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The Perceptions of Rural Teachers Engaged in Environmental Education Professional
Development Workshops: A Case Study of the Alder Creek Community Forest and the
Story of Your Place

by

Bryan R. Benz

A dissertation submitted in partial fulfillment of the
requirements for the degree of

Doctor of Education
in
Educational Leadership: Curriculum and Instruction

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Abstract

Environmental issues can be difficult for people to understand and for teachers to address in their classrooms. Issues such as climate change and ozone depletion are difficult to comprehend and present a challenge for most people to understand thoroughly the complexity of these environmental challenges. Professional development programs could provide the tools for teachers to improve their environmental literacy and a pathway for learning new methods for engaging their students. However, in rural Oregon, where professional development opportunities are scarce, teachers rely on a lean supply of organizations to provide these experiences. Alder Creek Community Forest, a nonprofit organization, provides opportunities for teachers to explore and to learn about the environment. Specifically, Alder Creek Community Forest collaborates with rural educators by facilitating workshops to help teachers integrate environmental education into a school's curriculum. My problem of practice was that teachers in rural areas have limited professional development opportunities related to environmental education. The purpose of the study was to describe the perceptions of teachers engaged in environmental education professional development workshops. I interviewed three teachers to capture their experience of participating in the environmental education curriculum with interviews before their participation, during their participation, and after they attended a minimum of two workshops. Results from my analysis offer insight into the lived experiences of three rural educators who participated in an environmental education curriculum. Their experiences contribute to this qualitative case study about

how an environmental education professional development program can improve environmental literacy.

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Chapter 1: Problem Statement

Environmental issues continue to become more complex and difficult for people to understand. Issues such as climate change and ozone depletion represent topics difficult to comprehend by most people because of the many factors involved with these topics. Not only are there issues with comprehending environmental knowledge across multiple disciplines, many people do not understand the social and environmental effects their actions have on the environment (Hollweg et al., 2011). As the complexity of environmental topics increases, providing members of society with meaningful environmental education can equip individuals with the knowledge to identify and address these complex environmental problems (Hayes et al., 2019; Tuncer et al., 2009). One method for addressing current and future environmental problems is to develop an environmentally literate citizenry that understands the seriousness of how the environment is changing and being impacted by current environmental practices (Charles, 1992; Hungerford & Peyton, 1976; Tuncer et al., 2009; UNESCO, 1977). With schools playing such a critical role in the development of future environmentally literate citizens, efforts should be made by those who run educational institutions to include environmental issues in the curriculum (Kim & Fortner, 2006). Because preservice teachers often receive little preparation regarding how to emphasize or incorporate environmental education into their future practice (Heimlich et al., 2004; Karaarslan et al., 2014; McKeown-Ice, 2000), in-service professional development may be a way to improve teacher's environmental literacy.

Researchers report that teachers do not have the environmental literacy necessary to teach environmental education (Amirshokoohi, 2010; Groves & Pugh, 1999; McKeown-Ice, 2000; Yates et al., 2019). Environmental literacy is a person's knowledge and understanding of their relationships in natural systems which is the desired outcome of environmental education (Oregon Environmental Literacy Task Force [OELP], 2013). Inservice professional development for teachers could provide a pathway for developing the environmental literacy of teachers and give them the opportunities to evolve within this complex field of learning (OELP, 2013).

Teachers still face several internal and external barriers that can hinder their professional development in the field of environmental education. Whether these barriers are real or perceived, external barriers such as having the time to attend professional development workshops or internal barriers such as the environmental content knowledge of teachers, prevent teachers from evolving in this field and presenting environmental topics in their classrooms (Ham & Sewing, 1988; Kim & Fortner, 2006). Internal barriers can also arise from the assumptions that adult teachers bring to their learning environment and how their personal experiences affect their learning new ideas and topics. Teachers may face additional barriers such as their comfort level when navigating between their professional development experiences and implementing their new insights and approaches with students. Compounding the comfort level of teachers is the sheer magnitude of attempting to integrate environmental education across multiple subject areas in schools. Plus, the complexity level associated with learning topics in this field makes it challenging for teachers to integrate environmental knowledge into their

curriculum (Carleton-Hug & Hug, 2010). In their study of different curricular models for interdisciplinary environmental education, Vincent and Focht (2011) noted that when teachers attempt the integration of environmental education across multiple programs, they may experience a loss of identity and confusion about who is supposed to teach which topic. Given the barriers teachers face with professional development activities and how their backgrounds affect their learning, teachers could help organizations to develop professional development better suited to their needs and advance their pathway to environmental literacy.

Professional development courses and workshops have long been recognized as a means to develop the knowledge of educators (Wood, 2001), yet many professional development options seem inadequate (Borko, 2004). Evaluations of professional development programs have shown methods used to develop teacher's knowledge that may provide insight for determining the effectiveness of professional development programs (Guskey, 2002a). Given the known gaps in the environmental content knowledge of educators (Robertson & Krugly-Smolska, 1997), many teachers continue to seek ways to improve their environmental literacy. However, when attending professional development workshops or attempting to integrate environmental topics in the classroom (Kim & Fortner, 2006), teachers face barriers which impede their efforts to promote environmental education in their classrooms. Examining the methods used when implementing professional development workshops and educators' perceptions of these methods, could help to identify instructional practices that benefit teachers.

Problem Description

Inservice professional development has the potential to enhance teachers' environmental literacy and promote the inclusion of environmental education topics into teachers' practice. However, teachers face several barriers when attending in-service education or when incorporating materials into an existing curriculum. In their research study, Ham and Sewing (1988) explored conceptual, logistical, educational, and attitudinal barriers to implementing environmental education in the classroom and recommended that in-service workshops target those areas to develop teachers' abilities related to implementation. Conceptual barriers often stem from a lack of consensus about the scope of environmental education and how to integrate across multiple courses (Ham & Sewing, 1988). Logistical barriers, such as time constraints of in-service teachers, limit their ability to develop new long-term solutions for developing effective teaching strategies (Knapp, 2000). Logistical barriers also play a significant role in rural areas where attending a workshop might require extensive travel and time. Educational barriers stemming from a teachers' perception of their competence with the material can also prevent an teacher with integrating environmental topics into their curriculum (Ham & Sewing, 1988). Attitudinal barriers may stem from the teacher's attitude about environmental education, and if their attitude is not positive, then the topic will not be discussed in their classroom (Ham & Sewing, 1988). The barriers identified by Ham and Sewing provide examples of the hurdle's teachers face when attempting to integrate environmental education into a curriculum and offer a focus for examining how in-service workshops affects teachers.

When faced with logistical and educational barriers, teachers may resort to adopting an “activity-guide mentality” to seek opportunities to provide daily or weekly lessons for environmental education (Knapp, 2000). The “activity-guided mentality” stems from an analysis of products created by organizations that provide a myriad of short-term materials, allowing teachers to have their lesson of the day; however, these activities do not represent a long-term investment in the behavior of the students or of the teachers (Knapp, 2000). When factors such as budgets or time constraints restrict a teacher’s ability to develop new environmental education materials, then activity-guides offer an option for presenting environmental topics. Recent research has shown that activity-guided programs are effective in terms of increasing a teacher’s knowledge of environmental education (McConney et al., 2000; Velardi et al., 2015; Weiser, 2012). Although support for activity-guided programs contrast with Knapp’s discussion, I agree with Knapp that more effort needs to be put into developing long-term solutions and investing in more substantial models. Although living in a rural area where professional development workshops are limited, I think in-service professional development could include learning about individualized activities and programs to help teachers augment their curriculum while seeking out long-term solutions. Nevertheless, investing in opportunities that address more of the barrier’s teachers face might provide a more effective opportunity for teachers to increase their environmental literacy in the United States, and particularly in rural areas of Oregon.

Context of the Problem

I acknowledge my bias in presenting narratives of my experiences to support my exploration of the context of the problem that teachers face with professional development workshops. While multiple lenses exist to view any given situation, I present my own lived experience within the rural community to put my problem of practice into context. In my exploration of the methods used in environmental education workshops, I witnessed how the methods affected the teachers' ability to learn the content. My own experience supports a discussion of professional development focused on environmental education. To affect teachers' learning effectively, I contend that the professional development facilitator needs to build upon the teachers' background knowledge.

I recognize that most teachers' expertise relates to pedagogy, but I argue that teachers should have a more developed understanding of environmental topics. Because teachers develop the next generation of environmentally literate students, they need a thorough understanding of the topics they teach. In my conversations with some teachers, I noticed a gap in what I thought was common knowledge about environmental topics. These conversations with teachers made me aware of my own bias when facilitating workshops and gave me a deeper appreciation for understanding the roles of those participating in the workshops. When conducting research about environmental education, I need to remain aware of my own personal biases and perceptions of teachers.

The natural environment plays such a vital role in the economy of Oregon that it is necessary to prepare the next generation of students to maintain—or improve—the

environmental legacy in this state (OELP, 2013). Unfortunately, many of the youth in Oregon are disconnected from the natural world and have little understanding of how humans are connected to the environment (OELP, 2013). Working with teachers to develop the tools necessary to connect students with nature is vital for creating lifelong stewards of the environment. During the past 11 years as a botanist with the U.S. Forest Service (USFS), I have presented environmental lectures, facilitated activities for local high school and middle school classes, and worked in collaboration with non-traditional and traditional classroom teachers. The non-traditional teachers I have worked with represent various non-governmental organization such as Oregon Youth Conservation Corps, Douglas County museum, Glide wildflower show, Wolf Creek Job Corps, and other similar organizations. Many of the educational activities were single-day events that focused on presenting topics related to botany, various field data collection methods, and natural resource-centered topics. Similar to workshops I have attended, when I facilitated a workshop, I focused on the content, rather than the teachers or students who the process would affect.

Illustrating my views about the teaching methods used to educate in-service teachers is my experience attending a series of STEAM (Science, Technology, Engineering, Art, Mathematics) seminars during summer 2015. During one of the sessions, a guest lecturer gave a talk on botany and the “doctrine of signatures.” Given my professional background in botany, I knew the lecture about plant morphology was adequate. However, when the guest lecturer launched into the doctrine of signatures, I felt disheartened by the lecturer’s use of this topic to educate teachers at a professional

development workshop. In brief, the doctrine of signatures is a premise that the basic look of plants dictates its use for treating ailments or diseases. A common example used by supporters of the doctrine of signatures is the shape and look of a carrot: when cut in cross-section the cross-section of a carrot resembles an eye, and is therefore, helpful with improving one's vision. While carrots are high in vitamin A, many other vegetables are beneficial for maintaining good vision and their shape does not match that of an eye. When the instructor presented the doctrine of signatures, I felt a sense of outrage! I recognize that other communities, ethnicities, or cultures might disagree with me, but through my own lens, I felt the instructor presented out-of-date views of the natural world; for me, this was unacceptable. From my perspective, not only does the doctrine of signatures represent an outdated view, but it also continues to increase the gap of teachers' environmental literacy.

While the presentation of outdated views represented an isolated incidence, the teachers did not seem to note any discrepancy or inaccuracy in the content presented. For me, the problem was that the teachers were unaware of inaccuracies in the professional development workshop and the potential of these inaccuracies to influence their learning. When professional development facilitators used outdated information about the natural world, then I questioned the direction of in-service education.

As stated previously, I acknowledge my personal and professional bias in this example. Yet, it also causes me to wonder how the material presented affected the other teachers attending the workshop. In this instance, adversity breeds change and spurs my motivation to make a difference in the field of environmental education by presenting

accurate information to teachers and to gain insight from those attending the workshops. For this reason, I continue to look for ways to improve the quality of professional development workshops.

The context of Oregon presents many opportunities to explore and to learn about the natural world—from the urban center of Portland where parks abound to the most remote school district where nature is literally in the backyard of the schools. Throughout Oregon, many federal, state, and private organizations promote environmental education and there are many positive things happening in Oregon that promote environmental education. The larger city centers in Oregon provide more opportunities to participate in environmental education, through the sheer number of private organizations that promote environmental education, than their rural partners such as those in Douglas County.

Every rural community is unique and has certain social, economic, or environmental issues that contribute to the complexity of the community (Avery, 2013; Theodori, 2004). Some suggest that all rural communities are alike, while others note the uniqueness of rural communities and their culture (Avery, 2013; Boyer, 2006; Schafft, 2016; Schafft & Jackson, 2010). The rural community where I frame my problem of practice may have similarities to other rural areas in Oregon, or other parts of the country; however, this particular rural community lacks many of the environmental programs found elsewhere in the state. For example, in 2016, voters in Oregon passed Ballot Measure 99 that would provide funding for all fifth or sixth grade students to attend a week-long outdoor school program. In Douglas County, Oregon only five elementary schools of approximately 30 elementary schools participated in outdoor activities during

the 2017-2018 school years (Oregon State University [OSU], 2018). In these five schools, one person heads the efforts to promote outdoor school in her school, and she is doing this without additional outside support. In an informal survey of my college students who grew up in the area, I asked them about their participation in outdoor school. Of the 50 students surveyed, only five had participated in outdoor education during the fifth or sixth grades. Of these five students, three of the students had only a one-day outdoor event as their “outdoor school” experience. While resources are available in Oregon, those resources do not reach all rural areas.

While rural areas lack private, environmental organizations as resources, in comparison to more populated areas, the governmental agencies’ presence in smaller communities can help fill the void. For example, in Douglas County, Oregon, the U.S. Forest Service offers a speaker’s bureau where resource specialists are available to give presentations on various natural resource topics to educational institutions in support of K-12 curricula. Through my firsthand experiences, I know that few schools in this area have contacted the U.S. Forest Service to take advantage of this opportunity; many teachers do not know of the availability of this resource.

One available resource in Douglas County is the Alder Creek Community Forest (ACCF). Since the late 1990s, this organization has provided environmental education opportunities for students and teachers. Now, ACCF is in the process of developing a new program to enhance their story of place. This process involves teacher workshops in support of the Story of Your Place and can range in topics from how to collect environmental data to classroom learning about spatially explicit data using Geographic

Information System (GIS) as well as work with teachers to provide direct feedback with their activities. The Story of Your Place focuses on investigating the physical and biological characteristics, while weaving in historical, cultural, and other characteristics in the communities where people live. Although potential resources exist for professional development activities in rural communities, the challenge is finding individuals with a background in environmental education to facilitate the learning experience.

Validation that the Problem Exists

In their work to explore teachers' gaps in environmental education knowledge and practice, Robertson and Krugly-Smolka (1997) discussed how educators' skills lie in the field of teaching pedagogy and not in environmental education. Similar to Robertson and Krugly-Smolka's findings, other researchers have found that teachers are lacking in environmental knowledge and as such, cannot use their pedagogical methods for teaching environmental education (Pedretti & Nazir, 2014). The problem of teachers not being well-prepared to integrate environmental topics has been evident in some of the educational seminars I attended; however, my attendance provided only anecdotal evidence of a larger problem with the professional development of teachers in the environmental education field. I posited that had in-service education program had the potential to provide effective opportunities for the future development of teachers' environmental literacy.

In her study of teacher quality and student achievement, Darling-Hammond (2000) used multiple data sources, including a 50-state survey of policies, state case study analyses, the 1993-94 Schools and Staffing Surveys (SASS), and the National

Assessment of Educational Progress (NAEP). She reported no consistent relationship between the measure of the subject matter knowledge of a teacher and teacher's performance as measured by student outcomes. Darling-Hammond also suggested that the mixed results of these studies might relate to the teachers' pedagogical skills augmenting the subject matter knowledge and may not be reflective of the actual subject matter knowledge of the teachers. For example, Byrne (1983) reviewed 30 studies on the relationship between subject matter knowledge and teacher effectiveness as it relates to student achievement. In Byrne's examination, 17 of the studies showed a positive relationship, and 14 showed no relationship between subject matter knowledge and teacher effectiveness. In another study, Ashton and Crocker (1987) reviewed 14 studies and found that only five exhibited a positive relationship between the subject matter content knowledge of a teacher and teacher performance as measured by student achievement. A study by Chen et al. (2020) examined the subject matter knowledge of teachers, and knowledge of students' misconception, as determined by post-test performance of their students. Seventy-nine biology teachers and 2749 students participated in the study by Chen et al. and the experiment demonstrated an effect where teachers' subject matter knowledge, and understanding the knowledge of students' misconceptions, influenced the ability of teachers to more rapidly adopt appropriate pedagogies for the benefit of students understanding of the knowledge. Although the studies by Darling-Hammond, Byrne, Ashton and Crocker, and Chen et al. reflected the differences between pedagogical and subject matter knowledge, these studies help to

validate the problem with teacher professional development and the need for other solutions to support teachers.

Other studies that focus more specifically on examining the professional development of teachers, speak to the need for finding better methods and available opportunities for teachers to participate. For example, a comprehensive review of 1300 studies examining the effect of professional development on student achievement found that only nine of the studies met the standards outlined in the No Child Left Behind Act of 2001 (Yoon et al., 2007). Inconsistencies on the benefits of professional development are presented in comprehensive reviews such as conducted by (Ashton & Crocker, 1987; Byrne, 1983; Yoon et al., 2007) and provide evidence to support the need for additional teacher education. These examples present a view on the larger and sometimes conflicting nature, of the need for more effective professional development. Some of these examples are specific to the environmental education field, while others are not. Nevertheless, they offer unambiguous evidence that teachers need opportunities for professional development to benefit the students they teach.

Statement of the Research Problem

In-service professional development workshops and seminars are standard practice for developing teachers, yet there is a shortage of high quality professional development programs across all disciplines (Borko, 2004; Carleton-Hug & Hug, 2010; Wood, 2001; Yoon et al., 2007). Although evidence indicates that professional development leads to teacher improvement and student learning (Borko, 2004), teachers continue to face many internal and external barriers for integrating environmental

education into their curriculum. Focusing on the perceptions of teachers participating in professional development workshops and seminars could provide more effective methods for developing the subject matter knowledge necessary to benefit teachers in their classrooms (Avalos, 2011; Kleinsasser, 2014; Meister, 2010). If teachers continue to strive towards expanding their base knowledge of environmental issues (content knowledge), and know how to teach environmental issues (pedagogical knowledge), then they will teach the issues more often and more accurately (Kim & Fortner, 2006).

In the past, teachers have paid little attention to evaluating the effectiveness of their professional development efforts (Guskey, 2002a), and little research has been conducted about professional development in environmental education. The scarcity of evaluation in environmental education was surprising given that most environmental teachers have embraced a practitioner orientation and have remained passionate about helping their students understand (Carleton-Hug & Hug, 2010). Carleton-Hug and Hug (2010) discussed how the field of environmental education would benefit from greater attention to evaluation and the dissemination of the findings to a larger audience as a way to strengthen the preparation of environmental teachers. Thus, Carleton-Hug and Hug's work aligns well with the purpose of my study and supports a formative evaluation process to make decisions about a program based on value and merit.

Significance of the Research Problem

Many problems exist with integrating environmental education into a schools' agenda when there is a limited curricular focus on environmental education (Gruenewald & Manteaw, 2007). Incorporating environmental education into an already-existing

curriculum might require additional and continuing professional development for teachers. Unfortunately, many approaches to professional development and some in-service trainings have been characterized as highly superficial, or “spray on” workshops presented by consultants with little long-term benefits (Loughran, 2014). Findings such as Loughrans’ (2014) illustrate that one-time workshops do not really have any lasting effect, so the focus needs to be on longer-term professional development for environmental education (Garet et al., 2001; Guskey, 2002b). The lack of environmental education professional development programs in rural areas of Oregon makes it difficult for teachers to benefit from the available short-term workshops. However, environmental education organizations in rural Oregon could provide a step in the right direction by delivering professional development models focused on environment themes or long-term goals. To develop professionally as an educator, according to Loughran, is about teachers learning how to learn.

The fact that Douglas County, Oregon, is a rural community with many economically depressed areas, presents additional challenges and barriers to teachers attempting to incorporate environmental education into a curriculum. Douglas County is similar to many rural areas in Oregon facing comparable challenges. In discussion with five high school administrators in the Douglas county school districts, most expressed that their districts’ professional development centered on working with children experiencing poverty and not on environmental education. When schools or districts focus inservice teachers’ education on meeting the basic needs of their students, it can be difficult for the school to justify the expenditure on educator’s time in non-related topics.

Addressing the needs of children experiencing poverty through in-service education in a rural county presents a barrier faced by teachers who live in rural parts of Oregon in comparison to areas of less poverty. When teachers spend time attending professional development to meet the basic needs of their students, focusing on other subject matters—such as environmental education—could be difficult for teachers to appreciate (Nolet, 2009). Differences in a school's focus on professional development, governing structures, and most teachers' pedagogical knowledge may be at odds with the cultural and pedagogical goals of environmental education (Gruenewald & Manteaw, 2007). Nevertheless, I know teachers who are champions of pulling other teachers together and providing motivation for others to develop their knowledge further through educational opportunities. These champions of education not only support their fellow teachers, but they also have the potential to help gain support from their current administration when looking to integrate subject matter. I know administrators who supported their teachers in pursuing environmental education opportunities; yet they reported that addressing the needs of working with children experiencing poverty to be a more pressing issue. However, teachers can incorporate environmental education into the curriculum and use it as a tool to address the basic needs of students facing economic hardships. Many vulnerable groups like children who face economic hardship will face the brunt of environmental degradation and will only add to the pressures already faced by these groups (Anderson, 2012). Incorporating environmental education and getting children out in nature has shown to not only increase academic scores across multiple subject areas, but also improve children's cognitive development, self-esteem, problem solving, and

motivation to learn (Louv, 2007). Exploring the perceptions of teachers and how professional development programs helps teachers to overcome some of the barriers they face with professional development, might provide insight on how to conduct better professional development workshops focused on environmental education.

Few organizations in Douglas County, Oregon provide opportunities to integrate environmental education across a school's curriculum. The ACCF is one organization working with schools in Douglas County to integrate environmental education into the school's curriculum through a program designated as a Story of Your Place. In 2018, the ACCF launched the Story of Your Place in partnership with the Center for Geography Education in Oregon (C-GEO). ACCF works with K-12 teachers at their schools and provides additional professional development at the ACCF site and other community venues such as the Douglas County Museum and the Roseburg Library in support of the Story of Your Place. The Story of Your Place seeks to cultivate a K-12 geographical imagination by putting places into context via spatial patterns, process, scale, and integration. To continue the development of the Story of Your Place, the ACCF is developing a program using a National Geographic curriculum to help teachers and students with telling a story of their place.

Presentation of Methods and Research Questions

The purpose of the study was to describe the perceptions of teachers engaged in environmental education professional development workshops designed to develop a sense of place. Two specific reasons prompted my exploration of teachers' professional development regarding environmental education. First, teacher professional development

has been an essential element to introduce environmental education into the curriculum (Álvarez-García et al., 2015). Second, evaluation of professional development programs could inform efforts of integrating environmental education into a curriculum (Carleton-Hug & Hug, 2010). For these reasons, I investigated the ACCF professional development workshops to provide a formative analysis of the perceptions of teachers' participating in the ACCF professional development workshops. To inform the development of the Story of Your Place program, I conducted a qualitative single case study (Yin, 2009) to describe and explain how teachers' perceptions have been influenced by participating in a professional development program in rural Douglas County, Oregon.

I used a single-case study design to describe the experiences of teachers participating within the context of the program. The results have the potential to inform ACCF in the continued development of their Story of Your Place. In this case study, the ACCF organization, is the bounded system which I use to describe and explain the teacher's perception of participating in the workshops that support the Story of Your Place. I gathered information for this study in two phases. The first phase consisted of open-ended questions to gather participants' demographic information and to help determine those who would be interested in participating in more in-depth interviews during the second phase of the study. Then, I conducted the second phase of the research project using a series of three interviews (Seidman, 2013) to focus on the perceptions of participating in a professional development program. I selected participants for the second phase of the study after I analyzed the results of the demographic survey.

Each interview focused on the perceptions of teacher's participating in the ACCF professional development program workshops. One of the goals of my research was to conduct interviews with rural teachers during various stages of involvement with the program. Teachers from the rural schools represent a range of teaching levels. Using the framework of the Story of Your Place program, I explored my problem of practice regarding rural teachers' in Oregon having limited professional development opportunities that focus on integrating environmental education into their curricula. Findings could inform the development of a more effective the Story of Your Place program as well as alternative solutions to teaching environmental concepts in rural schools. Results of this qualitative case study may also benefit the ACCF program by revealing how their program affects teachers,' which could in turn, inform their instructional methods for future schools and teachers participating in the ACCF program. The following research questions guided this study:

1. What are the perceptions of teachers' participating in workshops focused on an environmental education professional development program?
2. How does a story of place in an environmental education professional development program help teachers improve their environmental literacy?
3. How are teachers' beliefs about the environment and a sense of place supported by the Alder Creek Community Forest (ACCF) program?

Definitions of Key Concepts

In this section, I identify key terms relevant to my problem of practice. These terms include environmental education, environmental literacy, professional development, and case study.

Environmental Education

Environmental education is a process allowing people to explore environmental issues and to develop a greater understanding and knowledge of the environment (Environmental Protection Agency, 2017). The ultimate goal for environmental education is to provide a pathway of understanding with the goal of making harmonious decisions in the world around us (UNESCO, 1977).

Environmental literacy

The Oregon Environmental Literacy Task Force (OELP, 2013) developed a specific definition for environmental literacy: “An individual’s understanding, skills and motivation to make responsible decisions that consider his or her relationships to natural systems, communities and future generation” (p. 4). Given the definition’s statewide use and clarity, I adopted it for my study.

Professional Development

Professional development for teachers is a widely accepted approach for improving teaching and learning in schools through inservice training (Quint, 2011). According to Avalos (2011), professional development is the ability of teacher’s learning how to transform their knowledge into practice for the benefit of the student. In my

problem of practice, professional development refers to the in-service educational opportunities used to increase the environmental literacy of teachers in Douglas County.

Case Study

In the context of my research, I use the term case study to reference a qualitative research design. A qualitative case study uses an inductive strategy to search for the meaning and understanding of the issue being studied where the researcher is the primary instrument of data collections and analysis (Merriam & Tisdell, 2016; Yin, 2009). Using an in-depth description and analysis within a bounded system, a case study can provide a rich descriptive product of the participants involved with the research (Merriam & Tisdell, 2016; Yin, 2009). Within the context of my research, the bounded system is the ACCF program and the teachers represent the phenomena studied within the context of their participation in the program.

Summary

In Chapter 1, I described my problem of practice that there are limited professional development opportunities related to environmental education in rural Oregon. I noted the purpose of my proposed study is to describe the teachers' perceptions of environmental education professional development program opportunities. I concluded the chapter with definitions of the key concepts associated with the proposed study. In the next chapter, Chapter 2, I present my theoretical framework, a review of the research literature, and the methodological literature related to my study.

Chapter 2: Literature Review

The benefits from professional development improving educator's knowledge has been well documented (Avalos, 2011; Gore et al., 2017; Guskey, 2002b; Korthagen, 2010; Loughran, 2014). However, many professional development workshops have not met the demands to make lasting improvements on the knowledge of teachers. Even if teachers were interested in improving their knowledge in a content area, they faced many internal and external barriers that inhibit their implementation of new knowledge in the classroom. Working with an organization that provided environmentally-focused professional development, such as ACCF, afforded me the opportunity to explore the perceptions of teachers' participation in a professional development program. This study described the perceptions of teachers engaged in environmental education professional development workshops designed to develop a sense of place

Theoretical Framework

The professional development of teachers is essential for improving schools (Borko, 2004; Korthagen, 2010; Li et al., 2019) and looking at long-term solutions to develop teachers is crucial for preparing the next generation of environmental stewards. By developing the next generation of environmental stewards, Oregonians position themselves to have a generation of stewards to the environment with the knowledge to address environmental issues. Every year, schools, districts, and the government spend millions of dollars on different forms of professional development but may not take into account what we know about teachers' learning and how they learn (Appova & Arbaugh, 2018; Borko, 2004). In this section, I describe situated learning theory to support the

discussion of professional development and the field of environmental education. I also use situated learning theory as a lens for examining the ACCF program and the ways that social structure and interactions within a community of teachers effect the process.

Situated Learning Theory

Situated learning theory provides a lens to understanding how teachers are integrating learning within a socially constructed context in comparison to a more traditional form of professional development where teacher learning is abstract and conducted out of context for the learner. Situated learning theorists consider learning to be both an individual and a collaborative event where teachers are influenced by different school cultures, traditions, and social contexts (Avalos, 2011; Gregory & Oliver, 2018). Learning takes place through the relationships developed by the people participating and by connecting prior knowledge within a contextual setting.

Looking at learning as the acquisition of knowledge, Wenger (1998) put learning into the context of the social relationships and recognized that learning is not merely the acquisition of knowledge from one individual to another. When contextualized, learning was an integral part of the generative social practice in the lived world and depended on the way the material is learned while making it easier to apply and incorporate knowledge in the classroom (Anderson et al., 1996a). Therefore, when conducting professional development activities in the context of the school environment and the combined culture of a community of educators, the material should have an added benefit to the educator's instruction and learning. Wenger (1998) treated learning as changing participation in practice which is developed and changed through social relationships. By integrating

learning in a situational context for the teachers participating in the stewardship program, there should be a smoother transition of incorporating the learned knowledge of novice teachers into the realm of expert learners.

Communities of practice can be found nearly anywhere, and individuals may participate frequently in a number of different communities (Wenger, 2007). Whether these communities exist at home, work, or school, members are sometimes at the core of the groups, and sometimes at the fringes (Wenger, 1998). Within the context of developing a story of place, the professional development program works to build a community of educators—one organized around a particular area of knowledge. The ultimate goal of the ACCF is to develop a network of educators across Oregon to share the Story of Your Place. The relationships developed during professional development experiences, when educators are part of the same community, could help them develop relationships that extend beyond the parameters of the professional development program itself and carry forward into their daily practice.

Peripheral participation and learning can lead to the creation of a community of practice where knowledge is co-constructed and embedded in a situated learning environment. The social co-participation of the learning environment removes the notion of learning being just the transmission of knowledge from facilitator to student, and presents the learning as an embedded and active process (Gawande & Al-senaidi, 2015). The situated learning environment includes the processes by which newcomers become part of the community of practice (Wenger, 1998). Much like the methods used to

develop a story of place, teachers are learning in an environment where the process is as important to learning as the content.

Implications of Situated Learning Theory

Learning is the relationship between people, educators work so that people can become participants in communities of practice, and there is an intimate connection between knowledge and activity. These implications are viewed as an activity where the central defining characteristic is the process called legitimate peripheral participation (Wenger, 2007).

The ACCF program seeks to create a community of educators by bringing them together through a story of place and to develop their sense of place by participating in a professional development program. Through this program, ACCF will work with a community of educators to navigate the process of integrating environmental education using a socially constructed environment. The community of educators involved with this program will consist of rural teachers within several school districts across Douglas County.

Critique of Situated Learning Theory. According to Fenwick (2000) pedagogical theories can be read as either a prescriptive basis for instructional design and intervention or, as an interpretive tool for understanding learning environments. In this section, I review situated learning theory as an interpretive tool for understanding the learning environment.

With any type of classification system found with learning theories, the classifier derived the classification from their perspective. As such, the classifiers viewpoint

arranged the world according to their preferred order and viewpoint (Fenwick, 2000).

Wenger (1998) emphasized that much of what is learned is specific to the situation in which it is learned, and the learning takes place within a community of practice.

However, many scholars have characterized the learning process as a method consisting of both individual and sociocultural features used to construct the process of learning, and not just within a community of practice (Borko, 2004; Cobb, 1994; Driver, 1994). Using a lens of situated learning to view the community of practice, could leave out other dimensions and interactions among the learners. These dimensions could range from a critical cultural perspective where determining the flow of power and how it influenced individual's participation to a constructivist lens where the situated perspective was thought to overstate the importance that knowledge is context dependent (Fenwick, 2000). As with any lens, it could be inherently difficult to apply any single dimension to interpret multiple perspectives (Fenwick, 2000).

One element of Lave and Wenger's (1991) situated learning theory was that the actions of learning were grounded in the context of where they were learned. However, not all knowledge has been specific to the situation in which it was learned (Anderson et al., 1996b). Lave and Wenger (1991) as well as Carraher et al. (1985) presented examples of individuals who could use mathematics on the street but did not do well in a school context. Lave and Wenger's study was of homemakers using math to purchase grocery store items, and Carraher et al.'s study was of Brazilian street youth who used math to make sales on the street. Both studies demonstrated that the individuals did not do perform mathematics very well in a classroom setting. As evidenced in their two

examples, Lave and Wenger and Carraher et al. viewed learning as occurring in a particular context. However, their studies demonstrated that skills learned in a real world context did not necessarily transfer to an academic environment (Anderson et al., 1996a).

Another tenet of situated learning theory was that newcomer's were socialized into a community of practice through peripheral participation (Lave & Wenger, 1991). Cox (2005) questioned the legitimation of participation in Lave and Wenger's work and did not think that the theory adequately explained all of the power forces within a community. Social, cultural, race, class, and gender relations have been ignored in situated learning theories, and these relationships could have determined the flow of power and the ability of individuals to participate meaningfully in a particular practice (Fenwick, 2000). Other researchers such as Fox (2000) attempted to provide a more detailed conceptualization of the process for legitimation as a power struggle using actor network theory. At some point in participation of a community of practice, participants have needed to determine whose voice has the greatest influence over the direction of the system (Fenwick, 2000). The flow of power, whether prompted by social, cultural, or other demographics, had the potential to cause conflict between the individuals participating in the process. Comparatively examining different perspectives could enlighten the researcher and provide valuable insight about the experiences of the learner (Fenwick, 2000).

Review of the Research Literature

In this section, I focus on the relevant literature supporting the exploration of examining the perceptions of a professional development program on teachers in a rural

setting to improve the teacher's developmental experience. Topics in this section address environmental literacy and education, a story of place, and the professional development of teachers.

Environmental Literacy

Historically, an overall goal of education has been to increase the literacy of society often defined by the ability of an individual to read and write (Moseley, 2000). During the 1980s and 1990s, the classic definition of literacy had been extended in scope to include several interest areas such as science literacy, computer literacy, and environmental literacy (Moseley, 2000). Over time, environmental education programs and organizations have advanced a wide range of goals contributing to the enhancement of environmental literacy participants (Stern et al., 2014). Drawing from the work of the Oregon Environmental Literacy Plan [OELP] (2013), I used the term "environmental literacy" to refer to an individual's understanding of environmental topics and the way understanding influences an educator's instruction.

Environmental Education

In this section, I focus my discussion of environmental education and environmental literacy, relying heavily on North American Association for Environmental Education (NAAEE) and the Oregon Environmental Literacy Plan (OELP) guidelines and definitions to support my review of the environmental education literature. Many researchers and practitioners of environmental education recognize these two organizations, NAAEE and OELP because they provide a source of expertise and information in the environmental education field. Environmental education is a learning

process designed to increase people's knowledge and awareness about the environment and prepares learners to be environmentally literate citizens (UNESCO, 1977). As teachers and students continue to understand the interrelationships between the environment, society, and the economy, it is necessary to move forward with educating the next generation of environmental stewards to develop an environmentally literate citizenry (OELP, 2013).

To move forward with developing an environmentally literate citizenry, a framework for promoting environmental education needed to be developed. The North American Association for Environmental Education (NAAEE), in concert with the hundreds of people involved with the environmental education field, developed consensus-based guidelines for developing the goal of environmental literacy in their *Guidelines for Excellence* publications (NAAEE [North American Association for Environmental], 2012). The NAAEE guidelines for excellence provided a framework for developing quality environmental education programs that help to build an environmental literate citizenry. The guidelines for excellence as set forth by the NAAEE provided a set of recommendations about the knowledge requirements for educators to provide high quality environmental education (North American Association for Environmental Education (NAAEE, 2012). Hundreds of researchers, theorists, and practitioners in the environmental education field have contributed to these NAAEE guidelines and explanations for defining what might generally be agreed upon as best practices in this field (Stern et al., 2014; Yates et al., 2019).

Globally, environmental education plays a critical and essential role in our planet's future because the environment sustains all life (NAAEE, n.d.). According to NAAEE (n.d.), environmental education is “a process that helps individuals, communities, and organizations learn more about the environment, develop skills to investigate their environment and to make intelligent, informed decisions about how they can help take care of it” (para 2.). It also builds on the principles of sustainability: “how people and nature can exist in productive harmony” (para 3.). For the purposes of this study, I position environmental education as a vehicle for building a sustainable future with teachers at the helm.

In Oregon, the No Oregon Child Left Inside (NOCLI) Act was signed into law by Governor Ted Kulongoski in 2009. The Act called for the appointment of an 11 person committee designated as the Oregon Environmental Literacy Plan (OELP) to develop an environmental literacy plan that would in part, examine teachers' professional development (Oregon Department of Education [ODE], 2010). The plan set forth by the OELP helped to illuminate some of the problems and viable solutions with educating teachers in the field of environmental education in the state of Oregon.

Environmental teachers must possess the skills associated with promoting environmental literacy and have a working knowledge of the content they will be teaching (North American Association for Environmental Education, 2017). Examining in-service professional development for education related to environmental literacy is one aspect of evaluating the effectiveness of the strategies set forth by the OELP (OELP,

2013) and supports the development of environmental competencies for professional teachers.

Environmental Education Integration

A common approach to introducing environmental education into a curriculum is to infuse environmental education into existing lessons or units (Easton & Monroe, 2002) across disciplinary subjects such as science, history and social studies (Monroe & Cappaert, 1994; Ramey-Gassert & Shroyer, 1992; Sukma et al., 2020). Environmental education often begins with the introduction of the physical and biological components of the environment but there also needs to be an addition of the societal and humanistic dimensions to the discussion to better integrate environmental education across a curriculum (Roberts & Dyrli, 1971). Some teachers have the perceptions that environmental education is only relevant in science curricula and cannot be a topic in other K-12 subject areas such as English, social studies, language arts, and so on (Sewing, 1986). Although educators generally have positive attitudes about incorporating environmental education into a curriculum, their personal knowledge of environmental topics often hinders teachers from incorporating environmental topics into their curriculum (Ernst, 2012; Esa, 2010).

Story of Your Place

The Story of Your Place centers around a sense of place which is a rich concept focused on developing a deeper understanding of place, and is at the core of many environmental learning initiatives (Kudryavtsev et al., 2012). Place is a way of knowing, seeing, and understanding the world, and when viewed through this lens, a way to make

connections between people and their environment (Cresswell, 2004). The concept of place is a multi-dimensional construct, depending on the discipline, yet it has three main components central to the study of a place: location, locale, and a sense of place. Each part of this multi-dimensional construct may expand on the sense of place by tying in an individual's culture, politics, social interactions, or an esthetic perspective (Kudryavtsev et al., 2012). For this research, the sense of place focused on the stories of individuals and how they perceive their experience of place as defined by their participation in the ACCF Story of Your Place curriculum.

A growing interest in the environmental education has been evident in the literature focused on a sense of place (Kudryavtsev et al., 2012). Since the sense of place was first proposed by geographers several decades ago, scholars offered numerous interpretations of the term (Devine-Wright & Clayton, 2010; Farnum, 2005; Jorgensen & Stedman, 2001; Manzo, 2003). While nature-related experiences have often been regarded as one of the most important factors for constructing a positive view of the environment (Tani, 2017) a place-based pedagogical approach can help develop an ecological understanding by connecting people to the places where they live (Engel-Di Mauro & Carroll, 2014). A sense of place could make students more aware of their environment and connect them with their surroundings while developing a sense of personal concern for the future of the environment (Kudryavtsev et al., 2012).

Within the context of this research, the Story of Your Place curriculum used an active-learning model called geo-inquiry. The geo-inquiry model helped students to explore their sense of place and to understand the interactions between human behavior

and natural systems using six guiding inquiry questions related to settlement, land use, physical, human, comparison, and connection (ACCF, 2021b). Each one of the curriculum steps, presented in the Story of Your Place workshops, used a geographic perspective as a lens to analyze space, place, and the interconnections between humans and the natural world. Each one of these steps led to the next step and incorporated technical training in GLOBE (Global Learning and Observation to Benefit the Environment) and ArcGIS (Arc Geographic Information System) when appropriate. The GLOBE program, an international science and education program, allowed the teachers to collect data and use the scientific process to understand the Earth's systems and the global environment (GLOBE, n.d.). ArcGIS, a system with an infrastructure to create maps, compile geographic data, analysis, and sharing data across an organization, a community, or across the Web, provided teachers with more hands-on technical tools (ESRI, n.d.).

The Story of Your Place curriculum focused on five steps presented in the separate workshops: (a) prepare, (b) ask, (c) collect, (d) visualize, and (e) create/act (ACCF, 2021a).

1. *Workshop 0: Prepare.* The first workshop focused on exploring places around the world, defining and bounding the teachers place, and getting to know the natural world around the teacher's respective places. The key outcome for the first step of this Story of Your Place workshop was to prepare teachers to provide the name of their place, a description of their place, and to contextualize where their story would take place.

2. *Workshop 1: Ask.* The second workshop focused on asking good inquiry-based questions and communicating their answers to specific questions. This step was about what makes good inquiry questions, brainstorming possible questions, and finalizing the Story of Your Place questions. The key outcome for the second step of the workshops was to develop one good inquiry question for each one of the following categories: (a) settlement; (b) land use and resource utilization; (c) physical and biological characteristics; (d) human cultural, psychological, and economic characteristics; (e) comparison of their place with other places; and (f) the connection with other places.
3. *Workshop 2: Collect.* The third workshop focused on planning information and a gathering strategy to collect data to answer the questions about the Story of Your Place. During this step, teachers used the opportunity to brainstorm ideas for potential information sources and to identify a gathering strategy. The key outcome for the third workshop involved collecting enough information to answer the Story of Your Place questions.
4. *Workshop 3: Visualize.* The fourth workshop involved visualizing the answers to the Story of Your Place. In this step, teachers visualized the answers involved analyzing the collected data and used multiple approaches to present the outcomes: maps, charts, tables, timelines, and key excerpts. It was up to the teachers to determine a data analysis strategy

to achieve the desired outcome. The teachers completed a worksheet as a guide for exploring the patterns and trends in their data. The outcome for this step was to answer the six of the Story of Your Place questions (ACCF, 2021b).

5. Workshop 4: Create/Act. The fifth workshop of the geo-inquiry entailed designing and telling the Story of Your Place. Teachers explored potential stories using power-point presentations, a video narrative, or an ArcGIS story map. Each one of these methods would be tools to share the Story of Your Place with the teacher's school and the community where the story took place. The outcome for this step was to tell the Story of Your Place.

Each one of these steps outlined a brief introduction for exploring the curriculum used to tell the Story of Your Place (ACCF, 2021a). However, due to COVID-19, the teachers involved with this study were unable to complete all the curricular steps used to tell the Story of Your Place.

Professional Development

In this section, I discuss components of effective professional development. The professional development of educators is a widely accepted approach for improving the instructional practices of teachers (Quint, 2011).

Avalos (2011) defined professional development as the ability of teacher's learning how to transform their knowledge into practice for the benefit of the student. Caffarella and Zinn (1999) discussed three components to continuing professional development: (a) self-directed learning experiences, (b) formal professional development

programs, and (c) organizational development activities. Self-directed learning involved those activities where educators learn from the encounters they have had as part of their normal learning activities. Examples of self-directed professional development included activities such as developing class materials, teaching, revising curricula (Caffarella & Zinn, 1999). More formal professional development programs involved both short-term and long-term workshops and seminars. Professional development programs could range from learning pedagogical knowledge, to subject matter knowledge, to those types of development that focused on scholarship and research. Organizational development activities tended to focus on areas organizational needs and issues with the explicit purpose of organizational development (Caffarella & Zinn, 1999). Caffarella and Zinn's components represented one method for defining the distinct aspects of professional development and helped to provide me with a framework for describing aspects of my problem of practice. In this case, the Story of Your Place program was primarily a formal professional development program designed to increase a sense of place in a community of educators through the delivery of workshops. In the context of the Story of Your Place program, a community of educators referenced the teachers involved with the Story of Your Place program. In my research, I viewed professional development as the in-service educational opportunities used to increase the knowledge and understanding of environmental topics of rural teachers in Douglas County, Oregon.

High-quality professional development is at the core of almost every modern day educational proposal that seeks to improve education (Guskey, 2002b) and yet, researchers note a shortage of high quality programs (Borko, 2004; Carleton-Hug & Hug,

2010; Wood, 2001; Yoon et al., 2007). Much of the literature on teacher learning and professional development indicates that high quality programs result from sustained professional workshops and long-term support that provides greater opportunities for educators (Garet et al., 2001; Guskey, 2002b; Hayes et al., 2019). Sustained and iterative opportunities allow teachers to develop a better understanding of pedagogical strategies, a greater in-depth discussion of content, and an exploration of student conceptions and misconceptions (Garet et al., 2001; Hayes et al., 2019). According to Garet et al. (2001), extended activities allow teachers to explore new practices and to have opportunities to obtain feedback on their teaching. The research literature documents the benefits of professional development, while noting the limited opportunities to participate in these effective methods in rural areas (Hickey & Harris, 2005; Salazar, 2007; Werth et al., 2013).

Rural Schools

The National Center for Education Statistics defined rural areas as those areas that do not lie within an urbanized area or an urbanized cluster (Strange et al., 2014). Rural schools often tended to be isolated with low-population densities and fewer students per school/grade than in urban areas (Williams, 2010). One-third of U.S. public schools have been in these rural areas (Williams, 2010) and only one in 10 students attended schools in rural parts of Oregon (Strange et al., 2014). In a review on rural education in the 21st century, Schafft and Jackson (2010) found a lack of resources afforded to urban centers. The lack of resources required additional efforts to prepare students for being economically competitive and productive in a modern world.

Opportunities and exposure to science organizations, colleges, and corporations have been generally limited in rural areas as are jobs in these respective fields (Avery, 2013). In addition to rural schools having limited access and exposure to different organizations, schools within a rural context were more likely to have smaller budgets, fewer technology resources, and special programs (Schafft, 2016; Schafft & Jackson, 2010b; Williams, 2010). Many rural children have had the opportunity to acquire science skills in their daily lives through the exploration of their surroundings, though little attention has been given to research focused on rural science education (Avery, 2013). In Oregon, many children have had the opportunity to acquire environmental education in their daily lives in the rural areas where they live. Rural teachers could benefit from a focus on their rural contexts, rather than on what their contexts lacked (Avery, 2013); this could also give teachers' a sense of place associated with their learning. Notably, each rural area has had a unique, culture, ecology, and set of relationships that facilitators need to factor in when designing professional development programs.

In the preceding section, I described the topics and research literature related to my study about exploring teachers' perceptions of environmental education professional development opportunities in a rural setting. In the next section, I review the literature on case study methodology.

Review of the Methodological Literature

I used a case study research methodology to explore my research questions that focused on the perceptions of teachers engaged in environmental education professional development workshops. I studied the phenomenon of the ACCF Story of Your Place

program, and I examined the program through the lens of educators working with the story of place program. To gather data, I gave a demographic survey with open-ended questions to the participating teachers, who were participating in the ACCF program. Using information collected from the demographic data, I refined my list of participants and conducted in-depth interviews of the perceptions of teachers participating in ACCF workshops.

Case studies are one of the most frequently used qualitative research methodologies in education (Yazan, 2015); however, the methodology does not have well-defined or well-structured protocols (Yin, 2009). Case study does not imply the use of a particular type of evidence nor does it imply the use of a particular data collection method (Yin, 1981). Rather, qualitative case studies provide a methodology for using a variety of data collection methods when studying complex phenomenon within their contexts (Baxter & Jack, 2008). More specifically, and in comparison with other research methods that purposefully separate a phenomenon from its context, case study focuses on a contemporary phenomenon within a real-life context (Yin, 1981).

According to Yin (2003), a case study design needs to be used when (a) the focus of the study is to answer the how and why of a phenomenon; (b) the behavior of those involved cannot be manipulated; (c) the contextual conditions are thought to be relevant to the phenomenon; and (d) the boundaries between the phenomenon and the context are not clear. Yin's approaches help to define strategies and determine when to consider using a case study methodology to help define the extent of the research. In my research,

I use these guidelines to create the boundary of the ACCF Story of Your Place program to examine the perceptions of teachers' participating in the program.

Within the case study methodology, Yin (1981) noted that there are two distinguishing characteristics which focus on when to use a case study: (a) to explore the attempts for examining a real-life phenomenon within a particular context, and (b) when the boundaries between the phenomenon and the context are not clearly evident. Merriam (1998) further defined Yin's work by noting that the key characteristics of a case study should include the delimitation of the case, which aligns with Smith's (1978) view of a case being a bounded system. The case could be a person, a program, a policy, or a unit in which there are boundaries (Yazan, 2015). Placing boundaries on a particular case could help to ensure the study remains focused (Baxter & Jack, 2008). In my research, the case was the integration of the ACCF program into rural schools.

Once the case has been determined, one should also consider what the case will not be (Baxter & Jack, 2008). A common error associated with designing a case study was a tendency to answer too broad of a question or a topic that has too many objectives for one study (Baxter & Jack, 2008). To avoid the problem of being too broad or having too many objectives, Yin (2003) and Stake (1995) suggested placing boundaries on the case which would ensure that the study remained reasonable in scope. By limiting the case to the ACCF program, I was able to focus my research questions on the perceptions of teacher's participating in their professional development program and did not explore the overall structure of the ACCF organization.

Case study research has often been perceived to be more subjective than other methods of qualitative research because of the amount of personal contact made with those being examined (Riege, 2003). Because researchers tended to have close personal contact with the people being studied, the researchers should attempt to refrain from making subjective judgements during the research design and data collection to help enhance the validity of the research (Riege, 2003). By acknowledging my biases, I attempted to present the narrative of the teachers participating in the program while refraining from making judgmental decisions about their lived experiences.

To address issues of validity and reliability in qualitative research, researchers should conduct the investigation in an ethical manner (Merriam & Tisdell, 2016). Although the methods and procedures do not guarantee validity, researchers should work to rule out the validity threats and increase the credibility of the conclusions (Maxwell, 2013). Other qualitative researchers have used the terms credibility and dependability, instead of validity and reliability, respectively when discussing methods for judging the quality of a qualitative study (Yilmaz, 2013). For the purpose of my study, I used the terms validity and reliability.

Maxwell's (2013) discussion of validity focused on two broad types of validity with qualitative research: researcher bias and the effects of the researcher on the participants of the study. Although it was impossible to eliminate all of the researcher's bias, qualitative researcher should be concerned with how their values and expectations influenced the study (Maxwell, 2013). By discussing my bias, I have attempted to address the threats to validity and the integrity of my research.

To reduce threat to the validity of the study and increase the credibility of the study, researchers could use important strategies including (a) intensive, long-term involvement, (b) rich data, (c) respondent validation, intervention, and (d) triangulation. Although Maxwell (2013) discussed other strategies for increasing the credibility, I relied on three strategies for my research: rich data, respondent validation, and triangulation. By incorporating these strategies into my research, I tried to ensure the accuracy of the findings (Merriam & Tisdell, 2016).

Beyond incorporating strategies to enhance the validity of a case study, it was equally important to ensure the approaches taken were reliable. Reliability referred to the ability of the research to be replicated, which could be problematic with qualitative research (Merriam & Tisdell, 2016). Yin (2003) suggested methods for overcoming the problem of reliability by documenting the case study with a rich description of the participants and the researcher's experiences. In my study, I included a rich detailed description and documented the participants' experiences during the intervention. An additional strategy involved setting up a detailed case study protocol and database.

Gibbs (2018) suggested other procedures to ensure the reliability of the collected data. Procedures such as reviewing the transcripts to make sure there were no obvious mistakes made during transcriptions or by checking that there was no drift in the definition of the codes. While conducting the study, I afforded participants with the opportunity to review the transcribed notes to verify that their descriptions were accurate and reflect their lived experiences. Allowing the participants to review their lived experience, also helped me to identify my own biases and misunderstandings of my

observations. Triangulation was another strategy used to reduce the risk of chance associations and of systemic bias (Maxwell, 2013). In my study, I collected the lived experiences of a diverse set of teachers from multiple subject areas who participated in workshops focused on developing a story of place. By collecting multiple perspectives, I was able to assess the generality of my explanations for how teacher's perceptions were influenced by their participation in the ACCF program. In this section, I described different approaches, characteristics, and indicators for assessing the quality of qualitative research methodology, specifically a case study design.

Summary of the Research Literature and Application to the Study

In this chapter, I discussed the theoretical framework of situated learning theory as a lens to describe the problem of teachers receiving little preparation to integrate environmental education into their curricula using the short-term workshops available in rural Oregon. I used Lave and Wenger's (1991) situated learning theory as a lens to describe the social structures of the Story of Your Place program within a particular context and the perceptions of the teachers participating in workshops focused on developing a long-term professional development program.

The research literature reviewed in this chapter helped to demonstrate the need for considering how participation in a professional development program could influence the development of a new curriculum. Within the literature review, I described how various aspects of professional development relate to my problem of practice focused on teachers having limited professional development opportunities with environmental education in rural Oregon. I presented evidence that rural teachers face different barriers when trying

to improve their environmental literacy (Barrett et al., 2015; Stevenson et al., 2014; Williams, 2010). I also noted that the ACCF program, a professional development program, could provide support for developing in-service teachers. Further, I reported findings that indicate that long-term professional development programs have been more effective at developing teachers who use new ideas and learning methods than the more frequently used short-term programs (Darling-Hammond et al., 2017; Knapp, 2000; Loughran, 2014; Wei et al., 2010).

In the last section of my literature review, I reviewed the methodological literature relevant to my proposed study. I described how a qualitative single case study (Merriam & Tisdell, 2016; Yin, 2009) could be used to explore the bounded system of the ACCF Story of Your Place program and the perceptions of teachers participating in a sustained professional development program focused on a story of place (Garcesa & Limjuco, 2014; Pe'er et al., 2007; Stevenson et al., 2014). A qualitative case study allowed me to describe the perceptions of teachers participating in the Story of Your Place program.

Chapter 3: Methods

The long-term professional development of teachers has been a well-documented pathway for improving the knowledge of teachers, in comparison to one day, or short term, professional development workshops and seminars (Guskey, 2002b; Loughran, 2014; Wei et al., 2010). One of the biggest challenges that teachers face when wanting to improve their knowledge in a respective field has been overcoming the barriers of attending in-service educational opportunities. Learning how teachers perceived some of the barriers they face with their professional development pursuits could help to break down the walls so often put in front of them when trying to improve their knowledge and benefit their students. Like many areas of study where teachers face barriers to improving themselves professionally, environmental education topics presented different barriers due to the lack of the subject being a core study area for most schools. Fortunately, some organizations in Oregon have helped with the integration of environmental education across a school's curriculum and the development of teachers' environmental literacy. These organizations, through their practices, also helped teachers with navigating different personal and organizational barriers—one's teachers have typically faced when trying to improve their educational practice.

As noted previously, the purpose of this study was to describe the teacher's perceptions of participating in a sustained professional development method focused on developing the teachers' sense of place in a rural setting. Specifically, I conducted a case study of the Alder Creek Community Forest (ACCF) Story of Your Place program and qualitatively described some of the perceptions faced by a community of teachers

participating in a professional development program. My study focused on teachers in rural schools in Oregon located in Douglas County. I used three research questions to direct my study:

1. What are the perceptions of teachers' participating in workshops focused on an environmental education professional development program?
2. How does a story of place in an environmental education professional development program help teachers improve their environmental literacy?
3. How are teachers' beliefs about the environment and a sense of place supported by the Alder Creek Community Forest (ACCF) program?

Research Methods

My research interests focused on the perceptions of teachers participating in an environmental professional development program. I used a qualitative case study methodology (Baxter & Jack, 2008; Merriam & Tisdell, 2016; Yin, 2009) to describe the effect of the ACCF Story of Your Place Program on participating teachers. I approached my research using a constructionist paradigm where truth has been recognized as relative and dependent on one's perspective (Baxter & Jack, 2008). The premise of constructivism has been built upon the premise of a socially constructed reality (Searle & Willis, 1995) where the close collaboration between the researcher and the participant enabled participants to tell their stories (Crabtree & Miller, 1999). The constructivist paradigm included the importance of creating human meaning and does not reject outright the notion of subjectivity (Baxter & Jack, 2008). Much of the research in the field of environmental education, which aligns with my own research, used a

constructionist lens that aligns with a relativist form of reality. Choosing a paradigm and a reality that aligned with current literature in this field could help me to explore my personal beliefs in the context of a professional development program.

Through my personal experience, some professional development workshops consisted of the instructor presenting a topic of their own construction and reality. Unlike the workshops where the facilitator transmitted the knowledge from presenter to participant, the knowledge construction occurred when the teacher acts as the facilitator of the process (Matthews, 1997). In addition to the facilitator's own construction of reality, other hurdles teachers face in their pursuit of professional development stem from the critical realist lens imposed on many educational institutions. In critical realism, it is the beliefs, that enable and constrain the learning process. Educational institutions, in part, are driven by policy leaders who seek to identify causal relationships and discard other hermeneutic approaches (strategies based on interpretation) to educational research (Brown, 2009). To break down the critical realist approach to evaluating education, examining methods used for professional development using a situated learning theory lens, could lead to dialogue for creating successful methods for teachers.

Qualitative researchers have tended to view the world in terms of how people, situations, events, and the processes that connect these groups could be explained based on an analysis of how certain situations influence others (Maxwell, 2013). A strength of qualitative research has been the focus on specific situations or the lived experiences of people, with an emphasis on description rather than numbers (Maxwell, 2013). In this method, researchers typically studied a relatively small number of individuals, in contrast

to quantitative research, to understand how events, actions, and meanings were shaped by their unique circumstance in which they occur (Maxwell, 2013). Qualitative researchers used theory for a broad explanation of behavior, attitudes, and themes from the context of theory, to help provide a narrative based on the literature in the respective field (Creswell, 2014).

In my qualitative case study research, I used situated learning theory to describe the perception of teachers participating in a series of professional development environmental education workshops and seminars focused on developing a story of place. In addition to guiding my process for research, my theoretical framework could contribute to an explanation of how I am positioned within the research (Creswell, 2014).

Participants

In this study, I used a purposeful sampling method (Patton, 1990) to select participants from the schools that are involved with the Story of Your Place program. Using purposeful sampling, I selected a sample of participants from which the most can be learned (Patton, 2015). The participants were not selected to get an average opinion, but rather were selected because of their specialized experience (Merriam & Tisdell, 2016).

During Phase 1, I worked with the ACCF personnel to contact teachers involved with their Story of Your Place. ACCF provided me with a list of email addresses and phone numbers for teachers who were willing to participate in my research. I contacted the teachers, via email, and asked them to fill out the initial surveys and to send me the completed survey. The goal of the initial survey was to contact at least 20 teachers and

recruit three to five teachers for interviews during Phase 2 of the research. However, only seven teachers returned their initial surveys and only three of these teachers had participated in the ACCF program. The other four teachers were planning to attend the ACCF workshops but due to the COVID-19 restrictions in place at the state level, ACCF canceled the upcoming workshops. My goal was to recruit two or three teachers from different schools who would be willing to participate with more in-depth interviews, and I did have three teachers who were willing to participate in the in-depth interviews. Another goal was to select teachers across multiple subject areas to get multiple viewpoints on their perceptions of participating in the ACCF program. In respect to having teachers represent multiple subject areas, I had two teachers, Debra and Helena, who taught at the elementary school level. These two elementary school teachers taught a range of subjects in their classroom and were not focused on any particular subject area. I also had one secondary school level teacher, Laura, who taught both science and natural resource classes at a local charter high school. In addition to this brief description of the participants, I provide more detailed information about these participants in Chapter 4.

Procedures

In March 2019, I received approval from Portland State University's (PSU) Institutional Review Board (IRB) to conduct the research. I sought IRB approval because university and federal regulations protect the participants from human right violations (Creswell, 2014).

Due to the COVID-19 pandemic and the cancellation of all but one of the professional development workshops at ACCF during the spring of 2020, I interviewed

teachers who had previously participated in ACCF workshops. Unfortunately, I was not able to conduct my study during each stage of the spring ACCF program schedule.

However, all participants in this study participated in at least three ACCF environmental education workshops. Despite the cancelation of the spring workshops, teachers received approximately 18-24 hours of ACCF professional development workshops and seminars.

Participation in the study was voluntary, and I communicated the voluntary nature of the study to the participants. The Story of Your Place was an ongoing process, so I asked teachers to reflect on their experiences during their participation in the program. I conducted two phases of research for my research on the ACCF program. In Phase 1, I gathered educational and background demographic data of the teachers involved with the ACCF program. In Phase 2, I conducted in-depth interviews to capture the stories of the teachers' experiences.

During the second stage of my study, participants were contacted via telephone to set up in-person interview times. Due to the COVID-19 pandemic, I was limited to conducting a couple of the interviews in-person; then, I switched to conducting the interviews via the Zoom video conferencing platform. Specifically, I conducted the first two interviews with Debra and Helena, while I used Zoom to conduct their third interviews. I conducted all three of Laura's interviews via Zoom due to the restrictions imposed by the state related to COVID-19 virus.

Phase 1. In Phase 1 of my research, I used a short, explorative demographic survey to determine which participants were interested in participating in more in-depth interviews for the second phase of the study. Data from the demographic survey helped

me to describe the background of the teachers and their participation in the ACCF program. I worked with ACCF personnel to contact teachers, involved with the story of place program, and who were interested in participating with my research. Once I had obtained informed consent, I administered the demographic survey to the teachers. I shared the purpose of the study with the participants, and I gave them the option of participating in the proposed study. If the teachers were willing to participate in the study, I provided an informed consent form to all participants and discussed the process and purpose of the study. The informed consent form helped to assure that participation was voluntary and that participants had the ability to withdraw at any time. When I contacted the participants, I also informed each participant that I was looking for a subset of participants for more in-depth interviews. I asked each participant for feedback on the purpose and intent of the research.

Phase 2. Once I collected the demographic survey data (see Appendix A) from Phase 1 of the proposed study, I analyzed the qualitative results to determine those individuals willing to participate in more in-depth interviews. The goal of Phase 1 was to narrow down the list of participants to three to five individuals, although more participants would have been welcomed if they were interested in participating with the study. I contacted each one of the individuals from the first phase to arrange times for the interviews. During Phase 2, I used a series of three separate semi-structures interviews and described the meaning of the participants experiences (Seidman, 2013). Based on Seidman's (2013) interview methods, I conducted three separate 30 to 45-minute interviews. My plan was to conduct interviews during three distinct stages of the program

but due to the cancellation of the workshops, I asked the teachers to reflect on their experiences of participating in prior workshops.

The first interview consisted of questions used to the participants experience in environmental education prior to participating in the program. I asked the participants about their perception and experiences with environmental education, environmental literacy, and their experience with professional development programs up to the point of participating in the ACCF program (see Appendix B). In the second interview, I asked participants to describe their experiences of participating in the ACCF workshops (see Appendix C). One goal of the second interview was to guide the teachers to reconstruct their detailed experiences of participating in the ACCF program. Another goal of the second interview was to focus on the social interaction between participants and between the participants and the facilitator. In the third interview, I asked participants to reflect on their perceptions of participating in the ACCF program and to describe how their experiences has influenced their environmental literacy (see Appendix D). My questions for the third interview focused on the effect of participating in the ACCF program and the ways their experiences contributed to their future endeavors in teaching environmental education. The overarching goal of the interview questions were to capture teachers' perceptions of their experiences in a professional development program. I conducted my interviews in-person and on Zoom-meetings, during the spring and summer terms of 2020.

Given the presence of COVID-19 and social distancing, I used technology-based platforms (virtual methods) to complete the interviews in a timely manner. While

acknowledging that conducting interviews using virtual methods had the potential to affect the dependability of the research, Seidman (2013) asserted that if necessity demands, it would be better to conduct a long-distance interview than none at all. One possible limitation of only seeing the participant's head during the interview was being unable to capture participant's body language or detailed information about their surroundings. As such, virtual interviews have been shown to allow the researcher to focus on the level of the text and not impose any contextual information into the data (Hanna, 2012; Holt, 2010). In addition to using a virtual platform (i.e., Zoom) for conducting the semi-structured interviews I used a digital recorder and took field notes, during Phase 2.

Instruments and Measures

Unlike quantitative research, qualitative research focuses on meaning in context and requires a data collection instrument that is sensitive to underlying meanings when collecting data (Merriam & Tisdell, 2016). The aim of developing instruments for qualitative studies is to describe and understand the phenomenon being studied through the lens of the participants (Yilmaz, 2013). In my study, I used a teacher demographic survey for Phase 1 of my research in April 2020. Using this teacher demographic survey (see Appendix A), I collected data to capture information about gender, ethnicity, educational level, teaching experience, teaching subject, years of teaching experience, and years of environmental education experience.

For Phase 2 of my research, I conducted three semi-structured interviews (see Appendices B-D): (a) environmental education experiences prior to participating in the

ACCF program, (b) experiences participating in the program, and (c) the perceptions of participating in the program. These interviews took place during the spring and summer terms of the 2020 academic year.

Data Collection and Analysis

Teachers who participated in the ACCF program came from different rural schools with proximity to ACCF as a determining factor for some teachers involved with the program. However, I used the potential opportunity of proximity to identify teachers with disparate backgrounds who had participated in the ACCF program. In this sense, because of the limited professional development opportunities in the region, ACCF personnel partially mediated the proximity to the ACCF site was by delivering workshops at various locations, in addition to the ACCF site.

I conducted two in-person interviews with Debra and Helena, and then used Zoom meetings to conduct their final interviews. Because Tammy entered the study later than the other two teachers, I conducted her first interview in person and then conducted the two other interviews via Zoom. Allowing the teachers to use alternative methods, such as Zoom, to conduct the interviews helped to minimize the impact on teachers who were willing to participate in this study.

For all the semi-structured interviews, I used a digital tape-recorder to capture participants' voices. I also took field notes using a pen and paper during the interview process to describe the tone of the dialogue. I transcribed the data collected from the interviews using Google Recorder. After I transcribed the interview data, I reviewed it for accuracy and incorporated any field observations made during the interview process with

the transcribed notes. Using an inductive form of content analysis allowed me to identify or develop topics, themes, and categories of interpretation from the data (Patton, 1990). The focus of my data collection was on the teacher's experiences and the effect of the ACCF program.

After I reviewed and edited the transcribed results from the study, I shared the transcripts with the teachers to gather additional comments, suggestions, and clarification for each of the interviews. I used member checking to allow the teachers to check the accuracy of their responses and to validate the credibility of their narrative.

After I collected the data, I reviewed organized the data into categories based on excerpts from the interviews (Seidman, 2013). During the process of coding the data, I labeled passages that seemed interesting. After I labeled the passages, I reviewed the participants' data and determined if it was necessary to retain certain passages. Once I determined the pertinent passages in the interview date, I reviewed the data, looked for connections between the different categories, and then clustered the data into larger themes.

During the analysis, I identified similar themes that captured the experiences and perceptions of teachers participating in the ACCF program. Prospective themes included participants' environmental experiences and beliefs, perceptions of participating in environmental education workshops, participants' discussions of their interactions with the professional development, and the implications of the participants' environmental beliefs.

In Chapter 3, I outlined the research method used to describe the perceptions of teachers engaged in environmental education professional development workshops at ACCF. I explained my use a qualitative study to help understand the perceptions and lived experiences of teachers participating in a professional development program. I also described the instruments for the two phases of my study. Phase 1 involved collecting demographic style data to help identify participants for more in-depth interviews. Phase 2 entailed conducting three interviews with each participant to explore their life history, details of their experience, and their reflection on their experience. In the next section, I conclude Chapter 3 with my role as a researcher.

Role of the Researcher

I recognize that being a White man raised in a culture of Western science with its masculine history influences my position as a researcher. I acknowledge that I carry that dominant culture perspective forward. In addition to the dominant White culture in which I was raised and educated, I acknowledge my bias regarding the importance of teaching and integrating environmental education into a curriculum; this bias is reflective of my experiences in the natural world. Having worked professionally in the natural resources field for the last 12 years and having taught natural resource and science-based courses at a community college for the last nine years, I have an appreciation and knowledge of the natural world. During my time working in the natural resource field, I have interacted with many teachers and have drawn upon these experiences to initiate my research agenda. My experience of being a natural resource professional influence my perception of the knowledge and skills needed by teachers who teach environmental education

topics. In addition to my experience with the natural world, I come from a background of positivism where scientists use evidence and statistics to explain the natural world.

Nevertheless, I recognize my bias and realize that individuals are unique. I respect that their constructed reality can provide insight for examining my problem of practice.

Chapter 4: Results

The purpose of this study was to describe the perceptions of teachers engaged in environmental education professional development workshops. I used a case study of the Alder Creek Community Forest professional development program, where I interviewed three K-12 teachers and captured their experiences with participating in environmental education workshops at the Alder Creek Community Forest (ACCF). The goal of this research was to assist ACCF with an analysis of their instructional methods used for conducting professional development and to help inform their process for creating a series of workshops focused on a Story of Your Place. The purpose of my study was to describe the perceptions of teachers engaged in environmental education professional development workshops. I guided my study with the following three research questions:

1. What are the perceptions of teachers' participating in workshops focused on an environmental education professional development program?
2. How does a story of your place in an environmental education professional development program help teachers improve their environmental literacy?
3. How are teachers' beliefs about the environment and a sense of place supported by the Alder Creek Community Forest (ACCF) program?

One aim of my study was to assess an environmental education center in rural Oregon because few organizations promote environmental education to help build environmental literacy in teachers and students.

In Chapter 3, I introduced the intervention of qualitatively interviewing teachers who were involved with the ACCF professional development program. I

discussed the methods used to answer my research questions, the procedures involved with my research, and the rationale used for my decisions.

In Chapter 4, I describe more fully the ACCF organization, the participants, and the analysis of the data collected. The ACCF organization offers K-12 learning and professional development workshops in a rural area of southern Oregon. In the context of my research, the ACCF organization delivers environmental education professional development workshops on their site and in the community to educators in Douglas County, Oregon. The participants had previously participated in ACCF professional development workshops, and they taught in rural schools located in Douglas County, Oregon. In the next section, I discuss my analysis of qualitative data to address the purpose of my research and address my research questions.

Analysis of Data

In this section I discuss the analysis of my data in two stages. The first stage represents my analysis of the survey data, and the second stage represents my analysis of the interview data.

The first stage of my research involved emailing a demographic survey to recruit teachers interested in participating in my research study. I received a list of email addresses of teachers who had previously participated in workshops at ACCF, from the environmental educator at ACCF. The demographic survey allowed me to capture the background of the teachers and helped me to contextualize their experiences. I also used the survey results to gather teachers' insights for analysis of interview data collected

during the second stage of my study. After reviewing the demographic surveys, I identified the three teachers who had participated in ACCF professional development workshops.

To analyze the three surveys, I reviewed and transcribed the surveys into a spreadsheet. After extracting the data from the demographic surveys, I used attribute coding to compare the teachers' backgrounds. I selected attribute coding because it has been used at the beginning of a data set and helped me to manage basic descriptive information about the participants for further analysis (Saldaña, 2013). Using attribute coding, I analyzed each answer of the demographic survey with a focus on the first five questions.

The second stage of my qualitative study involved conducting a series of three semi-structured interviews to capture teachers' experiences prior to participating in the ACCF workshops. The purpose of the second stage of data collection was to evaluate the methods used by ACCF during their professional development workshops by capturing the experience of teachers participating in their workshops.

After I transcribed the interview data using Google recorder, I exported the transcripts into Microsoft Word for analysis. After each interview, I reviewed the notes for spelling accuracy and labeled the transcript with the teacher's name and my name to correspond with our discussion. After these corrections, I emailed the edited transcript to the study participants for member checking to verify the accuracy of the transcription and to give them the opportunity to add clarifying information. Member checking helped me to rule out any misinterpretation or bias I might have during the interview process and

allows the participants the opportunity to validate what they said (Merriam & Tisdell, 2016). After sending teachers the edited transcript, I asked each teacher to respond within two weeks of the interview. Once I received the notes from the teachers, I reviewed the interview notes for key terms and started the initial coding process. My analysis of the three semi-structured interview data went through an inductive and emergent process in which I developed themes from a two-cycle process of coding and categorization

To analyze the transcripts, I engaged in initial coding (Saldaña, 2013), also known as open-coding, a method of breaking down qualitative data into discrete parts and looking for connections within the data. After my review of the transcripts, I assigned codes during the first reading of the interview data using the initial coding method. Reviewing the transcripts shortly after the interview allowed me to process the gathered data and provided me with the opportunity to reflect on the meaning of the teacher's experiences. I reviewed data line-by-line, as suggested by Charmaz (2006), and I assigned process codes to phrases and ideas present in the data and at times, I also included sub-codes within the process codes. I selected process codes because they use gerunds to describe action captured in the data (Saldaña, 2013). I recognized during the initial process of coding that my assigned codes were tentative, and data analysis would require multiple reviews of the data. After I reviewed the transcripts and assigned process codes, I switched to *In Vivo* coding (Saldaña, 2013), which refers to the process of looking for words or short phrases found in the actual language of the transcription generated by the participant versus the researcher generated codes. During the *In Vivo* process, I did not assign words as codes as I did in the first step of coding, but rather I

selected words and short phrases from the transcripts as codes. I reviewed the transcripts multiple times as I digested the data; I adjusted the process labels and sub-codes as I became more aware of the emergent categories in the data. Initial coding helped me to make decisions about defining the future categories used in this analysis.

During the second cycle of coding, I used the refined process codes from the first cycle to help define focused categories based on similarities between the initial codes. Focused coding allowed me to search for the most frequent initial codes, which helped me to make sense of the data. Using the focused coding process, I compiled similar codes into tentative categories with an emphasis on the process through the use of words (Saldaña, 2013). By constructing new codes into categories, I was able to compare participants' data to assess comparability and transferability. During this process, I supported my new coded categories with participant quotes to aid in future analysis. I reviewed and re-categorized the focused coded data on three separate occasions. From the categorized data, I identified three central themes based on the participants data: (a) positive environmental experiences, (b) reinforcement of environmental attitudes, and (c) professional development—positive and challenges. In the next section, I present the results of the analysis in the context of the themes learned from this study

Presentation of Results

To gain insight into the perceptions of teachers participating in the ACCF professional development workshops, I collected interview data from three experienced teachers who had participated in at least two ACCF workshops. The teachers' experience ranged from 15–34 years of teaching experience. I had additional conversations with the

co-founder of ACCF and with one of the environmental educators who had worked with the three teachers participating in this study. By having the additional conversations with ACCF personnel, I learned more about the background of the organization and the methods used to facilitate environmental education and professional development workshops.

ACCF as the Case

The Alder Creek Community Forest (ACCF) is an educational nonprofit organization in southern Oregon that provides teacher professional development, K-12 education, and lifelong learning opportunities. Founded in 2002, the ACCF operates on the 80-acre Proctor Memorial Forest located just west of Canyonville, Oregon. ACCF serves as the case for my case study research.

The cofounder of ACCF, Dr. James Proctor, serves as a member of the board of directors. James has an extensive background in geography and environmental studies and is currently a Professor of Environmental Studies and the Director of Environmental Studies at Lewis and Clark University. With his background in geography and environmental studies, James developed the ACCF as one of the few outdoor learning sites in Douglas County, Oregon and has collaborated with the Umpqua Valley STEAM Hub, the Center for Geography Education in Oregon (C-GEO), and the Global Learning and Observation to Benefit the Environment (GLOBE). By collaborating with these organization, James has helped to reach the teachers and students of Douglas County, Oregon, bringing geography educational outreach across Oregon, and building connections around the world.

In 2015, the ACCF received funding through the Gray Family Foundation, in collaboration with C-GEO, to present place-based education and explicitly, the Story of Your Place. For James, the Story of Your Place was born out of his interests in geography and how he could help ACCF become an innovative environmental studies organization. To reconceptualize how place-based education happened in K-12 and higher education, the partnership between ACCF and C-GEO sought to promote a model that science is more than just collecting data. In addition to collecting data, place-based education needs to be about communication and engagement. The geography-based curriculum, the Story of Your Place, provides a venue for K-12 and educators to explore other dimensions of environmental and place-based education beyond the collection of data.

AACF employs part-time workers to deliver the K-12 professional development workshops and K-12 education. The part-time workers work approximately 20 hours a week in their capacity as ACCF employees. ACCF typically employs one environmental educator which is currently filled by an AmeriCorps person. Prior to the current AmeriCorps person, Isaac, served as an ACCF part-time educator and lived in the local area. Isaac has since moved on to another organization but had worked with the three educators who participated in this research. Because of the connection between Isaac and the teachers involved with the study, I talked with him about his experiences with teaching environmental education. Although I have known Isaac for approximately four years, I had not previously discussed his experience working as a facilitator at ACCF.

Isaac brought his experiences as a wildlife technician, an AmeriCorps volunteer at a nature center, and a dance instructor to his ACCF facilitator role. Interestingly, he made

special note of how he carried forwards the lessons he learned about teaching while being a dance instructor to his position at ACCF. He was able to relate his ideology from working with beginning students who did not have knowledge of dance; he recognized that it was more important for a teacher to ask good questions through an inquiry process and not just present scientific facts. One the challenges he had to overcome when he started working at ACCF was that he was unknown, so he had to perform a lot of outreach to the local schools to break down some of the perceived barriers teachers commonly face when working with an organization. He felt that the issue of hiring a new employee every couple of years, or every year in the case of hiring an AmeriCorps volunteer, required the new employee to spend the extra time making connections with local educators. Notably, Isaac enjoyed spending time with the teachers and the students with whom he worked at ACCF. Similarly, the three teachers I interviewed spoke highly of his character.

ACCF conducts most of their professional development workshops at an 80-acre site in Canyonville, Oregon but also partners with a few organizations to help facilitate environmental education workshops in Douglas County, Oregon. For example, ACCF provides workshops during the local STEAM hubs summer institute. In addition to the STEAM hub, ACCF started working with the Douglas County museum and the Douglas County Library as sites to provide professional development workshops and to introduce the community of educators to some of the other resources in the area. Holding workshops in different venues was a step in the right direction because these provided opportunities for educators to develop a sense of place.

Participating Teachers

Three rural K-12 teachers agreed to participate in this study. I used a demographic survey during Phase 1 of data collection to collect background information about these three teachers who had participated in the ACCF workshops. I had no preconceived notions that any of the teachers had a background in environmental education, though each had participated in the ACCF workshops. To protect their identities, I assigned pseudonyms for each teacher and then summarized the results of survey data in Table 1.

Table 1

Teachers' Demographic Information

	Ethnicity	Degree(s) and major	Numbers of years teaching in K-12	Years in current position	Subjects currently teaching
Debra	White	BA Elementary Education	34 years - grades 3-8 mostly grades 5 and 6	20 years	All subjects, elementary self-contained
Helena	American Indian	BS in Science Education	27 years, grades 4 - 6	21 years in grade 5	math, science, social studies, reading, English
Laura	White	BS in Biology, AS in Medical Lab Tech	about 15 years. Levels: mostly high school science and math	1.5 years	Integrated Science, Biology, Natural Resources, Scientific Research and Design, Science Credit Recovery, and Pathways (homeroom)

Each teacher had participated in the ACCF workshops and had worked with the ACCF staff in support of their K-12 teaching. Beyond the ACCF workshops, these teachers had participated in multiple environmental education-focused workshops at various locations throughout their careers.

In addition to how the teachers' background had helped prepare them to teach about the environment, I was also interested in their definitions of environmental literacy as a gauge of their competency and improvement in environmental topic knowledge as they progressed through the ACCF workshops. I asked each teacher to define environmental literacy on their demographic survey; then, I asked them to define environmental literacy after in the ACCF program during their final interview. While teachers defined environmental literacy on their demographic survey, I have reported their responses in the following vignettes from their interviews as a comparison of changes to their definitions.

In the next section, I present vignettes from the interviews to introduce the teachers—Debra, Helena, and Laura—who participated in my research. These vignettes give a sense of their backgrounds including how they were prepared to teach environmental education, and the professional development experiences that informed their knowledge about the environment.

Debra

Debra identifies as a White female with a BA in Elementary Education who has been teaching for approximately 34 years with 20 years in her current position. Because Debra teaches at the elementary level, she is responsible for teaching all subject matter

in the school where she teaches. Debra seems to enjoy teaching her students thoroughly and enjoys her job.

During the interview, I asked Debra about what a typical day looks like at her school, she responded:

Okay so a typical day, ...I love walking in the door. I love when the students walk in the door and describe the day is action packed full. You know, not wanting the day to be over when 3:30 comes around just because I haven't gotten to everything yet...I have a true passion for teaching sixth grade at a rural elementary school.

When asked about whether her education prepared her to teach environmental education topics, she expressed that she had only received an exploratory introduction to environmental education, but it was enough to spark an interest in the environment.

I was an elementary education major and there were probably some seminars and... not too heavy on the sciences in elementary education. So, I'd say it [experience] was more seminar based... I know we did like a weekend excursion as part of a class to Mount Hood and I think it was just excursions within elementary education classes; like I think teaching the sciences and elementary education. I did not take very many sciences in post high school, so yeah, not too much other than relating it to elementary education.

Throughout her 34-year teaching career, Debra has attended many academic and environmentally focused workshops. When asked about her environmentally focused

professional development, Debra was able to tell me about many experiences. She shared the following examples of these experiences.

- My first teaching job was in another rural part of Oregon and that's where I got involved with my original Project Learning Tree, Project Wild, Project Wet, and all those things and I went on some weekend seminars...
- Hancock run by OMSI in the John Day Fossil Beds. That's when there was lots of money [approximately 20 years ago] and again the OMSI people did the work, but we still planned the experience for the kids. And, we would stop at Richardson's Rock Farm in Redmond and get thunder eggs, and then you cut and polish them at Outdoor School.
- ...I'd gone to professional development at the BLM (Bureau of Land Management) and I can't remember what the class was but usually if there was something offered in Douglas County that had to do with Outdoor School, I would try to go to it.

On the demographic survey, Debra defined environmental literacy as: “The ability to incorporate all aspects of learning through a background knowledge of our environment.”

Although there were other indicators of improvement to her definition of environmental literacy from participating in the workshops, I asked her specifically during the last interview to speak to the gains she had made in her understanding of environmental literacy. Debra responded to my question during the last interview by stating that her views were slightly different and “...things change as we learn new things.” Debra made

a slight change to her original definition of environmental literacy; however, she recognized the difference in her understanding of environmental topics and issues.

Helena

Helena identifies as an American Indian who has been teaching for the last 27 years with 21 years in her current position. Like Debra, Helena teaches at the elementary level and is responsible for teaching all subject matter in her school. Helena seems to have a passion for teaching the students where she works and shows a level of excitement when talking about her job.

When I asked about what a typical day looks like at her school, I got a sense that she likes working with her students and looks forward to greeting them every day. Helena focused on interactions with students, saying:

- So, a typical day would be kids coming in. I greet them at the door because I like to see you know, what kind of a morning they've had before they come to me.
- ...and then my favorite time of the day is probably my math class. It happens about 10 o'clock. I have strugglers who are lacking in confidence in math. My favorite kids to work with and so they come in and we do some math talks and number talks, just basic problem solving.

When asked about whether her education prepared her to teach environmental education topics, she only mentioned an astronomy and a math in science class she took while working on her undergraduate degree. When in high school, she had only taken one biology class, and she was not thrilled with the subject matter. She responded with an

anecdote about signing up for a biology class and recognized that she should take a different class: "...and the first day when they're talking about dissections that they'd be doing, I just said I'm in the wrong class and then I took chemistry and physical science instead."

Though her experience in high school biology did not suit her very well, Helena was a strong proponent for environmental education in this rural area of Oregon. She has participated in a number of environmentally focused workshops and seminars throughout her career and seemed to have a passion for the environment. When asked about her experiences with environmentally focused professional development, she focused on a non-professional development experience about wanting to learn about the environment to benefit her students.

I'm gonna start actually, something wasn't professional development, my granddaughter who's a second grader this year, went to an outdoor school in Denmark for kindergarten and they went outside every day. It was for school, that's where they did their learning and I was really intrigued by that and so one of my teaching partners and I, you know, we've got this nature trail and it's not used nearly enough, and so we thought maybe we could figure out how to create it and outdoor school nature. ... we did a lot of research about different places that we might be able to either correspond with or follow their websites or what and whatnot...

When Helena responded to the question about her definition of environmental literacy in the demographic survey, she had only responded with the word "developing." However,

during her final interview, Helena acknowledged feeling initially challenged by this question though she had progressed in her thinking and had started to make connections between the environment and people. She shared:

Some people come up with questions about their places that they wanted to study. For example, one person wanted to study the nature trail area at a local park and the question of people who are homeless camping out in certain areas of that came up. I mean that is pretty integral to thinking about the whole environmental impact to that place and their connection to that place as opposed to the families that want to go and just feed the ducks.

Because Helena possessed a passion for teaching, as evident in her discussion of working with students, she set a great model for her students and her fellow teachers. Her connections between people and the environment were refreshing to hear and showed progress in her thinking as a result of participating in environmental education related professional development workshops.

Laura

Laura identifies as a White female who holds a BS degree in Biology; she has been teaching for 15 years with the last 1.5 years in her current position. Laura works at a local charter high school where she teaches specialized classes to her students: Integrated Science, Natural Resources, Scientific Research and Design, science credit recovery, and a pathways class as part of her homeroom studies.

When asked about what a typical day looks like at her school, I sensed that she loved the opportunity to conduct hands-on activities with the students. She gave some

examples of the activities she does to engage her students. Unlike the two other teachers interviewed for this study, Laura has had the opportunity to teach environmentally focused classes. Laura did mention that she was talking about her pre-COVID-19 experiences. She explained:

A typical day of having them come in anyway...they have them do a little warm up usually of sometimes. I'll pick like a news article that relates to science and have them read it as they come in as part of that classroom management.

Referencing a natural resource class that she teaches, Laura shared:

I love that class, that we do a lot of the hands-on. Sometimes I'll just take them out to a park or take a walk to a local park...we'll start talking about the different plants there, and the wildlife, and...there's a waterway, so we start thinking about how the ecosystem is all connected.

Laura's undergraduate education focused on marine biology that gave her with some of the tools necessary to teach environmental education. When she went back to get her teaching certificate, the school she attended had a particularly good science component along with some inspirational teachers focused on project-based-learning. Laura remarked:

...we had a very good science component with that [referencing the school she attended], excellent. Science professor who showed us a lot of interactive things to do with the kids, a lot of hands-on, you know, some of the project-based learning before it became projects-based learning.

When I asked Laura about her definition of environmental literacy in the demographic survey, she responded, “Awareness of the impact humans have on our environment. Understanding of the interactions of the life forms in our community.” Laura’s academic and professional development involvement in environmental education supported her well-defined definition of environmental literacy. Although her initial definition from the demographic survey provided a good definition of environmental literacy, she added to her definition by including the work she does with her students, sharing:

If environmental literacy is my kids being not only aware of their environment, but connections and ecosystems and the effect of human activity systems...

Especially when I can take the kids down there [AACF] to see, you know, that the trails and the nature there and reinforcing how we as humans can, you know, be imbalanced with what's out around us without cutting down too many trees, ... eliminating it versus living within it.

Of the three participants in my study, Laura was the only teacher who has a background in the environmental sciences and teaches courses focused on the natural world as part of her regular curriculum. Like the other teachers represented in this study, Laura has participated in a few environmentally related professional development workshops throughout her career. Because of Laura’s background in environmental sciences, her perspective on the workshops she discussed had a different tone about the content. When asked about her experiences with environmentally focused professional

development, she focused on a few examples from the workshops she had attended throughout her career.

I went to a wetland ecology [workshop] out in Eastern Washington that was several years ago. That was very good. We um, went out on a walk into a desert environment, but along a waterway so it was kind of unique for me because I've always been more in the Western Oregon and Western Washington layout, so it was cool being in a different biome in a sense...nature conservancy and some tours that they have had. Audubon society, I've gone on bird walks with them. And involved kids in some of the competitions that they have like they did an artist competition. Of drawing birds for competition and that was that kind of motivated the kids.

Laura came from a strong background in the environmental sciences, and her experiences have helped inform her students when teaching about the environment. She frequently referenced how her experience helped her students to make connections with the environment and her own enjoyment of teaching her natural resource courses.

Results Summary

The results reveal a passionate group of teachers and provide a snapshot of the teachers represented in this rural area of southern Oregon. It appears that their participation in the ACCF workshops and other environmentally related workshops have added to their understanding of the environment that they have been able to pass on to their students. Given the many years of experience these teachers represent, their discussion of their experiences with teaching, professional development workshops, and

their interactions with their students, demonstrates an appreciation and development of their environmental literacy.

Interpretation of Findings

In this section, I interpret the findings from my interviews with the three teachers. In doing so, I seek to describe their perceptions of environmental education professional development workshops. I address and discuss the three research questions of my study in the context of the three themes generated from my analysis of the interviews: (a) positive environmental experiences, (b) reinforcement of environmental attitudes, and (c) professional development—positive and challenges.

Perceptions of Teachers

Teacher's perceptions can be influenced by both the external and internal environments. The external environment (the landscape) is influenced by the internal environment, or to say, the perceptions and attitudes towards the external environment are greatly influenced by the actions of individuals and should be considered when teaching environmental issues (Sondergeld et al., 2014). Each teacher in this study brings their own unique set of attitudes and perceptions about the environment to their experience of participating in the professional development workshops. Each of their educational backgrounds and experiences of being in nature provide a lens to view their experiences with participating in the workshops.

Positive Environmental Experiences

The three teachers in my study expressed positive environmental views when they reflected on their experiences when growing up. Debra for example, reported growing up

in the suburbs of a major California city with family trips to the mountains and the beach. She recalled, “During my youth, we had field trips to the local museum where I learned about the natural world and poisonoak.” Whereas Helena thought about the cultural and personal connections she made with others when outside. She shared, “We spent a lot of time in the outdoors, clamming at the beach, and spent time hunting with my dad. Reflecting back on those times as more of a cultural connection than the outdoors.” Speaking of her experiences, Laura recalled moving around a lot as she grew up in a military family. Her memories included “...chasing squirrels, fighting off snakes, and exploring the swamps in rural Georgia.”

While some people might not view the experience of Debra learning about poisonoak or Laura running around in the swamps of Georgia as being affirmative or upbeat, they both held positive views of their times in the natural world and the lessons they had learned as children.

Reinforcement of Environmental Attitudes

In developing their environmental attitudes from children to higher education, two teachers (Debra and Helena) had minimal introductions to environmental education and very little exposure to the sciences in general during their academic years. Helena recounted, how she had accidentally signed up for a biology class and realized that she was in the wrong class. In contrast, Laura talked about the positive science component she had in her curriculum and the benefit of having a professor who demonstrated many interactive activities to do with her students. Although only Laura had a positive view of her environmental interactions while pursuing her bachelor’s degree, Debra mentioned

her experience of a school related field trip she took during her academic journey. She recalled:

One seminar which stood out was a weekend fieldtrip to Mt Hood. My experiences were exploratory at best. During our orientation at college, we had a field trip to broken top mountain in Oregon and this one of my first experiences of being introduced to the wilderness areas and the forests in Oregon.

Early childhood outdoor experiences served to provide a positive foundation and may be influential in developing environmental attitudes (Ewert et al., 2005). The positive childhood experiences of these three teachers contributed to their positive attitude about the environment.

In the case of Debra and Laura, their appreciation of the environment continued into their higher education. The environmental childhood and academic experiences of each teacher helped them to develop a unique lens of how they perceive their interactions while participating in environmental education. For example, Helena focused on the human connections with the environment and how that knowledge might be passed on to future generations. Her perspective on the cultural connections with the environment as a youth provided a foundational lens for looking at how her attitude had changed after participating in the professional development workshops. She explained:

It makes me think about when I am out and about. Wonder about who is going to tell the story of a particular place - example family cemetery being built around. Pass on the information to other generations. Made me think about the human connection and how a place might be more multifaceted than another place.

On the other hand, Laura, who showed a deeper understanding and had a background in environmental issues from her academic studies, expressed that her attitude had not really changed by participating in the workshops. She explained how her previous experiences had contributed to her environmental attitude: “I have already been of that mindset of protecting the environment, being aware of the environment. Thinking outside of the box and appreciate what is around us.” In our discussions, she carried forward her positive attitude about the environment, which provided her with insight when reflecting on her environment literacy.

In contrast, when Debra reflected about how her environmental attitude had changed through participation in the workshops, her brief response focused on the positive effects of engaging in the workshops that tied to her prior knowledge. She stated, “It hasn't changed at a super high awareness. [The workshops served as] reminders—positive effect of reminders of things.” Each one of the teachers spoke of their positive reinforcement of environmental attitudes gained from their experiences by participating in the professional development workshops.

Professional Development

For these three teachers, their attitudes about the environment had not changed substantively as each held a positive view about the environment before participating in the professional development workshops; instead, the program reinforced their prior knowledge. Although their academic experiences might not reflect an extensive amount of environmental education, their experiences of growing up and experiencing the natural world seemed to be a reflection of their environmental views of the natural world. In

other words, the teachers appeared to make positive connections with the environment by participating in the program.

However, when the teachers were asked about their perceptions of participating in the professional development workshops, each teacher tended to focus on the organizational structure of the workshops and the processes involved with facilitating environmental education. The teacher's focus on the organizational structure might relate to their experiences with other professional development workshops and their view of what makes for successful professional development activities. When asked about the perception of participating in the ACCF program, the teachers responded similarly. Debra said:

I think they are very well organized, and I was looking forward to the next one but COVID-19 came into play. Multiple workshops helped to solidify the ideas. I am looking forward to get a couple of ideas that I have and how to use it [Story of Your Place]. I look forward to building on the learning.

Laura also thought highly of the ACCF program. She asserted, "I have enjoyed the workshops I have participated in. They were well organized and there was a good balance of information and was not high pressure. I will definitely do them again." Noting the variable quality of the ACCF workshops, Helena shared:

There were challenges with the organization and once they had worked through some of the problems, COVID-19 closed everything down. My first experience with ACCF workshop I left more confused than I was anything else. Participating in the second workshop helped me to process what we were talking about and it

helped me to figure out what that would mean to the students. A good way to learn.

In this instance, Helena linked her confusion to the organization of a professional development workshop and gained clarity by participating in the second workshop.

The challenges initially faced by these three teachers with the organization and logistics of the workshops appeared to have been mediated by the actions of ACCF personnel. The ACCF personnel moved forward with a new plan to increase the enrollment of other teachers, after adjusting for some of the organizational hurdles they faced with implementing their professional development program. Beyond the organizational and process issues, each teacher seemed to have had a positive view of the workshops and were looking forward to participating in the post-COVID-19 workshops. For example, Debra confirmed:

I guess I am looking forward to get[ting] a couple of ideas that I have on how to use it. I think I'll have a huge benefit next fall and hopefully there is a next fall and that would be that some of the fifth grade students at our school have been doing some of um, some activities that go with story of my place with their teachers, so I'm going to get kids that don't look at me like they don't know what I'm talking to, or they've never heard of it.

Helena noted the connection between in-person teaching and in-person workshops saying

I really think a lot of it's applicable to the Story of Your Place as well. Just like school, I think in person is best because there's just things that in person offers that virtual just doesn't. it's just hard to get ideas expressed when you just have

this electronic communication, but I think there's probably some areas where you can do a lot of your work virtually and then just get together to share ideas and have that in-person kind of experience as well. I could really see this going well and it actually might be more flexible for teachers.

Though succinct, Laura also expressed interest in continuing her participation in the ACCF workshops. She remarked, "I will definitely do them again."

Each one of the teachers who participated in this research were pleased with their involvement in the ACCF program and the progress they made. They held positive perceptions and attitudes with the ACCF professional development program. Through my personal conversations with ACCF personnel planning the ACCF workshops, I know that they are looking forward to continuing in-person facilitation post COVID-19 restrictions. The ACCF workshops appeared to reinforce these three teachers' positive environmental attitudes and could improve the instructional methods of other teachers involved with the ACCF program.

Environmental Literacy

Teachers need to undertake the responsibility of developing their environmental literacy to promote the environmental literacy in their students (Goulgouti et al., 2019). By developing their environmental literacy, teachers should be able to recognize gaps in the environmental knowledge of their students. In my study, teacher's attitudes about the environment had not really changed appreciably by participating in the program. However, reinforcement of the teacher's environmental literacy and pedagogical methods

were evident by the positive connections they made with the environment while participating in the program.

Reinforcement of Environmental Attitudes

Debra's viewpoint on environmental literacy had shifted from her initial response of focusing on different aspects of gaining environmental knowledge to a slight progression of her ideas and how there was a benefit to her students. When asked about the gains she had made in her environmental literacy, after she had participated in the program, Debra responded with:

It's a little different view, things change as we learn new things. I have taught for a long time, so it was a positive effect and most of it was just reminders of. Ways to do things that were more student centered and not teacher centered.

Debra's response to the question of environmental literacy was straightforward and she made note that there was a positive effect from being reminded of what environmental literacy meant to her, and how she should focus on what is best for her students.

Helena first introduced her definition of environmental literacy as "developing" and I appreciate her candid response to a very complex question. As we progressed through the Phase 2 of the study, Helena had a chance to think about what environmental literacy meant to her and how to articulate her response: "By searching for those answers, you are learning more about the environment. I think environmental literacy is about the connections, not just nature, but history, culture, and livelihoods. The connections are almost like a spiderweb of stuff."

Helena's definition of environmental literacy demonstrated a marked improvement from her initial response and I think she captured the intent of the Oregon Environmental Literacy Task Force (OELP, 2013) definition for environmental literacy: "An individual's understanding, skills and motivation to make responsible decisions that consider his or her relationships to natural systems, communities and future generation" (p. 4). In comparison to the OELP's definition, Helen's definition only lacked the connections with future generations. However, during our conversations about environmental attitudes, she mentioned the idea of passing on knowledge to future generations and who would be there to tell the story of their place. She responded with a story about a cemetery located in proximity to her family's property to help illustrate her point of connecting people with their environment:

And right now, the cemetery is surrounded by new development, so the farmland has been chopped up and sold and developed so it makes me wonder who's going to tell that story someday about how on earth did you end up with a cemetery in the middle of all these brand-new homes. The cemetery is very rustic and it's not well maintained. People go in about once a year and fight back the blackberries. There aren't big headstones or anything like that, but it really makes me think about who's going to explain this to my granddaughter.

When asked directly about environmental literacy, Helena provided an excellent definition of environmental literacy capturing the full intent of the OELP's definition during our discussion about environmental attitudes.

Laura had initially responded to the question about environmental literacy by

focusing on the awareness and impacts that humans have on their environment while also understanding the interaction between different organism. During our final interview, Laura had expanded her definition to include the connections between her students and the natural world. She responded with:

I think it made me think about beyond the walls of the classroom. I would say so expanding horizons in that way, it's not just what happens within those four walls the classroom and that you can connect what you're doing there with what's going on in the world around us and I think that makes us stronger connection and a better lesson for kids.

Laura's background in the natural resources continues to evolve, and she is likely to refine her definition of environmental literacy as time progresses. It would be interesting to speak with her in a couple of years to see how her definition changes from her current perspective.

Given the background experience of the teacher's and their limited environmental education exposure, I believe the teacher's demonstrated an improvement in their environmental literacy, relative to their ideas of environmental literacy before they started working with the ACCF program. Each teacher recognized and was reminded of the positive benefits of environmental education as well as how to connect students with nature in their classroom.

As mentioned in my previous discussion with Helena, there were other methods for assessing the environmental literacy of the teachers beyond asking them a direct question focused on environmental literacy. The teachers described their integration of

the lessons learned from participating in the professional development workshops. In part, I view the ability of the teachers integrating environmental concepts into their classroom discussion as a gauge of how they have progressed with their environmental literacy and their ability to share their environmental knowledge—environmental literacy.

Professional Development

During our interviews, Debra spoke about her participation with the Story of Your Place workshops and not being able to integrate what she had learned into her curriculum. Although Debra had not been able to incorporate what she has learned about the Story of Your Place into her classroom, she developed an implementation plan for the post-COVID-19 world. She explained:

So, my integration is a little bit on standby because we haven't been to school since March 12th, but I selected a site to be for Story of Your Place and I made a plan on how I would introduce the site ... and so I made the whole pre-plan. So, like what how I would present what the kids would do. And again, it was the very introduction stages of the location to start doing our own story of your place.

Given the current COVID-19 world, Debra chose to spend her time developing a plan to integrate the Story of Your Place into her classroom. Her discussions of preparing lessons for future classroom activities revealed the positive nature of her efforts to introduce concepts she has learned from the workshops that could benefit her student's environmental literacy.

Helena had participated in the ACCF workshops prior to the springtime sessions

that occurred during February 2020. Given her familiarity with the concepts of the Story of Your Place prior to the COVID-19 shutdown, she was able to incorporate some of the activities she had learned in the workshops with her students, and had adjusted her methods of teaching about the environment. For example, she used to take her students on nature walks on a nature trail at her school. When talking about the nature walks prior to her participation in the workshops, she shared:

The first time we went out, was actually before any of the professional development workshops and we just sort of went out walk through the trails and just talked about what we were seeing. We didn't really do too much.

After she had participated in the Story of Your Place workshops, she expanded on her classroom activities and incorporated the knowledge learned from the professional development workshops. One of the concepts she had learned about in the workshops focused on the students developing a sense of place and having a spatial awareness of the environment around them. She reported:

...the next thing I think I had them do was make a map from memory of what they thought was out there. That was pretty interesting. There was some that were pretty close and some that were way off from being accurate. And then we have a Dollar General up behind our school, so we walk up the hill and sort of had that bird's eye view really of the area that we've been talking about and had them do some mapping from there. We started talking about we'll how do you know which way is north and what are some reference points that we can use to help us identify where things are and where we can find them.

In Helena's response to the question about her classroom activity, she demonstrated a connection between human impacts and the environment by developing a spatial awareness with her students. Her classroom activities went from not really doing much to taking the students outside and exploring their connection with the natural world; this example highlighted a progression of her environmental literacy.

Laura had a slightly different approach with the classroom integration of what she had learned in the ACCF professional development workshops. From her experiences with the workshops, she would incorporate a sense of wonder and acknowledgement while focusing on the little intricacies of nature. Laura took a more refined approach, in comparison with the other research participants, for broadening her environmental literacy by focusing on the intricacies of the natural world. She revealed:

I have learned and then been reinforced to look at the little things. I guess as you're walking through a path to look at the branches that are broken the droppings from animals and being aware not just of your big surroundings, but also of the little surroundings because you can pull those little observations into various lessons about. You know, what animals have been here just by. I mean can tell where deer have eaten and branches off of things. Of when a raccoon has stirred up the dirt next to a pond and things like that.

Laura understood environmental concepts and education. By looking at the connections between different organisms and their environment, Laura helped her students to explore their surroundings.

Each one of the teachers had positive environmental experiences when

participating in the ACCF program and have adjusted their methods of integrating environmental education into their curriculum. The development of environmental literacy in the eyes of the teachers, may seem minimal through their lens, but they were able to incorporate and modify their teaching techniques that speaks to an increase in their environmental literacy.

Professional Development Support

Each teacher in this study has their own set of environmental attitudes and perceptions, which they used to participate in the ACCF program. Their work with the ACCF program supported their beliefs about the environment. Support for their participation came in the form of the professional development workshop activities, the resources given to the teachers, and the ACCF personnel interactions during their professional development journey. These three forms of support contributed to the development of a community of educators, their beliefs about the environment, and their sense of place. The community of educators extended beyond the teachers involved with this research and included the teacher's administrators, workshop facilitators, and other participants in the program. Each contributed to the community of practice, either directly or indirectly, and supported the teachers' growth related to environmental literacy.

Positive Environmental Experiences

The teachers discussed how their administrators supported their decision to participate in the ACCF program. For example, Debra described how her school was supportive of her participating in the program. She shared, "Our school was very supportive of many activities put on by ACCF." Similarly, Laura recalled that not only

was she supported, but the administration had put her in contact with the ACCF. She responded, “Our administration supports a lot of opportunities and they put me in touch with ACCF.” Helena also received support from her school administrators and felt they were supportive of her extracurricular professional development activities. She disclosed, “Very supportive [Administration]. Asked principal to have some extra time on Friday in-service days to work on Story of Your Place, instead of school PD, and he was very supportive and told me to take whatever time I needed.”

These three teachers gave short answers but were happy with the support they received from their administrators. Helena had a supportive administrator who even allowed her to use her normal professional development time to explore the Story of Your Place. Although professional development requirements of a school can conflict with a teacher who wants to pursue additional environmental education opportunities, these teachers were fortunate to have supportive administrators that helped to sustain the teacher’s communities of practice.

Professional Development—Positive

In addition to the administrative support the teachers received, their community of practice was further supported by the positive actions of ACCF personnel. Whether the ACCF personnel went to their classroom to help with instruction or facilitated workshops at one of the venues used for the activities, the support from ACCF personnel was positive and reflected highly on the ACCF organization. When asked about the support from ACCF, the teachers mostly reflected on their experience with the environmental educators, but also discussed some of the resources provided by ACCF.

Debra spoke highly of the personnel at ACCF and was positive when asked about the ACCF program support during her interview. She responded with a discussion about the personnel and how the materials from ACCF and the local STEAM hub supported her learning. She reported:

They were very helpful in helping me to understand what ACCF is about and how it could be of benefit to my students. Personnel would come to class and help with instruction and leave either their supplies from ACCF or STEAM hub. Resource - overwhelming because there were so many.

Her discussion went beyond the experiences she had with participating in the workshops and reflected on the ACCF personnel coming to her school to help incorporate activities in her classroom. She included the STEAM hub in her discussion because of the overlap with Isaac, an environmental educator, who worked with both organizations. However, Isaac's overlapping work with the two separate organizations seemed to be a point of confusion for the teachers. In addition to mentioning the supplies provided during the activities, Debra went on to talk about other resources, saying:.

Aware of resources but not had the chance to use due to COVID-19. Visiting the ACCF site is one thing I wish to do with my students. The natural setting of ACCF is nice but we also have natural settings close to our campus. However, traveling to a new site can be very positive. I like the aspect of comparative possibility.

Beyond the support of personnel, location can influence how educators feel supported in their sense of place. As mentioned in Debra's discussion, she made special note of having

the “aspect of comparative possibility.” Comparative possibility focused on an aspect of the Story of Your Place and could introduce students to different settings for a comparison of where they live. In Debra’s discussion, she compared the natural setting at her school with the natural setting at the ACCF site. This was a strong connection with a Story of Your Place and spoke to how Debra’s belief system in the environment is evolving.

Laura’s discussion about how ACCF personnel supported her presented a challenge, not with ACCF personnel, but with the motivation of her students. She recognized that sometimes it was difficult to get students motivated. She acknowledged:

They (ACCF) gave me new ideas of how to incorporate technology, GPSs, geocaching, in my natural resource classes. Challenges with personnel coming to help with class but was due to lack of motivation with students...sometimes you can't get the students engaged. Resources—ACCF site, help with instruction, student activities, worksheets.

Laura’s experience with the unmotivated students was an example of what most teachers can face while teaching. Although Laura presented a challenge with teaching students, she was happy with the materials brought by the ACCF personnel, and she appreciated the worksheets and other equipment she had received for the student activities. However, in one of the classroom activities, Laura had difficulties with the GPS (Global Positioning System) units provided by the ACCF personnel. Fortunately, Laura was able to create a work around with her students, and they incorporated their smart phones with a geocaching activity.

Helena not only discussed the ACCF personnel and some of the tangible resources provided such as worksheets and equipment, but she also made mention of the different venues used for the professional development workshops. She noted:

Worked with different people from ACCF. They are super generous with their time, talent, and knowledge. Help to plan activities by having meetings. ACCF—provide activities with worksheets and help the teachers to explore how to conduct activities. ACCF will travel to schools to help with students. Resources—Holding workshops at different venues helped to highlight other resources available in the community: Library, Museum, ACCF site.

The acknowledgement of the different venues was important to note because this integrated a different dimension to the resources being provided by ACCF. By holding professional development workshops at different venues, the ACCF introduced new and valuable resources to the educators involved with their workshops. Helena furthered her discussion of the different venues when asked about the resources provided by ACCF. She responded:

Resources have been progressive. Started with Google Docs but she really hadn't looked at them. Holding PD at other venues to introduce resources to teachers—Douglas County Museum and Library. I have the experience using these new places and passing that onto the kids will give them an experience that's going to stay with them longer than just seeing something or reading something. Bring in people that can help us learn—community partners.

Helena has been involved with the ACCF professional development programs for a few years and made note of their method of using Google Docs, which she did not like.

Through my conversations with personnel at ACCF, I became aware of future attempts to refine their process of delivering material and potentially video recording the workshops to make the content more accessible to the educators who are interested in the workshops.

Support from ACCF personnel was supportive of teachers' beliefs about the environment and a sense of place. Each teacher positively reflected on their experiences with the ACCF program and were appreciative of the connections they made during their time with ACCF. Laura, for example, reported on the efforts of ACCF personnel and how they supported the educators involved with the workshops. She described, "They are very supportive and will bend over backwards to try and coordinate with you. They help to support a particular learning topic. Share ideas and bounce ideas around." Debra acknowledged that teachers have too much to do and that support can come from the repetition of a program to help solidify concepts. She explained:

Experiences were spread out because teachers in the whole world always have too much stuff to do. The repetition of the Story of Your Place got me set on the idea and hearing it from different angles and different organizational methods, made it more doable for me.

Helena reflected on how her interactions with other teachers supported her beliefs. She recalled, "Attending workshops with other teachers and hearing other participants ideas. ...broadened my own horizons. Safe space to have a conversation about what works and worries. A nice place to brainstorm and to come up with solutions." In this instance,

Helena, Debra, and Laura had positive experiences with the ACCF professional development workshops and the Story of Your Place curriculum workshops.

Professional Development—Challenges

However, with many professional development workshops and activities, there are often hurdles faced by the educators that prohibit their participation. The biggest hurdle faced by teachers was the COVID-19 pandemic and the cancellation of the planned workshops. There was nothing that could be done about the impacts of COVID-19, so I focused on the other perceived barriers of the teachers who participated in the ACCF program.

Each teacher recognized the hurdles they faced when trying to participate in the ACCF program and discussed these challenges honestly. The biggest barrier the teachers faced to participating in the professional development, which has been a widely recognized as a barrier to professional development, was finding the time to participate. The teachers in this study acknowledged that time was a barrier. For example, when asked specifically about the barriers faced with attending the workshops, Debra responded, “Time is always a barrier and it's on me to carve out the time to do something new.” Similarly, Debra and Laura both talked about not having enough time to do something new. In Laura’s situation, she mentioned time and the ability to “...getting a substitute” which would free up her time to participate in the extra workshops.

Other barriers brought forward in my discussion with these three teachers were logistics, outreach, and weather. For instance, Laura thought about some of the logistics of trying to attend workshops and not receiving notifications of when the workshops were

happening. In addition to the barriers of time, logistics, and notification, Laura touched on a topic that might be unique to environmental education: weather. The weather influenced the ability to conduct workshops in the outdoors. She reported:

There is a lot ACCF has to offer but the logistics can be difficult to overcome.

Time and coordination of getting a substitute. Mother nature and

‘snowmageddon’ affected the ACCF site being open during a part of the year. I don’t always get the outreach notices.

Laura also mentioned “snowmageddon” which might not have been a barrier for other forms of professional development, but when the activities were meant to be conducted in the outdoors, having a “snowmageddon” and the resulting damage, was prohibitive to participating in any type of activity.

Helena goes on to discuss some of the organizational and communication problems that ACCF faced during their earlier workshops. As previously discussed, ACCF mediated some of their organizational hurdles by switching venues that helped to provide better access to their workshops. Helena also mentioned planning which referred to the low enrollment of participants at some workshops. She explained, “Initial organization [was problematic] but worked through the issues with planning. Outreach for workshops but started working with STEAM hub to get the message sent out to all teachers.” Helena recognized the challenge of communicating when the workshops were going to occur and noted that the ACCF had started working with the STEAM hub. To counter the low enrollment and communication issues, ACCF started working with the local STEAM hub to help with outreach for upcoming workshops.

Positive Environmental Experiences

Looking through the lens of the teachers involved with this study, they appeared to value of the overall experience with the ACCF program including the positive support of the ACCF personal, the resources provided, and the community of educators with who they worked. The teachers involved with the ACCF professional development workshops had many positive experiences and looked forward to continuing with workshops during the post-COVID-19 world. Thus, they viewed the ACCF as a valuable experience. Debra responded positively, and she hoped the program continues to grow. She was looking forward to continuing with the Story of Your Place and has developed plans to integrate what she has learned in the workshops to increase the environmental literacy of her students. She explained:

One that I hope that just keeps growing. I mean, I hope to continue to grow with it. Since we didn't quite finish off what we're doing this year and I really hope. To incorporate the story of my place, which is I think one of the main Alder Creek things that they teach in my next year's sixth grade class. Continues to grow for me and for me to increase the environmental literacy of my students and I believe. Working on some form of a story of my place project will definitely enhance the environmental literacy of my students and me.

Through many of her responses during our discussions, Laura noted her appreciation of the resources and the support provided by ACCF. She looked forward to starting up with the program in a post-COVID-19 world. When asked about the overall structure of the program and whether it was a valuable experience, Laura responded:

Yes! The staff is very welcoming, and they promote working together to help find the resources needed to be an effective teacher. Having the site there. One more thing I can pull into and expand my expertise. They are very proactive when you need something. The facilities are nice when the weather is bad.

Helena was also looking forward to starting up with the ACCF program knowing that some of the organizational barriers have been mitigated for and hoped that ACCF can get more participation at future workshops. She reflected on her experiences with ACCF professional development, saying:

So short answer is yes! The longer answer is yes, after we sort of got the organizational part down the first part of it was more frustrating. Things were going more smoothly and then COVID-19. Not enough participation for one reason or another. Breaking the program up into smaller chunks instead of here is the whole program. Taking it piece by piece and doing it one month to the next.

In sum, each one of three teachers involved with this research were looking forward to starting up with the program once the COVID-19 world has ended. They have acknowledged some of the barriers encountered with attending the workshops and have recognized the efforts of ACCF to promote the Story of Your Place and to overcome the perceived barriers of teachers involved with their program.

Limitations of Study

These findings speak to the overall positive nature of the ACCF organization and the benefits of participating in their professional development workshops. However, it is important to discuss the limitations of the study including the analysis of data. One

limitation is the small sample size; only three teachers participated in this study.

However, the purpose of this qualitative case study was not to generalize the findings.

Instead, my purpose was to describe and explain the perceptions of teachers engaged in environmental education professional development workshops. In turn, the ACCF would be able to use these teachers' perceptions to inform the development of their professional development program. In addition, findings from this case study may be useful to other researchers examining similar situations.

Another limitation related to the sample size was that the ethnicity and economic status of the three teachers in this study. Two teachers self-identified as Caucasian and one teacher self-identified as an American Indian. Given their teacher roles, I assumed these teachers were members of the middle class. Their ethnicity and economic standing of the three teachers were not necessarily reflective of all the educators who participated in the ACCF professional development workshops and activities. As such, having the opportunity to interview more teachers might provide greater insight into the perceptions of teachers participating in the ACCF program.

One of the biggest hurdles for getting teachers involved with this research was COVID-19 and the availability of teachers who had participated in the ACCF program. In addition to the number of teachers participating in this research, there were few environmental education centers in this rural area of southern Oregon. Because of the limited environmental education centers in this area, there were not opportunities to evaluate and compare the perceptions of teachers with other rural environmental education organizations. However, the limited environmental centers in Douglas County,

Oregon was one of the reasons I conducted this particular case study research. I hope that my findings can be used to inform and improve the processes used by the ACCF organization for professional development workshops in the future.

Given the limitations to the study, I also need to acknowledge my own set of biases including my positionality as a White man have potentially impacted my interpretation for the analysis. I come from a background of being a professional natural resource specialist (botanist) in the Western tradition for 13 years, and I have been involved directly with several different environmental education activities and programs. In addition to my bias from professionally working in the natural world, I am also a community college instructor and teach various natural resource related courses. Because of my professional and academic background, my expectations of what was a reasonable amount of knowledge required of an educator teaching environmentally related topics might be skewed on the higher end of the knowledge continuum.

Chapter 5: Conclusion

My problem of practice was that teachers in rural areas have limited professional development opportunities related to environmental education. I based this study on the premise that many teachers have not been adequately prepared to teach environmental education and that there have been few organizations that provide opportunities for teachers to explore and to learn about the environment in a rural part of southern Oregon. My literature review indicated that fewer resources have been available to rural areas than those found in urban areas. Resources in the context of this research, relative to more urban centers, ranged from equitable funding across the state to the number of organizations offering environmental education opportunities. Being in a rural community with limited resources has also limited the opportunities to explore environmental education experiences. My literature review also revealed that teachers and administrators have thought of professional development workshops as one-stop shopping, which has been shown to be less effective.

The overall purpose of this study was to describe the perceptions of teachers engaged in environmental education professional development workshops to help inform the Alder Creek Community Forest (ACCF) organization's evaluation of their professional development workshops. The following research questions guided my case study:

1. What are the perceptions of teachers' participating in workshops focused on an environmental education professional development program?

2. How does a story of place in an environmental education professional development program help teachers improve their environmental literacy?
3. How are teachers' beliefs about the environment and a sense of place supported by the Alder Creek Community Forest (ACCF) program?

Findings from my study can contribute to the body of research environmental education and to insights regarding the experiences of rural educators participating in professional development workshops.

In Chapter 4, I described the analysis of qualitative data collected from a survey and individual interviews, presented results of the case (i.e., ACCF), individual teacher vignettes, and themes generated from the interview data. Then, I addressed each research question by the identified themes. For example, to address research question two about environmental literacy, I used two themes: reinforcement of environmental attitudes and professional development—positive and challenges. In addition to my presentation and interpretation of the results, I described the limitations of the study and my personal biases.

In Chapter 5, I provide a synthesis of my results and situate the results within the larger theoretical and research contexts. Then, I advance a set of implications for professional development organization and policy makers. Finally, I offer future research suggestions.

Synthesis of Results

In this section, I synthesize the results of my study by addressing each research question in the context of the themes generated from the qualitative analysis of the

teachers interviews: (a) positive environmental experiences, (b) reinforcement of environmental attitudes, and (c) professional development—positive and challenges. Each research question will be discussed in the context of themes relevant for the respective research question. From my synthesis of findings, I will then explore the research situated in a larger context, and then I will discuss the implications of my research to provide insight and recommendations for the ACCF professional development program.

Research Question One: Teachers Perceptions of Workshops

The first question asked: What are the perceptions of teachers' participating in workshops focused on an environmental education professional development program. The aim of this research question was to capture the perceptions of teachers who had participated in the professional development workshops and to assess the effectiveness of their participation in the workshops. In Chapter 4, I described the perceptions of the teacher participants using the three themes: (a) positive environmental experiences, (b) reinforcement of environmental attitudes, and (c) professional development—positive and challenges.

Positive Environmental Experiences

Capturing teachers' perceptions helped to provide insights into the effectiveness of the ACCF program and to identify how internal and external environments influenced their experiences. The teachers spoke of the support they received, from their respective administrative staff, on attending the ACCF workshops. Having a form of internal support from their administrators to attend ACCF professional development, which is

outside the scope of their normal professional development, allows the ACCF program to become more successful by creating an effective organization that has the ability to reach out to this rural community. In contrast, an organization not supported by the teacher's administrator's might not be able to develop their environmental education program to be effective at increasing the environmental literacy of the community. For my research, I defined effectiveness as a positive experience and would reflect a program that has the potential to bring support to the ACCF program and help to develop a community of educators in rural Oregon. Whereas a negative experience would indicate potential areas of improvement for the ACCF program.

Reinforcement of Environmental Attitudes

The effectiveness of environmental education in enforcing environmental attitudes has been the subject of debate in the environmental literature (Bergman, 2016; Carleton-Hug & Hug, 2010). Within the context of this research, I choose to reflect on the perceptions of the teachers experiences to explore the reinforcement of environmental attitudes through their collective experience from their youth to participation in the ACCF program. All three of the teachers had reflected positively on their childhood experiences with the natural world. Whether it was Laura exploring the swamplands of rural Georgia or Debra reflecting on her time with her family on the Oregon coast, each one of the teachers were brought up in an environment where they had the opportunity to explore nature and to develop an appreciation of the environment. It is from this appreciation of the environment that I discuss the reinforcement of environmental attitudes from the perceptions of the teachers participating in the ACCF program. The

teachers continued to appreciate the natural world while participating in the program and felt that the ACCF program helped to reinforce their ideas about the natural world and to make renewed connections with the environment. For example, both Helena and Laura had reflected on how participating in the program allowed them to make connections with people and their environment and how they could help to connect students with the environment.

Professional Development—Positive and Challenges

It has long been recognized that some of the challenges to environmental education focus on the institutional or teachers willingness to participate in particular programs (Carleton-Hug & Hug, 2010). However, teachers are more likely to participate in programs when there is minimal temporal, financial, or administrative burden (Bergman, 2016). All three the teachers had positive experiences during their participation and interactions with the ACCF organization while participating in the workshops. The teacher's positive experiences of the ACCF organization can partially be summed up with Debra's discussion of hoping to see the continuation of the program so she can help to increase the environmental literacy of her students.

The challenges faced by the teachers participating in the workshops are the common barriers many teachers face when trying to participate in professional development and that is, having enough time to attend, and the logistics of attending outside professional development workshops. The ACCF program helped to overcome the logistics of attending the workshops by moving their program to different venues in closer proximity to the teacher's schools. By moving the venues closer to the teachers,

not only did it introduce new places to explore for the teachers, it also removed some of the logistical problems commonly associated with teachers attending professional development. Debra had reflected on time being a barrier and it has always been difficult to carve out the time to do something new. In addition to the different locations, ACCF personnel would also supplement their professional development activities by traveling to the schools to help teachers with their integration of environmentally related topics. In addition to the barriers of time and logistics, the teachers made note of other challenges with participating in the workshops, but they were countered with a corrective action by the ACCF organization. For example, Helena had discussed some of the early issues about the sheer amount of information that was being discussed in the workshops but made note that the ACCF organization was receptive to the teachers needs and broke down the workshops into smaller digestible chunks of information. The teachers' perceptions are valuable as they reflect the efforts and support being delivered by the ACCF personnel and of the program. Recognizing that each teacher had a unique lens when participating in the program provides insight into the effectiveness of the program. Seeing that the ACCF organization addressed the teachers' challenges should lead to a more effective environmental education program and help to draw others into the community of environmental educators.

Research Question Two: Story of your Place

The second question explored: How does a story of your place in an environmental education professional development program help teachers improve their environmental literacy. The intent of this research question was to analyze the story of

place and how the program helps to improve the environmental literacy of teachers participating in the ACCF professional development workshops. In Chapter 4, I presented results of my qualitative analysis of teachers' improvement in environmental literacy using two themes: reinforcement of environmental attitudes and professional development—positive. I identified these two themes from my analysis of the teachers' interviews, which helped me to qualify their gains in environmental literacy. Developing teachers' environmental literacy through environmental education experiences should increase teachers' ability to help their students understand the natural world around them. In response to specific interview questions, each teacher reported about their improvement and their increased understanding of environmental literacy.

Reinforcement of Environmental Attitudes

The ACCF program's use of the Story of Your Place curriculum helped to reinforce these teacher's positive environmental attitudes and in turn, increased their environmental literacy. Although the teachers described only a slight increase in their environmental literacy by participating in the program, other evidence supported their more thorough understanding and appreciation for the environment. For example, when Helena talked about the gains she had made in her interpretation of environmental literacy, she went beyond the connections she made with the environment and included the connections with the environment, people, and culture. Through the connections Helena had made by participating in the Story of Your Place, she was better able to integrate lessons learned from the workshops and helped to connect her students with

their surroundings. These connections moved her past her initial thinking of just the environment and allowed her to increase her environmental literacy.

Beyond the direct reporting of their interpretation of environmental literacy, the teachers described their incorporation of ACCF program activities into the school curriculum. Although Debra has had little time to integrate some of the activities, she learned by participating in the workshops, she reflected on the methods she will use in the future to help develop the environmental literacy of her students. Debra did not report on a specific method to use in her classroom, but the fact that she has started to organize her thoughts into the development of her curriculum, represents a greater understanding of her literacy that she had previously reported. These descriptions provided additional insight and indicated a larger increase in environmental literacy than reported directly by the teachers. Given their limited experience and participation in the number of workshops, the increase in these teachers' environmental literacy reflects positively on the ACCF program. Their experiences can provide a baseline and inform the development for future program workshops.

Professional Development—Positive and Challenges

The teacher's responded positively to the use of the Story of Your Place as a framework for professional development. The Story of Your Place curriculum allowed the teachers to contextualize the natural world around them and to look beyond their surroundings. For example, Helena reported on some of the field activities she used to do with her students, before attending the workshops, where they would hike on a nature trail and just look at what was in their immediate environment. After participating in the

workshops, Helena went on to report about how she would have her students map out the different areas so the students would be able to make connections with the broader environment in their community. The progression of thinking from moving the student's immediate environmental lens, to the larger community, shows an expansion of their environmental literacy by making connections between the environment and where the students live.

Some of the challenges expressed by the teachers focused on the initial stages of ACCF developing their Story of Your Place curriculum. During the initial stages of the Story of Your place, there appeared to be too much information being presented and challenges with the organization of the workshops. Both Debra and Helena had reported on these challenges when they had first started to work with the ACCF organization, and they were happy to see that the ACCF organization had adapted to the needs of the teachers. By adapting to the needs of the teachers and reorganizing their workshops, the ACCF organization was able to make their program more successful by removing some of the barriers to teachers developing their environmental literacy.

Research Question Three: Teachers' Beliefs and Sense of Place

The third question examined: How are teachers' beliefs about the environment and a sense of place supported by the Alder Creek Community Forest (ACCF) program. I used research question three to identify the supports given by the ACCF organization. In Chapter 4, I presented results of my qualitative analysis of teachers' beliefs about the environment and how those beliefs were supported by the ACCF program. In this context I used two themes to explore how the teacher's beliefs were supported: positive

environmental experience and professional development—positive. I identified these two themes from my analysis of the teachers' interviews, which helped me to qualify their beliefs about the environment and how the ACCF supported those beliefs. While I was not able to directly observe the interactions between ACCF personnel and the teachers, I was able to infer the ways in which the ACCF organization supported teacher's beliefs about the environment from their interview responses. I determined support from our discussion about the availability and access to workshop activities, ACCF personnel availability, resources provided to the teachers, and the development of a network of educators focused on environmental education. In the following sections, I discuss the context of the themes generated from my analysis of the interviews.

Professional Development—Positive and Challenges

In this case study, the three teachers felt well supported in all aspects of participating in the professional development workshops. The support they received led to a positive professional development experience and spoke well of their respective administrative staff and of the ACCF organization. One of the common themes in environmental education research related to obstacles teachers face when integrating their use of environmental education in their classroom is a lack of administrative support (Ernst, 2012). In this research it was evident that teachers were able to overcome the obstacle of not receiving support from their respective administrators. For example, Laura had reported that it was her principal who put her in contact with the ACCF organization and suggested she attend the workshops. Each one of the teachers in this study felt like they were being supported by their administrators and were allowed the

time necessary to pursue professional development focused on environmental education. When Helena asked her principal to have extra time off to pursue the Story of Your Place curriculum, during the school's normal professional development workshops, her principal was very receptive and told her to take off whatever time she needed.

Positive Environmental Experiences

In addition to the support provided by the teacher's administration, ACCF personnel provided support by fostering a positive environmental experience where the teachers were allowed to explore their beliefs about the environment and a sense of place. Support came in the form of the willingness of ACCF personnel to spend time attending the teacher's classroom to help them with integration of concepts and ideas into their curriculum. Debra reflected on how the ACCF personnel took their time to really help her understand what the curriculum was about and how it would benefit her students. Support from ACCF personnel also came in the form of ACCF personnel bringing supplies when they visited the teacher's classrooms to help integrate environmental topics into their curriculum. Being available and present in the teacher's classrooms helped to provide a positive atmosphere where the teachers were able to translate their environmental practice from the workshops, into their own curriculum. Laura felt that the classroom visits helped to support different learning topics and it was nice to have the ACCF personnel there so they could share and bounce around different ideas. In addition to the classroom visits, the ACCF personnel provided supplies and worksheets for the teachers to incorporate into their curriculum. For example, Laura discussed how ACCF personnel helped her to incorporate technology into her classroom using GPS units to perform a

geocaching exercise. Each one of these types of support provided by the ACCF organization and their personnel reinforced the teacher's beliefs about the environment and a sense of place. Supplying teachers with the proper support and tools to conduct environmental education can improve the likelihood that teachers will implement these strategies with their own students (Sondergeld et al., 2014).

Situated in the Larger Context

In this section, I discuss my research through a framework of situated learning theory and how this lens provides a method for exploring the themes generated from the teachers interviews. To contextualize my theoretical framework and the body of literature supporting professional development in environmental education, I use the following themes: environmental literacy, professional development, and the perceptions of the teacher's environmental education experiences.

Situated learning theory provides a lens to understanding how teachers are integrating learning within a socially constructed context and are more likely to learn by actively participating in this domain (Gawande & Al-senaidi, 2015; Korthagen, 2010; Lave & Wenger, 1991). In context to this research, the socially constructed domain references the community of educators who participated in a series of ACCF workshops. This community of educators extends beyond the teachers and those that are helping to create a community of environmental educators: administration personnel, workshop facilitators, and personnel working at the different venues where the workshops were held. Helena had reported about how the communication with other educators during the workshops helped to bring different perspectives to the learning experience and helped

her to broaden her own horizons. Debra echoed some of the same sentiments as Helena and recognized that hearing the material from different angles and organizational methods helped her to better understand the content of the workshops. In each example, the learning experience went beyond a transmission of knowledge from facilitator to student (teacher) and became an embedded part of the workshop. Each one of the groups of individuals who supported the development of the teachers played a role in helping the teachers to become more environmentally literate. However, I think the teachers who participated in this research along with the support of others can help pull other educators from the realm of novice to expert—as described in Lave and Wenger’s (1991) pivotal work on situated learning theory.

Professional Development

In this study, I used qualitative data from the perceptions of a small group of teachers to highlight a professional development environmental education program that continues to adapt to the needs of their participants. The benefits of environmental education have been recognized as a way to advance an environmentally literate society and the perceptions of teachers are essential to understand the effectiveness of an environmental education program (West, 2015). Each one of the teachers in this study reported how the ACCF program contributed to an increase in their environmental literacy. The teacher’s perceptions of their professional development experience are essential to understand the effectiveness of the ACCF program. Teacher’s perceptions were key in determining the effectiveness of an environmental education program;

however, it must also be noted that a number of barriers impacted teachers' attendance at professional development workshops.

While environmental education in pre-service learning has been generally lacking (Dada et al., 2017; McKeown-Ice, 2000; Yates et al., 2019) the importance of pre-service course-work has been well documented in helping teachers understand environmental topics (Álvarez-García et al., 2015; Groves & Pugh, 1999; Yates et al., 2019). As confirmed by the voices of the three teachers, there was a lack of pre-service learning related to environmental education. Though Laura reflected on the positive experiences she had with the science components of her teaching credential program, she was not able to specifically address environmental education. To help bridge the gap between a lack of pre-service learning and gaining environmental knowledge, in-service learning in the form of professional development programs can be useful for developing the environmental literacy of teachers. Prior to their participation in the ACCF program, each one of the teachers reflected on their limited pre-service experiences with different forms of environmental education and reported that most of the recent workshops they attended were one day events. In contrast to these one-day events, Debra and Helena reported on their experiences with environmental education over the last few decades and how they used to have more opportunities to participate in multi-day workshops. For example, Debra talked about her experiences 35 years ago when she was able to go on multiple weekend long field trips to explore the natural world.

Professional development programs have been an effective approach for increasing the environmental literacy of teachers (Yates et al., 2019); yet, many barriers

have prevented teachers from attending in-service workshops (Caffarella & Zinn, 1999). Whether there were external barriers such as a lack of time, resource, and logistics (Ham & Sewing, 1988; Kim & Fortner, 2006), or internal barriers such as attitude or content knowledge (Gess-Newsome et al., 2017; Johnson, 2006), helping teachers to overcome these barriers can assist with teachers participating in environmental education workshops. As reported in the literature (Ham & Sewing, 1988; Kim & Fortner, 2006) and known as common knowledge by many teachers, the lack of time and logistics were the biggest barriers to teachers attending ACCF workshops. Although all three teachers reported time as being a barrier to attending professional development workshops, the teachers in this study received support from their respective administrators to attend the ACCF workshops. In addition to the support from their respective administrators, the administrators also helped facilitate the teacher's ability to overcome the perceived barrier of time by allowing the teachers to attend the professional development workshops. Administrative support can have a positive effect on how teachers perceive their working environment (Avalos, 2011) and can create a positive culture of learning. The fact that the teachers involved with this study have received support from their administrators might be reflective of an organization that is trying to create a culture of learning.

Other logistical-based perceived barriers focused on having the resources necessary to not just participate in the professional development workshops, but also to conduct classroom activities with those resources. Supplying teachers with support and the tools necessary to conduct environmental curriculum in their own schools could

benefit their students in gaining an understanding of their own environmental literacy (Sondergeld et al., 2014). Organizations could also play a role in helping teachers to overcome the resource barrier by providing tools to help conduct activities in their classroom. The ACCF not only provided activity sheets for the teachers, but they also provided the equipment necessary to conduct the activities. In addition to the supplies provided to the teachers, the ACCF started holding their workshops at different venues to introduce the teachers to new organizations or groups that may benefit their future classroom activities. For example, ACCF held one of the most recent workshops at the local history museum. Holding the workshop in the museum introduced the teachers to a venue where they would be able to take their students to explore the natural history of the region. Using such venues could also help to facilitate the development of environmentally literate citizenry in a rural area of southern Oregon.

Environmental Literacy

The development of environmental literacy has been one of the key goals of environmental education and has served to make environmentally responsible citizens who are more aware of the environment and its associated problems (Charles, 1992; Krasny & Roth, 2010; Tuncer Teksoz et al., 2014). The term literacy originally referenced the ability to read and write but within the context of environmental education, the term literacy has evolved to refer to being well educated and demonstrating an extensive knowledge of learning or culture (Charles, 1992). It should also be noted that environmental literacy is not a concept whether people have it or they do not, but rather a literacy that develops over time as the knowledge of an individual expands and becomes

more refined (Hollweg et al., 2011). This study represented a small sample of teachers who have shown an increase in their knowledge and an expansion of their ideas related to their environmental literacy from their participation in professional development workshops. Through this expansion of knowledge, the teachers in this study are on a pathway to becoming more effective educators of environmental topics.

The results of this study aligned with previous studies in showing that environmental education can develop the environmental literacy of teachers (Ernst & Erickson, 2018; Hollweg et al., 2011; Ruggiero, 2016; Werth et al., 2013; Yates et al., 2019). As previously discussed, each one of the teachers reported minimal increases in their environmental literacy. When asked directly about her environmental literacy gains, Debra had commented, that her views had slightly changed from when she first started participating in the workshops; she made note that things change as we learn new things. As Pe'er et al. (2007) discussed, environmental behaviors can reflect the environmental literacy of an individual. Within the context of Pe'er et al., and although the teachers reported only minimal gains, their integration of new concepts into their curriculum and their environmental attitude spoke of larger increase in their environmental literacy. For example, all three teachers talked about the reinforcement of concepts and then went on to discuss the connections they were starting to make with nature. Helena reported on the spatial connections between human interactions and the environment that was reflective of the Story of Your Place curriculum. The connection with the relationships between people and nature supported the ideas set forth in the assessment of environmental literacy by the Oregon Environmental Literacy Plan (2013).

Teachers' Perceptions of their Environmental Education Experience

Pre-service environmental education has been lacking in formal environmental education programs and as such, the perceptions of teachers about their environmental education experience were influenced by other internal environments (Ham et al., 1988; Kim & Fortner, 2006; McKeown-Ice, 2000). In her study of pre-service education programs in the United States, McKeown-Ice (2000), found that less than one third of the 715 universities studied did not provide the foundational knowledge of environmental education. In this study, only one of the three teachers, Laura, participated in courses with an environmental education focus. During her teaching credential program, she had a very good science component and reported some focus on project-based learning during her program. The lack of a pre-service environmental education experience by the other two teachers in this study is reflective of the studies by Ham et al. (1988), Kim and Fortner (2006), and McKeown-Ice (2000). Although pre-service environmental education is lacking in formal education programs, there are other experiences from which teachers can draw upon to enhance their environmental education programs.

The perception of each teacher's unique experiences with external and internal environments can influence individual action and foster an attitude of change (Sondergeld et al., 2014). The internal environment of needs, memories, and visions unique to each teacher influence, in part, their external environment. From this concept of the internal environment influencing the external environment, I draw upon the internal environments of the teachers, whom all had positive memories of their time spent in nature as a child as well as positive experiences while participating in the ACCF

program. Whether it was Debra going on field trips as a child to the nature museum, or Helena reflecting on the time she spent hunting with her dad, each one of these experiences helped to shape their views on the environment. As such, these positive memories provided a lens for the teachers to view their interactions with environmental education and their experiences with the professional development workshops.

Summary of Thematic Discussion

In this section, I examined my research within the context of professional development and environmental education literature, using three themes to guide my discussion. Comparison of my findings with those of other studies will contribute to the base knowledge of the barriers many teachers face when participating in professional development program. My results are consistent with other research in that time and logistics seems to be the biggest barriers to teachers attending professional development workshops. However, my findings are contrary to previous studies that suggest a lack of support being a barrier to participating in environmental education. Support has been shown to contribute to an increase in the environmental literacy of educators and of their students. Aligned with these studies, the teachers involved with this research felt they were supported by their administration and the ACCF organization and as such, they demonstrated an increase in their environmental literacy. Overall, as perceived by the teachers involved with this study, the ACCF program and the Story of Your Place curriculum provided a rich opportunity for the teachers to enhance their previous experiences with the natural world and to become effective environmental educators.

Implications

This study has several implications that stem from the perceptions of a small group of teachers who participated in a rural environmental education program. Although this research represents a small group of teacher's experiences, it is important to hear the teachers voice and their narrative, when making decisions about how to develop a professional development program. Qualitative research can be an effective method to explore lived experiences of teachers which can be missing in organizations that use quantitative analysis for their assessments. As such, the voice of the teachers are reflected in the data collected for this research and from the themes generated from the narrative of small group of teachers involved with a rural professional development program who are attempting to increase their environmental literacy.

The teachers showed an increase in their environmental literacy by participating in the ACCF program. Because the teachers showed an increase in their environmental literacy, I argue that elements of the ACCF program would benefit other teachers and provide a model for other organizations. Results from my analysis of the qualitative interviews provided insight into the teachers' perspectives related to the need to continue with the environmental education methods used by the ACCF organization. The Story of Your Place curriculum offered a method for linking the natural world with the cultural values of those who participate in the environmental education program and helped to develop a community of educators. The Story of Your Place curriculum and activities within the ACCF workshops could play a larger role in promoting environmental education in rural areas. For these reasons, the ACCF organization needs to continue to

work with other organizations for possible funding opportunities in support for the ACCF mission.

In the next section, I discuss the implications of this case study and how it can serve as a model for other organizations, policy makers, and other personnel involved with supporting environmental education in this rural part of Oregon. In addition to the exploration of how the ACCF program can serve as a model for other environmental organizations, I discuss the implications for professional development programs and policy makers who can craft policies to create equitable learning opportunities. Then, I summarize how others can use my findings about the ACCF program to further research environmental education.

Professional Development Organizations

Environmental education can play a critical role in developing the environmental literacy of teachers and of their students (North American Association for Environmental Education, 2017; OELP, 2013; Pe'er et al., 2007; Stevenson et al., 2014; Yates et al., 2019). The ability of environmental education to cross multiple disciplines has been well documented (Monroe & Cappaert, 1994; Ramey-Gassert & Shroyer, 1992; Sukma et al., 2020). By developing teachers' abilities to introduce environmental topics into their classroom curriculum, teachers have the potential to develop the environmental literacy of their students and to foster an environment for future stewards of our natural resources. This study represents a group of teachers who have had the opportunity to participate in a professional development program that has led to their increase in their environmental literacy. The experiences of the teachers with the ACCF professional development

workshops enable them to present and share environmental topics into multiple classroom discussion. Although the perceptions of these teachers experience with the professional development program might be reflective of their years of teaching experience, it also speaks to the quality of the ACCF organization.

This rural part of Oregon does not contain a lot of environmental education organizations that provide professional development programs, relative to the urban centers in this state. So, there is a potential to expand on this research by capturing the experiences of the teachers involved with other rural environmental education professional development programs. Although the professional development workshops provide an opportunity for future research efforts in this area to examine how teachers learn, and integrate environmental topics into their curriculum, the barrier of not valuing or requiring environmental education in the school's curriculum remains.

Policy Makers

Environmental studies have not been a mandatory part of school curriculum for most of Oregon, but many teachers have continued to integrate environmental subject matter into their curriculum. Though the No Oregon Child Left Inside (NOCLI) Act was signed into law by Governor Ted Kulongoski in 2009 and the Act called for the appointment of an 11-person committee tasked with developing an Oregon Environmental Literacy Plan (OELP), enacting the law has taken time and effort. In 2011, the legislature approved the committee's plan: *Oregon Environmental Literacy Plan: Toward a Sustainable Future*. Although the plan provides five learning strands to develop the environmental literacy of students in Oregon, barriers have impeded the

implementation of the plan. The OELP literature has mostly focused on assessments and how the OELP strands have been addressed in different classroom activities. To date, I have been unable to find any research examining the success of the State's implementation plan. Future research areas need to focus on a comprehensive evaluation of how the OELP impacts environmental literacy in Oregon. Given that there is policy in place to support environmental education, more schools should be supporting their teachers in developing their environmental literacy and this necessitates further exploration of the OELP.

Accrediting bodies and state licensure dictate what is taught in the classroom; often it is left up to the teacher to integrate environmental related topics into their classroom discussion. Rural areas of Oregon are often lacking the resources and organizations necessary to provide equitable professional development workshops and activities that would assist teachers with integrating environmentally focused topics into their classroom. A more in-depth inquiry of other rural areas in Oregon might provide the data to interrupt some of the inequities between rural and urban areas and provide support for future environmental education efforts in rural Oregon.

As discussed in the OELP implementation plan, various stakeholders need to support the plan; without stakeholder support, there is a risk that this plan will not reach its potential. Through my personal interactions with the teachers involved with this study and other environmental educators, I have noticed that few stakeholders seem interested in promoting environmental education. The negative connotations or views of the term "environmental education" has the potential to inhibit the funding opportunities for

professional development in rural Oregon. To address these concerns, policy makers need to recruit dedicated stakeholders and engage more community members as allies. Among these dedicated stakeholders are members of the local Indigenous tribes. Forming partnerships with Tribal education leaders holds potential for enhancing natural world perspectives.

Environmental organizations and school districts across Oregon continue to face difficulties and funding issues with implementing the environmental education programs. Although this study did not specifically delve into the funding opportunities available to the rural environmental organizations in this region, more opportunities for funding could help to benefit environmental organizations in this region and in turn, develop teachers' environmental literacy. If equitable funding opportunities were available to rural areas in Oregon, there might be a chance to provide additional professional development opportunities for the environmental literacy of rural educators. For example, over the last 10 years, the ACCF organization has received approximately \$250,650 from six different grants by the Gray Family Foundation. Since 2008, the Gray Family Foundation has provided approximately \$332,569 to different organizations in Douglas County, Oregon—the bulk of the funding has gone to the ACCF organization. The ACCF organization and similar organizations appreciate of the opportunities afforded by funding from the Gray Family Foundation. In the case of the ACCF organization, the funding has allowed them to develop the Story of Your Place curriculum and to provide professional development opportunities for rural teachers. However, in contrast to Multnomah County, which has seven times more people than Douglas County,

Multnomah County organizations have received \$5,234,521, which is 15 times more funding relative to Douglas County. While there are more rural counties in Oregon than urban centers, there is a disparity between the amount of funding available to different organizations based on their location. This comparison provided a snapshot of two counties in Oregon and their disparate funding opportunities. Policy makers need to take action to help integrate environmental education into pre-service education. If integrating environmental education into a pre-service curriculum is not feasible, the policy makers should ensure that there are funds necessary for professional development activities to develop the environmental literacy of our teachers. It is so critical that teachers are able to articulate and incorporate environmental topics into their studies to help shape the next generation of environmental stewards by giving them the tools necessary to address the foreseeable environmental problems

Due to the Grant Family Foundation funding, the ACCF organization has done an excellent job of acquiring most of the grants in Douglas County and might serve as a model for other organizations in this region. The success of the ACCF organization with acquiring grants might be attributed to the ACCF co-founder—a university professor with extensive grant writing experience—relative to other leaders of environmental organizations in this region. The ACCF organization and other organizations could benefit from the OELP implementation, direction, and funding provided by policy makers that would allow these rural organizations to continue with their environmental education programs.

Future Research Direction

The Story of Your Place curriculum provided an opportunity to investigate the perceptions of rural teachers participating in an environmental education program. Given that the teachers in the study were able to develop their environmental literacy, other organizations could benefit from capturing the experiences of these teachers to help refine their processes of conducting professional development programs and implementing environmental education curriculum. Future research efforts need to extend understanding of the ACCF program and their Story of Your Place curriculum. By increasing the number of teachers who have participated in the ACCF program, researchers may be able to interview more teachers and identify new themes from the interviews. The results could be used to lead the ACCF organization into a new direction or inform its current direction. In addition, researchers could expand on this study by including observations of the teachers participating in the activities post-COVID-19.

Recommendations for ACCF

Participating in the ACCF program was a positive experience for the teachers involved with this research. However, to improve the program I suggest that the ACCF finds some method for having continuity with their facilitators. Although this task is easier said than done, having a consistent facilitator for the ACCF professional development workshops would be beneficial for the teachers. During the time I have been conducting this research, three separate facilitators have been working at ACCF. Although each facilitator had personal reasons for leaving the position, this put a strain on the continuity of the program. From my personal experience, this type of personnel

turnover seems to be a common theme with many environmental education programs. Many times, people who work in the environmental education field must leave to find full-time work or to secure an increase in pay. I have seen many environmental education positions where the pay is minimal and tends to be seasonal in nature. No pun intended.

While this research has provided insight into a particular organization through the lens of experienced teachers, the results do not provide a comprehensive understanding of all environmental education organizations in rural area of Oregon. There is a potential to observe a greater range of teachers participating in the ACCF organization and across different professional development organizations in this region. By expanding the research into other organizations, researchers would be able to assess the roles played by these respective organizations. In addition, researchers could expand on this study by including observations of the teachers participating in the activities post-COVID-19. I think it would be of benefit to this rural environmental education community to continue my research into these other organizations.

Each organization in this region provides a niche for a particular aspect of environmental education. In the future, I would like to help ACCF and other organizations to organize a community of environmental educators. I plan to continue to look for opportunities for connecting different organizations together to develop this wonderful community of educators. By working with other professional development organizations in the area, I would be able to start the process of developing a community of educators who have a common goal of integrating environmental education into their curriculum. In addition to the support needed at the state level, this region could benefit

from developing a community of educators. Given the success of the ACCF program, their personnel could extend a helping hand to other organizations in this area to develop a larger community of environmental educators.

Summary

In this Chapter 5, I have explored my synthesis of results using the themes generated from the interviews to address my research questions that guided my case study. I continued with my discussion by situating my research into the larger context of a theoretical framework and research literature focusing on professional development, environmental literacy, and the perceptions of teachers participating in environmental education workshops. From situating my research with the context of this body of literature, I moved on to discuss the implications of my case study and made suggestions for the future areas of research.

As I noted in Chapter 1, environmental issues continue to become more complicated and difficult to understand, our society needs to develop environmentally literate citizens to help tackle these complex problems. Professional development can provide the tools to help teachers become more environmentally literate and to guide the next generation of environmental stewards to care for the natural world.

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Appendix A

Teacher Demographic Survey

Please provide your name (last, first) _____

1. Please indicate your ethnicity identity:
2. Please indicate the degree you hold and the major:
3. Please indicate the numbers of years you have taught in K-12 and at what levels and the grades:
4. How long have you taught in your current position?
5. Please indicate the subjects you currently teach:
6. Please describe the types of environmental learning experiences you have participated in:
7. How would you define environmental literacy?
8. Would you be willing to participate in more in-depth interviews to describe your perceptions of participating in the ACCF program?

Cell phone, or summer email

Thank you, Bryan

Appendix B

1st Teacher Interview

1. What questions do you have regarding the initial survey? Please let me know if you would like to clarify any of the information.
2. What was your perception of the natural world when you were growing up?
3. Did your higher education prepare you to teach environmental topics, if so how?
4. How would you describe a typical day teaching where you teach?
5. Please describe some of the EE related professional development activities you had been involved with prior to participating in ACCF program.
6. What other kinds of professional development activities have you participated in with other educators in your district?
7. Prior to being involved with the ACCF program, had you tried to integrate into environmental topics into your curricula, and if so, how?

Appendix C

2nd Teacher Interview

1. Describe your interactions with ACCF personnel during the workshops and how they were able to help you with integrating environmental education into the curriculum?
2. How would you describe how administration supported the ACCF program and the role you played in participating in the program and can you describe any challenges?
3. Please describe any barriers you encountered with participating in the ACCF program.
4. How would you describe your experiences with the ACCF program?
5. How do you feel about the resources provided when participating in the ACCF school program?
6. How would you describe the community of practice?
7. What are your perceptions of being involved with the workshops you have attended?

Appendix D

3rd Teacher Interview

1. How have you integrated what you learned from your participation in the ACCF program?
2. How have the skills you acquired during your participation in the ACCF program affected your teaching?
3. How did participating in the ACCF program affect your teaching?
4. In what ways has your attitude about the environment changed by participating in the ACCF program?
5. How would you describe the resources available provided to you from the ACCF program for integrating environmental education into your curriculum?
6. As a result of your work in this program, what gains did you make in your understanding of environmental literacy?
7. Was the ACCF program and the overall structure of the program a valuable experience?