I also looked for the unintentional and unanticipated ways in which epistemological issues and tensions arose during the workshop. I looked for hidden cultural and epistemological assumptions, both in how they influenced PD organizers' work, as well as in participants' responses to particular moments of the PD. As much as PD organizers planned for particular ways of learning, other challenges and tensions arose because each person in attendance brought their own sociocultural upbringing and epistemological view to the workshop and interacted based on those predispositions.

Land education and ecological restoration education in particular provided a useful sociocultural context for examining both an epistemological comparison of WS and IK perspectives, as well as a context for examining how issues of power and inequity relate to those differences:

> For us science education, place-based education, and environmental education are critical sites of struggle because they typically reify the epistemic, ontological, and axiological issues that have shaped Indigenous histories (citing Brayboy and Castagno 2008). From a more hopeful perspective, we also see them as sites of potential transformings – forming a nexus between epistemologies and ontologies of land and Indigenous futurity …explicitly reengaging land-based perspectives in the design and implementation of a place-based science learning environment (Bang et al., 2014, p. 39).

Education about land can be approached from different epistemological perspectives and could include the complex histories of how it has been used by different groups of people over time. Educators from different sociocultural backgrounds may approach the same piece of land with different assumptions and practices, and therefore view what is happening in that space differently. As mentioned in the literature review, the nature-culture divide in WS often invokes an approach that catalogs and measures what happens in the land in an impersonal, possessive, hierarchical way. This contrasts with many Indigenous approaches that see everything on the land as a relative and therefore work with the land in a reciprocal mindset. Tensions exist between the two approaches, but non-Indigenous educators are often unaware of those differences. Presenting those two approaches side by side in a PD opens up an opportunity for comparison and discussion about the sociocultural conflicts and educational implications of considering both in the science classroom.

Many of the studies that paired WS and IK cited in the literature review also centered on land-based, ecological content for this reason (Bang & Medin, 2010; Bang et al., 2012; Chinn, 2012) PD within this content area readily invites a format where members of the community of

many ages and cultural backgrounds with different epistemological approaches, tools and skills could work together towards investigating a common problem.

Studying land use and land restoration often involves an interdisciplinary approach that explicitly brings in sociocultural, historical, political examinations that create openings for multiple points of view. Because of the centrality of sovereignty to Indigenous Peoples, the study of land, land ownership and land care are particularly salient. These topics also provide fertile ground for a PD that intentionally addresses long-standing inequities that contribute to ongoing conflicts related to Western and Indigenous approaches to land and land care.

A Critical Multilogical Approach to Education

Educators work with diverse populations. For those who develop PD it is helpful to ask, How can educators evaluate and critique different approaches and knowledge bases in a way that builds, sustains and strengthens students' connections to multiple cultures and ways of knowing (Django Paris & Alim, 2014)? Over the course of my analysis, critical multilogicality emerged as a desirable objective for work in this field. Kincheloe and Steinberg (2008) explained *critical multilogicality* as a way for educators to view the world through multiple lenses and use these different vantage points to understand the possible interpretations for a phenomenon (p. 138). It specifically addresses the need to attend to Indigenous Knowledges and epistemologies alongside existing hegemonic Western ones. Their approach pushes for educators at all levels to think about the way "truth" is produced and to develop a more reflective and progressive consciousness. Through this approach, educators (and their students) can "recognize that (de)legitimizing knowledge is a sociopolitical process, not disinterested abstract reasoning" (p. 137). Focusing on the subjugation of Indigenous epistemologies and histories in particular helps educators develop multilogicality because it uncovers the way knowledge is produced and

legitimated (Kincheloe & Steinberg, 2008). Kincheloe and Steinberg explicitly state that learning about Indigenous ways of knowing is not solely for the benefit of the Westerner, but rather so that the Westerner can help the Indigenous People work towards their own self-determination (p. 147).

Because the focal PD for this study presents both Indigenous and Western perspectives on land, critical multilogicality emerged as a useful tool for considering how the PD was developed and what types of learning experiences occurred for both the PD staff and educator participants at the workshop. In my final analysis, I looked for ways that Western and Indigenous epistemologies were recognized, presented, compared and discussed. I also looked for explicitly critical comparisons that helped participants begin to understand the dominance of Western thinking to the exclusion and detriment of Indigenous Knowledges and ways of knowing.

Introduction to Nature Alliance

Mission and Vision

Many of the choices I made were driven by the particular features of the selected research case subject that made it possible to study particular ideas and not others. This is a characteristic of using sociocultural perspective. For this reason, an extended introduction to the case context is important to understanding how the study unfolded. This section provides relevant background information on Nature Alliance, the organization that created the PD program that is the focus of this study. I will provide a brief overview of their mission and vision, a description of their core restoration education curriculum, an introduction to their staff, as well an overview of the full suite of programs offered by the organization, which includes Urban Indigenous Professional Development, the focus of my research.

Nature Alliance (NA) is an organization with a mission to "engage educators and learners of all ages and backgrounds in community-based ecological restoration for healthy environments." They conduct educator professional development, youth programs and community engagement activities aimed at helping teams create and implement plans for ecological restoration and stewardship of a tract of land, often on school grounds, be it a prairie, rain garden, riparian community, forest or school garden. Founded in 1991, Nature Alliance began working in Wisconsin and has since expanded to conduct PD across the United States and in Latin America. The organization is housed within the University of Wisconsin-System with little support from the institution and is primarily grant-funded. All of their programs are built around a restoration education curriculum, described in the next section, that teaches a collaborative process to investigate historical and current uses of the land, research its ecology, create a design for ecological restoration, plant and install the restoration, and then maintain the site while using it as an outdoor classroom. Their vision "is for communities across the world to be actively engaged in ecological restoration that connects people to the land and each other through a commitment to stewardship."

The Core Ecological Restoration Education Program

NA's Restoration Education Steps (Table 1 and also in original form in Appendix 1) guide the organization of NA's workshops, as well as actions organizations would take to create, implement and maintain their parcel of land. They normally start with the *Connect* step, which collects information about the community resources and partners present nearby. The *Study, Investigate and Analyze* steps leads teams through procedures to identify the native[1] species and

[1] I am aware of the irony of using this word within a project on Indigenous Knowledges. However, NA uses the term and is common in the field of ecological restoration. In this context "native" refers to species endemic to an area.

ecosystems present, create written and oral site history and describe landscape patterns, and document soil, water, slope, sun/shade, physical characteristics and other existing aesthetic qualities of the land. From there, they use a collaborative process to design the purpose, layout and actual species composition of the new space during the *Plan* phase. Participants then learn to *Prepare* and *Plant* the site—including how to remove unwanted existing vegetation, layout the design, sow seeds, and transplant seedlings as an inclusive community venture. *Manage*[ment] of the site long term, including ongoing invasive species removal and creation of interpretive signage comes next. In the "final" step (they portray the ten steps as a circular process), they encourage use the space for long term education through *Research* and *Learn*[ing] with science, language, arts, math, social studies, music, art activities as well as nature appreciation exercises.

Workshop participants receive a bound copy of dozens of activities related to these steps that can be tailored to focal topics such as the creation of pollinator habitats, woodland restorations or rain gardens. It is noteworthy that although some materials have been completely translated into Spanish and some activities are available in bilingual form in English and either Spanish, or the language of Indigenous partners, only a few activities have been added or re-written to date to specifically orient towards an IPD or Latinx partner. Additional readings by other authors related to the workshop partner's cultural, ethnic or historical orientation are provided to the participants during workshops in the form of articles and handouts.

Table 1. Nature Alliance's Restoration Education Steps (note, as presented by NA in the Appendix of this document, the steps are circular and iterative. However, in their workshops they often present them in this order.)

Step	**Brief description**
Connect	To community resources and partners nearby
Study	Native species, habitats and ecosystems on site
Investigate	The written and oral site history and landscape patterns-past and present

Analyze	Soil, water, slope, shun/shade, vegetation, physical and aesthetic qualities of the site
Plan	The type of restoration: butterfly garden, rain garden, grassland, woodland or wetland
Prepare	The site: remove existing vegetation, layout the design
Plant	Sow seeds, transplant seedlings and celebrate
Manage	Remove invasive species, create signage
Research	Ask questions, make observations, use evidence to answer
Learn	Language arts, science, math, social studies, music, art, life skills, love of nature

Nature Alliance's Diverse Staff and Full Scope of Programming

NA's current outreach programs include versions with a focus Indigenous, Latinx, Global and Interfaith communities. All of these programs are run collaboratively by four staff members. While individual members may spearhead one particular component of their suite of programs, all four support one another to complete all of this work. They also hire part-time interns for short periods of time when funds are available. The Director of NA, Elizabeth is white and is currently the only full-time staff member. She began working for NA in 1994. Sandra, the multicultural coordinator who works part time, began in 2012 and identifies as Latina. She heads the Global program, focused on Spanish-speaking partners both in-country and abroad. Naomi spearheads the interfaith ecological restoration programs along with Elizabeth. Naomi also began in 2012, currently works part-time and identifies as white. Aubree is a part-time PhD Candidate who focuses on the Indigenous PD programs (IPD), that partner with five First Nations. She first became affiliated with NA in 2010 and is the only staff member who identifies as Indigenous[2]. In its early history, NA employed all white staff members (Elizabeth, personal

[2] Note that by participant request, Aubree's tribal affiliation is not provided.

communication) and it was not until 2009, that they hired a graduate student who identified as Ojibwe as the first non-white employee[3]. The diversity and strengths of the current group speaks to the newer focus on explicitly cultural programming and increases their ability to network and collaborate with new partners and a different audience. Aubree, in particular, will be discussed later as crucial in both the development and connections she brings to the Urban IPD program.

Three of the Indigenous PD programs have both an educator and Indigenous youth workshop at separate times over the summer. Coordination and teaching of those workshops are done in conjunction with paid IPD coordinators at each site. The IPD coordinators also run community engagement programs throughout the year for each site in conjunction with the local public-school district. Aubree also helps runs a program for Indigenous youth in the city where Urban IPD was held in summer 2019, however, the educator PD and youth programs are not currently linked (students and teachers may not know one another or be from the same school) as they are at the other three sites. In fall 2019, Elizabeth and Sandra also began teaching an undergraduate course at the University based on the NA restoration education program and their IPD courses. They have also begun offering University credit for undergraduates to participate in the IPD educator institutes. The scope of this research does not provide an opportunity to delve into more depth about all of these programs, but it is important to recognize that all of the programs are intertwined in philosophy, in that one program learns and grows from another, and that staff time and resources are stretched thin because of the large footprint of their work. I will return to this theme from time to time as it impacts the Urban IPD program.

[3] According to personal communication with Elizabeth, this individual was originally hired solely as an extra set of hands for the NA program. She did, however, become involved in the creation of IPD. I did not learn the nature of her involvement until well after I completed my data collection and the majority of my analysis. She may be considered one of NA's Indigenous advisors in the larger story of IPD's creation and became an IPD Tribal Coordinator.

Road map for further chapters

Chapter 2 provides details on my positionality and methodology. This will be followed by two findings chapters. Chapter three discusses the history and evolution of the target PD program, Urban IPD, and addresses the subquestion:

- *How does a focus on ecological restoration education with an explicitly Indigenous cultural context create opportunities and tensions for professional developers to grapple with issues of epistemology, knowledge, racism and power?*

Chapter 4 unpacks one particular presentation during the Urban IPD workshop that brought out epistemological tensions between WS and IK. The chapter addresses three additional subquestions:

- *What tensions need to be navigated to support educator learning in a science-related PD with an explicitly Indigenous cultural focus?*
- *How do these tensions affect participant learning?*
- *What lessons emerge for PD organizers about what their roles should be to help participants navigate those tensions?*

In the final chapter, I will summarize the findings and implications both for the focal organization and the science education PD community at large.

Chapter Two: Study Design

Positionality

I would like to note that in choosing this research focus I am not claiming to be an expert on Indigenous Knowledges. I am a White, Jewish woman, trained and experienced as a science teacher in the WS tradition who is an outsider to an Indigenous way of knowing. I am also aware that IK is heterogeneous, and claims made from this study may not be generalizable (Dei, 2008; Kincheloe & Steinberg, 2008). However, I believe that through studying an organization that employs and partners with Indigenous peoples and groups who provide expertise and direct instruction, I am given an opportunity to consider one approach, among many, to consider the relationship between Western and Indigenous approaches to education and ecological restoration.

While conducting research as a participant observer, I believe it is important to recognize that my positionality as a white woman and former teacher may influence the way in which study participants interact with me. Some white participants may have been more comfortable providing honest answers to questions asked relating to whiteness as they may have perceived a common struggle and experience between us (A. E. Lewis & Diamond, 2015; Picower, 2009). In contrast, the refusal of some Indigenous participants to agree to a post-workshop interview may also be because of their wish to avoid participating in research in general due to long-standing distrust of white researchers and the institutions I represent (Sue, 2016; Tuhiwai Smith, 2012) in addition to other possible reasons related to additional time and effort required for participation. In chapter 4, I will discuss these issues of distrust in more depth, but it is possible those same issues may be relevant in how some Indigenous participants felt about my request for follow-up interviews.

My positionality as a white woman, trained in Western science education also influenced my analysis. As someone learning to recognize and critique epistemological differences myself, what stands out for me as needing analysis as well as my mode of interpreting what happened will be influenced and limited by my understanding of the situation given my cultural background, limited historical knowledge and training. My choice to pick apart, categorize and summarize findings in certain instances rather than letting complex stories with their nuances stand on their own speaks to the Western nature of my research.

As I mentioned in my Notes on Terminology and Indigenous Voice, my positionality also made my decision to develop pseudonyms for First Nations and tribal affiliation particularly precarious. I walked a line between respecting the danger of revealing the identity of key groups and individuals in my study with the act of possibly colonizing those same groups by "renaming" them in my writing.

One challenge for me in participating in these planning sessions was that I worked on and off for NA as a graduate student and have been involved in some of the preparations and discussions for a course they are offering to UW undergraduates with a similar focus to the summer PD. I also participated in NA workshops as a teacher, before Urban Indigenous Professional Development (IPD) began and was involved in editing some of the curriculum. I was more of a participant-observer at moments in planning meetings because of my familiarity with the staff and their curriculum, and because of their view of my expertise as a PhD Candidate in Curriculum Instruction, former teacher and education professional developer myself. As such, I spoke both with the Director of NA and with my advisor about this challenge and felt that I could still conduct this research even as a participant-observer. A researcher always impacts her participants by her presence, and I kept this in mind when making notes, interpreting interactions

and conducting interviews and my focus group. My participation in meetings as needed was also a way of giving back to the study participants and creating a beneficial reciprocal relationship between participants and researcher (Pasque & Perez, 2015). This dissertation is also a way for me to give back to the organization as they continue to refine their programming.

My long-standing relationship with NA staff members also made it more challenging for me to critique them and their programming. In analyzing NA and Urban IPD program, I was very aware of the impact of my writing on individuals I know well and continue to interact with on a regular basis. I tried to be as fair as possible in my writing, but I know that my history with NA and my personal investment in the program influenced some of my interpretations. My desire for objectivity and fairness again implicates my own white, cultural background. My own White Fragility (DiAngelo, 2011) made confronting members of the NA staff about uncomfortable racially charged situations through my writing more difficult.

Methods

The central research question for this study is:

How does creating an explicitly Indigenous cultural focus in a science-related PD engage professional developers and participants in grappling with issues of epistemology, race, power and the cultural nature of science?

"Professional developers" refers to the NA staff who plan and conduct the professional development. "Participants" include K-16 classroom educators, informal educators, college students and educational administrators who enroll in the professional development course.

The research focuses around the planning and implementation of the Urban Indigenous Professional Development workshop to be conducted at the end of July 2019. In brief, the components of the study roughly in order included:

1. Semi-structured interviews with four NA staff members
2. Observations of three workshop planning meetings
3. Limited content analysis of participant binders and published curriculum
4. Observation of three-day Urban IPD workshop
5. Post-workshop interviews with five participants
6. Interviews with five course instructors other than NA staff
7. Content analysis of writing submitted by one participant for credit
8. Post-workshop focus group with four NA staff and two interns
9. Follow-up interviews with four NA staff

The study methods described here were originally designed to answer the following questions:

Where, when and how do education professional developers and educators make sense of the relationship between Western Science (WS) and Indigenous Knowledge (IK) while participating in professional development around interdisciplinary ecological restoration education?

a. *How do education professional developers understand the relationship between WS and IK as they plan, design and run a professional development around ecological restoration education?*
b. *What type of learning about WS, IK, and the relationship between them takes place for educators while studying interdisciplinary ecological restoration education?*
c. *How do educators discuss the impact of this experience on their approach to teaching science?*

The current research question addressed in this dissertation, *How does creating an explicitly Indigenous cultural focus in a science-related PD engage professional developers and participants in grappling with issues of epistemology, race, power and the cultural nature of science?* emerged after observing the Urban IPD workshop. The methods described below were designed to answer my initial set of questions. I will describe why my research question changed in more detail below.

Focus on education professional developers

To address my first original sub-question, How do education professional developers understand the relationship between WS and IK as they plan, design and run a professional development around ecological restoration education? I researched multiple components of the development and implementation of the Urban IPD program.

To study the plan and design of the PD, I audio-recorded and transcribed interviews with the four Nature Alliance staff members and observed, audio-recorded and transcribed three planning meetings for the Urban IPD workshop between May and July of 2019.

The semi-structured interviews (Seidman, 2006) with each of the four Nature Alliance staff members (see Table 2.1 for names and positions) helped me learn the history of the development of the Urban IPD program, the goals for the program and more about the background of each staff member and personal motivation for conducting the Urban IPD program (see Appendix 2.1 for questions). Interviews lasted between 30 and 75 minutes. I also asked how each staff member understood the relationship between WS and IK and how they believed the program helped participants to develop this same understanding. The interviews also helped me learn about the challenges the staff faced in the past with helping educators learn

about IK and think about its role in their classroom, which informed the design of the Urban IPD workshop.

I also audio-recorded interviews with five of the guest presenters (Table 2.1), focusing primarily on those who identified as Indigenous in order to gain a diversity of perspectives to my question about the relationship between WS and IK and to understand what they thought would be important for participants to learn that may differ or agree from the NA staff (See Appendix 2.3 for questions). I interviewed Liana (Deer Valley), the Deer Valley Education contact, who helped plan and present at the Urban IPD workshop, before the Urban IPD workshop because I met her the month before the workshop. I knew she would be involved in the upcoming program and had a convenient opportunity to interview her. I interviewed the other four guest instructors

Table 2.1. List of Research Participants Mentioned by Name in the Study

Name	**Role**	**Self-identified Race or Tribal Affiliation**[4]	**Mode of Study Participation** (I)nterview, (F)ocus Group, (P)lanning Meeting (O)bservation (W) Writing
Elizabeth	Director of NA	White	I, F, P, O
Naomi	NA Staff	White	I, F, P, O
Aubree	NA Staff	Indigenous[5]	I, F, P, O
Sandra	NA Staff	Latina	I, F, P, O
Liana	Presenter: Deer Valley Educator	Deer Valley	I, P, O
Ruben	NA/IPD Intern	Ponca	I, F, O
Darian	Presenter-County Archaeologist	White	I, O
River	Participant/Presenter-Engineering Graduate Student	Lumbee/White	I, O
Dalia	Presenter—PhD Candidate Environmental Resources	Menominee/Oneida/Ho Chunk	I, O
Jacqueline	Participant/Presenter - School Parent-Landscape Architect	White	I, O
Rowan	Participant-Community Educator	African American	I, O
Simone	Participant-Early Childhood Nature Center Educator	White	I, O
Charlotte	Participant-Art Teacher	White	I, O
Bridget	Participant-Nature Center Educator	White	I, O
Amalia	Participant-High School Science Teacher	White	O, W
Barbara	Participant-1st grade teacher	Mohican-Stockbridge/Oneida	O

[4] Please see Introduction for rationale for why this information was collected and presented
[5] Tribal affiliation left out at participant request

within the month after the Urban IPD program, because I did not know the final schedule until a few days before the workshop began and wanted time to introduce myself and establish a relationship with each presenter before asking for an interview. Speaking to them after the workshop also allowed me to ask follow-up questions about specific parts of their presentations. I interviewed Ruben (Ponca), the NA intern who presented multiple times during the three-day workshop and was integral to the incident discussed in Chapter 4. River (Lumbee and White) and Dalia (Menominee/Oneida/Ho Chunk) both presented on their graduate research on wild rice restoration on day two of the workshop. River also attended on day one of the Urban IPD workshop as a participant and so could speak from that perspective as well. The only non-Indigenous instructor interviewed was Darian, a white archaeologist, who was chosen because of the controversial reaction his presentation provoked, which became the focus of Chapter 4.

I was unable to ask Liana follow-up questions after the Urban IPD workshop. I interpreted her reluctance to answer follow-up questions as related to the events that occurred in Chapter 4. She reasonably chose not to discuss the sensitive events that occurred with a white, Western Researcher. These incidents will be discussed in far greater detail in later parts of this document, but out of respect for her decision, I do not discuss her involvement in the incident.

I observed and audio-recorded three Urban IPD planning sessions, two in person with all four staff members in attendance, and one that was conducted on the phone with Liana, while two NA staff members drove to an event. Attending these sessions provided insight into how workshop goals were set and discussed, as well as how and why location, speakers and activities were chosen. They discussed teaching strategies, what they knew about participants and what concerns they had for the workshop overall. In general, while listening to the planning sessions I looked for and took notes on the following ideas:

1) What questions were raised and discussed about teaching WS?
2) What questions were raised and discussed about teaching IK?
3) What questions were raised and discussed regarding the program goals for participants regarding the relationship between WS and IK?
4) Who did the staff look to as experts to teach about WS and IK? How were they incorporated into the program?
5) What challenges did they anticipate regarding participant learning about WS and/or IK?
6) What strategies were discussed for teaching about WS and IK?

I also wrote field notes after each meeting to create a rich description of what occurred during the meeting and what stood out to me in regard to the above questions.

I originally planned to conduct an in-depth content analysis of the NA curriculum and printed materials distributed at the workshop, however, because these were distributed but seldom directly accessed by participants during the workshop, this reduced their relative importance from my original plan. Because of the staff's central focus on teaching some of the activities in restoration education curriculum guide and the way references to the guide emerged in interviews and the focus group, I did still use the printed version of this curriculum guide as a point of analysis. When conducting the brief content analysis, I focused on the following questions, especially question three:

1) What methods and knowledge systems are used to learn about the natural world? How are different methods for learning about the natural world from WS and IK positioned relative to one another?
2) When and how are WS and IK explicitly mentioned or compared?
3) How does the curriculum align with the stated goals of the program in regard to WS and IK? How do the printed materials support teachers to learn the goals of the program?

During the Urban IPD workshop I tried to make my primary focus on the participants and their learning experience, but I also paid attention to how the NA staff presented and interacted with participants, noted their use (or non-use) of any planning documents, and documented how they utilized the participant binder and published curriculum with the participants to enact their

stated goals. The curriculum itself was perceived by the staff as an integral part of the Urban IPD program therefore I wanted to see how it was used and how well the curriculum aligned with intended workshop goals. I later asked (described below) how the curriculum played into what educators said they learned (Kurz, Elliott, Wehby, & Smithson, 2010).

Finally, my investigation into the planning, design and enactment of the PD ended with a follow-up focus group approximately one month after the workshop with the NA staff and two interns (see Appendix 2.4 for questions). This allowed the staff to revisit their goals and reflect upon whether or not they fulfilled the intentions of the workshop as they related to my research focus. Throughout my work, it became clear that the mission of the organization was in some question, so I adapted my follow-up questions to address this. The focus group was a way for me to ask about how the workshop goals and organizational mission were evolving after teaching the course. During the focus group they also discussed the earthen mound presentation and the reactions (the focus of Chapter 4), which fed into issues throughout the workshop and I was able to ask probing questions about their own responses and what they would do differently in the future and why.

I chose a focus group for two reasons: first, I believe that I would hear a richer account of the workshop with the answer from one staff member stimulating answers from another; and second, because the focus group would serve as a debrief and learning experience for the organizers of the workshop and I would be learn more from hearing that process of unpacking the program together (Grudens-Schuck, Allen, & Larson, 2004). Because they ran the workshop together, but each was responsible for different portions of the workshop, they may have differing impressions of how parts of the workshop progressed. Multiple perspectives on the same activity would be valuable as each person may have heard or seen something different,

interacted with different participants, or interpreted an event differently. As a proponent of sociocultural learning, a focus group also made this learning process more visible as I observed the discourse between staff members and was in the room as they unpacked their own learning experiences of planning and running the workshop.

The NA staff, who are highly collaborative, also told me they appreciated having an opportunity to talk together about the workshop and think about how to improve the Urban IPD workshop in future years, as they seldom make time to do this for themselves in a formal way. Running a focus group that facilitated NA staff's own learning and program development was important to me as a critical researcher hoping not only to observe and report, but more directly assist in improving the program (M. Apple, 2009). As with my participation in planning meetings, this was another way to reciprocate to the NA organization (Pasque & Perez, 2015).

After the focus group, I conducted follow-up interviews with each NA staff member, asking the same questions from the focus group, probing more deeply into what they personally learned from the workshop, and asking about the future direction of the organization (See Appendix 2.5 for questions). By conducting follow-up interviews, not only did I want to allow time to expand on ideas from the time-limited focus group, but I also wanted to provide opportunities for individuals to speak more freely about their opinions, as individuals may have been willing to tell me something that they did not want to say in front of their entire staff (Morgan, 1996).

Focus on PD Participant Experience and Learning

The other portion of my originally intended study focused on answering the questions: What type of learning about Western Science, Indigenous Knowledge, and the relationship between them takes place for educators while studying interdisciplinary ecological restoration

education? How do educators discuss the impact of this experience on their approach to teaching science? I was uncertain what position participants who in enrolled in the Urban IPD would have in their professional life. They could be elementary school teachers who teach all subjects, informal educators from a nature center, school principals, or high school social studies teachers. Given those unpredictable circumstances, I left my study open to study all educators who enrolled in the PD. The content of the workshop would include WS and IK in some form for all, and valuable insights could be gained from talking to educators with different backgrounds and relationships to science.

Of the 18 consenting participants, three identified as members of a First Nation, two identified as African American and the remainder identified as white. Two of the participants only attended for one day and I did not focus on their input. As it turned out, four of 18 participants were undergraduate students pursuing a non-education-related major, and while I did not ignore them, I did not focus my attention on their responses as my research questions related to educators. Only five classroom teachers attended the workshop, and only one was a science teacher; many of the ten educators who attended all three days declined to be interviewed. The lack of science teachers and classroom teachers in general attending the workshop who consented to be interviewed played into my decision to focus more on professional development and move away from a focus on teaching and teacher learning.

I attended and observed the entire three-day, 24-hour total, Urban IPD PD program in July 2019 to describe the learning opportunities presented to educators and record interactions and reactions. During the PD, I video-recorded most indoor activities and audio-recorded most outdoor activities of consenting participants. I also photographed participants during some activities along with a few products they created. I observed the PD with a more ethnographic

approach, looking for episodes of pedagogical and epistemic reasoning from participants (Horn, 2007) about WS and IK. In addition to recording the workshop, I took field notes during the day and wrote a more complete summary at the end of each day (Emerson, Fretz, & Shaw, 1995).

During the Urban IPD workshop I focused my notes on:

1) How educators self-identified themselves and their background, especially in relation to WS and IK.
2) How educators identified their reasons for taking the course and demographics of their students.
3) Moments educators were learning or reflecting about different epistemologies, or WS and IK; how educators related information from the workshop to their work.
4) When and how they discussed types of knowledge, ways of knowing, values of one type of knowledge compared to another, and any explicit discussions of WS and/or IK.
5) When and how they discussed barriers or challenged the role of IK in their work.
6) When and how they discussed the benefits of incorporating IK into their work.
7) What concerns they mentioned for including culture, diversity, epistemology, language in their teaching.
8) How the NA staff adjusted the workshop to accommodate participant questions and concerns.

For whole group discussions or individual reflection events during the Urban IPD workshop, I merely observed the participants. However, during the small group activities, I often joined one group as a participant/observer. By joining one group at a time, and working with different participants for each activity, it helped me establish relationships with participants as a trusted individual, knowing that I would ask some to participate in interviews later on. It also allowed me to focus on an entire conversation or process, understand the questions that arose, and the way participants approached engaging with a particular task rather than moving between groups and only hearing snippets of decontextualized conversations (Louie, personal communication). I found this approach useful as I was often able to engage in deep conversations with participants, and learned more about their background as well as their schools or places of

employment, the questions they had that they hoped to answer at the workshop, and the discomforts or questions that arose from particular presentations. As a participant/observer, it made it less necessary for me to ask follow-up questions as a researcher, as I had anticipated doing (Luker, 2008) and helped me get to know and collect information from a few participants who declined to be interviewed at the end of the workshop.

For those participants who took the workshop for University credit, which included the undergraduate students and one educator, I read their submitted journal reflections, and in the case of the educator, an action plan for the classroom in the coming school year that incorporated material learned at the workshop. People may express themselves differently in writing than in person (Luker, 2008), and having this work provided additional insights into participant learning as well as how the workshop might impact participants' future educational work. Because only one classroom teacher took the course for credit, my access to writing from educators was far more limited than anticipated in my original plan, which again, contributed to my change in research focus. Still, the journal reflection spoke to what she learned in the workshop and what readings or activities helped her learn. The action plan she wrote helped me understand what she planned to bring back to the classroom and how her choices intersected with my research interests.

After the three-day Urban IPD workshop, I conducted one semi-structured 25-45 minute interview with consenting participants (Seidman, 2006) to learn more about the impact of the program on their understanding of the relationship between WS and IK, which activities they found most impactful, and to describe how they believe the PD may impact their teaching (See Appendix 2.2 for interview protocol.) I slightly adjusted the open-ended question in my interview protocol to assure I provided them with an opportunity to reflect on the "archaeologist

incident" described in Chapter 4. Follow-up interviews were conducted with five participants, one of whom also presented at the workshop (see Table 2.1). Simone and Bridget, both white, instruct at a local nature center; Simone is also a retired elementary school classroom teacher. Charlotte (white) teaches elementary school art. Jacqueline (white) is a parent-volunteer-board member at her child's school and also works as a landscape architect. She presented on day two of the workshop about her work with the school's outdoor restoration project and gardens. Rowan (African American) is a University librarian and community educator; she attended two other NA workshops in the past. As mentioned previously when discussing presenter interviews, I also interviewed River (Lumbee and white), who also attended for one day as a participant in the Urban IPD workshop; she also attended three other IPD workshops in 2018 and 2019 and provided insights into those programs from a participant perspective.

The interviews provided me with another opportunity to talk with participants individually about their impressions of the workshop, whether or not it met their expectations, what they learned and how they were considering using the information gained in the course in their work. All interviews were conducted within a month of the end of the workshop, giving participants at least a few days to reflect on the workshop, but not waiting so long that they would forget specific incidents or ideas they wanted to relate to me. I believe I received some valuable critiques and insights into more personal reactions to the workshop than I would have learned without this conversation. The semi-structured interview format provided a valuable opportunity to follow-up on participant responses that were vague in some way to probe more deeply into what they were thinking (Seidman, 2006).

Data Analysis

I used grounded theory (Charmaz, 2000) to analyze my data. Because I finished all of the preliminary NA staff interviews and two of three planning meetings over a month before the

Urban IPD workshop, I used a professional transcription service to transcribe all recordings and began coding and analysis of that data right away. I started with low-level in vivo coding of each transcript, pulling out key words or phrases in the participant's own words to begin to look for patterns and to deepen understanding of what information was conveyed. I then created high level codes using those patterns. I used NVivo 12 to highlight segments of all transcripts based on these high-level codes. After this I created a memo for each transcript. I also created a table of key facts about each NA staff member, including their role, self-identity, educational background, and history with NA. NVivo 12 was also used to sort through all data using those codes to find more patterns and create an initial codebook with exemplary quotes.

Before the Urban IPD workshop began, I wrote summaries of what I understood so far in relation to my research questions. I also wrote memos about the NA staff vision for the workshop, their overall goals for the workshop, as well as sub-goals for different portions of the workshop, which I planned to further investigate in my observations, focus group and follow-up interviews. This pre-workshop analysis allowed me to adjust and focus some of my observations and field notes on how they worked to present those goals and address anticipated tensions and challenges during the workshop, and to observe participant reactions in those areas. I consider this adjustment and shifting in focus as influenced by the use of grounded theory. For example, I noticed a strong emphasis in the NA staff interviews on their desire for participants to go through a learning journey and think about their personal identity. Participant identity became an important theme in analyzing reactions to the archaeologist incident.

After collecting the remainder of my data from workshop observations, follow-up interviews, participant writing and focus group in July and August 2019, I chose to transcribe all interviews, and the focus group, but selectively transcribed only those portions of the workshop

that most directly related to my research questions. The earthen mounds presentation and ensuing reactions became a focal point for thinking about WS and IK. All episodes relating to NA's history, Urban Indigenous peoples, and the mounds presentation (the "Darian incident"), were transcribed. I also selectively watched or listened to many of the workshop presentation recordings to supplement my field notes. I then iteratively worked with the codes developed before the workshop and created new ones as my research focus shifted and as new patterns emerged from the data. It was particularly important for me to focus on the reactions and processing of Darian's presentation. I also charted how IK and WS were presented at the workshop noting who presented which topics, the amount of time spent speaking about each topic, and also which activities participants identified in their interviews as helping them better understand IK, WS or the relationship between them. From this analysis, I adjusted my focus and rewrote my research questions to those found in this document.

My content analysis was greatly reduced from what was originally intended because NA staff did not create their own shared documents to teach from, rather relying on the one-page schedule given to all participants. They also did not actively use the curriculum guide during the workshop except to mention that a particular activity we had just participated in was located in the curriculum guide or to mention the existence of the one-page NA restoration education curriculum overview, which is described and included in the first chapter of this document. Because the guide was often referenced by the NA staff and understood by them to be as an entity separate from IK, it was more useful to analyze only the organizational structure and introductory passages of the guide, rather than scrutinize the contents of each individual activity. The guide as a whole is one focal point of my analysis in Chapter 3.

As I wrote my analysis I conducted member checks (Tracy, 2010), especially in describing NA's history and staff roles to assure accuracy. One participant reviewed all of the quotes where they were mentioned to make sure I had properly portrayed their intentions.

Chapter Three: Who is Nature Alliance? Evolution and Identity of the PD Program

Introduction

This chapter unpacks relevant experiences in the Nature Alliance professional development program history that brought them to the place where they now offer an Indigenous Professional Development (IPD) Program and specifically, the Urban IPD program researched for this study. The tensions I will discuss that brought forth Urban IPD continue to impact the program today and the staff continues to wrestle with how to best accomplish a diverse set of goals that compete for limited programmatic time. My analysis addresses the question:

> *How does a focus on ecological restoration education with an explicitly Indigenous cultural context create opportunities and tensions for professional developers to grapple with issues of epistemology, knowledge, racism and power?*

The first part of the chapter relays the conflicts, challenges and tensions surrounding the creation and building of the IPD program. This description sets the sociocultural stage for observing and collecting evidence about the Urban IPD workshop by describing the relevant historical, cultural and relational dilemmas that encouraged NA to start the program. In the second part, of the chapter I then examine how the NA staff approached planning the Urban IPD workshop, focusing particularly on their goals for the program as well as the decision-making process surrounding who should present which topics related to Indigenous culture and restoration. This analysis uncovered some epistemological dissonance in the workshop goals and core curriculum, where the Western nature of the ecological restoration approach taught in the workshop was not explicit identified and discussed. The program presents two separate tracks of content related to "restoration" and "culture." This dissonance contributed to ongoing

discussions for the NA organization as a whole relating to their identity, mission and vision for the program going ahead. In the last part of the chapter, I will share how after the workshop NA staff continued to discuss how to handle the increasing number of goals for the Urban IPD workshop and the most effective way to move forward teaching about both restoration and Urban Indigenous Peoples within given constraints.

Cultural Conflict: The context for creating Indigenous Professional Development

To understand NA's most recently developed workshop offering and focal point of this study, Urban Indigenous Professional Development, I begin this chapter with the story of the origin of the IPD program, which launched in 2012. IPD began new explicitly culturally focused programming for NA, and the demand for and expansion of that program led to the array of workshops offered today. The story of how Urban IPD came about begins to show us the issues of power, race, epistemology, and knowledge entangled in this program.

In 2011, the NA director, Elizabeth, was helping run a water stewardship-focused Nature Alliance teacher professional development workshop. At that time, NA was just beginning to develop a relationship with the Wolf Lake Nation, and Elizabeth asked if someone from the Nation could take participants into the wild rice sloughs on their reservation. The participants included teachers from many locations, but importantly included teachers from Wolverine, who serve students who live on the Wolf Lake Nation Reservation. Elizabeth recounted what happened that day:

> [A Tribal Elder] took us out. And everybody was so enchanted and impressed and it was like actually entering a different kind of world. Just a beautiful place and it felt very ancient to see this grass you know this wild rice grass in the water interacting, and the grass acted like islands that you've kind of negotiate around the boats. So, everyone was very positive, and we got off the boats and we stood in a circle. And had some really

> positive conversation, then all of a sudden, the whole conversation direction changed, and became kind of nasty actually. The teachers, the Wolverine teachers who serve Wolf Lake Nation youth started to accuse [the Tribal Elder] about "We[ll], you know you guys aren't doing a great job raising your children" and [the Tribal Elder] is going back and saying well "You're doing a terrible job! You're hurting our children in the school. I mean, why do they want to be there?" And it was, it actually got a little bit loud and it was pretty [pauses]. For me, it was a real surprise because I didn't really know very much about Native communities or Native people or the issues between the tribe and the schools. I've learned a lot more since then, of course. But it really got us thinking about, "Oh! There's a lot of work that needs to be done here." (Elizabeth, pre-workshop interview[6])

As the story is told, it brings out a tension between the white Wolverine teachers and the members of the Wolf Lake Nation that Elizabeth and other NA staff members had not previously seen. They recognized a discord that between two groups that somehow needed to be addressed. However, it is perhaps more apt to describe this incident as one example of the systemic racism endemic in schools today. Many Indigenous people retain a deep mistrust of public schools given the long history of attempts by whites to "reeducate" and assimilate children at boarding schools (Bang, Curley, Kessel, & Marin, 2014; McInnes, 2017). These schools forcibly removed children from their families, prohibited the use of their Native tongue, and often housed them in military-style, inhumane conditions (Blackdeer-Mackenzie, 2018; Loew, DeMain, & Leary, 2013). Generations of students raised away from their families resulted in tremendous loss of cultural knowledge for families, clans and tribes (Blackdeer-Mackenzie 2019; Loew, DeMain, &

[6] "pre-workshop" indicates the first interview with staff conducted before the Urban IPD workshop. "follow-up" interview indicates the second interview conducted after the workshop and focus group

Leary, 2013; personal communication Liana). Existing school curriculum tends to ignore this history (Austin, 2011; Castagno & Brayboy, 2008). What Wolverine teachers may have interpreted as poor parenting, may have originated instead in a protective stance by the Wolf Lake Nation families trying to shield their children from an education that positions their language, knowledge and culture as inferior and reinforces stereotypical, historical images of Indigenous people, when it is mentioned at all (Castagno & Brayboy, 2008). As Elizabeth mentions, at the time of the event, NA staff did not know this history and it served as an awakening, as they began to realize the sociocultural nature of restoration and the impact that historical interactions have on their work (K. D. Gutiérrez & Rogoff, 2003; Rogoff, 2003). NA had been running their water stewardship workshops as if the discord between the two groups did not exist. This interaction planted a seed that there might be something more that their organization needed to learn and do.

Later that summer, NA held another institute, and as usual, conducted one of their key activities for ecological restoration where they look at U.S. government-funded land surveys from the mid-1800's to see what was once growing at the focal site when European settlers arrived. The intended purpose of the activity was to help participants make decisions about whether or not it was possible to restore the land back to what it "used to be" or if there have been too many changes since that time. However, amongst this institute's participants was a team of "Urban Native teachers[7]" (Elizabeth pre-workshop interview), who voiced objections:

> they said, "Well, we look at this, these surveys, as is what, took us off our lands." And so it had a very different perspective about it…we were looking at it as a tool to understand about our restoration process. They were looking at it as 'we were removed from our

[7] Quotes indicate Elizabeth's word choice

> lands, and then the surveyors came in and, and mapped the land to sell it.' (Elizabeth pre-workshop interview)

In general, when white participants read surveys, they focus on the history of Euro-American settlement and changes to the soil, flora and fauna on the land from the development of agriculture and cities over time. They see the "pre-settlement" era that the surveys document as an impartial recording of a snap-shot in time; an aspirational view of what the land once was, unsullied by humans, or at least by Euro-Americans (Jordan et al., 1987). When Indigenous People read the same surveys, they see documents that remind them of genocide, theft and destruction of their homes (Grande, 2009; Tuck et al., 2014). Throughout the 1800's when these surveys were created, the US Government created and enforced policies that repeatedly benefited settler colonizers' access to First Nations' land and resources, and pushed people onto smaller and smaller reservation lands (Derks, 2016; Grande, 2009; Treuer, 2019). These injustices followed centuries of disruption and genocide perpetrated by Europeans as they reached what is now the Americas, bringing disease, invasive species, new technologies and colonizing epistemologies (Blackdeer-Mackenzie, 2018; Treuer, 2019). The U.S. frequently failed to meet the terms of treaties they signed; tribal populations were often moved with little notice in the dead of winter, leaving the population ill, weakened, and without food or shelter (Derks, 2016; Finn, 2015; Treuer, 2019). Not only are these surveys in themselves very Euro-American in their approach to measuring and describing property, but the act of reading surveys can be traumatizing for Indigenous People. Reading these surveys is not conducted with the "impartial," nostalgic view ascribed by white people who do not consider the sociopolitical history of the surveys.

As an organization with roots in the University of Wisconsin-System, influenced by Aldo Leopold, also a white conservationist, these two unsettling, yet, what Elizabeth calls "life-changing experiences" occurred in the same summer. Their collective impact led Nature Alliance to reconsider their educational programming (Elizabeth, pre-workshop interview). They invited colleagues from the Wisconsin First Nations communities to create an advisory group to think about what is happening in schools related to this experience and ways in which the NA program might be positioned to help heal relationships and improve the success of Indigenous students in schools. They also held listening sessions in both the Wolf Lake Nation and nearby Blue Pines Nation to learn what the communities wanted and to determine what role NA could play (Elizabeth, pre-workshop interview). As Naomi describes it:

> There started to be a realization that the way in which culture was being ignored [in educational settings], or they should say non-Western culture was being ignored or silenced, or presented inaccurately, how damaging that was to Native students and their families and communities. And it came to be this realization that, wow, teachers, there are a lot of non-Native educators, teaching Native students, serving Native students and their families. And there's a lot but that can be learned in order to do that better. And especially working with through with districts that serve tribal communities on reservations, or their tribal lands. All the United States is tribal, ancestral lands, but places that are really sort of centered communities for the individual tribes, that the land is such an important part, the land and water are such an important part of the culture... (Naomi, pre-workshop interview).

Naomi described the way in which the NA staff began to expand their view of the sociocultural nature of the problem that contributed to the conflicts between Western and Indigenous cultures.

The listening sessions helped NA staff members learn more about their "Western" epistemological approach to ecological restoration education from the position of the Indigenous Peoples who were pushing back against it. This helped them recognize the importance of working with Indigenous partners who could help them adjust their approach--an important step towards transforming the program. With a better understanding of the need to help non-Indigenous teachers work with their Indigenous students, NA, with help from their majority Indigenous advisory board and in partnership with the Wolf Lake Nation and Blue Pines Nation, received a grant from the University in 2012 for a two-year pilot project called Indigenous Professional Development (IPD)[8]. They chose the name for the PD[9] as "a phrase intended to convey the intellectual traditions of native nations [*sic*] who rely on these traditions to inform their lifeways, stewardship, and worldview" (H. YoungBear Tibbetts (Sauk and Fox) 2011, as cited in unpublished IPD Baldwin grant report, 2014). They intended that the program would "build capacity and 'grow' the next generation of stewards so that Native youth find strength in their cultural heritage and become inspired to explore science careers" (IPD Baldwin grant report, 2014). Using the money from this pilot grant, the collective team also secured a second NSF grant in 2014 to grow the program.

IPD maintained its foundation in NA's restoration education process but worked with a large group of Indigenous advisors to design a new type of summer experience for educators (IPD Baldwin grant report, 2014). Tribal members facilitated the days of the workshop, with NA staff teaching only the restoration activities. The new IPD program focused on the Nations' strengths and Indigenous voices. They brought educators to the reservation to meet and interact with tribal members and to contribute to land restoration activities. The program intentionally

[8] Reminder to the reader that this is a pseudonym.
[9] Which is not revealed to protect privacy

showcased funds of knowledge (Moll et al., 1992) within the Wolf Lake Nation and Blue Pines Nation and helped white educators gain an assets-based view of the Indigenous students and families connected to their schools. To help educators understand the socio-political history of the tribe and its encounters with damaging US Indian policy, IPD also brought in tribal members to recount their experiences of marginalization, including the historical trauma of relocation and boarding schools. These collective opportunities for white educators to listen to tribal members and contribute reciprocally to the reservation began a process of building positive relationships.

As an integral part of IPD, NA and Indigenous partners also created a program for Indigenous youth in 2012 to strengthen their cultural identity and knowledge through learning in the outdoors both from Elders and through participation in the restoration education process. Funding was secured to assure that a tribal coordinator could support the teachers and youth between summer programs. The coordinator acted as a liaison between the tribe and the schools, providing teachers with guest speakers and vetted resources to bring into the classroom, supporting Indigenous students and parents, and also running community relationship-building activities to bring non-Indigenous people from Wolverine together with people who lived on the reservation for common activities and celebrations. Many participants attended the workshop repeatedly in successive years, and NA facilitated ongoing discussions between the school district and the tribe (Elizabeth pre-workshop interview). One of the stated goals from the original grant report was “having students and teachers experience a diversity of perspectives and develop a personal understanding of their relationship with others and the natural world within the context of restoring native habitat” (IPD Baldwin grant report, 2014). From interviews with NA staff members, I understood this to also mean that they intended for these

multiple perspectives and for both Western and Indigenous teaching tools to become part of teachers' classroom curriculum.

The process of creating this new IPD program involved NA staff negotiating in and across cultural practices (N. S. Nasir & Hand, 2006), ostensibly shifting some power and responsibilities from NA to the tribes[10]. By elevating the role and importance of the knowledge, histories, epistemologies and cultural practices of their tribal partners, NA had to reevaluate and reconsider the prominence and importance of their restoration education curriculum. Because I did not attend these workshops however, I cannot speak directly to the form of transformation that occurred, but wondered: How did these two cultural approaches to land care relate to one another, intermingle or hybridize in the new PD program? How did IPD help participants navigate this relationship and consider the impact on classroom teaching and learning?

Word of the program's potential spread to other Wisconsin First Nations educators (IPD Baldwin grant report, 2014), and in 2016 NA staff collaborated on a four-year NSF grant with two other First Nations (Elizabeth, personal communication). IPD currently has programs for educators, community, and youth specific to the five collaborating Nations. The success of this program also helped NA develop a Latino Nature Alliance beginning in 2013, working with Latinx, bilingual partners in the US, as well as the Global Nature Alliance beginning in 2015 that has run in five other countries. At least eight other grants have been used to support the full suite of programs.

Connecting with Act 31

IPD became intertwined with Act 31, which requires Wisconsin schools to include instruction on the history, culture and tribal sovereignty of the 11 federally-recognized First

[10] Because I did not attend this workshop, I cannot confirm whether or not this occurred. However, I will return to this idea when I look at the Urban IPD program.

Nations located in Wisconsin (State of Wisconsin, 1989). The WI legislature passed Act 31 in 1989 in response to the "Walleye Wars" in the 1980 and 90s when white protestors threatened and intimidated Ojibwe spearfishers who were exercising their rights to hunt, fish and gather under treaties signed over 100 years prior (Loew, 1997; Nesper, 2016). Although the courts affirmed the Ojibwe rights to spearfish outside their reservations in ceded territory under those treaties, many non-native people (incorrectly) felt the tribe endangered the sports fishing industry by spearing during spawning season; they harassed spearfishers with racists taunts and threw rocks at their boats (Loew, 1997; Nesper, 2016). Act 31 mandated education to help Wisconsin residents understand the history, culture and sovereignty of the First Nations in Wisconsin in part to prevent these conflicts in the future. The American Indian Studies Education Consultant for the State of Wisconsin DPI served as an advisor for the development of IPD, and helped the program develop the qualifications necessary to provide Act 31 credits required for a Wisconsin teaching license. These credits became a selling point for teachers to participate in IPD. In Aubree's words:

> So, it was a natural fit to be able to teach teachers how to do land stewardship, in partnering with the tribe and learning about the tribal aspect, even though Act 31 was always in there. I mean, when you are learning from the tribe, that is Act 31. But now, it's explicit…that IPD is Act 31, as well as that land stewardship concept. (Aubree, pre-institute interview)

IPD provided a context and an opportunity for talking about both land stewardship and tribal sovereignty from the perspective of the First Nation partner. By combining education on both Act 31 and land restoration into one workshop that included tribal members and white educators,

NA hoped to contribute to positive relationship-building between both groups and to eventually help heal the rifts between them.

Addressing the Needs of the IPD Audience

Knowledge Gap about Wisconsin First Nations

NA opened the IPD for free to all educators, using grant funding to limit participant costs, frequently offering stipends to educators who attended not only the summer course, but also participate in monthly seminars and workshops to extend the program. The primary target audience is professional K-12 educators, but they encourage participation from post-secondary and informal educators as well. Participants reported attending with interests in learning restoration techniques, environmental education activities and also learning more about Act 31 and/or the First Nation partner. Mirroring the teaching population, the majority of participants who enroll are white (Elizabeth, personal communication), but not exclusively. For example, for the Urban IPD institute studied here, three of the 18 participants identified as members of a First Nation and two identified as African American. This is a voluntary program which tends to attract individuals or teams who are highly invested in finding opportunities to learn the contents, with some more focused on learning restoration and others on educating themselves about tribal partners. Many participants attend multiple workshops or the same workshop in successive years. Due to funding restrictions and increasingly limited teacher availability over the summer, they shortened the course this summer from five days to three days[11]. NA offers the course for University credit as an incentive, however, recent licensing changes in the State of Wisconsin have limited the need for continuing education to maintain a professional license.

[11] Elizabeth notified me in January 2020 that next summer they will increase back to four days after receiving feedback from participants that three days was too short.

Adding a focus on their tribal partner and Act 31 to NA's original restoration education model along with the pressures of a shortened PD length has caused changes in the program:

> …our IPD, so it's gone from, you know, a strictly restoration work, to now we're half our time if not three quarter is on this cultural aspect. (Sandra, pre-workshop interview).

Sandra talked about the way in which the IPD program forced NA to change the way they teach restoration and highlighted the loss of time for teaching restoration concepts. By mentioning that they are spending more time on the "cultural aspect" of the program, she implied that NA viewed teaching about restoration as distinct from teaching about Indigenous cultures. By teaching the course multiple times, NA came to know how little white educators knew about Wisconsin First Nations. In order to make time to teach about First Nations culture, history and sovereignty, NA dropped part of the restoration curriculum for the new IPD summer program.

Despite the enactment of Act 31 in 1989, the majority of Wisconsin teachers did not themselves receive quality preservice education about the First Nations in the State (Hadley & Trechter, 2014). This knowledge gap severely limits PD programs like IPD. As Aubree said during the planning stages for Urban IPD:

> The biggest problem is that teachers don't have the foundation, this should be something to build on previous knowledge that they are not getting in [their preservice education]. So, the state Act 31…mandates that pre-service teachers are supposed to receive that instruction so that they can go into their school. So…the biggest concern I have is that we're trying to do what the state is not, hasn't done in the first place…You would not believe how many schools, teachers that I've gone into, that don't even know the tribes of Wisconsin. So, if you don't know, the tribes, I was, like, that's just…fundamental, like, let's just learn about the tribes of Wisconsin, where they are, a little bit about their

> history. So there, that should be there should have better foundation, and we should be building on that. So, we're trying to in three days, or five days, or even six days with our winter meetings were trying to do what should have come to them in while they were in school in a 16-week course (Aubree, pre-workshop interview).

This lack of foundational knowledge places pressure on IPD to teach not only the culture, history and sovereignty of the First Nation partner as it relates to ecological restoration, but also to introduce the tribes of Wisconsin to teachers who did not receive good instruction under Act 31 or are not from the State. The perceived obligation of the need to fill that gap before moving forward with their own programming complicates decision-making about the focus and goals for IPD.

Participants' Learning Journeys: Reflection on Culture

Through pre-workshop interviews and in the planning meetings, all four NA staff members articulated a goal for participants to go on a "learning journey" through participation in the IPD program. In order to build authentic relationships with Indigenous partners, NA wants to help participants begin to recognize their own cultural and epistemological identities:

> Sometimes people sort of like, core values come in there, they're in a space where they they're questioning and maybe even for the first time, or maybe for the first time understanding that they have a culture too, you know, so there's a lot of, I think, personal [learning] for some participants. (Naomi pre-workshop interview)

The staff wanted to intentionally set up opportunities to hear from Indigenous speakers with different experiences and points of view to help participants perhaps recognize the existence and dominance of their own culture (Rogoff, 2003), how they have always heard history told from one point of view and learned only one way of relating to the world. By creating a window into

another epistemology[12] and holding a mirror up to reflect on their own, they hoped to help participants become more open to learning from others and eventually teaching about those other points of view (Sandra and Aubree, pre-workshop interview).

As part of that learning journey, NA wants participants to be open-minded, to ask questions, make mistakes and continue moving forward. Liana, their Deer Valley Education contact articulated this as a sticking point particularly for non-Indigenous teachers:

> the fact that it's so difficult for non-native educators to understand that, because I think that Western society, you know, if you're a teacher, you know, everything. If you have a classroom, you know, everything. You are the authority. And that is so contrary to our [Deer Valley] teachings (Liana, pre-workshop interview).

Here, Liana speaks to her experience with the authoritative nature of the Western approach to speaking about knowledge. The Western educational system claims a universal knowledge that is superior to other ways of knowing the world (Bang et al., 2012; B. F. Lewis et al., 2001). She represented the Deer Valley people as expressing a more humble, personalized view of knowledge, only speaking to their own experience and not holding their knowledge as superior to another's. I will return to this idea again in the next chapter. Liana, along with the NA staff, expressed a desire for the learning journey and openness about learning other perspectives to lead to educators presenting multiple points of view in the classroom.

Elizabeth and Naomi, the two white staff members in NA, often spoke of being on this iterative learning journey with IPD participants. Both of them spoke of how what they learned through working with their Indigenous partners has helped them reexamine their own cultural identity and changed their overall approach to restoration education work.

[12] The NA staff never used the word "epistemology" during this study. They used phrases like learning Indigenous perspectives or learning about one's own culture or "core values" as Naomi says in this quote.

> So, Naomi asked me the question yesterday…"You know, we're not doing as much ecological restoration as we used to." I said, "Yeah, that's true." But I said, "this whole thing about this kind of relationships, we've got to have this healing before there's ever going to be any, any real change." So, we started writing this down [draws concept map] relationships…those have to heal, and then you can go to doing Indigenous science…which then leads to land care, and restoration…We don't do linear. [gestures that the process is circular or interwoven] (Elizabeth, pre-workshop interview)

They saw working on this personal learning journey, which involves creating relationships with Indigenous people, perhaps as coming before an educator could make significant changes to curriculum or pedagogy incorporating the knowledge of Indigenous People. It also comes before doing restoration work. The whole NA staff noticed the slow pace of participants' learning journeys, causing them to reconsider how and what can be accomplished through their program. In her pre-workshop interview, for example, Sandra told the story of how one teacher finally made the connection for herself between how to integrate Indigenous culture and restoration after her fifth NA workshop. Sandra felt the teacher needed time to focus on learning the Indigenous culture and history first before she was able to figure out how to connect what she learned to her outdoor classroom. All NA staff members provided anecdotes of educators who attended the IPD program, especially those who attended multiple workshops in one summer or returned in successive years, moving through iterative changes in their self-identity, developing more empathetic approaches towards interacting with Indigenous students, and transforming the way they ran their classrooms.

While NA staff members can speak anecdotally to the learning journey of racial identity, especially as it helps white educators understand their hegemonic positionality and historic and

ongoing systemic racism against Indigenous Peoples, their organization's work has not extended to following educators back into their classrooms to formally observe the resulting outcomes for students. They described in interviews that they only learn informally from individual teachers what happens over the long term (pre-workshop interviews). The NA staff spoke in their interviews and planning meetings of the desired outcome that educators would develop "accurate and authentic" lessons on Wisconsin First Nations and that they would represent "multiple perspectives" in lessons related to science or environmental issues. They clearly described their priority during the IPD workshops to get members of white and Indigenous communities in the same room together to develop more empathetic relationships between the groups. Learning a more accurate history of Federal Indian policy and the impact on Indigenous communities and a desire for that history to be acknowledged in the classroom was also evident. Both of these ideas contributed to the idea of "healing relationships" between the communities, but an end goal, if one exists, for how that healing looks for both parties is yet unclear from conversations documented during this study. The journey of healing will be long-term and restoration education plays a small role within a larger process. What remained unresolved and perhaps is beyond the reach of a program like IPD, is to determine exactly how the school curriculum or educators' pedagogical practices would change as a result of the "healing." How should Western and Indigenous approaches to 'restoration' work together to create equitable education for Indigenous and non-Indigenous students? Would one dominate over the other, would they hybridize or be multilogical?

The conflict and tensions that NA began to address seven years ago, when founding IPD still exist, and continued in the minds of the workshop organizers throughout the planning and implementation of Urban IPD, which I will address next. How do they help educators navigate

the sociocultural boundaries between Western and Indigenous cultures and epistemologies? What experiences do they want to provide? What outcomes would they like to see? What constraints restrict them from providing those opportunities?

Why Urban IPD? Additional Needs Burden the New Program

NA ran Urban IPD, the focal workshop for this study, for the first time in summer 2019. When interviewed, the staff expressed multiple reasons for starting this workshop, the most basic being location. Their other workshops occur in the particular geographic locations near their collaborators, and they saw a need for instruction in this region. Another significant reason was the need to address the way in which Urban Indigenous people, and especially Urban Indigenous youth are "left out of the narrative" (Aubree, pre-workshop interview) and made to feel invisible.

Many non-Indigenous people believe that to be Indigenous means to live on a reservation (Lobo, 2001). The idea that Indigenous people cannot live in cities is of course, a falsehood, when over 2000 years ago Teotihuacan had 125-250,000 citizens and present-day metropolises such as Seattle and Chicago, were built atop the infrastructure put in place by Indigenous people (Peters & Lobo, 2001; Thrush, 2007). However, the policies of Indian Removal, Relocation, Reservation Systems and Termination broke up many organized First Nations' settlements and governing structures. Policies of extermination, separation, cultural decimation and assimilation scattered families and isolated many First Nations on the inadequate, rural reservations most people think of today (Treuer, 2019; Wolfe, 2011). These policies along with urban relocation programs and personal decisions of individuals and families to migrate to cities on their own created the complex picture that exists today of "Urban Indigenous." In the 2010 Census, only 22% of Native Americans lived on reservations and 60% lived in metropolitan areas (US Department of Health and Social Services, 2019). Indigenous People who live in cities today may have ancestry from one or more any of over 573 federally recognized tribes in the United

States, along with ancestry from any other cultural group from anywhere in the world. They may be enrolled members of a First Nation and strongly identify with their culture, have little to no connection to their culture, or maintain connections with multiple First Nations communities, depending upon their upbringing (Keene et al., 2019; Lobo, 2001). Some may "look native," some may not. Although many have become highly assimilated into Western society, Urban Indigenous people frequently maintain strong ties to their tribal homeland, and many are finding ways to reconnect to that heritage after U.S. policies separated them from their families and their culture (Straus & Valentino, 2001).

Many people are not aware of this complexity (Lobo, 2001). A single urban school district may contain students representing dozens of tribes (Aubree, Urban IPD planning meeting). Through listening sessions held in the one urban area, NA heard that Urban Indigenous students wanted to learn more about neighboring First Nations communities, "not just [the] Cherokee" (Elizabeth, focus group), who are often the only First Nation mentioned in school curricula. Through the Urban IPD program, NA wanted to focus PD for educators on reducing the invisibility of Urban Indigenous youth. They expressed a desire to help educators and all their students, both Indigenous and non-Indigenous alike, to see Indigenous people as successful living, diverse, modern people, not just as extinct, historical groups appearing in textbooks. By educating teachers, NA hoped that these types of representations and stories make it into the classroom in an "accurate and authentic" way (Aubree, Urban IPD planning meetings).

NA staff wanted to create this program to help educators understand the diverse Urban Indigenous students in their classroom, but also to help Indigenous students make positive connections with their tribal identity and reconnect to the land and to their Indigenous heritage. Right now, Urban Indigenous youth seldom report positive classroom experiences (Hatala,

Morton, Njeze, Bird-Naytowhow, & Pearl, 2019; Lees, Heineke, Ryan, & Roy, 2016). As someone with significant experience working with Urban Indigenous youth and as someone who grew up identifying as Urban Native herself, throughout my study Aubree spoke of examples of the detrimental experiences youth have with teachers who may call them out incorrectly as not being Indigenous or for teaching harmful stereotypes about Indigenous people as being poor or alcoholics:

> …there's so many tribes, there are people, the feelings Native students have, I mean, sometimes Native students if they can blend, I mean, they, they, you know, will see me and they're like, oh, gosh, that is it. They really don't want to talk to me [a Native school employee], they do not want to be stigmatized by being, it's a stigma to be Native. I mean, some kids are proud and embrace it. And that's kid and you got those kids, and you got those kids who are trying to learn but teachers who are shutting them down like, "Oh, you're not Native [when they actually are.]" I mean, I would be able to give a full kind of experience of what Native kids kind of go through. (Aubree, Urban IPD planning meeting).

Because of her background, the rest of the staff looked to Aubree to drive the program focus. NA wants the Urban IPD program to help educators incorporate more "accurate and authentic" information about First Nations people, develop better relationships with Indigenous youth, and over the long run improve the self-esteem and academic success of those youth[13]. From Aubree's perspective, helping teachers create a lesson in any subject that dispels stereotypes and creates assets-based views of diverse, Indigenous people is a primary goal. She emphasized the

[13] As a reminder, this educator PD is complemented by a youth program for Urban Indigenous youth which works on these same issues, but is beyond the scope of this study.

weight of racism and the powerlessness of invisibility students feel with much of the existing school curriculum (Stephens, 2015).

Making Land Connections in an Urban Indigenous Program

Because the Urban IPD workshop location was not connected to a clear tribal partner with their own lands, NA struggled with how to connect the concepts of land or place with a diverse array of Indigenous people, all with varied land affiliations. In other workshops the outdoor restoration work on tribal lands using NA's curriculum always created a clear place-based connection for the Indigenous workshop focus. Because Indigenous epistemologies are generally closely tied to connections with the land and tribal community, it can be more challenging for Urban Indigenous people to make those connections if their tribal homelands and communities are far away (Hatala et al., 2019; Lobo, 2001; Peters & Lobo, 2001). As Liana, the Deer Valley Education contact asked, "how do you connect to your tribe if you live in a city?" (pre-workshop interview). In some cities, Urban Indigenous community centers have helped recreate places of re-connection to urban lands and to other Urban Indigenous People, regardless of tribal affiliation (Straus & Valentino, 2001).

The issue of place arose in the planning sessions when discussing which First Nations to discuss during the workshop. As with other IPD programs, NA felt pressure to teach fundamental information about Wisconsin's First Nations, but because they did not have one clear tribal partner in this new urban setting, and because participants may attend from different parts of the state, they felt pressured to cover information about all 12 of Wisconsin's First Nations, instead of going deeply into just one. NA staff also wanted to recognize the workshop's location on Deer Valley ancestral lands but were unsure how much time to focus learning strictly about Deer Valley culture and history. Whose place and history of place do you discuss in an

urban context? When teaching about a place, how do you focus on its history and the Oral History knowledge of the place while helping people who have been disconnected from their own land history connect to that place? Learning about land in a city creates nuanced layers of land affiliation, many ways to connect to a place, and many different places of origin for Urban Indigenous People. NA staff wanted Urban IPD to present all of these nuances but struggled to determine how to do so.

Many of the planning meetings were spent debating and prioritizing the overall goals of the new program. Because the NA curriculum is rooted in ecological restoration of a particular place, the NA staff had to consider how the concept of place-based learning might be different in an Urban environment, where the diverse Indigenous people who reside there may not have historical connections or deep Oral History knowledge about that place. NA staff tried to determine the goals for what they want educators to understand about the different needs of Urban Indigenous youth and to think about how they wanted to address these complex connections between place, restoration and Urban Indigenous Peoples. In one of the planning meetings, Naomi spoke about this:

> …I was wondering if there is an opportunity, or maybe they're not even a need, but to make an explicit connection…for participants…How do we move from this idea of affirming this identity of urban Native people to place-based education? Like, what is the connection between those things? Because when you said like, okay, land and water…How are the activities that we're doing that are about land education, or land stewardship, or whatever it is, how is that supporting this bigger issue in the schools and representation? I'm just wondering, are we hoping teachers get there during the course of

> the three days? Or do we want to explicitly set it up for them like this is, this is the opportunity we see for this environmental education piece? (Naomi, planning meeting).

Creating an accurate lesson about Indigenous Peoples does not require a lesson with an outdoor, place-based component. At the same time, discussing ecological restoration or water protection does not require a discussion about Indigenous Peoples. In Naomi's questions she recognizes the scale of their dilemma and tries to direct the conversation to how Urban IPD can address environmental restoration education, place-based education, and representation of diverse Urban Indigenous Peoples. In response, Aubree puts more weight on the Indigenous portion of the program over restoration:

> I think if you do it right, the kids are going to see themselves in the curriculum. I mean, at least more I mean, we're not, we're not trying to go to 100%. If we can just get something better. I mean, everybody's got to start someplace. So if, if it's just improving one lesson plan, let's start there. Maybe the next year, it's got once they understand what they're doing, they're going to…teachers will internalize that when you're like, "aha! I've only taught about Native people from a past tense or a homogenized Native people"... I mean, once they learn one thing, then they can build on that…And then to go the other way of learning, teaching something positive. (Aubree, Urban IPD planning meeting)

Aubree's emphasis for Urban IPD is on assisting educators to improve any existing lesson in any subject area of the curriculum that helps Indigenous students see themselves in a more positive way in the curriculum. In this passage, she does not emphasize teaching about a Wisconsin First Nation, nor does she explicitly state that a lesson should connect to particular place or restoration education. As mentioned earlier, Aubree acknowledges the long learning journey educators must take to understanding the history, culture and sovereignty issues connected with Wisconsin, and

other First Nations. Her priority is making sure Urban Indigenous youth connect in a positive light with their Indigenous identities in the curriculum at least once.

NA did not resolve these questions while planning or running the Urban IPD institute. The tension between maintaining NA's restoration focus and how to relate those concepts with generally accurate lessons about Indigenous culture, history and sovereignty was ever present. The deepest discussions in planning meetings revolved around defining what they wanted participants to learn about Urban Indigenous cultures, histories and sovereignty. Much of the time in the focus group after the workshop was also spent revisiting these same dilemmas.

When activities from the NA restoration education program were mentioned during workshop planning meetings, there appeared to be an unspoken understanding and assumption amongst the staff of what participants would learn from them; the activities were named but often not discussed in depth. This glossing over of the reason for using specific restoration activities could be attributed to the staff's greater familiarity with teaching the NA restoration program and shared assumptions about their purpose. With limited time for NA staff to meet to plan this new Urban IPD workshop they placed greater emphasis on designing the new components of this program rather than discussing established, familiar activities. Not only did they spend considerable time discussing how to teach about Urban Indigenous Peoples compared with their approach with a tribal partner, but they also spent a great deal of their meeting time on the logistics (meeting space, food, payments, etc.) for the new workshop location. They eventually determined that educators would not spend time during the three days working on lesson plans given time constraints with the shorter workshop. Therefore, questions about how to help participants include components of both place-based learning and knowledge about Indigenous peoples in their teaching work was pushed off to monthly workshops and seminars

after the Urban IPD workshop ended. How does one go about creating a PD workshop that helps educators learn about Act 31, learn about local First Nations neighbors, understand the diverse stories of Urban Indigenous Youth as well as land restoration in only three days? These issues were not completely answered during this time of this study.

Course Goals Reveal Two Tracks for IPD

With these complex dilemmas in mind, NA presented five formal goals for the program. On the syllabus of the IPD course offered for optional University credit alongside the workshop, the program goals are listed as[14]:

1. Recognize the potential of restoration for enhancing education and engaging youth for solving local and global environmental issues resulting in healthy, resilient communities and improved relationships with the land and one another.
2. Recognize our interdependence with land/nature and describe one's personal relationship and responsibility to the environment.
3. Plan what is entailed in a restoration project and who to go to carry out a project and obtain resources.
4. Understand the purpose and goals of Act 31, what it means for one's responsibilities in the classroom, and how to implement content that is accurate.
5. Determine how instruction can build on Indigenous knowledge, interests, practices, identities and worldviews of learners and communities.

The syllabus applies to all four IPD workshops and does not list any distinct goals for Urban IPD. It is noteworthy that none of the goals explicitly combine restoration with IK, cultures or practices: with restoration and relationships to land and nature referenced in goals 1-3, and Act 31 and Indigenous peoples referenced separately in goals 4 and 5. The program description says that IPD "seeks to integrate Indigenous perspectives and experience with Nature Alliance's ecological restoration education programs" but the organization has not clearly articulated a goal for participants to do this integration themselves. As alluded to in the previous section, it is not

[14] These formal goals, which were written and submitted for University credit approval in the spring, were never referenced during the planning meetings. The goals were written to meet a requirement and although they reflect NA's intentions, were not foremost in the minds of the staff as they put together the workshop schedule.

clear that NA has articulated for the organization, especially with Urban IPD, exactly how Indigenous perspectives should be integrated with the ecological restoration education program. As the goals are written, they position restoration and learning about Indigenous neighbors as separate content strands in the workshop. Goals 1-3 could be accomplished without integrating content from goals 4-5 or vice versa. The structuring of these goals, suggests an additive approach to bringing the knowledge of Indigenous People to the core NA restoration education program (Grant & Sleeter, 2011; King, 2004; Gloria Ladson-Billings, 2018), but requires further review of how these goals are actually carried out in the workshop.

Whether or not this is their intention, structuring the training to keep restoration goals distinct from learning about Indigenous partners, sets up a dichotomy in the program. It speaks to the high value still placed by the organization on the core restoration education program and its parallel, but not explicitly integrated relationship with the newer focus on Indigenous partners. As the long-time, standard approach of organization, NA staff may see their restoration program as a vehicle for bringing people of diverse cultures and epistemologies together to learn. But does NA staff view the restoration education curriculum as a culturally neutral toolkit that can be adapted to any cultural partner? Is it acknowledged as a Western cultural toolkit that can be used alongside Indigenous approaches to land?

The presentation of these two tracks in the goals, warrants further investigation moving into the Urban IPD workshop. By examining the Urban IPD schedule, I can continue to unpack questions about how NA staff design the workshop to help integrate Indigenous perspectives with ecological restoration education, or whether they keep the two tracks separate.

Decisions of Emphasis made with Urban IPD schedule

General Schedule

Summer 2019 was the first time the Urban IPD program was offered. In this section, I want to provide a brief overview of what occurred during the workshop, identify who presented what topics, as well as discuss the motivations for some of those decisions. In my description of the schedule below I have chosen not to describe and analyze each individual presentation in detail in terms of how knowledge was represented, but rather focus on the general decisions NA staff made when putting together their schedule, focusing more on the implications of their choices to support the development of the two tracks of program goals discussed above, and how the positionality of different speakers could impact what participants learn about Western and Indigenous epistemologies.

The schedule provided to participants (Table 3.1) was developed from the experience NA staff gained running the other IPD programs but tailored to focus on Urban Indigenous People as discussed previously.

Each of the three days of the workshop had a theme: Cultural Landscape, Land and Water, and Taking Action. Both the first and second day occurred on campuses of private non-Indigenous educational institutions, the third day was at a Community Center run by a First Nation. They used the first day on Cultural Landscape to provide background information on Wisconsin's First Nations people, personal stories about American Indian Relocation and how Urban Indigenous families came to the city, as well as a talk and tour of earthen mounds.

Table 3.1: Urban IPD Schedule as presented to participants. Single starred items are from the NA Restoration Education Curriculum. ^, added by researcher, were led by someone who identifies as Indigenous. Some terms are presented in Deer Valley and Ojibwe languages.*

Hąąp Hinupahą Niisho giishigad Tuesday **Cultural Landscape** Science Center	Hąąp Hitaniįhą Aabitooseg Wednesday **Land and Water** Host School	Hąąp Hijopahą Niiyo giishigad Thursday **Taking Action** Community Center
8:00AM Welcome Research and Consent 8:30AM Morning thought with **Jayne**^ 9:00AM *Botany Bouquet*^ 10:00AM Our Stories^*Oak Reflections** 11:30 Native Approach to Learning with **Liana**^ 12:00PM Waruc Naawakwe-wiisini Lunch 12:30 PM Mounds Talk & Tour with **Darian** 2:15 PM Native Nations of Wisconsin^ 3:15 PM *Observations from a Single Spot** 3:45 Authentic Intellectual Work with **Ben** Wrap up, Credit	8:00AM Welcome and Morning Thought with **Greg**^ 8:30AM Nature Alliance Overview 9:00AM Host School Garden Tour with **Jacqueline & Kris** 9:30AM *Water in the Watershed** 10:00AM *Follow the Drop** 12:00PM Waruc Naawakwe-wiisini Lunch 12:30PM Save our Lakes with **Irini** 1:00PM *Observations from a Single Spot** 2:00PM *Waterdrop Journeys in the Water Cycle**^ 3:00PM Wild Rice Discussion **Dalia**^ & **River**^ 4:00PM Wrap up	8:00AM Welcome and Morning thought with **Kendra**^ 8:30 AM *Noting Notable Features** 9:45 AM *Soil Investigations**^ Community Planting* *Managing your Restoration** 11:30AM Waruc Naawakwe-wiisini Lunch 12:15 Community Center Trail Tour^ 1:00PM What's Possible? Designing a Restoration* 2:30PM Classroom Resources with **DPI Rep**^ & **Aubree**^ 3:30PM *Observations from a Single Spot** 4:00PM Circle Dialogue Evaluation Pįįhinagigi!! Miigwech!! Yakoke!! Thank you!!

The second day focused more on land restoration and the relationship between land and water. Participants toured a school landscape design restoration and used that as a launching point to think about watersheds, how to trace the path of water from the school property to a lake downstream, and the water cycle more generally. The day ended with two short talks from graduate students conducting research on wild rice restoration. On the third Taking Action day, participants did some analysis activities to describe the biological, physical and cultural attributes of the workshop location, considered restoration design opportunities for the entire property, and then worked with Community Center members on a pre-determined restoration planting to protect a drainage area. In the afternoon participants also heard presentations and discussed accurate and authentic resources and books available for discussing First Nations people in formal and informal educational settings.

Each day of Urban IPD started with a "Morning Thought" presented by an Elder, who may know the theme of the day, but was given the freedom to share whatever they wished with participants. Two of the three Elders invited to speak at Urban IPD were Deer Valley in deference to the workshop's location on traditional Deer Valley lands; the third identified with a tribal nation located outside of Wisconsin, representing the diversity of Urban Indigenous peoples. These morning thoughts centered the voices of Indigenous Peoples, and through the stories they told about their lives, helped participants learn about the culture, history and epistemological perspective of each individual.

Anywhere on the schedule where a name is provided in Table 1 indicates a guest presenter who was not a formal part of the NA staff. NA invited some speakers for their knowledge in interpreting the land: learning about earthen mounds, local watersheds, or landscape of the three properties where the workshop was conducted. Other speakers were

brought in to help teach about topics such as Indigenous approaches to education or accurate and authentic teaching resources on Indigenous peoples.

When planning the workshop, NA carefully considered the identity of guest speakers and their personal relationship to the topic they were being asked to present. For example, when discussing who should talk about earthen mounds, Elizabeth said:

> …it would be nice to have Brian. He's doing that work with "X[15]" school teachers, and they were doing that restoration work at "Y" Park…maybe there's something he could do as far as the hands-on activity, which might be better than a European white woman, about what he did with the kids with the mound over there at the park…(Elizabeth planning meeting #1)

Priority was given to local, Indigenous presenters to present about topics NA staff saw as Indigenous, such as the earthen mounds or Indigenous perspectives on education. Where possible NA staff preferred Indigenous people share IK and perspectives directly, rather than having representations filtered through a non-Indigenous individual's lens. NA staff did consider bringing in a few white teachers who were alumni of other IPD programs to talk about how they teach about the knowledge of Indigenous People in their classrooms, but they were not available.

Day one on Cultural Landscape, featured the most Indigenous speakers. The first morning of the program, three people told short personal stories about family relocation, which mentioned the decimation of First Nations populations, the disruptiveness of cultural loss, job loss, but also positive outcomes as families settled in new locations. These stories were told in the context of learning about the diversity of Indigenous, and specifically Urban Indigenous

[15] X and Y are stand-ins for actual names discussed.

People and how their migration stories may connect with those of non-Indigenous participants' family histories. Because this workshop focused on Urban Indigenous Peoples, Aubree, who considers herself an Urban Indigenous person, and NA intern, Ruben [Ponca], who grew up in the local area, provided these viewpoints. The Deer Valley Educator from the Deer Valley Nation, Liana, represented the Deer Valley perspective throughout the workshop, but on day one specifically spoke about the Deer Valley relocation story and Native approaches to learning. During the afternoon, NA had a white archaeologist present about the history of local earthen mounds and their restoration (An in-depth discussion of this presentation is the focus of the next chapter). During the final presentation of the day related to cultural landscape, Aubree gave a brief presentation providing an overview of tribal sovereignty, the history of Relocation and an overview of all 12 of the Wisconsin First Nations. This final presentation towards the end of the day and began at least 10 minutes later than scheduled. It was notably rushed and condensed a significant amount of historical and cultural information into the space of less than one hour.

Many of the presentations and activities on day two, which focused on land and water, were given by non-Indigenous guest presenters. NA staff members Elizabeth and Naomi, and intern Ruben led a number of their water cycle and watershed activities, following the NA restoration curriculum protocols. In the afternoon, the program included one short presentation on Deer Valley perspectives on water from Liana. They ended the day with formal presentations from two graduate students, both of whom identified as Indigenous, who discussed their research on Manoomin (wild rice) restoration. NA staff brought in these two speakers to help connect restoration issues with Indigenous culture, history and sovereignty (NA staff, Urban IPD planning meetings). Their presentations showcased the way researchers who identify as Indigenous approach a restoration project working with First Nation partners, highlighting some

of the epistemological dilemmas they worked through conducting University research with a First Nation. Unfortunately, the program ran out of time after these presentations ended and participants did not have a chance to reflect on how these presentations connected to other material in the program.

On Day three, NA staff and intern led participants for a few hours in activities from the restoration education curriculum to help them explore and do some planting on the grounds of the First Nation Community Center. Participants learned some of the steps involved in assessing a site, designing a restoration and then "Taking Action" to plant a pre-planned restoration. During the afternoon they had a chance to interact with some of the individuals who attend the Community Center. The final activity completed as originally planned provided an opportunity to learn and briefly explore educational resources and books focused primarily, but not exclusively, on Wisconsin First Nations. All resources presented were vetted by members of the Indigenous community for accuracy. Materials provided could be used for any age group and almost any school subject.

Over the course of three days a sampling of activities from five of the 10 restoration education curriculum steps were incorporated throughout Urban IPD workshop, making up a significant part of the program. Five steps were completely absent from the program. Botany Bouquet, Observations from a Single Spot, Water in the Watershed, Follow the Drop and Waterdrop Journey are all from the *Study* step. Noting Notables and Soil Explorations are from the *Analyze* step. Designing a Restoration is from the *Plan* step, Community planting is from the *Plant* Step and Managing your Restoration from the *Manage* step. These activities were all led by Nature Alliance staff members or intern, Elizabeth, Naomi, Sandra or Ruben. Botany Bouquet made some connections between Indigenous and Western ways to name and use plants.

Noting Notables and Designing a Restoration provided some opportunities to think about how a restoration might impact the people who run and use the First Nation Community Center. Otherwise, the remaining NA restoration activities used were taught through a Western lens.

Although NA made efforts to balance the amount of time spent listening to Indigenous and non-Indigenous speakers and scheduled multiple opportunities for participants to learn restoration techniques, topics related to Act 31 and Urban Indigenous peoples, they seldom presented connections between the restoration and culture tracks. Due to the large number of goals and limited time, NA staff were often forced to omit or drop time for reflective work which may have helped participants think about ways the two tracks did or did not fit together.

Also notably absent from the schedule compared to descriptions NA staff gave of other IPD workshops, was dedicated time to listen to an in-depth first-hand account of a specific topic such as historical trauma or tribal government and sovereignty. The absence of this topic is relevant when considering ways in which topics of land restoration and U.S. policies impact and interact with Indigenous culture, history and sovereignty. Some of these topics did come out in small ways during the Urban IPD workshop from various Indigenous speakers, but this workshop did not contain any focused accounts of how U.S. policies negatively impacted Indigenous Peoples. The decision to cover a broad range of content related to diverse Urban Indigenous People alongside teaching the restoration education curriculum impacted the program's ability to help participants deeply investigate power relationships and different epistemologies. It also reduced time to engage with the relationship between Western restoration practices and Indigenous relationships to land.

Initial Reflections on Year One Constraints

During the focus group after the Urban IPD workshop, the NA staff recognized many of the aforementioned absences and lost opportunities that they successfully incorporated in their more established IPD programs. They planned to continue some of these in-depth discussions related to goals four and five, which help educators integrate Act 31 requirements into their teaching, in their monthly seminars during the following school year. However, not all summer participants will attend these seminars and those who do not attend will not have opportunities to directly discuss race and power issues to the same extent, limiting their opportunities for considering ways to integrate Indigenous history, culture and sovereignty into their teaching and do so effectively (Baynes, 2016). NA staff did identify the need to build in more time for discussion and reflection in future years.

It is unclear if the shorter time dedicated to historical trauma and sovereignty came from the new focus on Urban Indigenous people, or if because the workshop planning was led primarily by NA staff without the assistance of a tribal coordinator. Although the staff discussed the importance of planning with their Deer Valley partners because the workshop occurred on Deer Valley ancestral lands, I only witnessed formal collaboration with the Deer Valley during the third planning meeting after the draft agenda was already determined. For other IPD workshops, NA staff reported that the initial planning was done more collaboratively with an IPD coordinator who lives on or near the workshop site, and that person takes the lead on many aspects of the planning and logistics. During planning meetings, the NA staff debated how much to include particular Indigenous collaborators. As they discussed the focus for an Urban Indigenous workshop, they debated how to include collaborators who were from neighboring Nations but did not identify as Urban Indigenous. They discussed which perspectives to include

with limited time as those who do not identify as *Urban* Indigenous have different experiences than those living in Urban communities. Because I did not observe planning for the other IPD workshops, I can only speculate on the impact of the IPD coordinators on the outcome of the workshop structure. Not having a clear tribal partner gave more agenda-setting power back to NA staff and it is possible that the workshop included fewer opportunities to directly discuss issues of racism, historical trauma and deep learning about tribal structure and land because the tribal partners generally push for this focus on the agenda. Aubree, as a self-identified Urban Indigenous person, did drive much of the agenda in meetings, but the number of Indigenous people with control over the final product dropped.

As a part-time staff member and the only one who identified as Indigenous, this additional responsibility could be seen as a powerful opportunity for Aubree, but also burdensome (Cross, 2005). Aubree was tasked with representing the "Urban Indigenous perspective," as often falls to People of Color who are the sole representative in a group and this forced her to take on an additional workload beyond what may be fair for her position (Cross, 2005; DiAngelo, 2018; Sue, 2016). This does not discount the connections the other NA staff members could draw upon, but without a tribal partner or additional Urban Indigenous person on the core planning team, this additional weight fell on her shoulders alone and impacted the resulting schedule.

As was previously mentioned, because this was the first time NA ran this Urban IPD workshop and because the urban context made choosing the Indigenous focus for the workshop more challenging, NA spent more time thinking about logistics such as locations to meet, planning food, and coming up with a new list of Urban Indigenous presenters who could speak to their goals. They saw this as a year to build their network of local, Urban Indigenous partners

who could be more involved in the future (NA staff, planning meetings). They were clearly aware of the complex challenges they were presented with and thoughtfully considered multiple angles.

Reflecting on Two Tracks

While the workshop presented both NA's restoration education program and brought in speakers to present an Indigenous perspective on different topics, there was not time dedicated in the workshop to determining how these two areas of restoration and Indigenous culture, history and sovereignty intermingle. Due to the shorter three-day time frame for the summer workshop, this was also pushed off to the optional monthly seminars. NA presents two tracks in the workshop, and as I mentioned before I did not study how they help participants to determine the relationship between the tracks in other IPD workshops. During the focus group after the institute, the staff reflected on the need to make these tracks perhaps even more defined and to focus their connection with the workshop goals.

> Naomi: since we're going back and forth from the stuff that's more, more focused on, you know I have to even divide culture and restoration, more talking about Native culture and identity. And then there's the restoration activities. That's like the process steps. I think it can feel like a real kind of like, back and forth sometimes. And I think it's really nice for the restoration piece, for any activity to sort of say, at the beginning of it, "This is why we're doing this now. This is our objective right here"…Whoever is introducing [an] activity that we say why we're doing that, how it fits into the larger goal of why we're here.
>
> Sandra: I actually agree, I think we have to, every, and moving forward that is, every activity. Why are we doing it? What's the objective? What do we hope that the

participants take? What are the takeaways from these? And if we cannot answer that we should not have an activity…

Elizabeth: It might be it might be better too if we would sort of have a connect, connected themes like the morning was a particular theme, the afternoon, so it feels more whole. And it's easy to say that as far as looking at restoration, but going through all the steps of restoration and in a chunk of time so you see that sequencing…

Aubree: We should do that with the cultural aspect then too like, [yeah!] wherever it fits. So introducing, if it's introducing the restoration process, introducing culture...

During this conversation, the NA staff named the "restoration" strand as distinct from the "cultural" piece, implying that their approach to restoration is not cultural. The "process steps" of the restoration education curriculum are spoken of as a stand-alone entity that is disconnected from culture. Given the Western origins of the curriculum, this invisibilizing of culture shows the normative nature of these activities for the organization.

Knowing the history of how IPD began, this ongoing separation of restoration and Indigenous culture is consistent with an additive approach (Grant & Sleeter, 2011; King, 2004; Gloria Ladson-Billings, 2018) to building the IPD program. Preferring to keep these strands distinct in this conversation, they do not discuss ways to help participants put the two strands into conversation with one another or discuss ways to integrate the two areas. The tensions created by adding an Indigenous focus, and then adding an *Urban* Indigenous focus have resulted in a deemphasis on the restoration in the PD program overall. In some moments the result is the presentation of two seemingly distinct, disconnected topics of culture and restoration.

In their programming, NA did provide opportunities for participants to think about the relationships between the two strands, for example when the Indigenous graduate students described their research on wild rice restoration. Both students described explicit connections between culture and restoration work, mentioning dissonant moments between Western research techniques and Indigenous epistemologies. However, NA did not plan in a way to help participants discursively unpack those connections as there was no time in the schedule after the presentation for reflection. This question of how NA intends for participants to ultimately integrate the two strands is as yet unresolved.

The NA staff was aware of the increasing number of goals and decreasing amount of time they had to accomplish them. Prioritizing the ongoing need to provide foundational education about Wisconsin First Nations presented a dilemma. Throughout my study, NA staff questioned how to put the pieces together and grappled with the role or format of the restoration education curriculum and the connection of "restoration" to the epistemologies and knowledges of their Indigenous partners. During the focus group and follow-up interviews, I asked NA staff about this change in emphasis and a possible change in their overall mission. In the next section, I present some of the data from discussions held throughout the study and examine how NA staff describe the identity of their program and possibly see it changing into the future.

NA Identity and the Future of Ecological Restoration Education in the IPD program

The 4 R's

Through the creation and ongoing refinement of the IPD programs, NA staff have been provided with opportunities to iteratively reshape and redefine their program mission and vision. As they work through this process, the organization's original focus on epistemologically Western restoration education has been expanded to include more Indigenous "cultural" components. In this section I will look at how NA staff members talk about their organizational

identity and how they are grappling with whether or not to change the way they talk about and teach restoration going forward as they consider the strengths and experiences they have had as they develop the IPD programs.

"Nature Alliance's model for multicultural engagement emphasizes the "4 R's" (Respect, Reciprocity, Relationship, and Responsibility)" (Bauer-Armstrong & McCann, n.d., p. vii). This statement, at the beginning of the NA Restoration Education Curriculum guide, originated with Sauk and Fox advisory board member Holly YoungBear-Tibbetts (Elizabeth, personal communication). YoungBear-Tibbetts described the 4 R's as a unifying theme between different Indigenous epistemologies:

> Native intellectual traditions are as diverse as the discrete native nations [*sic*] that have devised and relied on those traditions to inform their lifeways, situate their stewardship, and inform their worldview. While that diversity is apparent…there are some common themes that resonate throughout the intellectual paradigms of native nations,…a pattern of core values including relationships, reciprocity, respect, and responsibility.
>
> (YoungBear-Tibbetts, as cited via personal communication from Elizabeth)

NA's IPD model also relies heavily on the work of Citizen Potawatomi Nation tribal member Robin Wall Kimmerer, who serves on the IPD advisory board. As mentioned in the introductory chapter, Kimmerer's approach to reciprocity and especially reciprocal restoration, focuses on mutually reinforcing connections to land and all its inhabitants with Indigenous cultures (Kimmerer, 2011). Kimmerer also writes extensively on Respect, Reciprocity and Responsibility (Kimmerer, 2011, 2013). All four staff members used these ideas in their interviews and Elizabeth read from Kimmerer's works on two occasions during the Urban IPD workshop.

Although the 4Rs came from Indigenous partners during the formation of IPD, they were recognized as compatible in many ways with NA's existing philosophy before that program formed (IPD Baldwin grant report, 2014). When it first began, the NA vision was focused primarily on helping teachers connect students to the natural world through a white Western lens. Despite this, Indigenous partners still saw a number of ways the NA philosophy could interact well with Indigenous epistemological approaches toward land (IPD Baldwin grant report, 2014). As mentioned earlier, NA's vision "is for communities across the world to be actively engaged in ecological restoration that connects people to the land and each other through a commitment to stewardship." From the inception of the organization, NA wanted to help youth form respectful relationships with the environment and take responsibility for caring for it (Elizabeth pre-workshop interview). Building connections, or "relationships" with the land by observing and learning what grows and lives there, taking "responsibility" for creating, planting and managing the land long term was always emphasized. The relationship-building steps in the restoration curriculum include activities that help educators leverage student and community funds of knowledge (Moll et al., 1992). For example, the *Community* step in their curriculum program helped educators focus on human assets available to them, and many of the steps, including *Plant*, encouraged ways to include parents, families and other community members in the work.

The emphasis on "reciprocity" came from First Nations partners (Elizabeth and Naomi, personal communication). The recognition of the relational, interdependent nature of human and non-humans in the natural world is epistemologically Indigenous (Bang & Medin, 2010; Cajete, 2000) with a respectful give and take between plants, animals, water, rocks and people and obligation to care for the land in appreciation of what the land provides (Whyte et al., 2016).

IPD added an explicitly cultural focus to the NA program because the restoration education curriculum was not openly spoken of as cultural.

Through IPD, the 4 R's have taken on additional meaning in terms of bridge-building between the people of Indigenous and non-Indigenous communities. This focus on helping teachers connect with the larger community and NA's organizational experience facilitating relationship-building between teachers and communities was a strength of the program as they built IPD. All four NA staff members mention facilitating relationship-building as a critical part of their mission and as part of the program's strength. They have worked towards building their own relationships and network of Indigenous partners to strengthen the IPD program by joining Indigenous organizations and working with those groups to improve education for Indigenous students beyond their own programs. The four staff members are actively involved in organizations such as the Wisconsin Indian Education Association, the National Indian Education Association, and the Native Nations-University Working Group. Elizabeth and Aubree are particularly active and hold leadership roles in these organizations. NA has also committed to facilitating long-term conversations and relationship-building between school districts and their neighboring tribes (Elizabeth pre-workshop interview). Helping build trust between these groups has become part of their mission:

> My motivation for IPD…I really think that we can help to create that change. And part of it is because of where we are within…this kind of this collaboration. And we're somewhat a neutral party, because we aren't intimately involved in the conflicts. We have developed trust with the school community through providing professional development and working with the teachers, working with the administration…And we've developed trust with our tribal partners, through listening to what they're interested in, what do they

> want? What do they want for their youth?...We're in the community, we come to know the people. So there's a trust that's been built there. So for us to be able to bring these two groups together. I think that works pretty well. (Elizabeth, pre-workshop interview).

While Elizabeth says their role is somewhat neutral, NA's willingness to step in and address the conflict they witnessed seven years ago speaks more to an advocacy role. The allyship they demonstrated with First Nations partners earned them enough trust to play a "neutral" facilitating role. NA received positive feedback in their role as bridge-builder (Baldwin grant report, 2014)—tribal members told them they felt listened to and Elizabeth continued to hear more and more stories of positive relationships between the schools and the tribes (Elizabeth pre-workshop interview).

Liana, one of their key Deer Valley collaborators and tribal partners confirmed how NA's vision is beginning to come true. She sees members of the Deer Valley Nation developing more trust of white members of the community and a slow change to build more solid relationships:

> Well, I think that it's an opportunity for us to change, to impact educators. Not only perspectives, but attitudes, a lot of breaking down and barriers on walls on things that have never been done before. With regard to historical trauma, and education, in general, for my people, has built a real big wall between our communities and school districts and education in general. And I think that this Indigenous Professional Development is a way to start breaking down those walls, Some of the things that are being shared, have never been shared with anybody…real groundbreaking in terms of even talking about little things, like they're talking about, and they're not giving you all of the information, either. They're kind of giving you like surface things…what's important to us is something that

> we hold really close to us that we don't share with other people with non-Native people, which happens naturally when we're all together (Liana, pre-interview).

Liana recognized these moments of sharing between the Deer Valley Nation and participants in IPD program as significant. Her father was taught to "stay away from white people, that they would be the death of you" (Liana interview). Now she sees her people sharing limited stories with white IPD participants and working towards building trust. Liana and the NA staff describe a role for IPD as helping to heal relationships: "so much of the effort of Indigenous Professional Development, and our partners is to have that healing happen" (Elizabeth, pre-workshop interview). Progress is being made, but as Liana implies, overcoming centuries of mistrust is not a fast process. Nonetheless, she sees this program opening up opportunities to take small steps.

The Role of Indigenous Partners in NA's Identity and Programming

Bringing people together to share and learn from one another is a key part of the Urban IPD program. In planning, NA staff consistently expressed their preference for hearing from First Nations partners with direct experience on the topic of interest whenever possible in their workshops. All of them mentioned the value of the knowledge and experience of their First Nations partners and finding opportunities for participants to learn directly from them. This is especially important when trying to find ways to heal relationships between schools and neighboring tribes, as Elizabeth describes:

> getting to know the community you're working with to find out, have them help you determine kind of where the boundaries are. And bring them in as much as possible, because I think hearing directly from the community has much more strength. And I think it imparts more of a sense of appreciation and acknowledgement, and respect for, for the community that you're serving (Elizabeth, follow-up interview).

The NA staff see their role as providing a framework for doing restoration work and building bridges; they rely on First Nations partners to fill in the frame and provide much of the local knowledge and people power necessary to complete projects.

Alutiiq scholar, Leilani Sabzalian (2019) speaks about the importance of schools creating true power-sharing relationships with tribal partners that do not objectify, take advantage of or stereotype Indigenous people. During the planning meets all of the NA staff members spoke about myriad Indigenous people they heard, met or worked with at various conferences, meetings and gatherings. The relationship-building that NA does with the First Nations organizations and communities helped them create a network of people they could call on for sharing their knowledge in their programs. This is something that they are still building for the Urban IPD program. It is noteworthy that Indigenous presenters, like all speakers, are compensated for their time when they speak at an NA event and they do not assume that anyone will voluntarily present to benefit the primarily white participants (Cross, 2005). The IPD programs bring in speakers with whom NA staff members have both professional and often personal relationships. By intentionally planning to bring in multiple Indigenous speakers and asking them to share their knowledge, the programs showcase the unique experiences of each individual and help non-Indigenous participants develop a complex picture of a partnering Nation or what it means to be an Urban Indigenous person (NA staff in planning meetings). They also model for participants the importance of developing personal relationships and learning from Indigenous people firsthand (Chinn, 2012; Tolbert, 2015).

Restoration as a Vehicle for Recognizing Epistemology?

There are many possible ways to help participants learn about Indigenous ways of knowing, and through IPD, NA has leveraged their ecological restoration education program and

a focus on land as a vehicle for building these understandings. Helping white participants create epistemological bridges between themselves and their Indigenous students and communities is challenging. As NA discovered over time, they first need to fill in the knowledge gap on Indigenous histories for white participants. They also need to provide education on fundamental cultural and epistemological differences between participants and Indigenous partners so educators can recognize their own cultural identity. All of this is necessary before they can work effectively with Indigenous youth. The way in which NA presents the two strands of the program in restoration and culture, and how they help participants navigate and make connections between them is a key part of that process.

"[We are] using the land as a kind of that common ground that that's kind of a neutral ground, in some ways, is building those relationships with the land community (Elizabeth, pre-workshop interview)." The idea of land as "neutral ground" deserves consideration, for while it is a physical location where groups can perhaps meet and learn together, the land itself holds a contentious history. The way in which Urban IPD and the NA staff address land sovereignty and diverse epistemological orientations towards the land when they teach the actual steps of restoration in the workshop impacts the learning opportunities offered participants. If NA presents land as neutral, they also imply the epistemological orientation of the restoration education curriculum is neutral because they present it as compatible with their Indigenous partners. If this is the case, how will inequities and power relationships between groups be considered in planning an ecological restoration?

While in other statements, Elizabeth advocates for the need to discuss sovereignty and treaty rights during Urban IPD, speaking of land as "neutral" sits in discordance with that idea. Describing land as neutral reveals her socio-cultural perspective, with land as an object and

restoration as a universal Western approach. That Western approach tends to separate humans from the land in a hierarchical way. As a member of the dominant culture, in this instance, Elizabeth does not perhaps see or acknowledge her Western orientation. Connecting this statement to her previous mention of NA as a "somewhat neutral party" between the Indigenous communities and the public-school districts that serve them, NA may be somewhat neutral because they are not involved in the day-to-day interactions between the two groups, but even in their advocacy role as facilitators, and even with the increasing diversity and representation of Indigenous individuals on their staff, their Indigenous partners likely still recognize their Western lens and connection to Western institutions. She is not always acknowledging her own whiteness and NA's origin as an organization with roots in a Western tradition. Serving as a facilitator to heal relationships between groups puts Elizabeth along with the rest of the NA staff in a place where they must consider the language they use and how they explicitly address dispossession, land "ownership" and sovereignty during a restoration. Especially when NA facilitates an Urban IPD program that is not held on land explicitly and "legally" recognized as Indigenous, they must consider how the program and rest their restoration education curriculum acknowledges these discrepancies and differences in epistemological views towards land.

Has their "Restoration" Mission Changed?

In its current format, the Urban IPD workshop has a restoration focus and an Indigenous focus. Presumably, the other IPD workshops are run in a similar way. Out of habit, NA frequently refer to the steps in their restoration education program and think of it as a fixed process. However, throughout the course of the study, it became evident that they are no longer teaching all ten steps in their IPD summer workshops and have shifted away from strictly

planting "native[16]" vegetation, as in a prairie or rain garden for their restoration projects. They also help put in food gardens, improve wild rice habitat, and protect earthen mounds. The increased emphasis on Indigenous Professional Development and time spent learning about Act 31 puts in question the focal mission of the organization and if or how Western approaches to restoration remain important.

As Director of NA and the person with the longest history with the organization on staff, Elizabeth worries about losing the restoration focus of their group and how the partnership is pushing them to rethink their mission:

> [I'm] not sure exactly how [restoration] fits in anymore. But anyway, I got a chill thinking about it that way. And this is a concern. We don't want to lose what it was originally, who we are. Yeah, we're restoration-based education. And I know restoration is changing, how people look at restoration, and the challenges with impacts of climate change, invasive species and the substantial changes that we're seeing here on our planet. The traditional way of doing ecological restoration really isn't going to work anymore, we can't go back to another time...But I do think that we don't want to lose with our IPD or Latino Nature Alliance or Global [Nature Alliance], that we really are restoration. (Elizabeth pre-workshop interview)

This tension between NA's roots in Western restoration and the tug to provide foundational education about Wisconsin First Nations to non-Indigenous educators was evident throughout my research. When talking to different members of the NA staff, all see both concepts as critical, but each individual weight differently the importance of learning about one compared

[16] This is another semantic quandary presented through a focus on restoration in a Western sense. "Native" plantings are endemic to an area, but the most common term used in this field and in the restoration guide is "native," which causes confusion given their focus on Indigenous Arts and Science.

with the other. Aubree, the only Indigenous NA staff member, for example came to NA from a position where her job focused on helping educators find accurate resources about First Nations peoples to use in their curriculum. Her emphasis for the IPD programs leaned towards helping people recognize Wisconsin's First Nations and finding resources for any subject area that they can put in their curriculum. Sandra, Elizabeth and Naomi emphasized more the role of land, working and interacting with land as the way to build knowledge, and seeing land as the context for connecting with Indigenous culture.

Throughout the study, the NA staff used different terms when talking about restoration, suggesting a possible shift in the organization in terms of what they thought the purpose of the restoration activities were and a possible blending of the "culture" and "restoration" strands. The organizational goal is not "restoring" land back to the 1850's to "pre-European settlement" conditions. They recognized that the idea of taking land "back" to any time period is untenable from a colonizing perspective. As discussed earlier, Elizabeth moved back and forth between language that spoke of restoration in a universal, Western sense and then also spoke of reciprocity with the land, land acknowledgements and land sovereignty. With the influence of their now seven-year partnership with Wisconsin First Nations for IPD, NA now focuses less on the need to "restore" land and more on the idea of land "care." With feet in both Western and Indigenous ways of thinking about the land, the organization is wrestling with the way to present the "restoration" curriculum and was in flux on the appropriateness of using the term at all.

During the focus group I posed this question directly, asking the NA staff and intern, Ruben, to describe the focus of the "restoration" work in the workshops, and also to think about the words they use to name the process. The discussion that developed from those questions

exposed some of the ideas the organization must grapple with as they move forward in their program.

What is the Focus of the Restoration Work?

During the focus group, they described the types of projects that emerged from the IPD program revolving around two different areas: food sovereignty and protection or care of land and water. These projects often reflect the cultural practices of tribal partners and different approaches to land care.

Many of the "restorations" put in through the IPD programs are food gardens, which may involve traditional practices such planting three sisters gardens of corn, squash and beans, and labelling crops in both English and the local Indigenous language. During these projects, educators and students learn how to grow, harvest and cook food, frequently, but not always, connecting the garden with Indigenous cultural practices. Food sovereignty projects done through IPD also include "restoration" projects that protect foraging areas for collecting wild foods from the land or enhance growing conditions for wild rice habitat. Maintaining these traditional food sources by connecting and caring for the land sustains cultural practices (Kimmerer, 2011; Whyte et al., 2016). By involving Indigenous youth in the projects, they provided opportunities to strengthen their connections with Indigenous identities and ways to actualize sovereignty and self-determination (Castagno & Brayboy, 2008). As a whole, these food sovereignty projects interweave the "restoration" and "cultural" strands of the IPD program and demonstrate the potential for them to blend or complement one another.

During the focus group the NA staff also brought up projects involving acts of land and water protection with plantings that clean storm water from excessive runoff, or simple decisions to reduce the use of lawn chemicals to increase plant diversity and enhance bee habitat. These

types of projects improved habitats but did not "restore" them to a specific previously desirable condition. Connecting with the 4 R's, NA staff saw protecting or caring for the water and land as a way to take responsibility and create better relationships both with nature and between groups of people:

> Going back to Robin Kimmerer and why it's important to care for the land and how that engenders civic engagement, and responsibility. And goes on to, you know, not only caring for the plants and animals, but caring for each other through this process, we all grow…That's what we see, in all our Institutes and people who participate and engage…(Sandra, focus group).

The idea of civic engagement, responsibility and taking action to protect land and water often came up in answers to this focus group question and was also present in the planning stages for Urban IPD. The urgency of taking action to protect natural areas, especially in the face of climate change was discussed. "Restoring" land may no longer be possible as the future potential of any parcel of land may not be the same as what it was in the past, that habitat or those species may no longer be able to survive in changing conditions. This movement towards a focus on responsibility for taking care of the land along with the food sovereignty projects suggested some possible epistemological changes in the program approach. Indigenous attitudes toward the land appeared to take more precedence. In many of these examples the NA staff also clearly connected the "restoration" and "cultural" strands of the workshop rather than maintaining the distinct strands presented in their workshop and curriculum.

If Not "Restoration," Then What Term?

If the organization sees their mission and the types of projects they support through the IPD program shifting, does that mean they should change the word they use to describe their restoration education curriculum? They discussed other terms during the focus group.

Many of NA's Indigenous partners find the term "restoration" problematic as it represented lies and broken promises:

> [One particular Indigenous collaborator doesn't] even like us to use the word ecological restoration because with the issue of the mining, people that come in and mine can say, "Oh, well, we could just tear out all the whatever we want the minerals and whatnot, and you can restore the land back." (Elizabeth)

Elizabeth recognized how their tribal partners have seen the sovereignty of their lands violated again and again, and how governments allow companies continue to extract resources from those lands without regard for the long-term health and well-being of the land and the people who live there. Miners tear up the landscape, pollute the waters and retreat without "restoring" the land to its original integrity (Blackstock, 2002).

Interestingly, Ruben, the NA intern, who strongly identifies with his Ponca heritage, but also studies ecology at an epistemologically Western University, still sees value in the term "restoration:"

> it's really important that people start having a paradigm shift in their head about, you know, what it means to take care of an area to protect an area, but also to like, restore an area. Like I think…those things are still distinct. And I don't know, the restoration part of it is, is still a pretty important…especially having grown up in an urban area and having an urban area being my context for most of my life.

Ruben wanted to continue emphasizing how you can transform a landscape and do something such as convert a lawn into a more natural habitat. Because urban areas have lost so many of their wild places, he saw bringing those back, or restoring them as different from just caring for what is already there. Elizabeth too, connected with that idea of bringing back the integrity of the land.

During the focus group the staff members also discussed other terms such as “land care,” “preservation,” “stewardship” and “land and water protection”. They preferred words that prompted civic responsibility and action. A longer discussion of “land and water protection” occurred. In that discussion they brought up how land and water protection can include a range of actions including putting in a rain garden to protect the integrity of the water, as well as how it is forward-looking compared with ‘restoration’ which seems to live in the past. Aubree and Ruben, the two Indigenous participants in the focus group, debated the appropriateness of using “water-protector” more broadly in the program:

> Aubree: Well a lot of people are using water protectors. So, if we're going to use a word that, you know, protect, Yeah, then and water protector and or protection?
>
> Ruben: Do you want a whole bunch of white people running around saying they’re water protectors, Aubree?
>
> Aubree: If they're doing something! Well, it's everybody's responsibility. I mean, [G: yeah], it's not Native peoples’ responsibility to take care of the water, it's everybody's responsibility. [G: definitely] And if you use that word, “I'm a water protector.” That means you better be doing something.
>
> Ruben: It's just, it's hard. Because is the component of what is the definition of the word like the definition? What is the like, What are the relationships of the words to other

> words and how we use it in general language? And then there's also the appropriative aspect of it. Are we appropriating? Like, it's so it's so complicated when it comes to thinking about like, you know, how are people going to use this? How are people going to incorporate into their identity? How are other Native people going to see this how are other white people are going to see this?...

"Water Protectors" were strongly associated with the recent Dakota Access Pipeline protests at Standing Rock and Water-protectors.com and waterprotectorscommunity.org are affinity group organizations of primarily Indigenous people strongly dedicated to organizing themselves for the protection of the Missouri River at the proposed pipeline site. Ruben and Aubree did not agree on whether or not NA would be creating a conflict of cultural appropriation by adopting this term.

Ruben's stance against the term "water protector" and preference for using "restoration" despite strong objections from tribal partners represents the difficulty of choosing a new term, and whose opinions, epistemologies and values matter most when picking the word to represent NA's program mission. "Indigenous Professional Development" as the program title avoids the word altogether, but restoration is still critical to the current workshop goals and NA's curriculum. At the end of the conversation, Naomi advocates for possibly keeping "restoration:"

> I don't hear people struggle with the concept, the same way that when we as facilitators, or people who are involved in this in like, scholarly ways, you, you're thinking more top down. [Participants are] on an ethical journey for how they relate to land and water, and they choose their own terms. And that's not an issue that I typically see in our institutes. And maybe I'm missing something. But I don't see people getting really hung up on the term very much. I think there's sort of like, "Now I understand more about the water and

> the land where I live. And maybe now I have some more tools to take care of it, to restore it to whatever, however they frame it."

Here, Naomi references the academic nature of the exercise of choosing a word. When she speaks with both Indigenous collaborators and participants, she feels they focus more on sentiment and actions, rather than the word choice of restoration, stewardship or anything else.

Language does matter however when defining your epistemological orientation (Medin & Bang, 2014) and by choosing "restoration", the program as a whole maintains its core allegiance to an approach with Western cultural roots. Any future decision by NA to keep language as it has always been and not change it favors the Western restoration tradition and NA's epistemological origins. The staff, for example, could choose a word similar to restoration from one of the First Nations partners to express the same sentiment to name their curriculum, but continues to use the English option. Restoration is accepted as a more "universal" term that can be adapted to multiple situations: on reservations or off, urban or rural, for Indigenous or global partners. The NA staff are not pushing for a systemic shift in thinking in their program where Indigenous language or epistemologies hold the central position.

How Would a Revised Curriculum Look?

In her pre-workshop interview, Naomi raised the idea, which she learned of from Robin Wall Kimmerer, of "indigenizing" the NA curriculum and workshop pedagogy, and this idea occasionally came up during planning meetings. She described this as a way to provide both Indigenous and Western perspectives, which would especially benefit Indigenous youth who must navigate these different points of view while studying in Western educational institutions (Naomi, post-workshop interview). While it was not a central goal for the organization, I did ask

about it in the final individual interview with each staff member because it could present a way of joining the cultural and restoration strands presented in the IPD workshops.

Aubree dismissed the possibility: “Well, I think that's quite a process. Because you, it is years and years and years and years of learning. I think it's a fancy term.” To her, “indigenizing” the curriculum involved the process of thinking like an Indigenous person and would require completely rewriting the curriculum from an Indigenous perspective, which was not a realistic option. Most of the NA staff is not Indigenous and even she, as someone who identifies as Indigenous, felt unqualified to write from that point of view.

Elizabeth gave the question more consideration. She mentioned that one reason NA has not significantly changed their restoration education curriculum even after seven years of the IPD program, was somewhat pragmatic: limited time and resources for revision. However, she was also unclear exactly how a new single IPD curriculum guide would look if they wish to respect the diverse perspectives of their multiple First Nations partners. Elizabeth discussed next steps in this regard:

> Well, we certainly, I mean, you can't call it Indigenous curriculum right now…But I think if we're thinking about… So, how do we take the curriculum that we have now and make it so that it's useful for them?…but it's also going to have to be adapted for particular regions or [Indigenous] communities somehow… (Elizabeth post-workshop interview).

She considered the difficulty of creating a different guide for each First Nation community and the challenge of finding a recognized representative from that community who could help write that guide:

> Whatever the topics are, and then having an Elder or respect, respected voice in the community to do the kind of a preamble for each, and maybe a wrap up for each (Elizabeth post-workshop interview).

She described this version of the curriculum as maintaining the NA core activities, but with introductions and summaries written by an Indigenous partner. In this way both Western and Indigenous perspectives would be present in the guide. The separation of the two tracks as presented during the workshops would be maintained.

The possible multilogicality (Kincheloe & Steinberg, 2008) of the future guide, where Indigenous and Western perspectives are both present, and the current philosophy of presenting two tracks in the workshop remain important to NA's identity. NA staff do not claim to speak for their Indigenous partners and are cautious not to essentialize the First Nations groups and peoples with whom they work by writing a guide or presenting at a workshop on the behalf of their partners. A written guide would be particularly difficult for Urban IPD with the need to include hundreds of perspectives. Elizabeth also mentioned that IPD continues to believe that educators and students learn the most from face-to-face interactions and direct experiences, so the guide itself is not critical in providing Indigenous perspectives.

Summary

IPD originated with two conflicts: a conflict between neighboring Indigenous and white communities over the best education for Indigenous children, and a conflict about NA's Western approach to studying land. Both of these tensions originated with the systemic racism of white people towards Indigenous Peoples connected to sociocultural and historical tensions and epistemological differences about relationships to land. In recognition of these conflicts and their inability to solve them alone, NA collaborated with First Nations partners and created the Indigenous Professional Development program. NA used their focus on land restoration to bring

disputing groups together to focus on learning about Wisconsin First Nations' history, culture and sovereignty and to begin healing relationships between them. Over the long term the program founders expressed a desire to improve public school experiences for Indigenous youth and in particular increase participation in science fields.

Holding a PD workshop on a reservation makes it more straightforward to discuss culture, history and sovereignty compared with an urban location, as participants can focus on learning about one Indigenous partner. Sovereignty in particular, becomes more tangible when participants interact directly with the territory in question and Oral Histories can be relayed related to that land of how U.S. policies severely harmed the Indigenous Peoples connected to that location. In an urban area where particular First Nations were officially removed, but Indigenous Peoples of many backgrounds are now present, it is more complex for NA to teach about these same topics. The diversity of the Urban Indigenous experience and the variety of cultural backgrounds and land affiliations associated with them make it more difficult to find a focused story to portray.

In its first year, the NA staff purposefully grappled with many challenges of creating and running the new Urban IPD workshop. Tasked with more goals than the other IPD workshops and no clear First Nation as a collaborator, they found it challenging to decide which Indigenous stories to tell and who should represent them. They attempted to present a broad picture of Urban Indigenous Peoples but lacked time to dive into deep discussions on sovereignty.

Learning the history of IPD and Urban IPD through interviews and observing the planning and running of the workshops helped me describe NA's identity as an organization and the issues they are currently grappling with that may change their mission and vision moving forward. In my analysis it emerged that NA generally presents "culture" and "restoration" as

separate and distinct. They do not explicitly identify the Western epistemological foundations of their curriculum program for their participants and consider it complementary to Indigenous "cultures" and their varied epistemological connections to land. I problematized NA's tendency to present the restoration education curriculum as culturally neutral and raised some questions about how to help participants integrate the two tracks of the program as is mentioned in their program description and as was originally envisioned in the founding of the IPD program.

NA's identity is in flux. Under the influence of the epistemological practices of Indigenous partners for seven years, NA staff made huge strides in changing the workshop and helping non-Indigenous participants understand culture, history and sovereignty of Wisconsin First Nations. But transformation is a long-term process. The NA staff demonstrated a multilogical understanding of some of the epistemological differences between their curriculum and their Indigenous partners' approaches to land care (Kincheloe & Steinberg, 2008), and expressed a desire these different perspectives to be present in their Urban IPD program. However, in many ways the socioculturally Western restoration roots of the organization remain firmly entrenched, normative and "invisible" in terms of acknowledging their cultural origins. The staff is in the process of determining the role of the restoration approach in relationship to the Indigenous track of the program.

If one of the workshop goals is to help educators "build on Indigenous knowledge, interests, practices, identities and worldviews" participants need guidance to recognize the epistemological differences between the Indigenous and Western approach to land care and restoration, and to analyze examples where the ideas intermingle (Brown, 2017; Howard & Rodriguez-Minkoff, 2017; Lee et al., 2007, Parsons & Thompson Dorsey, 2015). Maintaining a focus on sovereignty or the impact of U.S. Federal Indian policies is important to addressing

settler colonialism and examining the ongoing systemic reasons behind the invisibility that impacts Urban Indigenous Youth (Castagno & Brayboy, 2008; Peters & Lobo, 2001; Sabzalian, 2019). Losing those topics would put the workshop at risk of maintaining a surface-level multicultural approach to teaching about Indigenous people (Castagno & Brayboy, 2008; Sabzalian, 2019).

In the first year of the Urban IPD program, some opportunities arose to make those connections, but NA did not completely capitalize on those moments. In the next chapter, I will zoom in on one of these moments in particular, where the differences between Western and Indigenous epistemologies rose to the forefront. Deconstructing this incident revealed additional challenges confronting NA in helping white participants in particular, unpack systemic racism and find ways to talk about the relationship between Western and Indigenous approaches to science and research.

Chapter Four: Unexpected Conflict Exposes Epistemological Dissonance

Introduction

Having an indigenous focus in a science-related PD exposes fault lines about who should hold certain forms of knowledge and how they can speak about them. Epistemological differences amongst presenters and participants may create distinctions in how people approach and think about knowledge, and differences in positionality can create tensions in how people speak about that knowledge and react to the ways in which that knowledge is represented. Anticipating and recognizing the nuanced responses to representations of knowledge about Indigenous Peoples, especially those presented by non-Indigenous Western researchers is important when planning professional development programs with intercultural interactions. Anticipating these varied responses and their potential impact on what participants may learn from those representations can help professional developers plan ways to facilitate uncomfortable conversations that may arise from epistemological dissonance and to help address the long-term effects of colonization and the ways people often stereotype and discriminate against Indigenous Peoples.

An incident that occurred during the first day of the Urban IPD workshop unexpectedly brought up many of these tensions for the NA staff and workshop participants. Issues of power, the role and nature of WS, race, and epistemology all emerged as a result of one presentation and the complex, multi-faceted reaction to it lingered throughout the entire workshop.

In this chapter I will deconstruct this episode and discuss its implications for how non-Indigenous scientists and educators approach working with and speaking about knowledge about Indigenous Peoples, asking:

- *What tensions need to be navigated to support educator learning in a science-related PD with an explicitly Indigenous cultural focus?*
- *How do these tensions affect participant learning?*
- *What lessons emerge for PD organizers about what their roles should be to help participants navigate those tensions?*

Because this incident offers a useful example of how WS and the knowledge of Indigenous Peoples can be in tension with one another, as well as the nuanced ways in which Western scientists can reinforce those tensions through the way they represent what they know and understand about their work, I will begin this chapter by providing a brief overview and then more detailed description of what occurred during the incident the first day of the workshop including significant quotations from the key individuals involved.

What happened?

A Brief Overview

NA staff invited Darian, a white[17] archaeologist, to speak to participants at the Urban IPD workshop about earthen mounds on the first afternoon of the institute. The area near where the Urban IPD Institute was held has a large concentration of earthen mounds, which the Deer Valley claim as being built by their ancestors and archaeologists label as being constructed about 2500 years ago (Loew et al., 2013). The NA staff felt that a presentation on the restoration and protection of earthen mounds would be a relevant way to connect their curricular focus on ecological restoration to the local Indigenous landscape (NA staff planning meetings). Darian has over 30 years of experience working on earthen mound restoration and protection and

[17] To the reader, a reminder that I described my philosophy for naming the self-described race, ethnicity or tribal identity of participants at the beginning in Notes on Terminology and Indigenous Voice and that I have heavily relied on the work of Indigenous scholars in my analysis.

frequently collaborates with the Deer Valley Nation in this regard. He presented for about 75 minutes about the creation of the earthen mounds, the historical destruction of many mounds and subsequent fight to protect those that remain in the state, and also went outside with participants to discuss the way a particular earthen mound had been protected at the workshop location.

After Darian left, Ruben, a Ponca NA intern/instructor for Urban IPD, got up and "debriefed" the participants about how they just heard a "white male historical perspective" [quotes indicate Ruben's words at the time] on the mounds. Ruben has been involved with NA since he was in his early teens, first in their youth IPD program and then as a summer instructor for the youth and educator programs; but he was not involved in Urban IPD planning meetings. In his debrief, Ruben pointed out many of the things Darian had said that he found problematic in terms of speaking about and to Indigenous Peoples. The rest of the NA staff did not know Ruben was going to get up and speak to the group, and they did not all share Ruben's reaction to Darian's presentation. The participants also responded in a variety of ways to this sequence of events, including some who became afraid to ask questions during the remaining workshop and some who came to question the validity of any of Darian's information.

Darian's Presentation

Darian began his presentation talking about the Mounds Protection legislation and how Tribal Historic Preservation Officers and people like himself had recently fought to keep that act in place to protect these burial sites against special interests like miners and particular government officials who no longer wanted to protect them. He positioned himself right away as an ally to the Deer Valley people.

He then launched into a detailed historical account of how Euro-American settlers interacted with the mounds, destroying the majority of them as they 'developed' the land or

intentionally dug into them looking for treasure. He credited Increase Lapham, who raised money to survey and create maps of the remaining mounds back in the 1830s with starting the reversal of that trend:

> *Darian: And he makes an early plea, telling people…that are flooding into [the State] at that time, that we need to work with the Native Americans to try to preserve these sites… So, people started…to preserve them.*

He went on to explain how Increase Lapham and other Euro-Americans collected information about the mounds and described the types of evidence both from Oral Histories and archaeological excavations he had to work with as a result today:

> *Darian: So, in the 1850s, when Native Americans at that time, especially the Deer Valley, were asked about what they knew about the mounds, they didn't really know a lot about the mounds because they have lost that oral tradition. … [the] first ethnographic account that we have on Native Americans talking about what they knew about…was a [Deer Valley]*[18] *Chief that had a principal village, right on the Rock River there, his name was White Breast. And he was asked what he knew about the mounds and White Breast told the Euro-American settlers in that area when he was young, he was told by the Elders, that the people that built the mounds long ago, actually brought the earth with them on their back from their winter encampments…and people would add soil to the mounds to construct the mounds. Now, there is some truth to that. And we know that because of not only talking to Native Americans, but also from archaeological excavations of mounds...*

[18] Some language has been changed here to protect Tribal identities. In his description, Darian did not use the current name of the Deer Valley Nation, but rather an older one the Nation discarded. He also used the term Chief, which is incorrect in speaking about this particular Nation.

Darian continued in his historical account crediting Charles Brown, "*the father of the State Historical Society*," as being "*solely responsible for the preservation of over 25 million [mound] sites*." He also credited Women's clubs with working on mound restoration and protection in the early 1900's. He ended his historical accounting with recommendations for further readings by Bob Birmingham, a fellow archaeologist, who he felt had published "*a synopsis of what we think we know about mound sites*."

At the end of his indoor lecture, he took a few questions from the participants. He struggled with the best way to answer one particular question that he interpreted as one that revolved around mound ideology and Indigenous spiritual beliefs:

> *Bridget: When you were talking about bringing the soil from the winter [encampments], and why were they doing [that]?*
>
> *Darian: Okay, so she's asking me more about specifics about about like, why they were bringing soil to build a mound? And you know that that's kind of a loaded question, like I can, I can literally talk for a whole day about ideology about why they built mounds and, and what the meaning is, and why they did certain things from our archaeological standpoint. And a lot of this comes from just, you know, talking [about] the ethnographic record, and…what we know from the record, and actually talking to the Elders, and what they're willing to share. And you have to understand, and a lot of…the Native Americans that are here today, also know that the tribes are not sharing all of their…intimate details of their spiritual practices with us, and they don't need to, we don't need to, we don't need to have that…So, I mean, I can answer that question from what I've learned, and from what I've heard, but is it right? I don't know…I don't want to personally step on anybody's toes about what they believe about mounds and burials and things like that…*

After questions, the group proceeded outside to look at an earthen mound on the grounds of the college where the workshop took place. Darian used the opportunity to discuss what one can and cannot do on a mound site under the Burial Grounds Protection Law and discussed his experience helping different people protect mounds on their property:

> *Darian: And that's one thing that I really encourage is Native American involvement. I don't do anything on a mound site unless I get [a] blessing from the Native American community.*

He also addressed the historical racism of Euro-Americans who encountered the mounds:

> *Darian: there was a lot of overt racism towards Native Americans, especially in the 1870s and 90s…there was a lot of anti-Native American sentiment in the United States and people flat refused to believe that the Native Americans were the authorship of the mounds… They didn't want to believe that the Native Americans could have such a high degree of culture and understanding of celestial events, and spirituality that they could actually build the mounds and do something. These mounds are no less significant than Stonehenge.*

Ruben asked Darian to speak more about the orientation of the mound in relationship to local springs. Darian responded that he had not discussed orientation because "*we didn't really get into the talking about ideology*," referring to his response to Bridget; but then launched into a long, detailed explanation of what he knew about ideology of the mounds and what evidence he used to build the explanation:

> *Darian:…earthen mound sites are almost always built on top of major springs. And that has, of course, spiritual significance to the Native American people that built them. And oftentimes, if you, if you read the ethnographic accounts that will tell you that springs are*

often looked upon as doorways to the underworld, where spirits of animals and humans can go between the upper and lower world…There's a major, major research project that's going on right now…And what we did was, we took the last hundred and 60-70 years of mound site, exploration and desecration. And we went back and we looked at every single thing that was ever written about mounds, every single excavation report, every single book, every single, anything that anybody ever wrote about mounds, every single Native American ethnography, anything that Native Americans said about it…And what we're finding is there was a common ah, this is our opinion, okay, this is this is our opinion as as, as researchers…Every mound that you see in a mound site was put in a very particular spot for a very particular reason…there was a very common theme that we started to see in Native American beliefs. And this was the concept of the path of souls…The path of souls is literally the Milky Way…What that means, basically, what we figured out, and this is just a theory, you can disagree with that if you don't like it, but we think we're right. And the problem with this is that we're trying to reconstruct an ancient belief system from the ground up with very little ethnographic information, right, because it's been lost for the most part…what we found was, is that less than 1% of all earthen mounds, virtually none of them face north…[continues a longer explanation and eventually gestures to Aubree] So she's a mound builder. She is descended from mound builders. [gestures at Ruben] Are you Native American? You're all descended from mound builders. And some people like to say, "Well, you know, it was just Algonquins that built mounds", No. Every Native American that is alive today had some type of lineage in the past, where their ancestors at one time or another, were involved in mound building…

Ruben's presentation

Darian's talk ended, he departed, and the participants returned to the classroom. Ruben then got up and "*debriefed*" the participants. He began his debrief stating that they just heard a "*white male historical perspective*" [quotes indicate Ruben's words at the time] on the mounds. He spoke for about five minutes about problems he saw in the presentation, beginning with the last few sentences from Darian quoted above:

> *Ruben: When you are communicating to American Indian students about kind of what their heritage is or trying to make them be proud of their cultural heritage, something you probably don't want to do is tell them what they are. So when he told me, "you're descendants of mound builders" and he's like, "You are [racially?] capable" of that it's, you know, it was, I could see where he was coming from, he was certainly coming from a place of wanting to sound, you know, pretty enlightened about what the capabilities of American Indians are. However, we are all American Indians in and of ourselves are aware of what we are capable of.*

Ruben also disagreed with Darian's decision to discuss spiritual and ideological beliefs related to the mounds, placing doubt in the participants' minds about what Darian said and suggesting other information that would be more appropriate for them to teach about:

> *Ruben: That was just his perspective, perhaps…representative of books that he gave to you guys?...But I do know that only American Indians and like, specific tribes are going to be able to describe to you certain things. It is not, you know, the privilege of a white person to tell you what exactly our cultural beliefs are.*
>
> *So, yeah, it's kinda, it's difficult, you know, kind of, for me to talk about this. And, you know…there's a difference between the intent and impact, you know, it's something that*

we all learn about if you ever go through cultural sensitivity training. But you have to remember kind of just, you have to be very delicate when talking about things...what I think it would be appropriate for you guys to teach about is that the mounds, you know, have spiritual significance, absolutely. And does my tribe, do the Deer Valley, do the Choctaw have stories about the mounds? Yes, they do. But…what you can, you know, reliably speak about is the fact that the mounds are built with a very practical importance. And that they point, he was right, they do point to certain astrological things. But the mound, and what I was trying to get out there was like, it points and most of the mounds…point to specific natural landmarks. And, you know, there's varying layers of significance to that, but it was pointing toward a spring, which would have been very important [geographically]…So I mean, that's definitely something you can teach kids without, including things like, the path of spirits…

Ruben also discussed who he believes has the best knowledge about the mounds and the problems he saw with Darian's conjecturing:

Ruben: My tribe is not from this area. So, I cannot speak to specifically, what, you know, what happened around the mounds…He went…immediately to the spiritual, from where the mounds were. So, he immediately started conjecturing about the spiritual importance of the mounds to American Indians. And while they are extremely spiritually significant,…you know, you shouldn't…kind of conjecture about what American Indian spirituality…Something…he said that was particularly like, red flag, he was that…he said, we're basically building cosmology, and…like spiritual…perspective from the ground up. Now, remember, what me and Aubree kind of were saying, we were talking about American Indian history is that there's a narrative of erasure, and no longer

existing, right?...Fortunately,…that is not true. We do have a lot of our spiritual beliefs still intact…For most of us, we will say, go back to the beginning of time or the beginning of creation…You know, he said a lot of its lost, and certainly [there] has been cultural loss but not to the extent you know, where our perspective also is [gone].

Ruben then opened up to questions. Bridget, a white educator who coordinates the curriculum at her nature center about earthen mounds expressed that she was seeking clarity on what she could teach:

Bridget: What I hope through these three days that I, I can learn how to best respect and talk about what you just said is, as a white woman, do not want to speak about…the connection that I know of? The story that Native people to the land, I just want to make sure that I'm doing things in a respectful manner…I don't believe that we have been disrespectful. But maybe I need to learn some things more that Native peoples would prefer we talked about history.

Ruben: Yeah, so if you recall what Liana was kind of talking…about with a Native perspective of teaching and learning is that I don't think there'd be a single like American Indian Elder, like bona fide by the tribe, as someone who was supposed to go talk to people that would claim that they are the overall authority on anything. Culturally, you know, I can only speak from my perspective as a Ponca person. Each, like American Indian person is only able to speak from their individual experience, that, you know, some of us have more of a connection to certain communities than others, you know, that factors into legitimacy. But, you know…I did, I mentioned white male privilege, doesn't mean you have to devolve to…constantly thinking about your yourselves. If you are a white person, your white guilt, you can just talk about the stuff that you particularly

know, and as long as you don't claim to be the overall authority. Something he was like he was claiming to be the overall authority on everything that had to do with the mounds. You know, that's something you don't want to do. But I mean, other than that, you just speak about what you know, respectfully, and remember to remember to mention that there are people who were there for thousands of years. That is still their land. You know, that's very important piece of just speaking about it.

Ruben's debrief and question and answer session lasted just under 15 minutes.

General Response

Significantly, not all of the NA staff knew Ruben was going to get up and speak and what he would say to the group, and they did not all share Ruben's reaction to Darian's presentation. The Indigenous participants and collaborators in attendance offered different interpretations when asked: some were offended by Darian's presentation and others brushed off some of his questionable comments and very much appreciated hearing what he had to share. I learned from a white participant later that afternoon, that Darian's presentation followed by Ruben's debrief made her very nervous about presenting the next day (she was a participant/presenter)--she worried she might say the wrong thing and disrespect Indigenous participants. I later learned that other white participants felt the same way and felt nervous and reluctant to ask questions during the workshop, for fear that their inquiries might come across as disrespectful. This discomfort carried over to the end of the workshop, and on Day 3, when participants were given the opportunity to sign up to receive more information from Darian and another speaker who had offered to send more resources, Bridget raised her hand and questioned the accuracy of Darian's information, requesting another possible source of information on the mounds she could use instead. Only three participants signed up for information from Darian

(compared with 11 for another speaker): two identified as Indigenous, and one identified as white, but worked at an exclusively Indigenous school and had attended the Urban IPD workshop with an Indigenous colleague who wanted Darian's information.

Research Approach

To learn more about reactions to this incident, I interviewed both Darian and Ruben, as well as the NA staff, five workshop participants and two additional workshop presenters. Within those interviews I directly asked them to speak about their reaction to the episode if they were present for them, as well as asking my previously designed questions about how they understood the relationship between WS and IK. The NA staff and Ruben also discussed the "Darian incident" as part of the focus group following the Urban IPD workshop. As I analyze this incident in this chapter, I will refer to information learned from these discussions as well as general statements made during the Urban IPD workshop.

In my analysis, I am centering the perspectives of the Indigenous people who participated in my research to highlight the lessons that can be learned for those of us who do not identify as Indigenous as I endeavor to unpack the epistemological and racial tensions that emerged through this incident. I used grounded theory to find patterns within the responses and connected them to existing literature related to the dissonance between Western and Indigenous epistemologies and the way whiteness contributes to learning about systemic racism.

When writing my analysis of this episode, I refer to "People of Color" (POC) as anyone who does not identify as white, and "non-Indigenous" as white individuals or POC who do not identify as Indigenous. While this chapter creates a dichotomy between Western researchers and Indigenous Peoples, I am aware that many people who identify as Indigenous engage in epistemologically Western forms of research. My use of "Western researcher" generalizes the hegemonic tendencies of the field as a whole.

In the analysis below, I will first consider the tensions and epistemic differences between Western researchers and many Indigenous Peoples that were revealed during the episode that caused conflict, discomfort and disagreement amongst those present at the workshop. Next, I will unpack the nuanced participant reactions to that presentation which revealed differences that were often connected to racial identity, with special attention to those exhibiting symptoms of White Fragility. Finally, I will discuss concerns raised amongst the staff who planned and ran the PD with the forward-looking intention of considering ways to better plan for and navigate tensions that may arise in future workshops.

Tensions with Western Research for Indigenous Attendees Revealed

Epistemological Humility and Non-Universality of Knowledge

While those who identified as Indigenous at the Urban IPD workshop may have had nuanced disagreements as to the overall value of Darian's presentation, they did agree on the problematic nature of a few things that happened during his talk. One obviously inappropriate action late in his presentation was to call out and identify Indigenous people in the workshop using stereotypical physical features. Some, like Ruben, also objected to him telling the Indigenous people present about their ancestral heritage and relationship to the mound building culture. Indigenous attendees also agreed that Darian spoke too aggressively and with too much authority about the mounds. In particular, they criticized him for not seeking out the members of the Deer Valley Nation in the room and recognizing their knowledge on the mounds as descendants of the mound builders. During a full group conversation about Darian on the last day of the workshop, Barbara, a participant who identified as Mohican-Stockbridge/Oneida said:

> [Darian should] apologize to our Elders for speaking, you know, like that? I don't know. And I almost thought like, I probably as him would have started with, "I want to apologize to the Native people." You know, what I mean? "I think I know these things.

> And I'm going to share what I know" ...But I thought maybe if he started with the apology, you know, with humility (Barbara, Day 3 of Urban IPD).

Humility and not presuming to speak on behalf of others emerged as an important theme from a number of Indigenous speakers at the workshop. This epistemic view of knowledge seemed to apply across individuals representing multiple First Nations attending the workshop; it also stood out for many of the white participants, who brought it up in their interviews and writing after the Urban IPD workshop. Western scientists and many white people in general tend to speak in universal terms and generalize their knowledge to apply to all situations (B. F. Lewis et al., 2001). In fact, uncovering knowledge that can be universally applied by anyone to any related phenomenon is desirable and can even be considered a normative goal in WS (Merton, 1973). In Ruben's debrief, he referenced Liana, the Deer Valley Education contact, who pointed out this difference when helping Urban IPD participants understand Indigenous approaches to teaching and learning on Day 1: one should speak from one's own experience, and if asked to speak on behalf of others when you feel it is not your position to do so, make apologies and show humility about the extent of your knowledge. Liana did not use the word "expert" or put weight on credentials like Western people do (although she also mentioned that she holds multiple degrees because of the utility for holding a job in Western society) and discussed how for the Deer Valley, it is unacceptable to presume that your own knowledge is better and more complete than someone else's. Knowledge can be shared but it is understood that it may not apply to everyone and each person must interpret the information for themselves.

Darian inconsistently demonstrated humility; there were many occasions when he did appear to qualify the sources and limits to his knowledge. For example, when answering Bridget's question he said "the tribes are not sharing all of their…intimate details of their

spiritual practices with us, and they don't need to, we don't need to, we don't need to have that…So, I mean, I can answer that question from what I've learned, and from what I've heard, but is it right? I don't know…I don't want to personally step on anybody's toes..." In this instance, Darian attempted to avoid answering Bridget's question about ideology, recognizing it was not his place to speak about spiritual practices and that his experience did not allow him the authority to speak on that subject. Aubree, who identifies as Indigenous[19], "thought he gave plenty of disclaimers" (NA focus group). However, later on when the group was outside and Ruben asked about the orientation of the mounds, Darian abandoned that epistemologically humble approach and defaulted to his Western researcher stance, describing in great detail whatever information he knew about the orientation of the mounds and the connection to spiritual practices. On the one hand, Darian knew the limits to his knowledge and authority to speak on behalf of Indigenous people, but on the other, his Western training and enthusiasm for his subject matter overruled many of his actions.

The end result for Ruben and a few others, was an interpretation of Darian's privileging of his own authority as a Western researcher to universally share his knowledge. By speaking about the mounds without showing what many Indigenous attendees considered proper humility and deference to the Deer Valley people as the "source of authority and power in the room" (Ruben, follow-up interview) Darian's presentation was epistemologically dissonant and interpreted as disrespectful by some, but not all, Indigenous workshop attendees.

History of Harm: Life-long Work of Becoming an Ally

The authority and power with which Darian spoke surfaced epistemological differences in terms of the way Indigenous and Western people speak of knowledge with humility or

[19] A reminder to the reader that Aubree requested I not identify her tribal affiliation

universal terms. The increased sensitivity with which some individuals reacted to Darian's lack of humility connects with the next theme that arose--the long-standing nature of the tension and distrust between Indigenous Peoples and Western researchers.

> From the vantage point of the colonized…the term 'research' is inextricably linked to European imperialism and colonialism. The word itself, 'research', is probably one of the dirtiest words in the indigenous [sic] world's vocabulary. When mentioned in many indigenous contexts, it stirs up silence, it conjures up bad memories, it raises a smile that is knowing and distrustful…The ways in which scientific research is implicated in the worst excesses of colonialism remains a powerful remembered history for many of the world's colonized peoples. It is a history that still offends the deepest sense of our humanity (Tuhiwai Smith, 2012, p. 30).

This powerful quote by Ngati Awa and Ngati Porou scholar Tuhiwai Smith reminds us of the ways science has been used to justify genocidal and assimilationist policies towards Indigenous people and has often exploited IK for the benefit of white researchers (Austin, 2011; Cajete, 2000; Hinkson, 2012; Kimmerer, 2002; Tallbear, 2013; Treuer, 2019; Turnbull, 1997; Wolfe, 2011). Scientists and researchers working with Indigenous Peoples today must contend with this inflammatory history and consider what it means to do their work respectfully given the deep distrust and unwillingness of many Indigenous Peoples to collaborate or share knowledge with researchers (Claw, Anderson, Begay, Fox, & Nanibaa'A, 2018; Tallbear, 2013; Turnbull, 1997). Well-intentioned white researchers who consider themselves allies of Indigenous Peoples, can offend, and learning not only how to conduct research, but also convey the knowledge gained from that work to others, is a complex, tricky endeavor.

In many ways Darian acted as an ally to Indigenous Peoples by supporting their rights, dispelling myths and distributing accurate information about earthen mounds, and working for mound protection. As discussed previously, although many of Darian's actions and words show support of Indigenous Peoples and understanding of epistemological differences, he naturally defaulted to Western perspectives and approaches in his descriptions of his work.

In his interview, Darian referred to multiple conversations with Indigenous individuals who challenged his representations of the mounds and taught him more appropriate ways to do his work. He spoke of his own learning journey over the decades of his work in archaeology. Despite these changes, Ruben's interpretation of Darian's presentation demonstrates the challenges Western researchers face if they wish to develop trusting relationships with all Indigenous Peoples.

In Darian's talk he mentioned not having access to all information of Indigenous people; he spoke of it as a cultural choice on their part to withhold that information from researchers. Ruben, however, emphasized the importance of historical distrust in that choice:

> when there are large outbreaks of disease that kill 90% of your population, knowledge is lost, for sure. But also, there are going to be people who retain that knowledge and not every single one of them is going to want to talk to some white guy walking around asking questions in the 1850's about their sacred religious sites. There needed to be room for that in the, in the dialogue (Ruben, follow-up interview).

Ruben felt that Darian still did not sufficiently recognize or speak to these issues of trust and respect. Similar to the Tuhiwai Smith quote that introduced this section, Ruben again brought up the point that Deer Valley people distrusted white researchers and were unwilling to share information with anyone associated with genocide, removal from their land and mound

destruction. In his interview, Ruben again explained to me that not only did knowledge about the mounds exist in the 1850's, but it still exists within Oral Histories today. Darian should be more careful in his representations and speak to how his lack of knowledge stems not just from historical, but also modern-day distrust of archaeologists.

Not all Indigenous attendees interpreted Darian's authoritativeness to the same degree or disputed the epistemological differences in the same manner as Ruben. Unlike Ruben, NA staff member Aubree (Indigenous[20]), felt that Darian's citing of his sources, disclaimers such as "this is this is our opinion …as researchers," and admissions of not having access to all information from the Deer Valley were enough for him to provide theories about mound construction (Aubree, personal communication). Ruben disagreed, however, and interpreted the excessive weight Darian gave to his Western deductive descriptions of the mounds compared with the existing knowledge amongst the First Nations peoples as dismissive of the value of that knowledge. He focused on Darian's white privilege and the hierarchical way he approached his work.

Ranking Sources of Evidence

For an epistemologically Western researcher like Darian, the challenge of archaeology is collecting evidence to reconstruct "the truth" about the past, answering questions of how and why structures, like the earthen mounds, were built. Multiple sources of information are available to mounds researchers, some from past excavations of the mounds, and some from century-old ethnographic accounts provided to Euro-American investigators trying to learn about the mounds from local Indigenous people (Darian, Urban IPD presentation) as well as Oral-Histories within Indigenous communities (Ruben, follow-up interview). WS looks to multiple

[20] A reminder to the reader that Aubree asked that I not reveal her tribal affiliation.

sources of evidence that confirm or dispute one another to build arguments and explanations of phenomena.

Darian described himself as a “mounds expert” in his interview as someone who dedicated his life to learning what he can about the mounds, which as mentioned earlier, signaled to Ruben that he was positioning himself as epistemologically distinct from Indigenous People in attendance at the Urban IPD workshop, who would not use that term. In his presentation, Darian explained his work as “trying to reconstruct an ancient belief system from the ground up” through a process of collecting and analyzing evidence--meticulously reviewing decades worth of excavation reports and ethnographic accounts about the mounds. Ruben, in his debrief and follow-up interview, particularly objected to the voicing of this Western perspective, which ignored the knowledge that exists today within the Deer Valley and other Indigenous communities. By Darian stating that he is “reconstructing” information about the mounds from “the ground up” he contradicted his own understanding that there are people alive today who know why the mounds are there and how they are built but “some of those things are kept, you know, secret within tribes” (Darian, interview). Darian positioned his own Western expertise above holders of IK.

During his interview, Ruben also pointed out Darian’s depiction of only white individuals, such as Lapham and Brown, as being responsible for protecting the mounds, as if the Indigenous People in the area were not trying to protect them from the colonizers who had invaded the land. Although Darian did credit Lapham as saying “we need to work with the Native Americans to try to preserve these sites,” Ruben still interpreted Darian’s overall historical account as one that left out the efforts of Indigenous residents and focused solely on the heroic work of a few white individuals. “I know Native people were protecting those mounds

up until right when they just absolutely could not" (Ruben, follow-up interview). Darian omitted a key part of the story that credited the local Indigenous People, conveying the greater value of the work done by Western groups.

Not only did Ruben perceive Darian's archaeological representation as highlighting the historical work of white individuals, but he also pointed out his inclination to value Western research methods for data collection and analysis as superior to descriptions obtained from Indigenous Peoples. For example, Darian described information recounted from [Deer Valley] Chief[21], but qualified it saying "Now, there is some truth to that. And we know that because of not only talking to Native Americans, but also from archaeological excavations of mounds, which did occur." Although he acknowledged multiple sources of information, including Western and Indigenous sources, his phrasing in these two sentences indicated a hierarchical way of ranking information obtained from an archaeological excavation above the account of a Deer Valley Chief. It discounts the Indigenous Oral History unless it can be confirmed through Western investigative methods. Deloria Jr. and Wildcat (2001) and Wynne (2012) discussed how scientists often devalue Indigenous and local knowledge when conducting investigations, believing that the information revealed through the controlled, systematic, documented methods of WS outrank what is perceived as the more haphazardly produced experiential knowledge of local people. This approach decreases local people's trust in the researchers themselves and inhibits the ability to build productive relationships between the two groups--which is a detriment to everyone's ability to solve the problem (Wynne, 2012). Darian did do better than many Western scientists in at least acknowledging what was learned from the local Deer Valley

[21] Some language has been changed here to protect Tribal identities. In his description, Darian did not use the current name of the Deer Valley Nation, but rather an older one the Nation discarded. He also used the term Chief, which is incorrect in speaking about this particular Nation.

leader, but he risked exacerbating shaky trust relationships between himself and Indigenous collaborators or those he tried to educate about what he knows when he spoke in a hierarchical way about different sources of information and qualified the reliability of Indigenous sources of evidence without validation through Western methods.

This ranking also exposes epistemological differences in how "truth" is determined (Kincheloe & Steinberg, 2008). According to Liana's presentation at Urban IPD, among the Deer Valley, each person speaks to their own experience: Oral Histories are a strong source of evidence and are believable accounts of what actually occurred. Many Indigenous people see all accounts as cultural and do not seek out the objectivity and one universal truth of WS (Brayboy & Castagno, 2008). Medin and Bang (2014) additionally argue that even "scientific practices embody values and perspectives, and these values and perspectives may vary across factors like gender, social class, and culture." But many Western scientists discount Oral Histories as merely subjective and do not give them the same weight as what can be collected through measurements and chemical analysis, and then faithfully written down and recorded. WS finds memory a faulty way to transmit information and privileges conclusions reached through what it considers more robust empirical means.

Building Trust and Sharing Knowledge

Darian's presentation on the mounds brought up the epistemological differences and sociocultural conflicts that can arise between those who do Western research and Indigenous communities. I intentionally spoke with other Indigenous presenters at the Urban IPD workshop to learn more about how they identify and potentially reconcile differences between the two groups. As collaborators with Urban IPD, the way they think about and represent their work provided different perspectives from Darian's.

The manner in which WS works with Oral Histories and other forms of Traditional Ecological Knowledge, or TEK, came up during three of my follow-up interviews with individuals who identify as Indigenous but work and study in the sciences in a Western University and therefore live and work in both Indigenous and WS spheres: Ruben (Ponca) an undergraduate in ecology, River (Lumbee and white) a graduate student in engineering, and Dalia (Menominee/Oneida/Ho Chunk), a PhD candidate in environmental studies. Ruben was the NA intern and frequently led activities and presented throughout the Urban IPD workshop. River and Dalia both presented their research on Manoomin (wild rice) restoration on the second day. River also attended the first day of the workshop as a participant and heard Darian's presentation.

Kimmerer (2002) described TEK as a type of knowledge created by Indigenous resource users. It is created through close observation and experience over the long term in one place and is interwoven and inseparable from culture, spirituality and language. She distinguished TEK from Scientific Ecological Knowledge (SEK), which may be collected in the same location by Western researchers and may employ some similar observational and predictive techniques, but tends to be conducted over the short term compared to TEK because researchers do not live in that place. SEK also lacks an explicitly cultural or spiritual purpose (Kimmerer, 2002).

The three Indigenous scientists I interviewed discussed how methods from WS complement TEK and could be used side by side as analytical tools. However, they expressed concern that Western scientists do not always respectfully collaborate with Indigenous People who hold TEK.

> I've heard like, some folks say that they're, they're tired of the encroachment,…not only with land, but also, like, ideas and perspectives…I always say "T-R-O-I", Tribal Return

> of Investment. Meaning, how is it that tribal folks can be remembered? And given the acknowledgement?...I heard over and over, even from Elders from Oneida and Menominee. They get so frustrated, it's like the research[ers], it's like you come to us and you ask us these questions. But then I never hear from you again (Dalia, follow-up interview).

In this passage, Dalia addressed an additional reason Indigenous Peoples often distrust or do not want to collaborate with Western scientists and share their knowledge--the historically one-way, extractive nature of the relationship. From her perspective, tribal Elders hold the TEK or IK that Western researchers often seek (for example, medicinal uses of local plants). Researchers solicit that information and gather it from the IK holders without any public or professional acknowledgement, or compensation of any kind. Those researchers use the TEK to further their own work without sharing the new ideas or inventions back with the tribe or giving credit to the First Nation who sparked the innovation. Through this process the TEK also is reduced to facts and molecules and disconnected from important cultural or spiritual practices (Nakata, 2002). This undermines trust and only makes relationships worse between First Nations and Western scientists (Claw et al., 2018; Nakata, 2002).

For this reason, Ruben and Dalia talked about using their science degrees to help different Indigenous groups conduct their own internal research, leveraging their WS skills for the benefit of the specific Nation that would employ them. River felt torn between the two worlds and appreciated the benefits of the type of research she could do through a culturally Western University and was not at a point where she wanted to exclusively work for a First Nation.

Interestingly, Darian, like Ruben and Dalia, also encouraged Indigenous students to go into science to work to the benefit of their Nation. He mentioned in his interview that he gave a talk, along with a Deer Valley Tribal Historic Preservation Officer, to Deer Valley elementary school students, to encourage them to go into archaeology as a profession so they could conduct State-mandated earthen mound research themselves for the Deer Valley Nation. The need for Deer Valley People to deploy Western archeological techniques on earthen mounds, however, ironically speaks to the Domestic Dependent Nation status of the Deer Valley in relationship to the US Government (Wolfe, 2011). Instead of being their own sovereign government with the full rights and ability to develop their land and interact with earthen mounds in whatever way they see fit, they are subject to the laws of the United States and many of the State. In this case, Western tools are forced upon them in order to comply with these laws. Darian encouraged the Deer Valley to be holders of those tools to take some control over the existing situation.

All three of these Indigenous individuals I interviewed spoke to ways that respectful collaboration could occur between First Nations and Western researchers. River emphasized the need for all researchers, both Indigenous and non-Indigenous, to declare and embrace their cultural or ethnic identity, and therefore dispel the myth of complete objectivity in science. She believed scientists should work for social justice, which in her case, would be her research on enhancing food sovereignty. Dalia and Ruben emphasized the need to value and credit the knowledge of Indigenous Peoples. “The Indigenous knowledge is from like, long time ago, and Western science is finally catching up” (Dalia follow-up interview). Rather than accepting IK only once it has been validated by Western methods as Darian did, they want researchers to consistently recognize and hold in high esteem the knowledge of Indigenous Peoples. As numerous Indigenous scholars have argued, this must happen to build trust between groups and

to facilitate future opportunities to work together to investigate and solve problems (Claw et al., 2018; E. McKinley & Stewart, 2012; Nakata, 2002; Turnbull, 1997).

During his interview, Darian expressed a desire for "more open dialogue between the Native American community and the archaeological community," but lamented the difficulty of doing so. To him there was "still this pervasive attitude within the Native American community, in general, in my opinion, that frowns upon archaeology and archaeologists and scientists. And, you know, that doesn't mix with their belief systems." Despite decades working with First Nations groups on mound restoration, it appears that Darian still struggled to understand the extent of the harm inflicted by Western researchers on Indigenous groups; it is more than different belief systems that prevent rebuilding of trust. Darian has built limited relationships with people within First Nations through his work restoring and protecting earthen mounds, perhaps relationships built on trust, perhaps ones built out of necessity on the part of First Nations to function in a Western world. His epistemological grounding within Western research and the centuries-old distrust Indigenous peoples have for it, along with the ongoing racism of many archaeologists, prevent his field in general from building a relationship of trust.

> on a few occasions, [Native American individuals] say to me, that they didn't think that me being a white man should be talking about the mounds, should be talking about Native American religious belief systems or anything like that. Of course, I obviously disagree with that. idea…It's like telling, it's like telling somebody that's English that they can't write about ancient Greece history or something…so I mean,…I totally understand, believe me, I totally understand where that attitude comes from and, and you know the hard feelings that are still there in the Native American community, about, you know, about the racism and things that have occurred in the past.

Here, Darian demonstrated some understanding of the past injustices archaeologists have done to the mounds and other archaeological sites. He also acknowledged some of the racist attitudes that created the injustice. However, his Western epistemology leads him to believe that all knowledge belongs to everyone; it should be universally known and shared. This conflicts with the way Indigenous people share knowledge: with the right people, at the right times, for the right reasons.

Darian's narrow focus on historical incidents of racism also ignores larger ongoing systemic inequities. He privileged Western views and frequently demonstrated a colonial desire for Indigenous Peoples to adopt those views. In speaking about his work with the Deer Valley on mound protection, he spoke of them as being "more attuned to the modern world" because of their willingness to engage in archaeological work and pursue the purchase of large properties that were part of their ancestral lands. These statements show his desire for First Nations people to assimilate and adapt to Western norms, rather than Western people adapting their own practices or compensating First Nations for past harm. Perhaps because he sees his epistemology as superior, he also sees historical racism as just one hurdle to overcome; that once it is acknowledged by Western researchers, relationships between archaeologists and Indigenous Peoples can be quickly healed, and they can all share everything they know. Again, Darian showed an awareness of some differences between himself, his field of work and the practices and knowledge of Indigenous peoples, but he defaulted to the Western system as what is best for everyone. Darian's story as revealed through this incident at Urban IPD speaks to the complex challenge of overcoming Indigenous mistrust of researchers and building true collaborative relationships.

Opportunities for PD Attendees and Organizers to Learn from Tensions

As I mentioned in my previous chapter, one of NA's goals for the Urban IPD program is to help facilitate a learning journey for non-Indigenous educators where they recognize their own cultural identity and perhaps think about the ways in which they have experienced privilege, as well as asking them to consider the implicit biases they hold. Howard (2006) and Sue (2016) discuss the importance of witnessing the stories of POC to help white people to recognize their position of dominance compared with others more clearly. As part of a white identity development journey, awareness of one's whiteness, positionality and epistemological differences from others is critical to moving towards fighting systemic racism (Austin, 2011; Helms, 1993; G. Howard, 2006).

Nature Alliance staff recognized that the Urban IPD program could be a piece of a larger journey of identity. As discussed in the previous chapter, by creating a window into another epistemology and holding a mirror up to reflect on their own, they hoped to especially help white participants become aware of their own culture and hegemonic position in society. By providing opportunities to listen to and interact with people of diverse Indigenous backgrounds, the Urban IPD program could facilitate this learning journey for all non-Indigenous participants while they also improved their understanding of Indigenous cultures and history.

After presentations in other IPD workshops with particularly sensitive content, such as a one with personal stories about the historical trauma of boarding schools that bring up inhumane systems imposed upon Indigenous Peoples by white political systems, the NA staff learned to build-in time for reflection and to conduct participant debriefs to help process the cognitive dissonance and complex emotions brought up by these subjects. They tried to provide opportunities for reflection and processing about these traumatic and uncomfortable stories as a culturally diverse group. The staff did not, however, anticipate they would need similar time to

unpack Darian's representation of his knowledge about the earthen mounds. It unexpectedly sparked controversy that they had not prepared themselves to address.

Darian was not NA's first choice to present on earthen mounds; nor was he their second. The top two choices were Indigenous individuals who worked on mound protection whom NA had seen present before, but neither was available for the Urban IPD workshop. The staff had planned for a speaker with significant experience conducting local mounds restoration to help participants connect the culture and restoration tracks of the Urban IPD program and wanted to make sure someone could fill that role. Aubree met Darian through a website he runs providing information on earthen mounds and their protection (Darian, follow-up interview), but the NA staff also knew of him as someone who worked with their first-choice speaker on mound protection and was often invited by the Deer Valley Nation to work on earthen mound protection and restoration projects (NA staff, planning meetings). Deer Valley partners for the Urban IPD program thought Darian would be an acceptable choice to present at the workshop, however, no one on the NA staff had ever directly interacted with Darian nor heard him present (NA staff, focus group). Nonetheless, he received and accepted a last-minute invitation to present at Urban IPD so that they could keep a discussion about mound restoration in an urban environment in the program.

Darian's presentation became an unplanned teachable moment both for the participants in the Urban IPD workshop as well as the staff running the program. It provided opportunities for participants to think about epistemological differences, whiteness and systemic racism. It also revealed problems for the NA staff to consider in terms of how to plan a professional development, how to conduct discussions about race and the impacts of settler colonialism, and how to speak, or not speak, about the knowledge of Indigenous peoples.

How do These Tensions Affect Participant Learning?

Many of the participants, both Indigenous and non-Indigenous, commented on how what happened was a "teachable moment:"

> It was almost like a...real life teaching of like how I felt in a high school classroom, when someone else was telling me how to be Indian, or something about where, like you said about acknowledging that student and that person and not telling me how I'm supposed to be, it was like a real life teaching experience for you guys to observe how the Native people felt in the room (Barbara, Day 3 Urban IPD workshop).

For Barbara, who identifies as Mohican-Stockbridge/Oneida, Ruben's debrief which explicitly pointed out, almost in the moment, the inappropriate elements of what Darian said and provided a chance for non-Native participants to have an empathetic experience with the Native people in attendance. Many participants indicated they signed up for the workshop to learn more about Indigenous perspectives and this episode presented one additional opportunity for that type of learning.

For River, who identifies as Lumbee and White, "the debrief that we had with Ruben made me understand some of those feelings that I was having to solidify them a little bit more (follow-up interview)." For her, the teachable moment was very personal. She had been struggling to articulate why she was uncomfortable with what Darian said until Ruben helped her put those feelings into words.

Other Urban IPD participants described the "Darian incident" as an epistemology lesson in ways to present knowledge:

> I do think that Darian's presentation served as a good counterexample in many ways. When discussing sensitive topics of any sort it is easy to misstep if one becomes too certain of oneself—which is why adopting a more humble perspective and seeing oneself

> as a valuable contributor without being the foremost expert is so valuable. (Amalia (white), post-workshop written reflection)

Amalia, who identifies as white, heard Ruben's counterpoint about how Darian did not acknowledge the Deer Valley and applied Liana's lessons on humility--using the experience to reflect on more respectful ways to present the knowledge of Indigenous Peoples as discussed earlier in the chapter.

In some ways Ruben acted as a culturally responsive mentor to the participants, helping them identify problematic moments in the presentation. Culturally responsive mentors help educators specifically focus and learn about the assets, cultures and ways of knowing of Indigenous Peoples (Tolbert, 2015; Zozakiewicz, 2010). Ruben's openness to sharing his reactions and describing his perspective on the problematic nature of the presentation helped participants to recognize the culturally inappropriate actions and microaggressions he and other Indigenous attendees experienced. The act of pointing out microaggressions, such as the way Darian singled out Ruben and Aubree and informed them of their mound building heritage, is especially instructive for white people, who often struggle to pick out these disparaging messages hidden in a person's language and interactions (Sue, 2016). Microaggressions may have to do with epistemological differences that are hard to recognize without explicit instruction. What Ruben may name as offensive or inappropriate may stem from underlying epistemological differences in how different people share or see the role of knowledge, as discussed earlier in this chapter. Ruben's actions combined with stories shared in the workshop about incidents of discrimination and stereotypical actions that Aubree and Liana experienced personally or told about others, provided many similarly instructive moments. Not only pointing out what the microaggressions are, but helping participants unpack why they caused offense

helped participants build racial awareness and metacognitive understanding of their own epistemological positioning.

White Fragility

Not everyone found Ruben's debrief equally useful, however. As I continued to analyze the reactions to Ruben's debrief, I uncovered other nuanced, less constructive reactions to the "Darian incident" amongst participants. Some white participants in particular, struggled with ways to filter and process the two perspectives on IK that Darian and Ruben presented.

White Fragility is "a state in which even a minimum amount of racial stress becomes intolerable, triggering a range of defensive moves" such as fear, guilt, argumentation and silence (DiAngelo, 2011, p. 57). This racial stress has foundations in confronting epistemological differences, which include how epistemologies associated with whiteness have subjugated those of others (DiAngelo, 2018). In instructional environments, encountering White Fragility can shut down a learning experience, but a skilled instructor can help facilitate more productive conversations (DiAngelo, 2018). D.W. Sue's work in leading racial dialogues (2016) mentions that white guilt can be good if it increases empathy, but bad if it closes people off to further action. The psychology of White Fragility is useful in analyzing the reactions that surfaced during this incident. Much of the way different participants processed the entirety of Darian's presentation and Ruben's debrief can be seen to differ based on racial identity and by individual participants' capacity to process what occurred based on their own comfort level encountering racial stress.

People of Color (POC) who attended the workshop (in this case meaning all non-white participants) were accustomed to experiencing and seeing microaggressions. Because of systemic racism that they encounter regularly in educational and governmental institutions, POC

presumably have more coping mechanisms in place for dealing with or confronting the issues that came up in Darian's talk (DiAngelo, 2011; Gloria Ladson-Billings, 2000). For example, River (Lumbee/white), Sandra (Latina), and Rowan (African American) all felt that they were able to learn from Darian. They overlooked some of his questionable statements and provided justifications or excuses for some of his actions that allowed them to focus on the rest of the content he presented: River (follow-up interview) and Sandra (Urban IPD workshop) spoke about the socially awkward quirks of scientists who are extremely enthusiastic about their research subject; Rowan pointed out Darian's lack of time to prepare to present due to the last minute invitation (Urban IPD workshop). Two additional Indigenous participants at the workshop signed up to receive additional information from Darian. All of these POC demonstrated the ability to filter out problematic elements of Darian's presentation and to utilize the history of mound protection and mound restoration suggestions he had to share. In his follow-up interview, Ruben also spoke to the need for all participants to develop a critical lens and filter for deciding whether or not to use some of the information Darian presented.

> As an individual person [Darian] probably does a lot of good work on the mounds, probably knows how to take care of them, probably knows a lot of information straight from the word of mouth of Deer Valley people, because he does work with the tribe. So, I mean, like he, is in and of himself is actually like a good source of information. The way that he presents it is problematic...I would've encouraged [the participants] all to sign up for [Darian's information]. I mean, you're a teacher. I mean, part of teaching is like primary and secondary sources. Analyzing bias, all that critical thinking stuff that I feel like people are kind of losing the ability to do nowadays (Ruben, follow-up interview).

Ruben was not present for the conversation on the last day where participants were offered the opportunity to sign up for information from Darian and did not intend for his debrief to block the participants from taking in all of the information that Darian presented, he only meant to provide a critique.

Rowan, one of two African American participants at the workshop, took the lessons from Ruben's debrief and related them to her own personal experience. During the debrief she described an analogous situation where a teacher presumed to know her daughters' culture better than her daughters did, concluding:

> And so, I think it's important to claim what you know, and always leave gray space for more knowledge to enter the space…there's so much more to learn, you have to qualify it gracefully. And then ask for forgiveness if you're wrong, but always leave room for someone's reality, to enter the space too as well, you know, it always goes from your intention, and if your intention is to get affirmation that you're the expert, you're starting off wrong (Rowan, Urban IPD workshop).

By comparing the two situations, Rowan acknowledged Ruben's message that Darian improperly claimed to be an expert on all information related to the earthen mounds, and also shared epistemological humility expressed by many Indigenous attendees. As someone familiar with the oppressive nature of whiteness, she was able to immediately take in what Ruben said without freezing up. Rowan recognized that she could critique Darian's information, knowing that he presented his information through his own filter, and placed it alongside other information she had about the mounds to build her own fuller picture. In her interview, she said that Darian's presentation got her interested in ways to restore mounds and sparked an interest in also hearing an Indigenous person present on the mounds to help fill in her understanding about why the

mounds were built in particular locations. Rowan recognized the value in the information Darian presented and simultaneously understood the limits to his representation.

Some of the white participants, however, reacted in a different way and did not appear to have critical filters and coping mechanisms in place to sift through Darian's information and Ruben's counterpoints to assemble useful information on the earthen mounds. Participants intentionally chose this workshop because they wanted to learn more about the Indigenous perspective and improve their ability to teach more respectfully and accurately about Urban Indigenous Peoples. But depending upon where they were in their learning journey of racial identity, their ability to reason through and filter both the information Darian provided, and Ruben's racially uncomfortable critiques differed and sometimes put up barriers to learning.

For some of the white participants in the Urban IPD workshop, the Darian incident and debrief made them uncomfortable, but unlike River, whom Ruben helped articulate feelings she already had, the faults Ruben pointed out in Darian's presentation felt more like personal attacks and made them uncomfortably aware of their white identity and the way they taught about Indigenous Peoples:

- The first day with the mounds was ah, that was really uncomfortable and really, really important...In thinking about that in my own teaching, I am sometimes very hesitant to bring up…cultures that are not from my own personal background…I want to be inclusive…[but continue to be] careful not to say "these people think this…" (Charlotte (white), follow-up interview).
- I think about all the language that I would normally use [to describe my school restoration project], and, how do you unpack all that? (Jacqueline (white), personal conversation during workshop)

- I wanted to go to this workshop…to make sure that we were telling the story correctly…And yet I walked away going, "because I am a white person, should I not be talking about this?" (Bridget (white), follow-up interview)

These quotes highlight some participants' hesitancy and awareness of how they speak about the knowledge of other cultures. As acts of self-reflection, the ideas brought up in these statements could potentially lead to transformations in the way educators present about the knowledge of Indigenous Peoples in their own teaching venue. But during the workshop itself, participants did not always reflectively work through that discomfort with the group at large. Ruben's direct unmasking of the race-related faults he saw in Darian's presentation and missteps in discussing knowledge about Indigenous Peoples made many of the white participants uncertain about what they themselves should or should not say during the Urban IPD workshop and doubtful about their own teaching. Some responded by not saying or asking anything, demonstrating symptoms of White Fragility, thus inhibiting their opportunities to learn.

Some individual participants worked through this discomfort on their own and by the time of the follow-up interview had made it through the barriers and figured out their next move. Jacqueline, for example, disclosed to me that she was afraid to give her presentation to the Urban IPD workshop the day after Darian's presentation and self-censored part of her previously prepared talk for fear of invoking the same response that Darian received from Ruben. For example, she did not point out the school's Three Sisters garden of corn, beans and squash. This allowed her to avoid talking about how her school had been unable to consult with a Deer Valley contact prior to putting in the garden and were perhaps disrespectful of important cultural practices. By the time of her interview she had reasoned through her discomfort and could articulate a different way to approach her work and future presentations. Jacqueline admitted "it

was my own whiteness showing up" and recognized that in that moment "it was just my own fear of not being an expert, and not getting it right." She had taken the defensive measure of avoiding the topic altogether. After naming for herself the components of her own White Fragility, her attitude had changed to "I am going to mess up" and recognized she could learn from this experience and do better next time.

In contrast, of the people who agreed to a follow-up interview, Bridget provided a case of someone who struggled with her whiteness and ways to talk about the mounds, in particular. In the quote below she references Ruben's response to her question:

> after this thing with Darian, and then after the debrief from Ruben, I felt that I shouldn't ask [questions], I really reined myself in. Because I wasn't, I wasn't sure…Like when [Ruben] said, one of the things that stuck out to me when…he used the phrase "white guilt." And and that makes it like, "Okay. Again, I'm kind of confused." And my position is, "I'm not guilty. I'm sorry for the past. I'm like in 2019." Like, I want to respect the past and tell the story [of the earthen mounds]. But you know, I'm just…so that was that kind of, that pulled me back a little bit (Bridget, follow-up interview).

In this quote, we see a complex combination of reactions. First, Bridget silenced herself and felt that she could not ask questions during the Urban IPD workshop for fear of being called out as white or having her questions shut down. Her expressions of fear and silencing in the face of uncomfortable race talk are strong evidence of White Fragility. Beyond just fear and silence, Bridget also demonstrated defensiveness when she brought up Ruben's use of the term "white guilt" in his debrief, feeling that she personally should not feel guilty nor take responsibility for anything other white people have said or done, past or present; she did not see herself as part of a larger dominant system. She attended Urban IPD specifically to learn ways to present about

earthen mounds at the nature center where she works and came away from the workshop feeling confused and uncertain about how to proceed. Ruben's statement about white guilt made it difficult for Bridget to process the information presented and know what to do. DiAngelo also mentions this tendency to "blame the person or event that triggered the discomfort" as a symptom of White Fragility (2011, p. 60). Bridget appeared to be confused by Ruben bringing up the possibility of white guilt and perhaps also to blame Darian for presenting information that left her feeling uncertain of how to proceed in terms of teaching content about the earthen mounds. She wanted facts about the earthen mounds, but was confronted with a lesson on epistemological differences, race relationships and historical injustice. Unlike Rowan, Bridget did not appear to want to engage with that complexity and did not take on the responsibility of recognizing the limits to Darian's representation and determining for herself what useful information she could take away from the earthen mound presentation. Rather than working through her discomfort, as many of the POC at the workshop were able to do, she rejected all of his information.

As mentioned at the beginning of this section, White Fragility, which includes guilt, can potentially close people off to further action (Sue 2016). I did not interpret this quote or the rest of Bridget's interview to mean she would completely stop working on revising the earthen mound curriculum for her organization, but in her interview less than one week after the workshop ended, she still took Ruben's statement personally and did not see the larger message he was trying to convey in his statement during the debrief about humbly speaking of the limits of one's own knowledge. Bridget maintained a historical view on the significance of the mounds and a historical view on the injustices faced by people of First Nations. Her comment that "I'm in 2019" indicated that her interpretation of what Ruben objected to were historical problems,

and she did not recognize that Ruben was trying to help participants speak about the significance of the mounds in the present day and recognize the living knowledge within the Deer Valley Nation. Akin to some comments from Darian, Bridget seemed to imply that racism and settler colonialism was in the past, and did not involve her, presenting another defense mechanism. In her interview, she mentioned that she was still looking to tell the story of the mounds "correctly" and felt that the workshop had not provided the answers she expected. Bridget mentioned a desire to hear an Indigenous perspective on the mounds in addition to Darian's (as did other participants), feeling that would help her figure out what to teach about the mounds and perhaps with that perspective she would be able to revise the earthen mound curriculum. She expressed the usefulness of hearing an Indigenous account, but possibly limited the value of such a representation as a way to learn the facts. Her search for the "correct answer" continued to discount the importance of addressing the epistemological and racial conflicts Ruben presented (Kincheloe & Steinberg, 2008), something that commonly occurs in race dialogues with white people (Sue, 2016).

Roles for PD Facilitators in Navigating Tensions

The NA staff was caught off guard by Ruben's debrief and the episode sparked dialogue between the NA's staff members over the most instructive ways to help participants work through the epistemologically and racially charged moments that occurred that day that could either help or hinder participants' racial identity journeys. Recognizing the variable responses that emerged from Darian's presentation and Ruben's debrief, NA staff discussed what happened amongst themselves throughout the workshop (Elizabeth, focus group) and then formally with me during the focus group and follow-up interviews. They debated what to do in the moment and what to do going forward. In this section, I will analyze these conversations.

The last piece of unpacking this incident is to examine how NA staff responded both during the workshop and what they learned about planning and running PD moving forward. Of importance are the choice to invite Darian to speak about the mounds in the first place, the manner in which Darian's talk was critiqued during the workshop, and the responsibility of individual members of the NA staff to explicitly address the problem.

Who Should Speak about the Mounds?

As mentioned previously, Darian was NA's third choice to present on the earthen mounds. I do not know the exact circumstances that led to him being invited with what appears to be only one days' notice, but the NA staff believed Darian would be a knowledgeable presenter. During the focus group after the workshop, when discussing the incident, the NA staff and Ruben spoke to the need to book speakers they know much farther in advance, a desire to articulate clear goals for each presentation which could be shared with each presenter, and in the case of the earthen mounds, a strong preference to bring in an Indigenous speaker for that topic. When I asked them to explain the latter, they struggled to provide a clear answer:

> for the mounds I think we should have an Indigenous person speak. [Researcher: Why?] Because it's about an Indigenous something very Indigenous, created by Indigenous people, as opposed to looking at pairing of Western and Indigenous science. Experts in looking at water or that type of thing is very different. So, I think we have to be careful there (Elizabeth, focus group).

During the planning meetings the team spoke of trying to bring in Indigenous perspectives to help participants learn from non-Western points of view and perhaps integrate those additional perspectives into their teaching. In this moment, Elizabeth actively wrestled with this question of who is best to represent the knowledge of Indigenous people and to describe objects or

subjects with clear Indigenous history. She compared earthen mounds, which she would present from an Indigenous perspective, with the topic of water, identifying water as a topic for which two perspectives could and should clearly be articulated in the workshop. For example, in their watershed activities during Urban IPD, which Elizabeth references here, NA asked Liana to speak on Deer Valley perspectives on water in between some of the water-related restoration education activities. In her follow-up interview, I pressed Elizabeth to speak more to this idea. She explained that because of the bias and stereotypes she heard Darian use, she was rethinking who should represent knowledge about the mounds to Urban IPD participants:

> It's always preferable when you're talking about, say, mounds, or something that is very unique to a particular culture, that it's somebody from that culture that, that shares it. It's firsthand, it's more authentic. And you're, you're getting it without the bias.

The theme of letting someone represent their own story, which values and respects the views of their Indigenous collaborators, remains important to Elizabeth. She is still wrestling with the best way to articulate why a non-Indigenous person should not describe Indigenous subjects or knowledge and why she wants only one perspective for the mounds, compared with two for water. Although she does not say this directly, it is possible that what she wants from this "firsthand" account from someone in the culture would include not only specific facts, but also a particular epistemological representation about what they know that she and other NA staff value. Whether or not a white presenter could provide that epistemological perspective is a question to consider.

While we have shown that Darian's representation of the mounds defaulted to a white, Western scientific bias, I want to problematize the last part of Elizabeth's statement: "that you're getting it without the bias." A presentation on the mounds by any presenter would contain bias.

As Liana mentioned, every individual speaks to their own knowledge and experience, and therefore has personal bias. One person may tell a different story from the next. A member of the Deer Valley Nation, a descendant of the mound builders, would still represent their own particular version of the Deer Valley story. As discussed earlier, in terms of "authenticity," we must also remember that a Deer Valley speaker on the mounds would be likely to censor some of the knowledge shared with those who are not members of the Deer Valley Nation and may not be willing or able to share any more knowledge at a workshop than Darian did. Other Indigenous speakers who are not members of the Deer Valley Nation may not have access to that information either. In choosing a Deer Valley or other Indigenous individual to speak about the mounds, NA would not necessarily be choosing someone who can present more or "unbiased" information, rather they would be prioritizing and privileging the epistemological filter and bias from which that presenter speaks, which presumably will be more respectful and balanced towards the knowledge of the Deer Valley than was Darian's. The advantage of hearing directly from Indigenous presenters on the mounds is not necessarily what they know and which facts they will pass on to participants, but rather how they represent what they know and what they can teach participants about how to respectfully speak about the mounds themselves. It also privileges the knowledge learned and shared through Indigenous practices. This goal is in line with the Urban IPD program push to hear diverse Indigenous perspectives and to let them represent their own experiences and understandings. The challenge for NA to continue considering, however, is when and why they prefer one epistemological position for some workshop subjects and two for others.

How Should They Debrief?

The manner in which Ruben "debriefed" participants about Darian's presentation was also a matter of controversy. As mentioned previously, Ruben decided to get up in front of the group to run the debrief without consulting any of the other NA staff members, which caught them off guard. His "debrief" was also more of a set of "counterpoints" given in response to Darian's presentation (Sandra, focus group), with a few minutes for questions and answers, rather than an in-depth reflective dialogue amongst all participants. Although providing a teachable moment, not all participants walked away with the understanding about the history of earthen mounds and mound protection that NA had intended from that session. Sandra explained this concern to Ruben in the focus group "…What you did is you did a counterpoint to [Darian's presentation],…which was good. But then how do you process all that? Because, you know, what came out is that they are confused." Given that one intention of the workshop was to help non-Indigenous participants go through a learning journey of cultural identity and especially to reflect on their role within the dominant culture, the manner in which this unexpectedly racialized event was unpacked is relevant to what participants learned and took away from the workshop. As discussed in the previous section, cultural identity also impacted participants' abilities to filter information from presentations and pick out accurate content to bring back to their work. Aubree led a second discussion on the last day of the workshop because it was clear that some participants had still not processed Darian's presentation and Ruben's debrief. As a result of the full series of events, one topic of discussion that surfaced in the focus group with NA was determining when and how to integrate discussions of uncomfortable topics about historical injustices and ongoing discrimination in the workshop.

Elizabeth appreciated that Ruben spoke his mind to the group. "Because I think what he did is he opened up something that maybe wasn't going to be said. And it opens up opportunities for conversation" (follow-up interview). In an ironic way, Darian's problematic representation of his knowledge about the earthen mounds helped explicitly highlight what not to do. With a different speaker, the epistemological differences between Western and Indigenous representations of knowledge may not have stood out so sharply to participants, Ruben would not have served in his mentoring role, and participants might have gone on to present information about the mounds to their students in a less respectful way. In her first interview, Aubree mentioned that she worried about how people present what they learned about Indigenous people in the IPD workshops once the returned to their classrooms:

> But people can take information that they've learned, and they can twist it that just as bad as, Just because…we're presenting it doesn't mean that equals them presenting it in a meaningful way. (Aubree, pre-workshop interview)

She discussed situations she experienced where teachers take one short course or lecture on Indigenous Peoples, gained a small amount of knowledge, but still presented that information in a harmful way that perpetuated stereotypes or only presented negative stories about Indigenous people. After a short lesson, some teachers considered themselves experts and did not critically think about the way they represented the information they taught. As uncomfortable and painful as it was for some to sit through Darian's presentation or grapple with Ruben's debrief, having those direct, open discussions about microaggressions and epistemology allowed explicit opportunities for participant learning and growth. Just as white people struggle to see microaggressions, they may have also struggled to pick out on their own what is epistemologically distinct in a presentation about the mounds given by an Indigenous person, and

then be able to represent the important elements of that perspective themselves (Tolbert, 2015). It is interesting to consider what advantages the entirety of the Darian incident itself afforded participants in the workshop, and what evidence they have to that effect. It is also important, however, for NA to consider where opportunities were lost in this teachable moment, and how to more effectively capitalize on similar moments when they arise in the future.

Given that the incident did happen, considering the best way to help participants process and reflect on what happened so they can learn from it was a critical issue for the NA staff to consider. Aubree, in particular, took issue with the way in which Ruben conducted the debrief:

> [Yeah.] So…I'm glad it came out. In my opinion, this is only my opinion here, that [Ruben] disregarded what Darian said…So I feel that that was kind of problematic, because it doesn't give people space for themselves to figure out, I think [it] would have been better …for Ruben to say, " I'm just interested in what you guys thought about this experience"… Because if, I don't feel it's my place to tell somebody what they shouldn't or should, I can only tell you what the research says, what the facts are, how another perspective, it's up to. So that's kind of where I would have gone with this. (Aubree, personal communication during the Urban IPD workshop)

Aubree would have preferred a more open-ended unpacking of Darian's presentation, where participants could bring up what they liked or did not like about the presentation, hear multiple opinions, and draw their own conclusions. In her opinion, Ruben's approach too directly challenged Darian's presentation and discredited the value of his information. Ruben did not allow for a more nuanced dialogue about what and how Darian presented.

Aubree did not mention White Fragility, but in her interview, she recognized how some participants shut down as a result of Ruben's debrief and how because Ruben critiqued Darian's

information, some would not see any of Darian's information as credible. She noticed that it was the white participants who became conflicted as to whether or not to believe what Darian had said at all after Ruben spoke. Elaborating more on this idea, she pointed out that with the exception of Liana, the other Indigenous participants, herself included, and Rowan, one of the African American participants found value in Darian's talk.

As she thought about these differences Aubree considered the best way to hold discussions on racially charged subjects. She brought up Ruben's youth and inexperience at leading these types of discussions in her critique of his approach towards the debrief.

> Ruben's young, there's no doubt about that…And so I think there…could have been room for discussion…And that he didn't give people a chance to…he's got to learn too, he didn't give chance for people to talk it out and say what they liked, or just like, what he did was got up there and…what he said was problematic, and that put everyone at odds with their own feelings. So, I feel like that was a huge problem. (Aubree, follow-up interview)

During his interview, Ruben mentioned that as an undergraduate, he is heavily involved in the "social justice and activism community" and is studying and learning about white supremacy and white male privilege (follow-up interview). He has a very direct approach to dealing with race issues and discrimination. Aubree, by contrast, is older, and has nearly a decade of experience working with non-Indigenous educators on the same issues and through her experience working with that audience feels she has developed a gentler, more effective discursive approach to helping white educators learn and teach about Indigenous Peoples. Unlike Ruben, who is only a summer intern and does not plan to work in education, Aubree also tries to build and maintain long-term relationships with many of the IPD participants after they finish the workshops so she

can help them build curriculum and serve as a reliable resource for materials about Indigenous Peoples. As such, she is sensitive to the possibility of alienating educators. Whether the two different approaches are generational, experiential, or intentional, they raised the question of how to have uncomfortable conversations about whiteness and epistemology in the Urban IPD workshop. Awareness of the cultural predispositions of participants in terms of how they talk about race, whether they respond to "rational" and "objective" conversations, or "angry" and "emotional" stories (Sue, 2016) plays into setting up a productive dialogue.

The NA staff all recognized the need for conversations about racial and systemic injustice, for talking about what information can be shared about IK and by whom, and for unpacking some of the epistemological differences between Western and Indigenous ways of speaking about knowledge in general. However, in the moment that Darian's presentation occurred, neither the staff, nor the participants were prepared to have that conversation (NA focus group). There were conflicting views about how that conversation should occur and perhaps who should lead it. During the focus group Sandra mentioned that multiple participants expected Elizabeth to address the whole group about the incident; but she did not, except to briefly mention in a general sense during the introduction the morning after the earthen mound presentation that we learn from uncomfortable situations. Elizabeth had other obligations to attend to during the time Kevin presented and could not speak from first-hand knowledge about the incident. An open dialogue about what Darian and Ruben said did not occur until the very end of the last day when Bridget raised the issue of whether there was a different source of information available about the earthen mounds, and Aubree decided to let participants talk in small groups and then as a large group about what they thought about the mounds.

Naomi discussed the need to prepare participants at the beginning of the workshop for uncomfortable conversations should this type of situation arise again:

> you know, people were not ready for the difficult discussions or murky areas...you're gonna have to do some hard work here. And you're not gonna leave here with all the answers (Naomi, focus group).

All four staff members through interviews, planning meetings and the focus group expressed an understanding that participants' learning journeys were long-term and extended far past the IPD workshop. They spent some time in the focus group discussing ways to prepare participants, as Naomi mentions above, for being open to questions, to recognizing and working through their biases, and learning how those biases may be grounded in particular epistemological and sociocultural ways of viewing the world. Participants also must understand, as the staff does, that they will not find all the answers in three days at the Urban IPD workshop.

The Responsibility of White Staff Members to Address Tensions

In thinking about leading these uncomfortable conversations about race and discrimination, it is worth considering whose responsibility it should it be to lead those discussions at the workshop and why. Participants requested to hear from the Director, Elizabeth, but it is noteworthy that the only people who led dialogues about the incident were Ruben and Aubree. From the conversations in the planning meetings and focus group, it appears that Aubree generally takes the lead in all IPD workshops in this way.

> But I do want to say, Aubree, when we were at LCO [Lac Courte Oreilles IPD workshop], Aubree did an awesome job. I can't tell you how many times, how many places people either wrote in their journal, reflections or evaluation, how they appreciated that opportunity for Aubree, feeling her sensitivity, then that you had for what how they

> were feeling and kind of helping them work, work through it just, they were really, really upset. (Elizabeth, focus group)

Elizabeth shows appreciation for Aubree's openness and skill in discussing sensitive race and historical trauma-related issues. The participants also recognize and find value in her mentoring and leadership on these topics. They trust her guidance, and her background and experience does allow her to better "translate" certain cultural information from presenters (Aubree, focus group). However, it still leaves the question of why she is the staff member who conducts these debriefs, why she is the only one capable of demonstrating that "sensitivity" and not the others, who now have many years of experience running the workshops and interacting with First Nations partners. I did not ask this during my research but can speculate that it could be because Aubree volunteers, or because of her experience from her prior position. However, it could also be because she is the only NA staff member who identifies as Indigenous and the other staff members are either uncomfortable leading these conversations, or perhaps feel it is not their place to do so. This discomfort and avoidance of leading uncomfortable discussions with participants about racism, whiteness and discrimination may be evidence of White Fragility amongst the white NA staff members. White educators are often uncomfortable calling out systemic racism and discussing it with their students (Sue, 2016). Their inclination to focus on building trust between groups of people and being nice to one another reinforces a tendency to avoid confrontations (DiAngelo, 2018). Howard (2006) speaks to white people's responsibility to take on these tough conversations themselves, and to help other white people identify and work through race discussions. While Elizabeth and Naomi clearly prioritize work towards building understanding between Indigenous and non-Indigenous people, the public role they play during IPD in terms of participating in uncomfortable discussions could be further considered. It

brings up the question again, as I mentioned in my previous chapter, about the additional workload and responsibility put on POC. While Aubree is experienced in leading these types of discussions, I wonder about the impact it has on her to constantly be the one who must point out and explain the microaggressions and help non-Indigenous participants unpack their own emotions about these issues.

NA staff have not explicitly built in implicit bias, or personal learning journey programming, however, it naturally emerges from the program, especially for white participants. It reflects the original intention of starting the IPD program and the conflict between the Wolverine and the Wolf Lake Nation. NA staff generally approach the conflict by elevating the voices and knowledge of Indigenous people, but they do not often explicitly push on the role of whiteness and epistemological dissonance in creating those conflicts. Most personal reflection, internal debate and struggle with implicit bias is done by the individual and not scaffolded in an intentional way by Urban IPD program. NA staff know the need is there but are limited in time and by program demands and perhaps knowledge of the best way to assist with this process.

Summary

Focusing on Darian's presentation on the earthen mounds and the subsequent reactions revealed multiple epistemological tensions that exist between Western approaches to research and Indigenous views of knowledge. Identifying how Indigenous People often express epistemological humility and only reveal certain types of knowledge under certain circumstances contrasts with Western expectations for people to speak about their expertise and to broadly share what they know. The episode also highlighted how Western researchers hierarchically rank the value of different types of evidence and how the tendency to devalue Oral Histories as subjective and less reliable than other methods particularly disrespects Indigenous forms of knowledge transmission. My analysis also revealed that healing relationships between Western

researchers and Indigenous Peoples requires work to build trust between the two groups, finding ways to equitably share and learn from combined knowledge, and reconciling epistemological differences in a way that serves all parties.

Within a science PD workshop format with an explicitly Indigenous focus, it is challenging to find ways to explore these differences amongst a culturally and epistemologically diverse group of participants. Participants at different levels of comfort in their own racial identity development demonstrated differing abilities to recognize and process epistemological differences between Western and Indigenous perspectives. They also exhibited differing capacities to unpack the contested presentation and to tease out information of value about the earthen mounds from critiques about the Western representation of the information and the problematic microaggressions committed by the presenter. White Fragility surfaced as a barrier in multiple forms for both participants and staff members, contributing to the uneven learning outcomes.

Given NA's desire to address both Western restoration and Indigenous history, culture and sovereignty in the Urban IPD program, identifying the tensions between the culture and restoration tracks of workshop content as well as recognizing the needs of their participants to navigate those tensions can help them in planning for future workshops. They continued to articulate criteria for who to bring in as speakers for professional development workshops to represent knowledges of Indigenous Peoples based on more specific goals for each topic. Finally, they grappled with how they should help educators deconstruct, filter and analyze what they are learning.

Moving forward, the staff needs to consider ways to put the two tracks and their affiliated epistemologies in conversation with one another. They must also consider their own roles in

helping set up and contributing to constructive conversations during the workshop around personal identity and epistemological differences.

Chapter Five: Conclusions and Implications

Framing

In this final chapter I will summarize my findings and conclusions from previous chapters and then discuss implications and suggestions for Nature Alliance and the larger community of professional developers in science education. My overarching question for this research was:

- *How does creating an explicitly Indigenous cultural focus in a science-related PD engage professional developers and participants in grappling with issues of epistemology, race, power and the cultural nature of science?*

In Chapter three, which focused on the history and evolution of NA and the Urban IPD program, I examined the sub-question:

- *How does a focus on ecological restoration education with an explicitly Indigenous cultural context create opportunities and tensions for **professional developers** to grapple with issues of epistemology, knowledge, racism and power?*

In Chapter four, which analyzed the presentation by the white archaeologist and reactions to the presentation, I examined three additional questions:

- *What tensions need to be navigated to support educator learning in a science-related PD with an explicitly Indigenous cultural focus?*
- *How do these tensions affect participant learning?*
- *What lessons emerge for PD organizers about what their roles should be to help participants navigate those tensions?*

Limitations

Before I address the answers to my research questions, I wish to acknowledge the limitations of the work completed here. First, I chose to focus only on the Urban IPD program and lack firsthand observations and analysis of the other IPD programs. I made many assumptions about the way NA staff planned and operated the three other summer IPD programs, especially in terms of the role of Indigenous collaborators, based on references staff made in interviews, planning meetings and the focus group for Urban IPD. The First Nation partner and cultural focus of each IPD program is different, therefore, it is likely that the issues and tensions for planning and operating each program also differs. Directly observing the planning and observing the content of these other IPD programs would help me build a broader understanding of how IPD "integrates" IK about land with ecological restoration and how they address those tensions and challenges in each case. Directly observing the role of the IPD coordinators within the other IPD workshops rather than only the NA staff would also be useful. Learning the coordinators' role in determining the overall design and approach to running the other workshops may help me understand how a broader group of PD organizers discuss ways to bring issues of epistemology, systemic injustice and other concerns to the program. I made assumptions about the burden placed on Aubree for the Urban IPD workshop and observing the planning of other workshops might provide more evidence to support or refute that assumption.

It would also be informative to observe the youth and community components of these other IPD workshops as the staff and collaborators spoke of them as important to the success of the programs and the way they address trust and relationship-building between communities. The Urban IPD program did not yet have these formal components. Seeing this full scope of programming would also help me compare and understand the unique tensions and challenges of the urban context of the Urban IPD program.

As mentioned in my opening Notes on Terminology and Indigenous Voices, in order to protect the identity of certain collaborators and organizations connected to my research, I obscured the tribal affiliations of many groups and individuals. In order to honor the request of the Nature Alliance staff members to protect the relationships they built with their collaborators, and because of the possible harm my interpretations, right or wrong, could cause to the progress made so far, I erred on the side of not naming particular Tribes and Nations formally involved in professional development programs. Some of the contextual connections between land and people are lost in obscuring tribal affiliation. I also run the risk of essentializing the First Nations mentioned in my work, denying them agency and voice, because it is difficult to discuss differences between groups without providing identifiers. As mentioned previously, I recognize the potential for colonization as a white person creating pseudonyms for First Nations.

I am aware of holes in my accounts of the planning of the Urban IPD workshop. I was only present for particular group meetings and know that much of NA staff work occurred during short office conversations, over the phone and by email with collaborators, and in numerous in-person conversations at various events with their network. I did not observe all of these interactions and therefore have limited knowledge of the rationale behind decisions the NA staff made in these moments. There may have been disagreements or concerns about who to bring in to speak or what activity to present raised by collaborators that I missed and could not discuss in connection to other tensions and challenges in creating the Urban IPD program. Again, I may have made incorrect assumptions based on my limited contact.

My research only scratched the surface in the recounting of the history and evolution of NA, an organization that has been in existence for over 25 years. The program has worked with hundreds if not thousands of people and organizations over this time period, and I may have been

unaware of or misunderstood important people or events that shaped the organization over this time period leading up to the creation of the Urban IPD program. I was not privy to all of the tensions and challenges they navigated over this long history. This includes an incomplete understanding of the history of the development and iterative modifications to their restoration education curriculum during that time period. I am aware that they have revised their curriculum many times and do not completely know how Indigenous partners and others helped them revise this work to address epistemological differences. I do know, however, that NA does not feel that the curriculum directly represents the approach of any of their Indigenous partners.

In terms of understanding the impact of the tensions that surfaced in the workshop on educator learning, I was limited by the number of participants and presenters who agreed to fully participate in my research study. As a result, my depiction of participant reactions to the archaeologist incident, for example, was incomplete. I cannot say with certainty that I covered the full range of reactions. I am also aware that many of those who did not wish to fully participate may have done so because of concerns about my positionality. As a white, Western researcher writing about IK, some individuals who identified as Indigenous may not have completely trusted my intentions or how information from this study would be shared. My positionality may also have influenced those participants who did agree to speak to me to provide more or less information based on their comfort level with me. I have chosen to take participants' responses at face value, as if they were offering an unfiltered account of their own reactions, but reality is probably more complicated.

I also recognize that although I endeavored to listen and learn from Indigenous mentors and scholars throughout this process, my training and sociocultural positionality as a white researcher trained in Western science and science education influenced my choices in terms of

which incidents and quotes to analyze and the choices I made in terms of how to write about that analysis. I cannot help but write from a white perspective and as such likely omitted other important perspectives and critiques that a researcher from a non-white background would highlight.

In particular, my own White Fragility and inclination to avoid confrontation, made it challenging for me to critique the participants in my study. Critiquing members of the NA staff specifically, whom I know well and with whom I want to continue a working relationship beyond the time of writing this dissertation, was uncomfortable for me. I walked a line between my desire to analyze and critique controversial statements made by certain individuals and my inclination to write in a way that would not offend NA staff members, whom I knew would read this dissertation. I was also aware of the White Fragility of some individuals in my study who may read my research and wanted to write in a way that allowed them to learn and grow from reading my analysis rather than becoming defensive and closed to my perspective. My writing undoubtedly favors sparing the feelings of white participants, to the detriment of highlighting the experiences, perspectives and needs of Participants of Color who would have written stronger critiques than myself. All research contains bias because of the positionality and sociocultural background of the researcher and my work is no exception.

Given more time, it would have been valuable to follow participants after the Urban IPD workshop to observe the impact the program had on their work as educators. This study is limited in only learning initial reactions to the workshop and I do not know if or how participants adapted their teaching in any way based on what they learned from the program. With extended study, I would better know if and how participants worked through tensions experienced during the workshop and what resources they accessed to do so. Also in thinking about how NA staff

responded and adjusted to the tensions that arose during the Urban IPD program, following participants who return to future workshops offered by NA would further inform an understanding of the role this type of PD program can play over the long term in helping teachers identify, understand and decipher ways to teach about differences between WS and IK.

Summary

In Chapter three I reviewed NA's history and the evolution of the Urban IPD program, examining the question: *How does a focus on ecological restoration education create opportunities and tensions for professional developers to grapple with issues of epistemology, knowledge, racism and power?* IPD began because NA's restoration education program experienced two conflicts in 2011 which exposed their Western programmatic bias as well as race-related tensions between a primarily white school district and the neighboring Indigenous community. NA used those experiences as a challenge to their organization to reexamine their Western programmatic bias, assess their strengths, and critique their deficiencies. Together with First Nations partners, they built a modified professional development program still focused on ecological restoration education, but now integrated with the history, sovereignty and culture of a location-specific Indigenous partner. The new Indigenous Professional Development program centered the voices of Indigenous Peoples and paired their perspectives and stories with the existing NA restoration education curriculum. A major objective of the program was to bring white educators into conversations with their Indigenous neighbors using the focus on land and restoration as a way to begin building trust and stronger relationships between the two groups. For the long-term, the program founders expressed a desire to improve public school experiences for Indigenous youth and, in particular, increase participation in science fields.

The IPD workshops provided an important opportunity to connect the ideas of ecological land restoration with land sovereignty, an issue that is central to First Nations' struggles both

past and present. Focusing on land and sovereignty distinguishes a program like IPD from a more typical "multicultural" program that only emphasizes cultural differences and does not address the political goals of self-determination uniquely present amongst Indigenous peoples (Sabzalian, 2019).

IPD organizers recognized a need to fill gaps in participant knowledge related to Wisconsin First Nations history, sovereignty and culture, and therefore dedicated a significant amount of time in the workshops to these topics. This diverted time away from land-based restoration activities and NA staff found they were unable to cover all 10 steps in the restoration education program as they had in the past. The NA staff saw the change in priorities as painful, but necessary, however, to contribute to larger goals of trust and relationship building between school educators and Indigenous communities, and to improving the academic success of Indigenous students.

The time constraints for the Urban IPD program, which was conducted for the first time in summer of 2019, were particularly pressing. In addition to the goals of their other IPD programs in terms of covering Wisconsin First Nations history, sovereignty and culture, NA additionally wished to address unique characteristics of diverse Indigenous populations living in urban areas. Educational programs tend to ignore Urban Indigenous people and perpetuate stereotypes about what it means to be Indigenous, what Indigenous people look like, where they should live, and how they should act abound in schools (Hatala et al., 2019; Lees et al., 2016). Individuals who identify as Urban Indigenous also have complex relationships with land, as they may live far from their traditional homelands and settler-colonial rules control the places where they live on a daily basis, making it more challenging to connect to the land in meaningful ways (Keene et al., 2019; Lobo, 2001; Straus & Valentino, 2001).

In its first year, the NA staff grappled with many challenges of creating and running the new Urban IPD workshop. Tasked with more goals than the other IPD workshops and no single First Nation as a collaborator, they found it challenging to decide which Indigenous stories to tell and who should represent them. They attempted to present a broad picture of Urban Indigenous Peoples but lacked time to dive into deep discussions on sovereignty.

NA staff spoke of two tracks in the Urban IPD program, one on "culture," which covered the Indigenous content of the workshop, and the other on "restoration," which taught the restoration education curriculum. My analysis revealed that NA generally presents "culture" and "restoration" as separate and distinct although the program description speaks of integrating the two areas. The program and staff also do not explicitly identify the Western epistemological foundations of the curriculum program for their participants and consider it as complementary to Indigenous cultures and their varied epistemological connections to land. I problematized NA's tendency to present the restoration education curriculum as culturally neutral.

NA staff are aware of tensions that may change their mission and goals in the future depending upon how they position the restoration education approach relative to the perspectives, stories and expressed needs of the (Urban) Indigenous students and communities they wish to support. They have not completely unpacked the epistemological differences between the Indigenous and Western approaches to land care present in their professional development program and have not clearly articulated a unified vision for how they would like to help participants put these approaches into conversation with one another in their teaching.

Chapter four focused on the presentation by the white archaeologist and reactions to his representation of the history of local earthen mounds. The first question I examined in that chapter was: *What tensions need to be navigated to support educator learning in a science-*

related PD with an explicitly Indigenous cultural focus? Through the presentation and debrief about the earthen mounds, the Urban IPD program attendees received an unexpectedly direct set of lessons on the ways in which the approaches of Western researchers can conflict with Indigenous epistemologies. Despite his extensive experience working with First Nations and self-professed understanding of Indigenous cultural norms, the white archaeologist gave his presentation in a manner more consistent with his epistemologically Western scientific training, which contradicted the epistemological perspectives of many of the Indigenous attendees. For example, during his presentation the archaeologist privileged particular Western research methods and called for universal sharing of knowledge. Most of the Indigenous attendees, in contrast, held the Oral Histories and Knowledge of the Deer Valley People, the descendants of the mound builders, in the highest esteem. They humbly tempered and qualified when and how they spoke of what they know about the mounds and felt the archaeologist should have done the same. Unpacking the archaeologists' presentation through interviews with Indigenous individuals who work in the sciences also exposed the long-standing distrust many Indigenous Peoples have for WS and researchers due to exploitative interactions that contributed to genocide, cultural loss and other systemic injustices.

The second question in chapter four examined how the tensions mentioned above affected participant learning during the Urban IPD workshop. The episode about the earthen mounds became a teachable moment that allowed participants to begin to think about and discuss differences between the ways some Indigenous and Western people, especially in the sciences, work with and talk about knowledge. The NA staff wanted the Urban IPD participants to have an opportunity to recognize their own cultural and epistemological identities as part of a learning journey connected to the PD programming. In some respects, the tensions raised in this episode

helped them in this regard. However, some white participants in particular struggled to filter and process information from the white archaeologist when Indigenous attendees challenged his representation of IK. Some of them left the workshop feeling conflicted about the accuracy of what the archaeologist said about the mounds and what they could appropriately use in their own work as educators. Symptoms of White Fragility (DiAngelo, 2011), particularly silencing and censoring themselves during the workshop, interfered with some white participants' ability to engage in learning about the epistemological differences and reactions to injustices perpetrated by Western systems. In contrast, Participants of Color demonstrated coping skills to acknowledge and learn from the critiques of the archaeologist's presentation and still reported learning valuable information about the mounds.

A few conclusions emerged in regard to my third research question which considered the role of NA staff members in helping participants navigate the tensions brought up from the presentation and reaction to the archaeologist. First, Ruben, the Ponca intern's formal response to the participants after the presentation revealed the ways in which the Urban IPD program has the potential to provide *culturally responsive mentorship* for participants. Culturally responsive mentors help educators specifically focus on and learn about the assets, cultures and ways of knowing of Indigenous Peoples and point out places of conflict often go unnoticed by their non-Indigenous mentees (Tolbert, 2015; Zozakiewicz, 2010). Ruben's response helped participants begin to reflect on the dissonance between Western and Indigenous representations of knowledge and the ways in which Western scientists often clash with Indigenous Peoples through the ways they conduct their work. Deconstructing a presentation from a white archaeologist with an Indigenous cultural mentor helped to point out microaggressions, historical inaccuracies and differences in epistemology and cultural norms.

The manner in which the cultural mentoring occurred in this instance brought up differing views amongst NA instructors in terms of how to most constructively help participants work through uncomfortable conversations around the long-term effects of colonization and the ways people often stereotype and discriminate against Indigenous Peoples. During the focus group and follow-up interviews, the NA staff took the challenges from this experience and considered, but did not yet decide upon, appropriate ways to prepare and engage workshop participants in the future for these difficult, complex discussions. They understood the importance of including these conversations in the Urban IPD program to help participants learn a more accurate and complete picture of Indigenous People and to help participants on their learning journey of identity. In other IPD workshops, they leaned on Aubree to lead these conversations. Elizabeth expressed past participants' as well as her own appreciation for Aubree's open-ended, non-confrontational approach to discussing difficult issues. Aubree also preferred this approach. I noted that the preference for avoiding confrontational situations, while not always bad, may also be a symptom of White Fragility. I also problematized the reliance on Indigenous staff members to take full responsibility for mentoring participants and leading these types of difficult conversations.

The final issue of note that surfaced during the focus group with NA staff involved their reflection on the problematic decision to have this particular white archaeologist speak about earthen mounds. The NA staff and interns discussed whether or not to invite non-Indigenous people to represent "Indigenous" subjects in the future. As a whole they preferred Indigenous presenters for these topics. However, this preference begs a larger question of how to help participants consider how non-Indigenous educators could best represent this same knowledge to their students.

Implications for Nature Alliance

The Urban IPD workshop attempts to address an overwhelming number of goals. In addition to teaching ecological restoration education, NA staff aspire for participants to see Indigenous Peoples as diverse and complex. They also want educators to develop understanding of the common historical policies that affected who Indigenous Peoples are today, where they live, what they lost, and the possibilities of how they connect to the land. All of this cannot be taught in only three days. A sustained focus on a smaller number of goals makes for more effective professional development (Darling-Hammond et al., 2017). The NA staff must prioritize their goals for the program and find ways to sharpen and define their intention "to integrate Indigenous perspectives and experience with Nature Alliance's ecological restoration education programs." In particular they need to add specificity to their goal for participants "build on Indigenous knowledge, interests, practices, identities and worldviews of learners and communities."

A PD program like Urban IPD that focuses on both Indigenous culture, epistemology and history alongside WS techniques has the potential to help educators develop *critical multilogicality*. Kincheloe and Steinberg (2008) describe critical multilogicality as a way for educators to view the world through multiple lenses and use these different vantage points to understand the possible interpretations for a phenomenon (p. 138). Focusing on the subjugation of Indigenous epistemologies and histories in particular helps educators develop critical multilogicality because it uncovers the way knowledge is produced and legitimated (Kincheloe & Steinberg, 2008). Kincheloe and Steinberg envisioned this type of study as a way for educators to create a more just and inclusive world that works towards the self-determination of Indigenous Peoples (2008).

During my study, individual NA staff members demonstrated critical multilogicality in talking about different epistemological approaches to restoring or protecting the land. They articulated the differing perspectives of their First Nation's partners and understood why certain terms or approaches were more or less compatible with different communities' ways of knowing. The NA Director also recognized the lack of Indigenous perspectives in their restoration education curriculum and expressed a desire to change this.

Despite the ability of individual NA staff members to do critical multilogical work, the professional development programming of Urban IPD does not yet explicitly help educators develop critical multilogicality around the topic of restoration and land care. The program also invisibilizes the Western origins of their restoration education curriculum.

Just as Darian defaulted to his Western archaeology bias when speaking about the knowledge of Indigenous peoples, NA staff expressed a desire for keeping restoration, as taught in the curriculum, as the default for the program. Because they treat Western restoration as a default, they run the risk of elevating its value relative to the approaches of their Indigenous partners. The restoration education curriculum as the "restoration" track still represents NA's core epistemological approach to working on the land and they see it as universally compatible with all of their program partners.

They also continue to speak of and present the restoration approach as culturally neutral, maintaining the separate "culture" and "restoration" tracks in the program. The normative nature of the curriculum for the staff essentially silenced its cultural origins during the Urban IPD workshop. However, the approach is cultural:

> Any kind of scientific (i.e., empirical) inquiry—whether [in] Indigenous or sustainability sciences-is inseparable from a protocol…Protocols are attitudes about how to approach the world" (Whyte et al., 2016, p. 26).

The NA restoration education curriculum contains a set of socioculturally-developed tools, and those tools represent a particular history, a particular epistemological connection with nature and particular set of socio-cultural goals. While the curriculum has been taken up in many classrooms and other educational settings to guide restoration work, NA has not yet taken the opportunity to deeply examine the curriculum and look at it from an epistemological perspective. A more critical multilogical examination of that curriculum could help them better focus the program goals and decide the way in which they would like educators to think about "integrating" Indigenous perspectives with Western approaches to ecological restoration. One way to help participants consider ways to bring Indigenous perspectives into their teaching would be to explicitly point out the epistemologically Western origins of their restoration education curriculum and how it differs from those of Indigenous Partners.

It is imperative that as they do this work that they continue to keep a strong focus on sovereignty. "Acknowledging Indigenous homelands, peoples, and nations is an important practice of denaturalizing settlement and rethinking what it means to live within and with a sense of responsibility to Indigenous lands, peoples, and sovereignty (Sabzalian, 2019)." In their first year, NA staff attempted to teach about all Wisconsin First Nations, their nearest neighbors--the Deer Valley, and diverse Urban Indigenous peoples. This breadth took away opportunities to talk in depth about any one of those groups and the impacts of colonization. Finding ways to focus specifically on the land where the workshop occurs, might provide better means for critical multilogical discussions about a smaller subset of those Indigenous groups.

One way to help participants focus on issues of sovereignty for Urban Indigenous people and the neighboring First Nation(s) would be to examine the original land survey of the property where they plan to conduct a restoration. NA de-emphasized the importance of land surveys in their curriculum because they learned from Indigenous participants that the protocol was historically associated with the taking of Indigenous lands and reading those surveys was a reminder of that time period. Omitting the activity from the PD denied participants of all backgrounds an instructive opportunity to consider why different groups of people interpret the same protocol in completely different ways. If NA chose to bring up surveys in a critically multilogical way, they could let participants reason through why they may or may not want to use surveys in their work and how they might use them in educational settings. Having a written record of what grew on the land in the 1800s remains informative and provides one source of information about how the landscape looked in the past[22]; but the motivation for the creation of that land record involved Indian Removal policies. Returning those surveys to the curriculum and putting the creation and use of land surveys into a sociocultural context that examines them from both a Western and more importantly, an Indigenous perspective, would allow participants in Urban IPD to learn about history and US policy. They could focus on the impact of the specific First Nation that once inhabited that land and those that live there today. It would also help them think about the way in which Western ideas about scientific documentation and land use have long conflicted with the sovereignty of First Nations. These lessons would be directly connected to restoration, however, not separate.

[22] I am aware of the controversies surrounding the idea that it is not always ecologically feasible to "restore" an ecosystem to the way it was in the past and arbitrarily choosing that time period as a goal does not always make sense. I bring up this example because of the possibilities for complex, critical multilogical instruction.

As a small component of the broader Urban IPD program to learn about and care for the land from both Western and Indigenous perspectives, this type of discussion could help non-Indigenous educators develop more empathetic understandings of Indigenous perspectives and why they often distrust scientists and Western methods. Putting the Western restoration technique in sociocultural context alongside Indigenous perspectives on history, culture and sovereignty provides an opportunity to discuss both Indigenous and Western perspectives on equal footing. It reveals the problematic history of the survey protocol but allows participants to consider how using surveys might still serve a purpose when used in an appropriate way when planning an ecological restoration, alongside other tools and knowledge, as part of developing a richer sociocultural picture of the land. Talking about the benefits and drawbacks of using Western restoration tools in conjunction with Indigenous accounts and perspectives of the land "integrates" the two perspectives in a critical multilogical way. This approach aligns with the original goals of NA's Indigenous partners in creating the program (2014 IPD Baldwin Grant Report).

Similar opportunities to help participants explicitly unpack the relationship between the Indigenous and Western approaches to restoration arose during the Urban IPD workshop through the presentation from the wild rice researchers. Their work explicitly put epistemologies and techniques into conversation with one another. However, participants were not provided with an opportunity to unpack the critical multilogicality of how these researchers, who identify as Indigenous but work in an epistemologically Western University, approached their work.

The controversial presentation and reactions to the white archaeologist provided attendees at the Urban IPD workshop with opportunities to think about epistemological differences, whiteness, colonization, and systemic discrimination against Indigenous Peoples.

NA staff stated that they did not want to avoid speaking about these differences, but they wanted to reconsider the manner in which they create opportunities to make these comparisons and learn about contentious histories. This larger problem goes beyond the presence of cultural mentors who can catch unexpected missteps by presenters. It speaks to the need to plan out ways to explicitly name, critique and compare Western components of the workshop with Indigenous ones. NA staff could create these critically multilogical opportunities in the Urban IPD workshop both with speakers as well as in the printed restoration curriculum. Instead of separately presenting each perspective in an additive manner, the program could give participants repeated opportunities to decipher (King, 2004) how Western approaches to restoration differ epistemologically from those of their Indigenous partners, how differing epistemological relationships to the land provide different motivations for decision-making in land care and protection, and importantly, examine how elements within NA's restoration curriculum are connected historically to the injustices perpetrated against Indigenous People.

The incident with the white archaeologist raised important questions about who to invite as a speaker to represent the knowledge of Indigenous people, how to speak about the knowledge of Indigenous Peoples, and how to conduct discussions about the normative, invisible dominance of Western systems and how they harm Indigenous Peoples. Although NA staff prefer Indigenous presenters speak about the knowledge of Indigenous people, the advantage of hearing directly from an Indigenous person about a topic like the earthen mounds is not necessarily just what someone knows and which facts they will pass on to participants, but rather how they represent what they know and what they can teach participants about how to respectfully speak about the mounds themselves. It can also intentionally privilege the perspective on knowledge learned and shared through Indigenous practices over what is learned through Western ways of

gathering information. Whether or not this precludes a non-Indigenous presenter from speaking on the same topic is important to consider as this is a PD program for educators of varying backgrounds who will presumably teach these topics through their work.

Providing guidance for participants to consider not only the facts relayed, but also to identify and critique important elements of a representation of IK from a particular speaker, may help participants develop more accurate and empathetic representations for their own audiences. The episode with the archaeologist clearly revealed that participants require assistance to recognize epistemological differences between Indigenous and Western approaches to investigating the history of the land, and to determine how to speak about these differences and the knowledge that is uncovered in a respectful manner (Brown, 2017; Howard & Rodriguez-Minkoff, 2017; Lee et al., 2007, Parsons & Thompson Dorsey, 2015).

Ruben's formal response to the participants after the presentation revealed the ways in which the Urban IPD program has the potential to provide culturally responsive mentorship for participants. Cultural responsive mentoring has been shown to be critical for helping white participants recognize their biases and work towards transformative ways of teaching (Chinn, 2012; Poitras Pratt & Hanson, 2020; Sue, 2016; Tolbert, 2015). However, NA discussed the need to set up norms for conversation to help participants feel safe as they change their understanding about the impact of colonization on Indigenous Peoples and learn to recognize inappropriate or false understandings they once held. NA staff want participant to feel safe making mistakes. Finding additional assistance to learn to lead discussions to avoid or move past White Fragility, may help the program set up their workshops to better work through these barriers.

Planning out these lessons in advance and preparing participants for diving into uncomfortable conversations may also help create an environment where inaccurate or insensitive statements about Indigenous People can be discussed and corrected in a supportive learning environment that lessens symptoms of White Fragility that inhibit learning (DiAngelo, 2018; Sue, 2016). NA could also provide guidance for participants to consider the ways in which different tools, knowledge and epistemological approaches could respectfully be used together in an investigation of a piece of land when making decisions about its care. Rather than leaving these types of discussions to chance and unexpectedly uncomfortable moments like the ones that arose out of the earthen mound presentation, NA staff could intentionally cover the important epistemological differences, impacts of colonization and historical injustices in deliberate ways during the Urban IPD program.

Lastly, in unpacking the archaeologist incident and debrief, I also problematized Indigenous NA staff members taking on sole responsibility to mentor participants and help lead conversations about epistemological differences and impacts of colonization on Indigenous Peoples. Considering the overall burden placed on Indigenous staff during the planning and teaching of the Urban IPD workshop, the literature speaks to the role white people can play as allies and role models to unburden POC in these important discussions (DiAngelo, 2018; G. Howard, 2006; Sue, 2016). Indigenous and white mentors could serve complementary roles in the program in unpacking these complex issues.

The white NA staff members have demonstrated significant commitment and progress in developing multilogical epistemological knowledge and historical background of Federal Indian policy to step into a mentoring role. To date, however, it appears that they defer to Indigenous colleagues, whose voices and experiences they want to center in the program in these moments.

Discomfort and avoidance amongst the white NA staff members for leading uncomfortable discussions about impacts of colonization, whiteness and discrimination may be evidence of White Fragility (DiAngelo, 2018; Sue, 2016). The tendency to focus on building trust between groups of people and being nice to one another rather than entering into confrontations with speakers and participants can also be illustrative of this whiteness (DiAngelo, 2018). Howard (2006) speaks to white people's responsibility to take on these tough conversations themselves, and to help other white people identify and work through these issues. By leading some of these discussions, white NA staff members could not only relieve some of the burden for Indigenous colleagues, but also model ways for white educators to lead controversial conversations in their own work. NA staff should continue to discuss the roles and responsibilities of different individuals in the program and whether or not to share the responsibility for having discussions of epistemological difference, systemic racism and the long-term effects of colonization. If they decide to expand their critical multilogical critique of their curriculum and intentionally plan time to identify and discuss the epistemological perspective of different speakers, all of the staff will need to become comfortable leading these types of conversations.

Broader Implications

As science education research grapples with epistemological questions about what science is and what are considered legitimate science practices, this study provides an exemplar of one programs' attempt to expand the boundaries and bring other cultures and other ways of knowing the natural world into conversation with Western science in educational settings. Thinking about all that is involved in possibly expanding the science standards and creating critical multilogical dialogues between ways of knowing the world is a challenge, especially for the predominantly white science teaching force. This research provides some insights into the possible challenges in this work.

The barriers to bringing non-Western cultural ways of knowing into the classroom involve not only acknowledging cultural and epistemological differences, but also require a working knowledge of relevant history and policy. Focusing on epistemology revealed not only differences between ways groups of people generally explore and come to understand the world, but also exposed how past and present actions related to these epistemological orientations created and continue to cause ongoing tensions. The historical acts perpetrated by Western institutions impacted First Nations not only in the past but continue to deeply impact Indigenous Peoples lives to this day. Long-standing mistrust of Western institutions that harmed Indigenous Peoples for centuries cannot be overcome without significant ongoing efforts to rebuild relationships. Without a broader socio-cultural and historical understanding amongst educators of reasons behind the mistrust and a lack of understanding of the problematic nature of assimilationist policies, it will be difficult to overcome many of the exclusionary practices embedded in our educational system.

Teasing out and untangling the issues of whiteness, Indigeneity, epistemological dissonance between Western scientists and Indigenous Peoples, and the impacts of colonization from this particular workshop is instructive particularly for others working in science education professional development. This work adds to the small number of examples in the literature, particularly in the United States, that help educators grapple with ways to engage with the relationship between WS and IK.

This analysis pointed out a range of issues and criteria to consider for crafting science-oriented professional development experiences for educators aimed at creating critical multilogical comparisons with Indigenous Knowledge Systems. Professional developers in science education, especially non-Indigenous individuals, must ask epistemological questions

about their own assumptions and about the orientation of their field to develop a critical multilogical understanding of their subject matter before they can successfully design professional development opportunities for others (Adams et al., 2008; Kincheloe & Steinberg, 2008). Professional development organizers must examine their protocols to think about the sociocultural context in which they were developed, what assumptions they are making about the purpose of their work, and whose knowledge they are privileging when conducting an activity.

Developing this deep level of understanding requires collaboration with Indigenous partners. An important step towards creating effective collaborative relationships with Indigenous partners begins by listening to their concerns and finding ways to develop programs together that center and support those needs (Austin, 2011; Bishop et al., 2019; Burridge, Chodkiewicz, & Whalan, 2012; Chinn, 2008, 2012; Sabzalian, 2019; Tolbert, 2015). Working towards power-sharing, listening and open dialogue between partners in all aspects of the development and teaching of the professional development program provide the best chance for long-term success of developing a program that respectfully presents and critiques the different epistemological approaches within a content area (Bishop et al., 2019; Chinn, 2012; Sabzalian, 2019; Tolbert, 2015).

Deciding how to create a critical multilogical professional development experience for educators requires ongoing learning and reflection for all parties involved (Kincheloe & Steinberg, 2008). Non-Indigenous professional developers require culturally responsive mentoring in the same way as other educators[23], as learning to speak respectfully about the knowledge and experiences of Indigenous Peoples is a life-long learning process. Explicit deciphering of the work of the focal science field for a PD and any existing science curriculum

[23] In this context "educators" are the educational professionals who would be participants in a professional development.

(King, 2004; Gloria Ladson-Billings, 2018) should be done in collaboration with Indigenous partners who bring different epistemological perspectives, histories, motivations and interpretations to determine how different perspectives could be presented in a professional development program.

Professional development organizers who recognize and understand these complex sociocultural and epistemological differences can better set goals, plan content and create activities to help educators unpack these issues. Included within that content should be ongoing opportunities for participants to learn about the political, economic, and historical policies that led to the disparities and discrimination against Indigenous Peoples that exists today (Na'ilah Suad Nasir, Scott, Trujillo, & Hernández, 2016). In particular, programs should create spaces for learning and dialogue about sovereignty and Federal Indian policy and how they intersect with the science topic. Non-Indigenous, and especially white educators often lack a deep understanding of these histories (Hadley & Trechter, 2014; McInnes, 2017). Explicitly incorporating these subjects can help participants make connections between historical injustices and ongoing impacts of colonization that create inequity for Indigenous Peoples. Skipping these sociocultural and historical components of the story would leave participants with only a surface-level multicultural understanding of Indigenous and Western approaches to doing science and just see IK or techniques as added concepts for study (Sabzalian, 2019). Without a deeper examination of historical reasons for the hegemonic dominance of the Western approach to science, participants may not address the epistemological needs of their Indigenous students or work towards transformation of an unjust educational system (Sabzalian, 2019).

During the planning phase, professional development organizers should consider criteria for who to bring into professional development workshops to represent knowledges of

Indigenous Peoples in a way that is either epistemologically congruent with the knowledge of those Peoples or intentionally presents differing, yet respectful, epistemological approaches that can be critically compared. After presentations on these topics, organizers should build in time to help deconstruct, filter and analyze what participants are learning and experiencing to help educators develop a critical multilogical approach in their own thinking and teaching.

Participants need guidance to identify and unveil different epistemological perspectives and to critique ways they see the knowledge of Indigenous People represented. If professional developers can anticipate potential epistemological disagreements or incongruities related to the way knowledge is uncovered, shared and utilized from a critical multilogical approach, they can craft discussions to help participants unpack those differences. Anticipating disagreements or incongruities also involves an awareness that educators of different cultural backgrounds, be they white, Indigenous, or People of Color who are not Indigenous, may bring different relevant experiences and coping skills to bear to these difficult conversations, contributes to the complexity of that planning. The act of preparing these discussions should also help professional development leaders tackle unexpected episodes of epistemological dissonance or address inaccurate statements about the culture, knowledge or history of Indigenous Peoples.

Professional development leaders of all identities must do the work to become critical multilogical educators so they can serve as mentors to educators (Tolbert, 2015). While it is important to learn directly from Indigenous individuals and hear their perspectives, it is imperative that we not leave the burden to educate others on topics related to Indigenous culture, history, sovereignty and knowledge on Indigenous People alone (G. Howard, 2006; Kincheloe & Steinberg, 2008; Tolbert, 2015). Recognizing that all individuals bring different perspectives and experiences to professional development, and interpretations are fallible, non-Indigenous and

especially white professional development organizers must also learn to teach about these complex subjects. This includes preparing to lead uncomfortable conversations in a way that provides the guidance required for productive learning to occur about the history of colonization and destructive acts against Indigenous People. It also requires those who lead professional development to study ways to confront and navigate barriers of White Fragility (DiAngelo, 2018; G. Howard, 2006; Sue, 2016) so that majority white educators can transform their own teaching.

A Proposed Model for PD

In Chapter one I discussed how the process of helping non-Indigenous educators, who make up the vast majority of the teaching force, learn to identify the dominance of Western culture and epistemology in their science courses and learn to bring Indigenous perspectives into their classroom is a complex, long-term, iterative journey requiring mentoring, time for reflection and frank discussions around issues of whiteness (Baynes, 2016; Briggs, 2005; Chinn, 2008; Kanu, 2005; E. McKinley & Stewart, 2012; Tolbert, 2015).

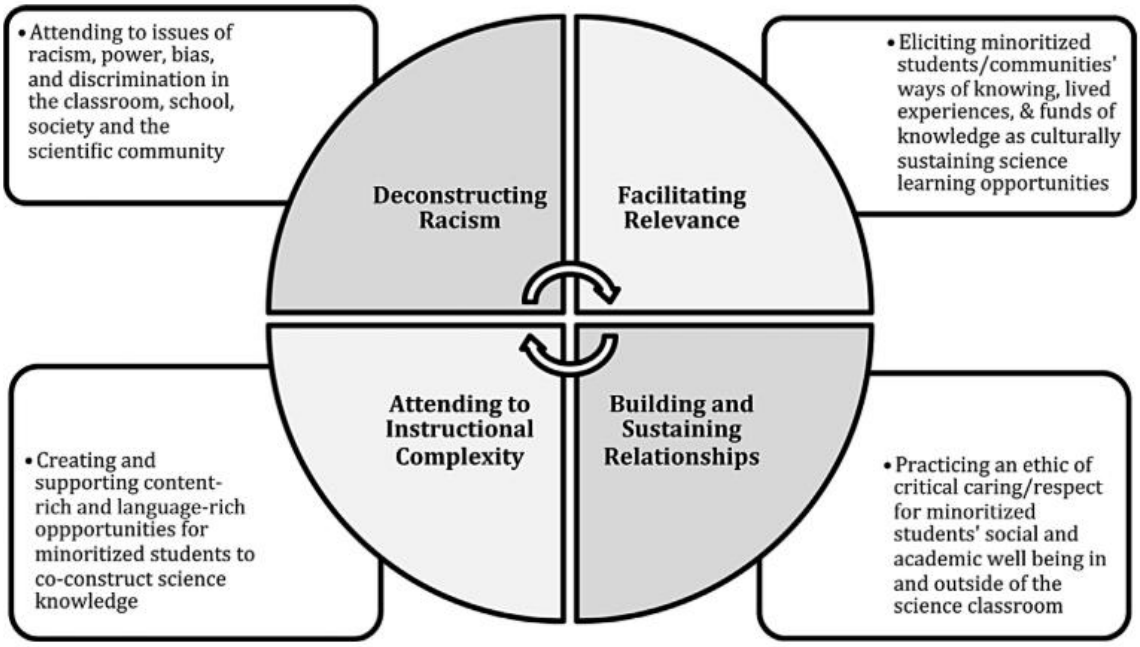
> Working with other forms of knowledge requires a capacity to first see the boundedness of Western epistemologies and knowledge systems and to then go beyond to other possibilities of knowing and understanding and thereby acting from multiple epistemological viewpoints (Austin, 2011, p. 169)

Finding ways to mentor educators to help them see ways in which Western systems hegemonically box in much of our educational work and begin to recognize the value of different epistemologies is an important part of that transformation. If one goal of professional development in science education is to help change the way our educational system teaches about Indigenous People, educators need to not only know historical facts and chunks of knowledge, but to also to be aware of and understand the epistemological differences that make

it difficult for students to thrive in an epistemologically Western school environment (Kanu, 2005; E. McKinley & Stewart, 2012; Tolbert, 2015). Intentionally putting educators into epistemologically challenging situations during PD may help them empathize with Indigenous students and better understand the scope of the problem so they can find solutions.

Tolbert (2015, p. 1351) proposed a framework for culturally responsible mentoring in science education with four themes that might be applied here: deconstruction of racism, facilitating relevance, attending to instructional complexity, and building and sustaining relationships (Figure 1). This type of program occurs inside the school with one-on-one mentorship for educators from an Indigenous mentor who provides year-long support.

Figure 1. A Framework for Culturally Responsive Mentoring in Science (Tolbert 2015, p 1351.)



Considering this framework on a broader scale, culturally responsive mentoring in these areas can also occur in other professional development venues. Educator mentoring is needed both in

schools on a microlevel to identify personal bias, incidents of racism and microaggressions committed against students, but also on a macro level to help develop curriculum in science, and other areas, that directly confronts sociocultural and political issues relevant to Indigenous students (Tolbert, 2015). To support her framework, Tolbert called for professional development to provide ongoing conversations for practicing teachers to discuss racism, relevance, relationships and instructional complexity (2015).

Programs like Urban IPD could be especially helpful in filling that niche because they provide time for practicing teachers with rare opportunities to work directly with Indigenous neighbors to intensively focus on these issues outside of the classroom in a supported way. NA's emphasis on land care and restoration provides one focal area for PD that help educators identify and attend to specific episodes of colonization, power, bias and discrimination. PD workshops like Urban IPD provide sociocultural contexts for the science content that help educators learn relevant epistemological differences between Indigenous and Western systems that could be brought back into educational settings and discussed for the benefit of all students. The staff members in these programs also model and facilitate ways to begin building caring and respectful long-term relationships with members of local Indigenous communities. If NA staff chose to decipher their restoration curriculum and find a way to bring out epistemological differences between Western and Indigenous approaches to land care, this would further allow their professional development to help participants attend to instructional complexity[24] and support Tolbert's full framework.

[24] Ongoing collaborations NA is involved outside the scope of this research may contribute to progress in facilitating this type of lesson planning.

While programs like Urban IPD in and of themselves are not sufficiently robust to fulfill all of the long-term goals proposed in this framework, they can play an important supporting role towards the forwarding of these ideas. The mentoring, relationship-building and micro and macro-level learning that is packed into a high-quality summer workshop, can be part of a larger collaborative system support of that addresses educator needs over the long term. Finding ways to create more collaborative professional development programs that directly connect educators to Indigenous mentors and community teachers in multiple contexts, and supporting the ongoing development of critical multilogical teaching, shows strong promise as one necessary component in transforming our educational system.

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Appendix 1: Nature Alliance Restoration Education Steps

Appendix 2: Semi-Structured Interview and Focus Group Questions

2.1 Semi-structured interview protocol for pre-workshop interview with NA staff

1. **What is your connection to NA, how long have you been with the program, what is your relationship to the IPD program?
    a. What motivates you, on a personal level, to engage in this work with teachers?
2. What was the motivation for offering the IPD version of the NA program? What are the goals for the Urban IPD and how are they different from previous IPD courses?
3. **How do you see WS and IK as alike and different?
4. **Do you think IK should play a role in the science classroom, (explain why) and if so, can you give an example of how IK might play a role in a science classroom?
    a. **What do you want teachers to understand about the relationship (similarities and differences?) between WS and IK?
        i. Probe if it is methods, type of knowledge, or something else
    b. How does your program help teachers understand this?
5. Thinking about elementary, middle and high school teachers who teach science, which experiences from the IPD PD are most impactful in terms of how participants view the relationship between science and IK? How do you know?
6. (**)Can you describe a time when teachers changed the way they taught science because of the IPD program? What was good and/or bad about that change?
7. (**)Can you describe a time when a teacher chose not to or struggled to include thinking and talking about IK in a science classroom?
    a. What was going on for them?
8. **What concerns do you have about how teachers talk about or integrate IK into their classroom (after finishing this program)?
    a. Follow-up: For those who teach science, do you have additional concerns about how they talk about or integrate the relationship between WS and IK?
9. What are the biggest challenges or limitations that concern you as you plan the Urban IPD program?
10. **Is there anything else of importance that you've come to recognize about the IPD program that we haven't yet talked about?

2.2 Semi-structured interview protocol with educators who complete the 3-day Urban IPD

1. Tell me about yourself, what do you teach and why you chose to take this Urban IPD course? (How many times have you taken the NA workshops?)
    a. Prompt: How does the course connect to your needs as an educator?
    b. Prompt: One of the focuses of this course is IK, how did that play a part in your decision?
    c. Prompt: Is there anything about your cultural identity that played a role in you choosing this course?
    d. Prompt: Is there anything about the cultural identity of the youth you work with that played a role in choosing this course?

2. Thinking about the workshop as a whole, which activities:
    a. Changed your thinking about science? – How and why?
    b. Changed your thinking about IK/IS—How and why?

3. You may have mentioned a little bit about this previously, but how do you think your understanding of the relationship between WS and IK or IS has changed as a result of taking this course? What parts of the Urban IPD workshop were most helpful for you to think about this in particular?
    a. Follow up: Where are you still left with questions? (mounds)
4. How will you approach teaching science differently based on what you learned in the workshop?
    a. (lead with this for a non-science person) Imagine you're walking back into your classroom to get ready for another year, what will you keep the same, what will you change based on this experience?
    b. How will you help students talk and think about the relationship between WS and IK?
5. How would the racial/cultural/ethnic demographics of your classroom influence how you might incorporate IK?

6. Open ended question to follow up with something I saw happen in the workshop either to them individually, or as a group—ask in open-ended way. Or ask about their reflection if I have it.

7. What concerns do you have about using what you learned in the Urban IPD program [or implementing your action plan] in the context where you normally work?
    a. Do you have concerns about helping students talk and learn about IK in your (science) classroom?
    b. No: Based on discussions in the workshop, do you feel like the science requirements (standards, curriculum) you work with should change? How?

8. Is there anything I didn't ask or that you didn't get a chance to explain that you want to tell me?

2.3 Semi-structured interview protocol for Urban IPD collaborators

1. **What is your connection to NA, how long have you been with the program, what is your relationship to the IPD program?
    a. What motivates you, on a personal level, to engage in this work with teachers?
2. **How do you see WS and IK as alike and different?
3. **Do you think IK should play a role in the science classroom, (explain why) and if so, can you give an example of how IK might play a role in a science classroom?
    a. **What do you want teachers to understand about the relationship (similarities and differences?) between WS and IK?
        i. How do you think non-Native teachers should approach teaching IK?
        ii. GS question
        How does the idea of authority play into the relationships between WS and IK? Especially for non Native science teachers working in a classroom?
4. (*)Can you describe a time when teachers changed the way they taught science because of the IPD program? What was good and/or bad about that change?
5. (*)Can you describe a time when a teacher chose not to or struggled to include thinking and talking about IK in a science classroom?
    a. What was going on for them?
6. **What concerns do you have about how teachers talk about (or think and learn about) or integrate IK into their classroom (after finishing this program)?
    a. Follow-up: For those who teach science, do you have additional concerns about how they talk about or integrate the relationship between WS and IK?
7. **Is there anything else of importance that you've come to recognize about the IPD program that we haven't yet talked about?

2.4 Question Protocol for Focus group with Nature Alliance staff after the Urban IPD

1. How did it go? Did you meet your goals? How do you know?
    a. (goals to represent urban youth as present, diverse, unique individuals, get to know neighbors, for teachers to go through personal identity journey, to learn about how to do a land restoration and connect to place)

2. How did the program help teachers navigate the relationships between WS and IS? What challenges arose?

3. Prompts: wild rice, prompt Darian and mounds
    a. Or: Which moments/activities from the workshop stick out in terms of educators grappling with the relationship between WS and IS? What did they learn?

4. During your meetings and interviews you mentioned about the struggle of teaching about restoration, Urban Indigenous people and Indigenous peoples of WI. Do you see the goals and approach of NA-IPD in general changing in coming years?

5. Only if time: What would you like to do or discuss with educators who attend follow-up trainings this year? Why?

2.5 Semi-structured interview protocol for individual NA staff after focus group

1. Is there anything that was not said in the focus group that you wanted to add? Perhaps something you did not agree with, something you were thinking about afterwards and wanted to add?

2. What did you personally learn about the relationship between WS and IK through planning for and teaching this workshop?

3. Some of you have used the term indigenizing science or indigenizing pedagogy as a possible goal for IPD. Is this something that you want for the IPD program? If so, how would that look? What does this mean to you? How would it look it practice? Is this possible?_

4. Where would you like to see the Urban IPD program go in the future? How would you like it to change?