Impacts of Place-Based Professional Development on Teachers

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Impacts of Place-Based Professional Development on Teachers

By

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B.A., University of Colorado, 2013

Plan B Project

Submitted in partial fulfillment of the requirements for the degree of Masters in Science in Natural Science Education in the Science and Mathematics Teaching Center at the University of Wyoming 2018

Laramie, Wyoming

Masters Committee:

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Abstract

The qualitative case study investigated the relationship between high-quality professional development for place-based education and long-term impacts on teacher practices. The case study focused on a small subset of teachers who attended all four years of the PLACE (Place-based Learning and Civic Engagement) program from 2011-2014. This study was built off a previous program evaluation of PLACE. The purpose of this research study was to evaluate the PLACE professional development's long-term impact on the teachers’ perceptions and practices as well as teachers’ implementation of place-based education. The data collection methods for this study involved interviews, observations, and surveys. Based on the data collected from the small sample of teachers, the evidence suggested that the program impacted the teachers’ practices to various degrees and their implementation of place-based education varied by teacher. The results identified the continuous, experiential, and collaborative structure of the PLACE program as factors for the program’s long-term impact on teaching practices. Recommendations and limitations are included.
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Chapter 1

Introduction

Professional development plays a crucial role in expanding teachers’ knowledge of educational strategies. Professional development is often included in most educational reforms (Luft & Hewson, 2014; Supovitz & Turner, 2000). One of the drivers for researching, improving, and investing in teacher professional development is the desire to improve student performance (Loucks-Horsley, Stiles, Mundry, & Hewson, 2010). Although it is difficult to demonstrate empirically that professional development directly improves student outcomes, the theoretical model follows a chain of logic that “high-quality professional development will produce superior teaching in classrooms, which will, in turn, translate into higher levels of students achievement” (Supovitz & Turner, 2000, p.965). Several studies have explored the first link in the chain between professional development impacting and improving teacher practices. However, additional research is needed to solidify this relationship.

The purpose of this research study was to investigate the relationship between high-quality professional development for place-based education and potential long-term impacts on teachers’ practices. A qualitative case study was conducted in order to evaluate a program’s impact on the participating teachers. The case study focused on a small subset of teachers who attended all four years of the PLACE (Place-based Learning and Civic Engagement) program. PLACE was a four-year place-based professional development program from 2011-2014. Therefore, the current study was built off previous program evaluations of PLACE.

PLACE was a series of professional development workshops that was designed with attributes of a high-quality professional development. In the educational research community, there is a general consensus about the components of an effective, high-quality professional
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development. These elements include the following: a focus on student learning needs and
standards, immersive, modeling teaching strategies, learning content, alignment with school
goals, continuous feedback, collaboration, and creating professional relationships (Archibald,
Coggshall, Croft & Goe, 2011; Loucks-Horsley et al., 2010; Supovitz & Turner, 2000). Since
PLACE was based on these components and could be considered a high-quality professional
development program, it provided an exemplary case to evaluate the program's long-term impact
on the participating teachers’ perceptions and practices.

PLACE focused on place-based education. Place-based education is a progressive
pedagogy that uses an interdisciplinary approach and connects students to the ecology,
economics, geography, sociology of their place (Woodhouse & Knapp 2000). Place-based
education has been shown to improve student outcomes and increase student engagement.
Lieberman and Hoody (1998) presented findings about several positive student outcomes that
were attributed to teachers incorporating the local environment into the curriculum. Webber and
Miller (2016) found that progressive pedagogies such as place-based education could potentially
enhance students’ civic engagement, classroom engagement, and curricular outcomes. Although a
growing body of research supports the academic benefits of place-based education, the teaching
strategy still has several limitations and barriers that prevent teachers from incorporating it into
their classroom, such as strict content standards and focus on standardize tests (Parlo & Butler,
2007). Continued research is needed to improve teacher professional development for progressive
pedagogies such as place-based education so that professional development is able to support
teachers adopting non-traditional teaching practices.
Statement of Research Problem

Teachers face higher expectations and demands to improve student learning and outcomes. To meet those demands, teachers will likely need to change their teaching practices (Borko, Mayfield, Marion, Flexer, & Cumbo, 1997). Teacher professional development is a way to foster those changes. However, change takes time. A study by VanTassel-Baska et al. (2008) found that teachers needed two or more years of professional development on a teaching strategy in order to effectively implement the strategy. Since changes in teacher practices take time, research should also track changes in practices over time in order to accurately capture that process.

Few studies track long-term impacts of professional development. A study by Meichtry and Smith (2007) addressed this issue. The purpose of the study was to evaluate a place-based professional development training to determine its impacts on teachers’ confidence using place-based education principles and field settings. The study used pre-, post-, and long-term (nine months) post surveys to evaluate the program’s long-term impacts. Overall, Meichtry and Smith found an increase in teacher confidence after the place-based professional development. However, significant results were only reported nine months after the program (Meichtry & Smith, 2007). The study highlighted that significant changes took place after the professional development and this identified a need for more long-term studies. However, nine months is still a short time-frame when other research suggests it takes two to three years to effectively integrate a new teaching practice (VanTassel-Baska et al., 2008). Therefore, more studies need to track teachers’ changes after the professional development.

Additional research is needed to understand the relationship between professional development and teacher practices. Teacher practices are influenced by several factors, such as
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content knowledge, teacher beliefs (Polly et al., 2015), and teacher education (Darling-Hammond, 2000). To better understand how professional development can improve teachers’ practices, studies need to track the teachers change process over time. Therefore, this research study’s purpose was to investigate the relationship between high-quality professional development and its long-term impact on teacher practices.

**Study Purpose**

The purpose of the study was to better understand potential impacts of a specific professional development on teachers’ practices. The study aimed to gain information on how teachers implement place-based education into their classrooms several years after participating in a multi-year professional development program. Educational research rarely tracks long-term, post-program effects on teachers. This research study investigated teachers’ practices four years after completing the PLACE professional development and how those teachers implemented place-based education in their classrooms.

An outcome of the study was recommendations for improvements for the PLACE program. The recommendations inform and extend to other similar place-based professional development programs. Additionally, this research study contributed to the current knowledge and findings on the relationship between high-quality professional development and teacher practices. The researcher planned to submit findings to an educational journal, in order to communicate the conclusions and recommendations to a larger audience.

**Study Research Question**

Research Question 1: What are potential long-term impacts of the PLACE program on participating teachers’ perceptions and practices?
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Research Question 2: How do PLACE teachers currently implement place-based education in their classroom?

Summary

Education policies often state that teacher professional development is a way to enhance teachers’ content knowledge and instruction so that teachers are able to prepare students with 21st century skills (Luft & Hewson, 2014). There is a wealth of information and research on teacher professional development. However, gaps still remain in our knowledge of the effectiveness of professional development. For instance, more empirical research is needed connecting professional development, teacher practices, and student outcomes. Due to the complexity of teacher change and growth, more long-term studies are needed in order to more accurately capture the change process. Therefore, one of the purposes of this study was to add to the current research findings of the long-term impacts of professional development on teachers’ practices. The study also explored how teachers translated their learning from the PLACE professional development into their classroom. The second purpose of the study was to offer recommendations for the PLACE program and similar place-based professional developments. The following chapters discuss in more detail the relevant literature (Chapter 2), the research methods (Chapter 3), the results (Chapter 4), and discussion and recommendations (Chapter 5).
Chapter 2

Introduction

The literature presented in this chapter provides the background and framework for this study. This study aimed to further the current literature by adding to the research on teacher practices and high-quality professional development. The topics covered in this chapter include the purposes of teacher professional development, high-quality professional development, teaching practices, place-based education, program evaluation, and research methods.

Teacher Professional Development

According to the U.S. Department of Education, billions of dollars in federal funds are provided to teachers for professional development (Teacher Professional and Career Development, n.d.). This investment in teacher education is based on the idea that supporting teachers’ growth and continued education will translate into improved student outcomes. However, it is extremely difficult to demonstrate empirically the connection between teacher professional development directly impacting student achievement because there are numerous variables affecting student achievement (Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). For instance, a meta-analysis study by Yoon et al. (2007) examined 1,300 research studies that connected professional development and student achievement and then categorized the studies based on their rigor and findings. The Yoon et al. paper outlined a theoretical model that illustrates the multi-step process of teacher professional development impacting student achievement (Figure 1).
Figure 1: Model illustrating the link between teacher professional development improving teacher skills, which then improves classroom teaching that ultimately leads to increased student achievement (Yoon et al., 2007, p. 4)

From the 1,300 studies that addressed this relationship, the paper identified nine studies that were properly designed, rigorous, and controlled (Yoon et al., 2007). Based on the nine studies, student achievement appeared to increase by an average of 21 percentile points after their teacher experienced a high-quality professional development (Yoon et al., 2007). The findings from the nine studies illustrated that teacher professional development had a “moderate” effect on student achievement (Yoon et al., 2007, p. 2). The study by Yoon and colleagues highlighted that limited studies that have been able to demonstrate professional development directly influencing student achievement. However, more research studies and literature investigated the first link in the chain presented in Figure 1, where professional development affects teacher practices (Supovitz & Turner, 2000; Yoon et al., 2007). Therefore, this paper limited its focus to investigating teacher professional development's impact on teacher knowledge and skills.

There is growing evidence that high-quality professional development can improve teacher practices. For example, Supovitz and Turner (2000) investigated various durations of professional development and correlated those levels with the implementation of inquiry-based teaching practice. In this study, teachers reported utilizing the new teaching practice after 80 hours of professional development whereas teachers who received 40 hours of professional
development reverted back to traditional teaching practices (Supovitz & Turner, 2000). This demonstrated a significant relationship between professional development affecting teacher practices when the professional development was intensive (over 80 hours) and sustained (Supovitz & Turner, 2000). These findings are consistent with current research that certain factors make the professional development more likely to be effective in altering teacher practices.

**Purpose of Professional Development**

Teacher professional development serves as a way to enhance teachers’ knowledge and practices and move the current state of teaching towards the desired state (Loucks-Horsley et al., 2010; Luft & Hewson, 2014). Professional development is a powerful mechanism to bridge the gap and provide teachers with the tools needed to prepare students for the 21st century. In order to prepare students for the 21st century, teachers are expected to provide them with opportunities to develop high-order thinking, problem solving, and analytical skills (Loucks-Horsley et al., 2010; Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009). These expectations require new teaching strategies and methods so that teachers are capable of instructing in a way that fosters the type of thinking and challenge needed to foster those 21st century skills (Borko et al., 1997; Darling-Hammond et al., 2009; Loucks-Horsley et al., 2010; Luft & Hewson, 2014). However, teachers are commonly not properly prepared or trained in the teaching methods needed to develop those 21st century skills (Borko et al., 1997). Professional development serves as a way to support, guide, and facilitate the change in teacher practices that are needed to meet the current national education goals.

**Teacher Professional Development Structures**

There is a spectrum of professional development structures that can lead to varying impacts on teacher practices based on the type and design. Professional development for teachers
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is a broad term that takes on different shapes and forms depending on the school, district, state, and national focus. It can focus on expanding content or pedagogical knowledge (Luft, Bang & Hewson, 2016) and the structure for continued teacher education programs can range from workshops, university course work, content-focused trainings, and observing other classrooms (Darling-Hammond et al., 2009). Professional development can be described as “a systematic attempt to bring about change - change in the classroom practice of teachers, change in their beliefs and attitudes, and change in the learning outcomes of students” (Guskey, 1986, p. 5).

For the purpose of this study, types of professional developments are grouped together based on their structure such as study groups, workshops including institutes and seminars, professional networks, and online professional development (Loucks-Horsley et al., 2010). Table 1 breaks down the key elements, strategies, and outcomes for each structure. Defining the structures of teacher professional development is important because it presents the variety of approaches that can be used in order to reach the professional development goals. Additionally, each structure is capable of impacting teacher practices as long as elements of effective professional development are incorporated.
The four different structures of professional development (Loucks-Horsley et al., 2009, p. 251-278).

<table>
<thead>
<tr>
<th>Structure</th>
<th>Key Elements</th>
<th>Strategies</th>
<th>Outcomes</th>
</tr>
</thead>
</table>
| Study Groups (a group who collaboratively     | • Organized around a specific topic or issues  
| examines issues of teaching and learning)    | • Related to teaching and learning goals  
|                                               | • Focused on problem-solving  
|                                               | • Coherent and planned  
|                                               | • Voluntary  
|                                               | • Requires direct support from school administrators                        | • Aligning and implementing curriculum strategies  
|                                               | • Examining student work and teaching strategies  
|                                               | • Discussing current issues  
|                                               | • Action research  
|                                               | • Case Discussions  
|                                               | • Observations  
|                                               | • Lesson Study  
|                                               | • Reflection                                                      | • Building professional community  
|                                               | • Supporting leadership capacity  
|                                               | • Increasing content knowledge  
|                                               | • Enhancing quality teaching  |
| Workshops, Institutes, and Seminars (structured opportunities for teachers to learn from an expert as well as peers) | • More discrete learning goals  
|                                               | • Expert guiding participants’ learning  
|                                               | • Generally focused on new curriculum, instructional materials, or content knowledge  
|                                               | • Collegial learning environment                                           | • Immersion, experiential, hands-on  
|                                               | • Modeling and practicing theory  
|                                               | • Lesson Study                                                            | • Increasing content knowledge  
|                                               | • Reflection                                                               | • Enhancing quality teaching  |
| Professional Networks (formal or informal     | • Voluntary  
| communities of professionals who are        | • Ongoing  
| connected by a purpose or theme)             | • Monitoring progress and impact increases effectiveness                    | • Examining student work  
|                                               | • Demonstration lessons  
|                                               | • Lesson Study  
|                                               | • Action Research  
|                                               | • Curriculum implementation  
|                                               | • Coaching  
|                                               | • Mentoring                                                               | • Building professional community  
|                                               | • Supporting leadership capacity  
|                                               | • Enhancing quality teaching                                               |
| Online Professional Development (technology   | • Effectiveness depends on technology  
| and the Internet to enhance learning and     | • Skilled facilitator is essential  
| communicate)                                   | • Content connects with teachers’ practices                                  | • Content courses  
|                                               | • Examining student work  
|                                               | • Demonstration lessons  
|                                               | • Lesson Study  
|                                               | • Action Research  
|                                               | • Case discussion                                                        | • Building professional community  
|                                               | • Increasing content knowledge                                              | • Enhancing quality teaching  |

The four structures outline approaches to professional development. The table is not a comprehensive list of all the elements, strategies, and outcomes. There are multiple ways to
define and classify professional development because teacher professional development is a broad term. A detailed description of these classifications is out of the scope of this paper. Instead, the table illustrates the variety of high-quality professional development structures that can be used based on the goals of the program.

**High-Quality Professional Development**

In order for professional development to be a meaningful way to transform teachers’ practices, there needs to be increased access to and opportunities for high-quality professional development. Several studies have outlined these key factors that differentiate effective and high-quality professional development from conventional models (Darling-Hammond et al., 2009; Loucks-Horsley et al., 2010; Luft et al., 2016; Parlo & Butler, 2007; Supovitz & Turner, 2000). The terms effective and high-quality are used synonymously throughout the literature and in this study. In a status report on teacher professional development, Darling-Hammond et al. (2009) created a concise list of the elements found in the literature:

1. Professional development should be intensive, ongoing, and connected to practice...
2. Professional development should focus on student learning and address the teaching of specific curriculum content...
3. Professional development should align with school improvement priorities and goals...
4. Professional development should build strong working relationships among teachers.

(Darling-Hammond et al., 2009, p. 9-11)

The elements that make up an effective, high-quality professional development are dramatically different than the conventional, one-time professional development model (Loucks-Horsley et al., 2010). Teachers in the United States have limited access to programs that would be classified as high-quality professional development (Darling-Hammond et al., 2009). Short-term
professional development (five-14 total hours) has remained the dominant model and studies have found no statistical evidence that they alter teacher practices or student achievement (Darling-Hammond et al., 2009; Yoon et al., 2007). However, nine out of ten U.S. teachers have been part of short-term workshops or conferences and also report that the available professional development is often not useful (Darling-Hammond et al., 2009). Therefore, the investment of money and time on these professional developments provides little return because they do not adequately change teachers’ practices in a significant way. This gap in continued education leaves teachers underprepared to reach student learning goals (Supovitz & Turner, 2000). Therefore, the system needs to transition away from short-term, one-time programs towards high-quality professional development in order to impact teacher practices.

However, program duration does not always correlate with higher impact. A literature review on short-term (less than 30 hours) profession development identified several features that led to positive outcomes during a short-term professional development such as active learning, specific learning objectives, modeling behaviors, and participant-centered (Lauer, Christopher, Firpo-Triplett, & Buchting, 2014). Lauer et al. (2014) concluded that what occurs during a program is more important than the program’s duration and an effectively designed short-term professional development can have positive outcomes. Therefore, program duration should be selected based on the goals and objectives of the program.

**Professional Development and Teacher Practice**

**Teacher Practices**

Before examining how professional development can potentially change teacher practices, the multiple factors that influence a teacher’s practices must be considered. Teacher practices are the approaches, strategies, and methods used by teachers to facilitate learning. Figure 2 diagrams
some of the major factors that influence teacher practices such as school background, professional coursework, contextual factors, and classroom. Figure 2 is adapted from a model by Borg (2003) in order to more explicitly display the concepts that are relevant for this paper. The original model focused on teacher cognition and factors that impact teachers’ thinking, beliefs, and actions. Although teacher practices are starkly different than teacher cognition, the factors that influence behavior appear to be similar.

As Figure 2 shows, teacher practices are influenced by the following factors: previous school, professional coursework, contextual factors, and the classroom. These factors are filtered through beliefs, attitudes, assumptions, and perspectives. The focus of this paper is specifically...
examining how professional coursework and education can impact teacher practices. However, that relationship cannot be fully examined without considering the other factors in Figure 2.

Teacher practices are a result of behaviors that occur consciously and unconsciously (Korthagen, 2017). Teaching is not merely learning theory and putting it to practice (Korthagen, 2017). Instead, there are mediating factors such as previous school experience, education, and beliefs that all play a significant role in a teacher’s behaviors and practices. It is out of the scope of this paper to discuss the multiple factors in detail. However, this section provides a quick introduction to a few additional influences on teacher practices besides professional development. For instance, a teacher’s previous school experiences can unconsciously influence a teacher’s behaviors because of this prior socialization (Korthagen, 2017). Pre-service teacher education can also have a significant role in a teacher’s effectiveness and preparation for teaching (Darling-Hammond, 2000; Darling-Hammond, 2010). Teachers that have more training are often higher rated than teachers with limited formal teacher education (Darling-Hammond, 2000). In addition to pedagogical knowledge, content knowledge also impacts a teacher’s effectiveness at teaching various subjects (Polly et al., 2015). Polly et al. (2015) demonstrated a link between increased content knowledge in a subject also increasing student learning outcomes.

Finally, beliefs influence a teacher’s practice and play a critical role in whether teachers implement a new teaching practice (Borko et al., 1997). Borko et al. (1997) identified teacher beliefs as an important factor that must be considered and addressed in professional development. The study stated that “when teachers’ beliefs are incompatible with the intention of the staff development and are not challenged, the teachers are likely to either ignore new ideas or inappropriately assimilate them into their existing practice” (Borko et al., 1997, p. 270). This statement implies that humans are not sponges absorbing information. Instead, new ideas are
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filtered through our beliefs (Pajares, 1992). Understanding (or at least attempting to define) teachers’ belief structures is essential to improving their teaching practices because beliefs determine our behaviors (Pajares, 1992). Although altering beliefs in adults is rare (Pajares, 1992), Borko et al. (1997) argue that in order to make significant changes to teachers’ practices, we must confront conflicting beliefs when new or challenging ideas are introduced. Addressing beliefs in professional development could help teachers accept the new practice and thus lead to greater implementation of the new practice. Overall, beliefs play a mitigating role at various points throughout the professional development and teachers’ change process.

Teacher Change

One of the major goals of professional development is to improve teacher practices in hopes that improved teacher practices will improve student achievement (Guskey, 1986). However, change is a slow process. Guskey (1986) presents a model (Figure 3) of teacher change that can be used to better understand the connection between professional development and teacher practice.

![Figure 3: Guskey (1986) theoretical model of the role of professional development and teacher change (p.7).](image)

This model outlines how professional development can influence the teacher’s content knowledge, practices, and effectiveness. After the professional development, the next step is the teacher using the new knowledge in the classroom. Implementing this new practice in the
classroom could lead to observed changes in student outcomes. Only after a teacher has used the practice and experienced the practice’s benefits will the teacher alter their beliefs and continue to use the new practice long-term. Without proof of student learning, even the best teaching methods will be ignored and pushed aside without that evidence (Smith & Sobel, 2010). Teachers will not continue to use a learned practice unless they have experiential evidence that the practice benefits students (Guskey, 1986). Changes in teacher practices rely on the teacher’s ability to use the practice, improve the practice, and experience positive student outcomes. However, Guckey’s model simplified the change process and been critiqued because it represented the change process as linear.

Clarke and Hollingsworth (2002) elaborated on Guskey’s model (1986) by creating the Interconnected Model (Figure 4) that demonstrated a non-linear and continuous change process. The Interconnected Model by Clarke and Hollingsworth (2002) recognized the complexity of professional growth by including multiple pathways that teachers can follow in their change process. This model considered the personal and situational influences that play a role in the change process instead of a simplified linear process.
Despite the linear and non-linear differences of the two models, both models represent a theory of teacher change that link professional development and teacher practices, and they also incorporate the idea that change is a process that occurs after the professional development. This long-term change process supports the need for two specific elements. First, continuous professional development is needed so that teachers have access to additional support throughout their change process. Secondly, in order to properly evaluate a professional development’s effects on teacher practices, program assessments should follow up with teachers in order to capture this type of delayed change.

**Place-Based Education**

This study focused on a place-based education professional development called PLACE. Because PLACE is the program of focus, the teaching approach that will be examined in more detail is place-based education. Progressive pedagogies such as place-based education make learning relevant to students by using real-world examples and providing hands-on experiences.
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(Webber & Miller, 2016). Place-based education professional developments could provide teachers with the tools to move away from a standardized, content-specific teaching methods to a progressive teaching model where content is taught through interdisciplinary and experiential methods (Webber & Miller, 2016).

Place-based education is a progressive pedagogy that has considerable literature supporting its educational benefits and development of analytical skills (Chawla & Escalante, 2007; Lieberman & Hoody, 1998; Meichtry & Smith, 2007; Nadelson & Seifert, 2013; Powers, 2004; Smith & Sobel, 2010; Webber & Miller, 2016). In the literature, there are multiple ways to define place-based education and several terms that overlap. David Sobel (2004) offers a broad definition and explanation:

Place-based education is the process of using the local community and environment as a starting point to teach concepts in language arts, mathematics, social studies, science, and other subjects across the curriculum. Emphasizing hands-on, real-world learning experiences, this approach to education increase academic achievement, helps students develop stronger ties to the community, enhances students’ appreciation for the natural world, and creates a heightened commitment to serving as active, contributing citizens. (p. 6)

The focus of the definition is that place-based education is defined as an interdisciplinary and experiential pedagogy that connects students to the ecology, economics, geography, and sociology of their place (Woodhouse & Knapp, 2000). In place-based education, the local community is the foundation that multiple disciplines can utilize to inspire and teach to a wide range of concepts. It is also characterized by real-world and hands-on learning because students are interacting with their local environment and utilizing real examples from their community.
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Place-based Education Benefits

Research has supported a wide range of benefits from place-based education, such as higher test scores and grades, advanced problem solving and critical thinking, increased motivation, and enhanced environmental stewardship (Chawla & Escalante, 2007). Despite these reported benefits, national education policies like No Child Left Behind has driven schools towards more conventional teaching and tends to work against education focusing on the environment or place (Gruenewald & Manteaw, 2007). In the wake of No Child Left Behind, education shifted to focusing more on standards and test scores (Gruenewald & Manteaw, 2007; Smith & Sobel, 2010). Smith & Sobel (2010) argue that this shift caused questions concerning the health of the environment and community to be pushed aside in favor of more standardized approaches. However, there is a growing body of literature that outlines the academic, social, and emotional benefits of incorporating place and the environment in education (Gruenewald & Smith, 2014; Lieberman & Hoody, 1998; Nadelson & Seifert, 2013; Powers, 2004; Smith & Sobel, 2010; Webber & Miller, 2016).

Place-based education makes content relevant to students which can increase students’ motivation to learn and ultimately lead to academic benefits (Chawla & Escalante, 2007). An extensive study that included 40 case studies schools conducted by Lieberman & Hoody (1998) found that most students taught using their local environmental context scored better on standardized tests and received higher grades than students taught under a more traditional framework. Several factors could explain the higher academic achievement (measured through standardized test and grade point averages) in the schools that use the environmental context. For example, incorporating the local environment into the curriculum makes the learning more relevant, meaningful, and engaging for students. Increased engagement can have a ripple effect in
other areas, such as increased attendance and better behavior (Lieberman & Hoody, 1998). These factors of interest, engagement, and attendance can help students be more prepared for assessment and thus contribute to improved academic outcomes (Lieberman & Hoody, 1998). Glenn (2000) found similar results to Lieberman and Hoody that schools using a place’s environment to frame the curriculum were higher performing in math, science, and reading than other traditional schools. In addition to higher test scores, Ernest and Monroe (2004) found that students who were taught using their environment and place were more skilled and proficient at critical thinking than students taught using traditional methods. These studies demonstrate how integrating place into the curriculum makes the content applicable, inspires students to learn, and leads to greater academic success.

Place-based education also has social and emotional benefits because it helps counteract students disconnect from their community and natural settings. As students learn and connect to their place, it could lead students to care for their place and eventually lead to increased environmental stewardship (Smith & Sobel, 2010). In addition to the social benefit of increased environmental stewardship, place-based education has been found to enhance students’ confidence and self-directed learning (Smith & Sobel, 2010).

Lieberman and Hoody (1998) found that students who were taught using the context of their local environment demonstrated greater pride and more ownership over their work. The affective and emotional benefits of place-based education is a holistic approach to education (Smith & Sobel, 2010). A holistic approach to education teaches to the intellectual, emotional, and physical aspects of a child in order to prepare the student to be a positively contributing citizen (Smith & Sobel, 2010).
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Citizenship appears in several missions and vision statements for schools and districts (Smith & Sobel, 2010). However, there does not appear to be intentional efforts or strategies to achieve this goal. Place-based education is a way to achieve that intention because it can provide students with the confidence and empowerment to actively take part in their community. Environmental stewardship and citizenship are things that are hard to assess, but there are several ways to gauge student achievement. Place-based education strives to teach the whole student instead of only focusing on test scores.

Limitations of Place-based Education

Despite the benefits, there are several limitations that teachers and schools face implementing this approach. In a program evaluation of four place-based professional development programs, Powers (2004) found that one of the most common constraints was the lack of time in the face of curriculum pressures. Programs tried to address this concern by focusing on that place-based education is not an add-on but can be integrated into the curriculum (Powers, 2004). However, place-based education does take more time and effort compared to using textbooks and worksheets (Powers, 2004). For instance, building community partners, organizing field trips, preparing resources are all additional tasks that fall on educators (Powers, 2004).

Another challenge to place-based education is integrating the pedagogy into the public school system. The public schools are geared towards a national/standardized focus that often does not include local examples (Gruenewald & Smith, 2014). Therefore, when a school adopts this approach, it often faces skepticism and must demonstrate the value of out of the classroom experiences (Gruenewald & Smith, 2014). Smith and Sobel (2010) found that a school’s readiness and developmental stage played a huge role in their ability to implement place-based education.
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The physiological needs must be addressed before a school can fully tackle place-based initiatives (Smith & Sobel, 2010). Place-based education is a paradigm shift and a school must be open to that change (Smith & Sobel, 2010).

**Place-based Education Professional Development**

In order to actually see the benefits of place-based education, it is critical that teachers are trained in how to properly implement place-based teaching strategies (Meichtry & Smith, 2007). The lack of teacher training in place-based education and environmental-based education is a major barrier for many teachers (Ernst, 2007). Ernst (2007) investigated the barriers teachers face in environmental-based education and found that both pre-service and in-service teachers need more effective training in order to increase the teachers’ comfort level around taking students outside. Since pre-service and in-service teachers often do not receive adequate training, they often view environmental-based education as a content area instead of a teaching method (Ernst, 2007). Environmental-based education has slightly different tenets than place-based education. However, trainings for both environmental-based and place-based education are limited for pre-service and in-service teachers, which creates barriers for teachers to feel comfortable using place-based teaching practices.

Teachers cited the following limitations and barriers to using place-based education: time constraints, restrictions on teacher autonomy, strict curriculum due to standards, and lack of resources needed to teach students outside (Parlo & Butler, 2007). Teachers appear to use progressive pedagogies such as place-based education for a short time before returning to more traditional approaches (Webber & Miller, 2016). In order for teachers to implement these practices long-term, these barriers must be addressed in professional development programs. Professional development for place-based education could provide the skills and knowledge
required to integrate place-based practices into the curriculum and to feel confident and invested in the approach. Place-based professional development should address that it is not an add-on (Smith & Sobel, 2010) and can be incorporated into any curriculum. To address these perceived barriers and misconceptions, teachers need access to high-quality professional development in place-based education (Meichtry & Smith, 2007).

The importance of high-quality place-based education professional development is represented in two different studies. These studies illustrate the challenges and successes of different approaches to place-based professional development. Parlo and Butler (2007) evaluated a 15-day coastal marine ecology professional development program to determine its effectiveness of encouraging teachers to incorporate environmental education into their classroom. The focus of the study was about using environmental education to teach science topics. Research studies specifically on place-based education professional development are limited and environmental education contains several of the components of place-based education, such as using the local place to teach concepts, hands-on activities, and subject integration (Parlo & Butler, 2007). Thus, the work provides insight into how professional development can prepare teachers to incorporate an experiential approach to teaching as well as identify its constraints.

The marine ecology professional development evaluated by Parlo and Butler (2007) incorporated a number of qualities of an effective professional development. For example, the professional development was a residential program, so the participants were immersed in the experience and the program focused on expanding the teacher’s content knowledge. Additionally, 80 hours of professional development is a timeframe connected with more significant changes and impacts on teacher practices (Supovitz & Turner, 2000). This program surpassed that time benchmark. Despite incorporating two of the four qualities related to high-quality professional
development, Parlo and Butler discussed the need for greater connection of the content and activities to teachers’ classrooms. Teachers in the program struggled to translate place-specific activities to their local environment. This study highlights the need for place-based professional development to consider transferability of content and activities to different environments (Parlo and Butler, 2007).

The second study that provided useful insight into place-based professional development was conducted by Meichtry and Smith (2007). This study evaluated the impact of a place-based professional development program on the confidence of participating teachers. The program was a 6-day summer workshop on field-based watershed studies and two follow-up sessions to discuss applications in the classroom. This program met all the requirements of a high-quality professional development, such as it was intensive, ongoing, connected to practice, created a network of teachers, and covered specific content knowledge. The program explicitly connected the professional development to practice by providing additional resources for teachers and requiring teachers to develop a unit. The intentional design of the program translated to significant improvement in teachers’ confidence related to measures such as using community resources, leading field investigations, and connecting curriculum to real life. The study presented recommendations for future place-based professional development programs that could help maximize the impact of programs. The key findings from the Meichtry and Smith study are that professional development programs should:

1. Develop clearly stated objectives that are linked to the state or school standards that teachers are required to address;

2. Conduct a program evaluation that is directly aligned to the program objectives;
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3. Connect program learning to K-12 classroom teaching, state standards, and school curriculum;

4. Connect program requirements to classroom practices by requiring units of study to be developed by teachers for use in their classroom teaching;

5. Model effective teaching strategies for use with K-12 students throughout the program;

6. Build relevancy into the program by using the local environment, community-based experts…

7. Conduct training programs that are sustained over time. (p. 27)

The recommendations of the study are similar to the qualities of an effective, high-quality professional development. However, these recommendations go a step further and outline concrete ways to tackle the barriers and limitations teachers face translating place-based professional development into practice.

Place-based professional development can provide teachers with curriculum ideas, resources, and support needed for teachers to effectively implement and sustain the teaching practice. The status quo for teacher education is isolated subject-specific content and methodologies that merely transfers knowledge to students (Webber & Miller, 2016). Place-based professional development expands teachers’ ability to creatively approach education and challenge the status quo. It assists teachers in envisioning a new approach to teaching that engages students in meaningful learning experiences, incorporates the community, and empowers students to be active learners (Webber & Miller, 2016).
Evaluating Professional Development

Designing a program that incorporates the elements of high-quality professional development is only the first step in assuring that professional development is reaching its goals. Legislators and policymakers often seek evidence that the teacher professional development is worth the investment (Guskey, 2002). Program evaluation is a systematic assessment of a program’s value, effectiveness, and improvements for future programs (Archibald et al., 2011; Guskey, 2002; Stufflebeam & Shinkfield, 2007). There is a diversity of general program evaluation models that could be applied to several disciplines (Stufflebeam & Shinkfield, 2007). According to a comprehensive assessment of program evaluation models by Stufflebeam and Shinkfield (2007), there are 23 different evaluation approaches that are often used. Common evaluation approaches for teacher professional development are the following: process evaluations, impact evaluations, and cost-benefits analysis (Archibald et al., 2011). The evaluators select the metrics and types of data suited to measuring the program’s specific goals (Archibald et al., 2011). Many program evaluation approaches involve the planning, objectives, formative assessments, and summative assessments (Guskey, 2000; Stufflebeam & Shinkfield, 2007).

Guskey (2002) outlined a framework to evaluate the quality of teacher professional development based on five different levels. The framework was adapted from model by Kirkpatrick and Guskey attempted to resolve the original model’s limitations. Figure 4 displays the five levels.
The five levels build on each other so that success at lower levels are generally necessary to be successful at higher levels (Guskey, 2002). For instance, if there are problems at level three such as lack of school support, then that lack of school support is likely going to prevent any significant gains from progressing to level four. The five levels help to structure the evaluation process in order to assure that the program goals are achieved on multiple levels. Despite the diversity of available approaches, the Guskey (2002) model was selected because it meets the needs of this project by providing a framework for a summative impact assessment.

**Research Methods**

There are multiple variables that must be considered when evaluating professional development for its impacts on teacher practices. These variables are intertwined and difficult to assess experimentally. Thus, a qualitative research approach provides an opportunity to consider the participants’ perspectives and experiences in order to tease out the multiple variables.
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(Merriam, 1998). Both quantitative and qualitative studies contribute to our scientific understanding of phenomena (Flyvbjerg, 2006) and deciding on a method is dependent upon the goals of the research. Qualitative research is appropriate when the research is focused on discovery whereas quantitative research is more focused on testing a hypothesis (Merriam, 1998). Because of the complexity of isolating different variables, educational research often focuses on finding correlations rather than causation (Smith & Sobel, 2010). Qualitative research is a beneficial approach when the variables cannot be easily controlled (Merriam, 1998).

For the purposes of this study, the type of research method that was used is known as qualitative case study. A qualitative case study is defined an intensive and holistic inquiry into a single, defined system (Merriam, 1998). A qualitative case study was chosen for this study in order to draw the most details out of the small sample of teachers and observe the teachers within their settings. Case studies allow researchers to study the defined subjects of interest within their context (Baxter & Jack, 2008). The methods for a case study are often interviewing, observing, and analyzing documents (Merriam, 1998).

**Interviews**

One of the techniques for case studies is the interview (Merriam, 1998). Interviews allows the researcher to access the participant's mind, perceptions, and experiences. There are several ways to approach interviews. In structured interviews the questions are worded exactly and asked in a set order. This style of interview is often more comfortable for new researchers. Another style of interview that is relevant is semi-structured interviews where the questions are more guides to the researcher and are not asked in a certain order. This allows the researcher to respond to the situation in a more natural manner. A key consideration for interviews is that the data are only as good as the questions (Merriam, 1998). Asking open-ended questions, practicing active listening,
and following up with prompting questions are approaches that can help gather valid data (Seidman, 2013).

**Observations**

Observations are another way to collect data for case studies. Although observations can be a useful data collection method, they are highly subjective, and it is often difficult to observe certain behaviors. Therefore, the literature suggests several techniques to focus the observer’s observations, such as creating a coding sheet, diagramming the space, writing participant’s quotes, and including the researcher’s verbal descriptions. For both interviews and observations, the data collected is coded using both categories derived for literature and categories developed directly from the data using comparative analysis (Merriam, 1998). Using codes that are pre-determined and developed from literature are called a priori codes (Johnson & Christensen, 2017).

**Surveys**

Surveys are an art form. Every aspect of surveys can influence the results from how the survey is presented to the wording of the questions (Alreck & Settle, 2004). Similar to interviews, the value of the survey data is directly connected to the value of the questions. Educational research textbooks outline tips and tools to enhance the reliability and validity of the survey questions.

The concern-based adoption model (CBAM) is a commonly used survey instrument, which is used to assess participations’ level of concern around adopting and implementing new practices (Roach, Kratochwill, & Frank, 2009). The CBAM was originally developed in the 1960s and continues to be used for educational research. It consists of three frameworks (Stages of Concern, Levels of Use, and Innovation Configurations) that evaluate teachers’ concerns and commitment to implementing new practices or reform efforts (Roach et al., 2009).
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Bradshaw (2002) used the Stages of Concern framework from CBAM to identify teachers’ concerns around using technology in the classroom. Based on 27 districts’ staff development plans, the Stages of Concern were used to identify, understand, and address the concern of the teachers so that staff development could meet their needs. The seven levels of concern are hierarchically ranked from awareness, informational, personal, management, consequence, collaboration, and refocusing. As teachers move up the levels of concern, it indicates moving from self to logistics to the impact of the new practice. The Bradshaw study results varied across the district and did not include data on the impacts on teachers. However, there was evidence that several districts were moving towards long-term staff development plans that included the CBAM in order to address teachers’ concerns. The CBAM has been used by researchers to gauge the commitment and evolution of a participant’s implementation of a new practice (Roach et al., 2009), and is a valuable evaluation tool for change processes.
Chapter 3

Methods

The research questions for the study are around the potential long-term impacts of the PLACE program on the participating teachers’ practices and how the teachers have translated their learning into their classrooms. The research methods that are outlined below were approved by the University of Wyoming’s Institutional Review Board (IRB) and the research study committee of the Wyoming school district where the four research participants were observed and interviewed. The methods were granted approval and determined to have little to no impact on the human subjects. This methods section describes both the PLACE professional development program and the current study’s research methods.

Population

The participants for this study were selected from the population of teachers who attended the PLACE teacher professional development program. The population was narrowed to participants who attended all four years of the program. The following sections describe the PLACE program, PLACE professional development teachers, and the selected participants.

PLACE program

Place Learning and Civic Engagement (PLACE) was a four-year professional development program from 2011-2014 conducted in partnerships between the University of Wyoming, Teton Science Schools, and four Wyoming school districts (Muir Welsh & Cook, 2017). The program was funded through U.S. Department of Education, Title II, Part B Mathematics and Science Partnership Grant, which is a federal pass through grant administered by Wyoming Department of Education. The program received consecutive funding awards three years in a row: Year 1 award $208,793, Year 2 award $230,762, and Year 3 award $243,530.
The PLACE program was designed to be intensive, ongoing, connected to practice, focused on specific curriculum content, and build strong working relationship between participants. These elements are consistent with the criteria for a high-quality professional development (Darling-Hammond, et al., 2009). It was assumed that the PLACE program was facilitated to the degree of a high-quality professional development.

The goal of the program was to connect elementary science curriculum to the teachers’ and students’ home and local places (Muir Welsh & Cook, 2017). The science content changed every year and the participants’ objectives were differentiated based on number of years in the program. Table 2 outlines the PLACE participants’ progression.

Table 2

PLACE Program Progression (Muir Welsh & Cook, 2017).

<table>
<thead>
<tr>
<th>PLACE Year</th>
<th>Science Content</th>
<th>Teacher Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>Watersheds</td>
<td>Place-Based Training</td>
</tr>
<tr>
<td>Year 2</td>
<td>Energy</td>
<td>Action Research Training</td>
</tr>
<tr>
<td>Year 3</td>
<td>Weather/Climate</td>
<td>PLACE Leadership Training</td>
</tr>
</tbody>
</table>

Although the program varied every year, a common thread throughout the program was a focus on inquiry as a science content and a pedagogical process. Additionally, the PLACE program always modeled place-based and experiential education methods. Ten place-based education principles (adapted from the Rural School and Community Trust (2003)) were created to represent key aspects of place-based learning. These were:

1. Learning is grounded in and supports the development of a love for one’s place.

2. Learning is focused on local issues.
3. Learning is supported by strong and varied partnerships with local organizations, agencies, businesses, and government.

4. Local learning servers as the foundation for understanding and participating appropriately in regional and global issues.

5. Learning takes place on-site, in the school-yard, and in the local community/environment.

6. Learning is personally relevant to the learner.

7. Learning is oriented so learners feel positive and in control.

8. Learning is structured to promote deep understanding of content.


10. Learning is interdisciplinary. (Muir Welsh & Cook, 2017)

The PLACE program modeled, taught, and guided teachers in how to incorporate and use the principles of place-based learning. Throughout the multi-year program, teachers discussed ways to incorporate the PLACE principles into elementary science curriculum and become leaders in their schools.

PLACE participants

Teachers were selected for the PLACE program if they expressed interest in attending and worked in one of the four partnering Wyoming school districts. Table 3 outlines the number of teachers that participated in PLACE. An additional PLACE program called the Power of Place summit occurred in the summer of 2014 where over 75 teachers/educators participated.
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Table 3

Teacher Participation in PLACE program

<table>
<thead>
<tr>
<th>Number of Years</th>
<th>Number of Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Years</td>
<td>9</td>
</tr>
<tr>
<td>2 Years</td>
<td>4</td>
</tr>
<tr>
<td>1 Year</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
</tr>
</tbody>
</table>

For this study, participants were selected from the nine teachers who attended all three years, however, only seven teachers were available for surveying. Teachers voluntarily participated. Table 4 provides additional information about the teachers in the study.

Table 4

Study Participant Information

<table>
<thead>
<tr>
<th>School Name</th>
<th>Teacher Name</th>
<th>Observed</th>
<th>Surveyed</th>
<th>Years Taught</th>
<th>Grade Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pinewood Elementary</td>
<td>Ellen</td>
<td>Yes</td>
<td>Yes</td>
<td>35</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Heather</td>
<td>Yes</td>
<td>Yes</td>
<td>27</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Susie</td>
<td>Yes</td>
<td>Yes</td>
<td>28</td>
<td>3</td>
</tr>
<tr>
<td>Meadows Elementary</td>
<td>Lynn</td>
<td>Yes</td>
<td>Yes</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Forest Elementary</td>
<td>Alice</td>
<td>No</td>
<td>Yes</td>
<td>N/A</td>
<td>6</td>
</tr>
<tr>
<td>Sunshine Elementary</td>
<td>Lucy</td>
<td>No</td>
<td>Yes</td>
<td>N/A</td>
<td>6</td>
</tr>
<tr>
<td>Waterfalls Elementary</td>
<td>Sarah</td>
<td>No</td>
<td>Yes</td>
<td>N/A</td>
<td>K</td>
</tr>
</tbody>
</table>

Note: pseudonyms were used for the names of the schools and teachers.

For the interviews and observations, one Wyoming district was selected because it had the highest concentration of participants. Thus, seven teachers were surveyed, and four teachers were observed and interviewed.
**Setting**

The PLACE program occurred in several different locations throughout a year. The table 5 outlines the general progression of one year of the PLACE program.

**Table 5**

*The general progression of a year in the PLACE program (Muir Welsh & Cook, 2017).*

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>6-day summer place-based workshop at Teton Science Schools (TSS)</td>
</tr>
<tr>
<td>July</td>
<td>4-day summer place-based workshop in school districts</td>
</tr>
<tr>
<td>Fall</td>
<td>Science Curriculum Workshop and TSS graduate students teaching in PLACE participants’ classrooms</td>
</tr>
<tr>
<td>Winter</td>
<td>Optional winter workshop at Teton Science Schools</td>
</tr>
<tr>
<td>Spring</td>
<td>Reflection Retreat</td>
</tr>
</tbody>
</table>

First, a six-day summer workshop took place at the Teton Science Schools in Kelly, Wyoming. The use of Teton Science Schools offered an opportunity to study in Grand Teton National Park where teachers could hike, conduct research studies, and immerse themselves in inquiry projects. This workshop was designed as an intensive dive into place-based education principles and teaching strategies. Second, four-day summer workshops were facilitated in the various school districts. By conducting workshops in the individual school districts, facilitators bridged gaps between the place-based education experience at Teton Science Schools and the opportunities in the teachers’ local areas. These workshops supported teachers’ efforts to integrate the PLACE principles into their district’s science curriculum through planning and experiencing local resources.

In the fall, continued support from partnering organizations varied from year to year. For instance, Teton Science Schools’ graduate students visited the classes to model additional inquiry
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science lessons. Also, workshops and check-ins were used to help support and encourage teachers. In winter, optional workshops were held at Teton Science Schools. The last stage of the program was a spring retreat. The retreat was an opportunity for teachers to reflect on their learning, to evaluate the program, and to share their work with other PLACE participants. Focus groups were conducted during these retreats and this data contributed to the yearly program evaluation.

**Current Research Setting**

For this study, the researcher visited four of the seven teachers. The four teachers worked in one school district in Wyoming. Also, they worked at similar schools so two elementary schools were visited. For the observations and interviews, the setting was the teachers’ school and classrooms.

**Data Collection**

The data collection methods for this study involved interviews, observations, and surveys. The semi-structured interviews focused on the participants experience in PLACE, discussed examples of place-based education, and provided additional context for the observation. The observation was one-half day with four of the teachers. The surveys were distributed to all seven teachers. The surveys included CBAM and the place-based learning rubric. The following sections outline the protocols.

**Interviews**

Interview questions focused on accessing how the teachers used the PLACE program in their classroom (see Appendix A). The questions were developed ahead of time; however, the interview format was semi-structured, which meant that the exact wording and order of the questions was not strictly followed during the interview. The tone of the interview was
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Conversational in an attempt to help participants to feel comfortable during the interview. Interviews took place in the teachers’ classrooms and lasted approximately 30 minutes. The interviews were recorded using Voice Memos software on Apple iPhone.

Observations

Observations of the four teachers’ classrooms were pre-arranged and lasted for one-half day for each participant. Observations occurred during the same week. The teachers were encouraged to consider incorporating their learning from PLACE during the time they were being observed. However, this was a suggestion. Teachers were not required to teach a place-based lesson because the district had strict regulations on interferences of the educational experience of the students. Thus, teachers could determine if a place-based lesson was relevant on the day they were being observed.

During the observation, detailed notes were taken. A graphic organizer was used in order to focus the researcher’s attention on certain details, such as the PLACE principles (see Appendix B). Field notes were taken on timing, classroom, lesson content, student engagement, and incorporation of PLACE principles. The researcher only observed the teacher and did not become an active participant.

Survey

Surveys were emailed to participants using the Google Forms platform or provided in hard copy (see Appendix C). The questions used for the survey were the same questions used in the previous PLACE program evaluation. The survey consisted of two separate sections. The first survey section was an adapted CBAM that assessed the participants’ concern, confidence, and commitment to place-based tasks. The second survey section was a rubric of the ten place-based learning principles.
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Data Analysis

Data analysis consisted of several stages of transcription, coding, comparison, and the generation of descriptive statistics. The coding process involved a priori codes to assist in answering the research questions: What are potential long-term impacts of the PLACE program on participating teachers’ perceptions and practices? How do PLACE teachers currently implement place-based education in their classroom?

Interviews

Interviews were transcribed verbatim using a transcription software called Transcribe. Transcriptions were coded using a priori codes (see Appendix D). The a priori codes were derived from Guskey’s (2002) model of five levels for evaluating professional development, which were (1) participants’ reactions, (2) learnings, (3) organizational support, (4) participants’ use of new knowledge, and (5) student learning outcomes. The codes focused the analysis on various levels of program impact and evaluated the PLACE program’s impact on teachers, which was directly related to the research question. Also, topics that were related to the PLACE goals, PLACE principles, and objectives were highlighted during the coding process. After coding was completed, memos and quotations were reorganized according to the five levels of Guskey’s (2002) model.

Observations

Observations provided insight into the teachers’ current practices. The detailed notes from the observations were transcribed into an electronic document. The notes were coded using similar methods to the interviews. The a priori codes were the five levels of the Guskey model and the ten place-based learning principles. The ten principles were included in the observation graphic organizer, which provided an easy way to pre-code the observations. The second round of
coding focused on topics such as PLACE goals and examples of place-based education. The observational data were reorganized, combined with the interview data, and then categorized based on the five levels of the Guskey model.

Survey

Surveys were used to elaborate on the trends from the observations and interviews. They provide additional evidence about the long-term impact of the PLACE program. Survey data from CBAM and the place-based learning rubric were transferred into a Microsoft Excel document. For the place-based learning rubric, it used word descriptions. Therefore, in order to compare trends in the data, the rubric was translated into a scale from one to five. The baseline data were the first surveys the participants took in year one of the PLACE program in 2011. Descriptive statistics such as averages and percent change were used to assess the participants’ change. The survey analysis provided numerical data on the degree of change from year one (2011) to present day (2018). Additional interview and observational data were used to further support the trends and patterns in the survey data.
The results are focused on answering the two research questions: (a) What are potential long-term impacts of the PLACE program on participating teachers’ perceptions and practices? and (b) How do PLACE teachers currently implement place-based education in their classroom? The observation and interviews \((n=4)\) were transcribed and then coded using Guskey’s (2002) five levels for evaluating teacher professional development (see Appendix D). Figure 6 outlines the levels that were discussed in greater detail in Chapter 2.

![Figure 6: Diagram adapted from Guskey (2002) paper on the five levels for evaluating teacher professional development.](image)

The survey data \((n=7)\) were compiled from written and online surveys. The data compared the participants’ first survey during Year 1 of the PLACE program in 2011 to the long-term post-program survey in 2018. The averages and percent change provided insight into trends in the data. The survey data was also compared to the interview and observational data to further support the findings. The following sections present the findings from the place-based learning principles rubric review, CBAM comparisons, and Guskey’s (2002) five levels analysis.
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Level 1: Participants’ Reactions

Participants in this study expressed positive reactions from their experience in the PLACE program. The teachers spoke of the general personal and professional impact of the program. Statements such as, “It was life changing” (Ellen) and, “it changed everything for me” (Heather) and, “the whole thing really influenced a lot about my life” (Susie). These statements highlight the overall impact of the program. The teachers referenced several personal impacts of PLACE such as becoming more connected to their place, encouraging them to get outside in any weather, and creating lasting friendships with other teachers.

Professionally, teachers spoke about the structures and formats of PLACE that made it successful. A survey comment mentioned that, “PLACE stays on my mind and within my weekly planning more than any other professional development I’ve participated in”. Stated reasons for the success of PLACE was that it was fully-developed, thoughtfully planned, intensive, dispersed over a long period, and experiential. Several teachers mentioned the combination of content and experiential learning assisted their learning process. For example, Susie reflected that one of the beneficial aspects of the program was, “learning that content and then figuring out how to take that content and implement it with little kids.”

The longevity of the program and the dispersed professional development workshops throughout the year provided opportunities for the teachers: to learn, apply the practice, receive feedback, gain ideas from other teachers, and continue improving their practices. During the interviews when the teachers were asked to identify things they wished were covered in the program, most teachers responded that they could not identify anything that was lacking. Instead, the teachers just expressed interest in and requested additional trainings. This implies the general interest and personal drive to learn more about this teaching method. Overall, the reactions
expressed positive sentiments about the personal and professional impacts of the program and the program’s structures that supported the teachers’ growth and change.

**Level 2: Participants’ Learning**

Level two focused on the knowledge, ideas, and concepts that the teachers learned from the PLACE program and the teachers’ implementation of their learning will be discussed in level four. The statements about the participants’ learning focused on the PLACE principles, place-based education, science inquiry, and science education as those topics related to the goals and objectives of the program.

During interviews, study participants were asked to define place-based education, which provided an impression of their understanding and perceptions of place-based education. Several of the teachers’ statements reflected the PLACE principles. An example is this statement: “I just think PBE teaches kids to be good citizens. It teaches them to be thinkers. It teaches them to be problem solvers and it just sort of changed my way of science” (Ellen). That statement reflects similar ideas present in the PLACE principles four and nine: “Local learning servers as the foundation for understanding and participating appropriately in regional and global issues” and “Learning engages students in investigation, inquiry, and problem solving” (J. Ellsworth & P. Ellsworth, 2012). These principles four and nine are also discussed in the section on the place-based learning rubric. Other statements eluded to the benefits the teachers saw in place-based education such as, “place-based makes them active. They’re stewards. They’re doers. They’re problem solvers rather than regurgitators” (Heather). Lynn defined place-based education as, “getting them to really connect to their place. But not just their place but also their learning. To connect to their learning. To be responsible for their learning.” Through the conversations with
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participants, it appeared that they gained a comprehension of the philosophies and concepts of place-based education as a result of the PLACE program.

In addition to learning about place-based education, the participants commented on learning a different approach to teaching science. As a result of the PLACE program, two of the four teachers reflected that the PLACE program helped develop their confidence to teach science. Lynn said, “the biggest change is that I became comfortable teaching science” and “that science isn’t this big scary thing. It's something that we all do every day.” Heather spoke about gaining the tools to make learning an experience. These sentiments touch on the idea of that the PLACE program expanded the teachers’ knowledge of science education reform.

**Level 3: Organizations Support and Change**

Organizational support had two trends in the data, which were school influences and cohort support. For school influences, Pinewood Elementary and Meadows Elementary staff appeared to accept different components of place-based education. The three teachers from Pinewood Elementary commented on the general support of the staff and school principal, which created more freedom to try new things. Lynn from Meadows Elementary reflected on changes in her school that made it more difficult to continue some practices. Lynn commented that, “changing teaching partners makes it hard and changing principals makes it hard. So I don’t have the support network that I previously had with it.” Lynn hypothesized that the changes with teaching partners and principals were causing the school to veer away from place-based education. Other grades at this school had dedicated place-based education time, however she felt it was hard to justify for her grade and science standards.

The comments and general sense of Meadows Elementary stood in contrast to Pinewood Elementary. Pinewood Elementary presented a more supportive attitude towards place-based
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education. The three teachers from Pinewood Elementary remarked that their principal supported the teachers incorporating anything that they are excited about and is research-based. This freedom allowed the three teachers to integrate the PLACE principles throughout their school. Ellen said, “I think our school adopted it, you know. The teachers that went we so strongly believed in the core premise of place-based education that we kind of wanted to make it grow. And tried to spread it throughout our building.” The support and acceptance of the PLACE teachers’ ideas within their school allowed the teachers to implement ideas and integrate PLACE into their practice.

The school differences could also be related to the number of teachers from each school that participated in the PLACE program. Pinewood Elementary had ten teachers who attended one year while Meadows Elementary only had two teachers. Therefore, more teachers at Pinewood Elementary have demonstrated interest and have experience in place-based education. Whereas, Lynn at Meadows Elementary expressed the feeling of being a lonely island. The differences in the schools highlight the importance of school support from partner teachers and principals.

Although the school support is probably the main factor influencing the teacher’s long-term implementation of PLACE practices, one initial support system that helped teachers implement the practice was the cohort, which refers to the group of teachers who were in a similar year of the program. For instance, the teachers who participated in this study were all part of the same cohort. Therefore, they worked with each other for all four years of the program. The cohort created smaller groups within the program, which appeared to help the educators both professionally and personally. Susie stated that the “cohort really influenced that I really had that follow through. That I had people that I could count on. That I always knew I could ask for help.
or see what they were doing. We were really good about sharing our ideas.” The PLACE community provided peer support and created lasting friendships. For instance, Heather emotionally remarked that the “PLACE people, we became such a family.” The continued support of peers during the learning process was noted as a powerful component for the teachers.

Level 4: Participants’ Use of New Knowledge and Skills

Level four focused on the concrete examples of how the teachers have implemented the PLACE program in their classrooms. When research participants considered how they used the PLACE program in their classrooms, several participants commented that the philosophy of PLACE translated more than the actual content. Interview responses and observational data were sorted into examples that were directly connected to the PLACE program and then examples of how teachers have expanded upon their use of place-based education. Barriers to implementing their learning were also discussed in this section.

Level 4 Sublevel: Implementation of PLACE Ideas. Teachers outlined ways they have implemented ideas from PLACE into their classroom, such as incorporating the schoolyard and community, inquiry practices, and science content. Teachers described changes they made to their teaching as a result of the PLACE program. A survey response stated:

The most dynamic change has occurred in my own personal understanding of the PLACE principles and ability to scaffold my students' understanding and connection to these principles. Developing a love of our PLACE has allowed me to: 1) teach by example using my own attention and wonder 2) learn from my students as their connections to place and others are strengthened and 3) find joy in the journey!

Other teachers described incorporating “more active ways to involve students in their learning” (Anonymous survey comment). Based on the data, teachers appeared to have integrated
the philosophy of PLACE into their teaching. However, several teachers admitted that they do not follow through with as much as they wish, but the ideas are always in the back of their minds.

Along with the philosophy, teachers also provided concrete examples of using their PLACE knowledge. Ellen spoke of using the inquiry processes to make predictions of how many rocks you can hold in your hand or experimenting with the best snow to make a snowball. Lynn collected local samples of flowers and snake sheds and adopted the TSS exploratory stations into her classroom. Ellen and Susie spoke of using the community building games and science exploratory games with their students. Several teachers mentioned that they were able to adapt some of the PLACE program’s content related to clouds, watersheds, and snow science.

**Level 4 Sublevel: Incorporation of Place-based Education.** Along with examples of teachers using their PLACE knowledge in their classroom, there was additional evidence of how teachers have expanded their use of place-based education. For instance, Heather created an activity called “Burn and Learn”, which was a 15-minute brain break for students to burn energy while also learning and exploring their schoolyard or nearby fields. Ellen and Susie also used this activity and adapted it for their grade levels. Teachers altered the activity to meet their student’s needs and personal teaching style. For instance, Ellen walked with her students outside. She found walking outside in the morning calmed the students and provided opportunities for the students to express their emotions. Susie used structured activities to foster exploration, observations, and activity. Heather facilitated more open-ended exploration that could be characterized as nature play, which is a term that refers to engaging with the outdoor environment through play, manipulating natural elements, and sensory exploration (Moore, 2014). During the free exploration, students discovered new insects and plants, built forts, and constantly asked questions about their observations. The common thread for the three teachers who incorporated
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Burn and Learn was that students went “outside every single day regardless of the weather” (Susie). The outside learning and exploration was a key component of how three of the four teachers incorporated the PLACE program into their practice. In addition to the Burn and Learn structure, the analysis of the interviews and observations created a list of projects and lessons that were inspired by place-based education. These examples include the following: using local seed pods to discuss averages, phenology projects at local parks, interdisciplinary science and math lessons, researching and building models of Winter Olympics courses in schoolyard, and 5th grade capstone projects focused on local issues.

**Level 4 Sublevel: Barriers.** As teachers shared how they have use their knowledge from the PLACE program, they also brought up the barriers that restricted their use of place-based teaching practices. The barriers mentioned that constrained their implementation: time, resources, limited age-appropriate ideas, district curriculum, and number of students. Also, all four teachers shared frustrations about their district’s new field trip policy that limited their ability to explore the community.

During the observations, these barriers were evident in some of the participant’s teaching practices. For instance, time restrictions led Susie to select a structured inquiry project instead of an open-inquiry science project. A structured science inquiry project refers to an investigation where the teacher provides the question and procedure and students explain the results. Open-inquiry science projects are where a student or a class creates the questions, procedure, and explanation of the results (Banchi & Bell, 2008). Susie’s structured inquiry project appeared to be an attempt to include science while also only taking 15 minutes away from the normal schedule. Another barrier example occurred during Lynn’s observation. Lynn was observed instructing a more traditional, teacher centered classroom with PowerPoint slides. This teaching approach
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could be a result of multiple factors. However, Lynn identified that district standards and school
constraints limited her ability to fully adopt place-based education practices.

Level 5: Student Learning Outcomes

For the last level of Guskey’s (2002) model, students’ learning outcomes are addressed. In
theory, professional development improves teacher’s practices, which translates to improved
student outcomes. Student outcomes were not assessed as part of this research study. Instead,
teachers identified a variety of positive student outcomes they associated with place-based
education. Most of the positive outcomes that teachers mentioned cannot be measured in a
standardized test. Instead, they relate to affective outcomes, such as developing a student’s love
for learning, empowerment, and confidence. Heather even admitted that her students will not be at
the top of standardized tests. However, she explained that her students are willing to “take on
things that are harder than they think they can do. And not freak out that they aren't going to get it
right.” Along with the confidence to take on challenges, Ellen stated that place-based education
“creates thinkers. I think that it they are beyond spitting out answers to creative problems
solving.” This exemplifies the place-based learning principle number nine that learning should
include investigation and problem solving.

Another benefit that teachers identified was that the PLACE teaching methods helped
students have control over their learning and empowered them to “see the world as something
they can take on” (Heather). Several teachers expressed the general sentiment that the PLACE
teaching approach was genuinely good for students, even if the benefits were more social and
emotional than academic.
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Place-based Principles Rubric

The surveys provided another lens to explore the participants’ growth and change over time. In combination with interview and observational data, the patterns in the data provide additional evidence about the long-term impact of the PLACE program. For the place-based learning rubric, the 2011 pre-program and 2018 post-program surveys were compared to see the overall growth. Figure 7 and Table 6 display the averages and percent change for each question on the rubric. Responses for all ten questions increased in value from the pre-program to the long-term post-program rubric. The average percent change was 22%, and percent change ranged from 8-42%.

![Average Pre- and Long- Term PBE Rubric Scores](image)

*Figure 7:* Bar graph displays the averages for the pre-program and long-term post-program place-based learning principles rubric.
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#### Table 6

*Averages for each question from the pre-program and long-term post-program Place-based Principles.*

<table>
<thead>
<tr>
<th>PBE Rubric Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning is grounded in and supports the development of a love for one’s place.</td>
<td>2.6</td>
<td>2.6</td>
<td>2.2</td>
<td>2.3</td>
<td>3.7</td>
<td>2.8</td>
<td>3.1</td>
<td>3.1</td>
<td>2.2</td>
<td>2.9</td>
</tr>
<tr>
<td>Learning is focused on local issues.</td>
<td>3.0</td>
<td>2.9</td>
<td>2.5</td>
<td>3.1</td>
<td>4.0</td>
<td>3.2</td>
<td>3.9</td>
<td>3.9</td>
<td>3.1</td>
<td>3.6</td>
</tr>
<tr>
<td>Percent Change</td>
<td>+14%</td>
<td>+11%</td>
<td>+15%</td>
<td>+37%</td>
<td>+8%</td>
<td>+15%</td>
<td>+27%</td>
<td>+23%</td>
<td>+42%</td>
<td>+25%</td>
</tr>
</tbody>
</table>
Responses on average increased for all the questions, which could indicate an increase in the use of the various place-based principles. Principles with high percentage change and additional observational and interview data indicate a trend of use for that principle. The principles that had between 35-42% change were principle four and nine. Principles four and nine were also identified in level two (participants’ learning) and level four (participants’ use of knowledge). Principle four was, “Local learning serves as the foundation for understanding and participating appropriately in regional and global issues.” The use of this principle was also supported during the observation. Heather’s class was working on a Winter Olympic Games project, where the students were researching a game, tracking the athlete during the Olympics, and constructing models of arenas in the schoolyard. This project used the local schoolyard while also connecting the students to a global event. Next, principle nine is focused on inquiry and problem solving. Both of these aspects were apparent in the interviews and observations. For instance, Ellen and Heather’s classes used wood blocks and rocks to build structures and towers. Students were working together, engineering, and problem solving during their Burn and Learn time. Also, Susie’s class was observed during a structured inquiry project where students were testing how plants absorb water by placing a celery stalk in colored water.

**Concern-Based Assessment Model (CBAM)**

Similar to the place-based learning rubric, the CBAM data provides an additional way to analysis the impact of PLACE on the participants. Based on the averages of the pre-program and long-term post-program surveys, questions that are related to the participant’s concerns (1-3) with planning, implementing, and evaluating place-based tasks went down. On average, responses related to participants’ confidence (4-6) of planning, implementing, and evaluating place-based tasks went up. Lastly, the averages for participants’ commitment (7-9) to planning, implementing,
and evaluating place-based task all went down. Overall, the average percent change was 28% and percentage change ranged from 3-55%. Figure 8 and Table 7 display the values for the pre-program CBAM and long-term post-program CBAM.

Figure 8: Bar graph displays the averages for the pre-program CBAM and long-term post-program CBAM. Questions 1-3 are related to concern. Questions 4-6 are related to confidence. Question 7-9 are related to commitment.
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Table 7

*Averages for the pre-program and long-term post-program CBAM.*

<table>
<thead>
<tr>
<th>Survey Questions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>When it comes to designing place-based tasks, my level of concern is ...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When it comes to implementing place-based tasks, my level of concern is ...</td>
<td>4.0</td>
<td>4.4</td>
<td>5.0</td>
<td>6.6</td>
<td>7.7</td>
<td>6.0</td>
<td>8.9</td>
<td>8.9</td>
<td>8.7</td>
</tr>
<tr>
<td>2011 Pre-Program CBAM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When it comes to designing place-based tasks, my level of confidence is ...</td>
<td>2.9</td>
<td>2.0</td>
<td>2.3</td>
<td>8.4</td>
<td>9.3</td>
<td>8.1</td>
<td>7.6</td>
<td>8.6</td>
<td>7.4</td>
</tr>
<tr>
<td>When it comes to implementing place-based tasks, my level of confidence is ...</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>2018 Long-term Post-Program CBAM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When it comes to evaluating place-based tasks, my level of commitment is ...</td>
<td>2.3</td>
<td>5.0</td>
<td>6.6</td>
<td>8.4</td>
<td>9.3</td>
<td>8.1</td>
<td>7.6</td>
<td>8.6</td>
<td>7.4</td>
</tr>
<tr>
<td>Percent Change</td>
<td>-29%</td>
<td>-55%</td>
<td>-54%</td>
<td>+28%</td>
<td>+20%</td>
<td>+36%</td>
<td>-15%</td>
<td>-3%</td>
<td>-15%</td>
</tr>
<tr>
<td>When it comes to evaluating place-based tasks, my level of commitment is ...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When it comes to evaluating place-based tasks, my level of concern is ...</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When it comes to evaluating place-based tasks, my level of confidence is ...</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>When it comes to evaluating place-based tasks, my level of commitment is ...</td>
<td></td>
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</tbody>
</table>
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Questions one through three about participants’ concern had an average decrease of 46%. Concern for implementing and evaluating place-based tasks had a decrease around 50%. Concern for designing tasks had a lower value of 29% percent change. This finding parallels some statements by teachers who mentioned struggling to create new age-appropriate ideas.

Questions four through six about participants’ confidence increased by 28%. Percent change for confidence in designing, implementing, and evaluating place-based tasks ranged from 20-36%. In interviews, teachers also mentioned that PLACE helped them become more confident teaching science. This increase in confidence is further discussed in level two.

Questions seven through nine about participants’ commitment decreased on average by 11%. These questions concerning commitment to place-based tasks had the smallest percent change compared to others. Previous PLACE program evaluations found similar trends where there was a slight decrease in participants’ commitment at the end of the program year. This trend occurred all three years of PLACE. Based on feedback, several reasons were identified. In the year two PLACE evaluation, one reason for the decrease in commitment could be “that participants rated their commitment higher during the year and didn’t actually realize that they rated themselves lower at the end” (J. Ellsworth & P. Ellsworth, 2013, p. 5). The year three PLACE evaluation stated additional reasons such as needing additional teachers at their school to participate, time, school expectations, and evaluation constraints (J. Ellsworth & P. Ellsworth, 2014). The slight decrease in participants’ commitment found in this study could have been a result of similar factors such as accidently answering a different value or barriers to implementation reducing commitment. Additional data is needed to support those claims.
Chapter 5

The data analysis of the interviews, observations, and surveys provided evidence to answer the two main research questions as well as provide recommendations for future professional development programs. The two research questions centered around potential impacts of the PLACE program on teachers’ perceptions and practices and secondly how teachers utilized their learning from PLACE in their classroom. This chapter also outlined limitations of the study and future questions for the field.

Discussion

Research question one stated, “What are potential long-term impacts of the PLACE program on participating teachers’ perceptions and practices?” Based on the data collected from the small sample of teachers, the evidence suggested that the program impacted the teachers’ perceptions and practices to various degrees. During interviews, all four teachers said that the program had an impact on their teaching. The factors that teachers attributed to the success of the program referred to the elements of a high-quality professional development, such as focus on content, modeling strategies, active learning, teacher collaboration, and continuous feedback (Archibald et al., 2011). The teachers’ statements support the theory that using those components of a high-quality professional development support teacher learning, which translates into teachers more effectively learning the teaching practice (Archibald et al., 2011; Yoon et al., 2007).

Trends in the interview, observation, and survey data imply that the teachers incorporated the PLACE principles and philosophy. That is not to suggest that all the teachers transformed their teaching as a result of the PLACE program. Instead, the teachers discussed a variety of
examples where they applied the PLACE philosophy and expressed that the PLACE philosophy was in the back of their minds.

The PLACE professional development impacted their perceptions of how they thought students should be taught and the practices that they use to accomplish that. However, in the observations, it was apparent that teachers’ implementation of place-based education fell on a spectrum. Figure 9 represents where the teachers fell on a spectrum of implementation of place-based education. Additionally, the labels under each teacher connect a place-based learning principle (see Appendix C) to the teacher’s example of that principle.

Figure 9: The spectrum of teachers’ integration of place-based education into their classroom. Underneath each teacher are examples of elements that the teacher incorporated. The figure represented the individual elements the teachers selected.

Heather appeared to have fully integrated the PLACE philosophy into her classroom through interdisciplinary projects, using the schoolyard as a place for learning, and making learning relevant to students. The teachers’ use of PLACE practices begin to be more isolated
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events as you move across the spectrum. Ellen and Susie illustrated how they integrated science with other subjects during the observation. Lynn maintained a traditional teaching approach but incorporated local examples as a way to make learning relevant to students.

Multiple teachers used similar place-based education principles. Heather, Susie, and Ellen all used principle five, which involved using the local schoolyard and community for learning. These three teachers integrated an activity called Burn and Learn, where every day students explored their schoolyard through free exploration, community games, and activities. Even though several teachers used similar principles, each teacher implemented the activity differently based on their grade, school, personality, and desired outcomes.

The observed spectrum of implementation aligns with the change process discussed by Guskey (1986) and Clarke and Hollingsworth (2002), where professional growth is an individualized process and can take multiple pathways. The results of the professional development and the implementation of a practice vary teacher to teacher (Luft et al., 2016; Luft & Hewson, 2014). As mentioned in Figure 2, there are numerous factors that influence a teacher’s practice, which causes every teacher to translate a teaching approach in their own way based on their background, school, and personality. Luft and Hewson (2014) identified this variation and adaptation of instructional approaches following a professional development to be an important area of continued research.

The second research question asked how the PLACE teachers currently implement place-based education in their classroom. Place-based education is a broad term. Teachers in this study appeared to have selected aspects that fit their own teaching styles and school environments. Examples of how the four PLACE teachers implement place-based education in their classroom is diagramed in Figure 10.
Table 1: Examples of Implementation of PBE

<table>
<thead>
<tr>
<th>Heather</th>
<th>Susie</th>
<th>Ellen</th>
<th>Lynn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watersheds</td>
<td>Community &amp; exploratory games</td>
<td>Community &amp; exploratory games</td>
<td>Stations with local flowers and snake sheds</td>
</tr>
<tr>
<td>Snow Science</td>
<td>Snow science</td>
<td>How many rocks can your hand hold?</td>
<td>5th grade capstone project</td>
</tr>
<tr>
<td>Averages with seed pods</td>
<td>Clouds</td>
<td>Best snow for a snowball?</td>
<td></td>
</tr>
<tr>
<td>Burn and learn</td>
<td>Burn and Learn</td>
<td>Burn and Learn</td>
<td></td>
</tr>
<tr>
<td>Phenology at local park</td>
<td>Phenology at local park</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building models  (Olympics, history, watersheds)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 10: Examples of place-based education in the PLACE teachers’ classrooms. The light green striped boxes are examples that related directly to the PLACE program. The solid green boxes are examples where the teachers have expanded upon their learning from PLACE.

The examples in Figure 10 were drawn from the observations and interviews. Teachers mentioned using specific learnings and activities from the PLACE program, which are represented in the light green striped boxes in Figure 10. These specific examples were related to the science content, community and exploratory games, inquiry questions, and teaching with local specimens. Also, teachers discussed examples that were built off their learning from PLACE, which are the solid green boxes in Figure 10. These examples included using yucca seed pods to work on averages, visiting local parks for phenology studies throughout the year, and capstone projects that explored a local issue.

Based on observations, interviews, and surveys, the teachers embraced the place-based learning principle nine that that incorporating place-based education into their classroom helps students develop problem solving skills. This higher order thinking connects back to one of the
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goals of professional development. Professional development is a way to continue teacher
education so that the classroom is preparing students for the skills needed in the 21st century, such
as problem solving (Darling-Hammond et al., 2009; Loucks-Horsley et al., 2010; Luft & Hewson,
2014). The multiple lines of evidence supported the examples of how teachers translated their
learning from the PLACE program into their classroom and created a spectrum of
implementation.

Study Limitations

The conclusions from this study suggest positive impacts of the PLACE program. This
study attempted to retain high qualitative research methods. However, there are still several
limitations that are inherent in the study. The research participants were narrowed to the group of
teachers who completed all four years of the PLACE program, in order to provide insight into the
maximum potential of the program. Thus, the sample size was small because only four teachers
were observed and interviewed, and seven teachers were surveyed. Additionally, the sample
selected for the study also represented the exemplary case. The participants had illustrated their
commitment and interest in place-based education by completing four years of the PLACE
program. Thus, the selected research participants were more likely than other PLACE participants
to result in positive findings since participants have already displayed their commitment to place-
based education.

Another limitation of this project was the limited observation time (½ school day for each
teacher). This time provided a general sense of the classroom culture and routines. However, it
only presented a snapshot into how the teachers implemented place-based education in their
classroom. Likewise, the limited amount of time with each participant only scratched the surface
of their perceptions and did not address their beliefs.
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The survey and interview data were self-reported, and there are inherent limitations to those selected methods. The quality of data relied on the participants to have a high level of awareness of their practices and learning. Also, self-reported data can skew data to either be under-reported or over-reported depending on the question and individual. The self-reported data on the surveys and in the interviews required participants to recall and remember several past lessons and events.

Recommendations for PLACE Teachers and Facilitators

In the following section, I will be speaking in first person because the recommendations are my personal conclusions based on the research process and the literature. My first recommendation is directed towards the teachers who participated in the PLACE program. Some teachers expressed guilt in not incorporating as much place-based teaching practices into their classroom as they desired. My recommendation is to counteract that guilt. Instead, celebrate the moments or lessons where the training is useful. Additionally, I would encourage the teachers to find 15 minutes once a week and continue to practice the skills they learned during their PLACE experience. Small steps could continue to build confidence and maintain commitment to this teaching approach. Also, the teachers may see the student benefits of participating in active learning.

My second recommendation addresses the teachers’ request for additional place-based professional development opportunities. Several teachers mentioned that Wyoming is transitioning science standards. The new Wyoming science standards were inspired by the Next Generation Science Standards (NGSS Lead States, 2013) and will be assessed beginning in the 2020-2021 academic year (Wyoming Department of Education, 2016). Since science standards
are changing, this gives additional cause for a follow-up PLACE professional development because I think the PLACE philosophy aligns with the new Wyoming science standards.

Lastly, my general recommendation is that programs similar to PLACE continue to be conducted either by Teton Science Schools or other similar organizations. The PLACE professional development was designed with the qualities of an effective professional development. Because of this design, I think that the program had significant long-term impact on the participating teachers. The Teton Science Schools’ branch that focuses on teacher professional development continues to provide a variety of professional development opportunities for teachers. The program frameworks have less contact time compared to the PLACE program (L. Cook, personal communication, March 5, 2018). Current programs range from two to eight days whereas one year in the PLACE program had 15+ contact days (L. Cook, personal communication, March 5, 2018). Based on the findings of this study and previous research, reducing the contact time in programs could reduce the impact and effectiveness of the professional development. Supovitz and Turner (2000) found that 80 hours of professional development resulted in the biggest change in teaching practices. The continuous and dispersed structure of the PLACE program was stated as one of the biggest successes of the program. As the Guskey (1986) model of teacher change outlines, the change process requires time for learning, practice, and feedback. Based on the current and previous research, continuous and ongoing program structures are more likely to result in greater growth and long-term changes in teaching practices.

Lastly, a large-scale recommendation that could increase the impact of the PLACE program would be to shift away from educating individual teachers to educating a whole school in place-based education. In this study, school buy-in from principals and teaching partners appeared
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to be one of the biggest factors that determined a teacher’s ability to implement place-based education. Also, the support of other PLACE teachers created a community that supported each other through the process. Therefore, the whole school approach would create a supportive environment for teachers, limit barriers, and create a collaborative learning community within the school. This idea for a place-based school was mentioned by one of the study’s teachers during an interview. The whole school and sustained professional development has been found to increase the effectiveness of the instructional practice as well as demonstrate positive impacts on student performance (Johnson, Kahle, & Fargo, 2007).

**Future Questions**

Considering the conclusions, limitations, and recommendations from this study, there are several questions that could extend this research project. First, how would the results and conclusions change if the research was expanded to include participating teachers from all four PLACE years? This question would enlarge the sample size in order to address this study’s small sample size limitation. Additionally, evaluating teachers who participated in one to four years of the program would provide an interesting comparison on the effect of multiple years. Other studies found a connection between the numbers of hours of professional development affecting teachers’ use of the practice (Supovitz & Turner, 2000). Thus, expanding the study would be an opportunity to see if similar trends are present and if the number of years in the PLACE program correlates with an increased use of the practices. Expanding the study could examine if duration has an effect on the use of the practice. One year in the PLACE program achieved the 80 hour benchmark discussed by Supovitz and Turner. Thus, one year in PLACE potentially could achieve positive outcomes.
This research project focused on the teachers who completed all four years and provided sample data that scratched the surface of their perceptions and practices. To build off this study, there are a few methodological additions that could improve the study. First addition would to align the interview questions with the Guskey’s (2002) five levels of professional development evaluation model. Also, including interview questions about the participant’s background and science training would provide larger contextual information about the PLACE teachers. Lastly, incorporating multiple observations would provide a more complete picture of potential long-term impacts of the PLACE program on teachers’ practices and classroom implementation.

In addition to expanding the sample size of the research, student outcomes and benefits of place-based education could be assessed. This project did not include measures of student outcomes or benefits although teachers discussed various outcomes they saw in their students. Smith and Sobel (2010) claimed that place-based education increases students’ confidence and self-directed learning. However, additional research is needed to confirm the teachers’ assertions of the positive benefits of place-based education. Additionally, the research could expand to include a focus on nature play, which refers to the exploration and play within a natural setting (Moore, 2014). During the observation and interview with Heather, she discussed the importance of free exploration and activity. This approach to place-based education called nature play appears to be gaining traction within outdoor, environmental education organizations and thus additional research is needed on that topic.

Future research is needed on applying the whole school professional development model to place-based education. Creating place-based schools could align the teachers and administration so that everyone is supportive and committed to this form of education, which could translate into increase implementation. Additionally, the importance of community was
identified during interviews as an important component of PLACE. Similarly, the whole school professional development creates a community of learners that can support each other throughout their change process.
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References


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Appendix A

Interview questions

Place-Based Professional Development

1. As a result of participating in the Place Project, what changes have you made in how you plan, teach and/or assess your curriculum? Examples?

2. Which elements of the project (activities, materials, strategies, philosophy etc.) do you use in your classroom?

3. Please rank the top three influences on your implementation of place-based principles in your classroom. For instance, was the PLACE project, additional professional development, school culture, or personal interest more helpful?

4. Describe a time when you felt like a leader in place-based education?

5. Now that is has been a few years since the professional development (PD), what do you wish the PD would have covered?

6. In your opinion, what made PLACE successful?  
   a. What makes a successful professional development program?

Place-Based Education

1. Please define place-based education?

2. Please tell me three times you’ve used PBE principles in your classroom over the past 4 years?

3. From your experience, what are some benefits of place-based education for your students?  
   a. What are the challenges or barriers of place-based education for you as a teacher?

Observation Questions

1. Tell me about what went well in the lesson today.  
   a. Now that you have taught the lessons, is there anything you would change?

2. Tell me about your place-based lesson. (Tell me what to expect)

3. What preceded this lesson? What will be your next lesson connected to the lesson I observed?
## Appendix B

**PLACE Teacher Observation Form**

<table>
<thead>
<tr>
<th>Educator:</th>
<th>Date:</th>
<th>Observed by:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>School:</th>
<th>Grade:</th>
<th>Subject:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Info:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

### Chronology of the observation period:

<table>
<thead>
<tr>
<th>Timing</th>
<th>Location/Event</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
### Classroom Culture

<table>
<thead>
<tr>
<th><strong>Place-Based Education</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevance to place, students’ lives, connections to real-world issues</td>
<td></td>
</tr>
<tr>
<td>Interdisciplinary approach</td>
<td></td>
</tr>
<tr>
<td>Incorporation of design &amp; inquiry processes</td>
<td></td>
</tr>
</tbody>
</table>

Love of one’s place.

Focused on local issues.

Supported by partnerships.

Foundation for understanding and participating actively in regional and global issues.

Takes place in school yard, local community/environment.

Personally relevant.

Developmentally appropriate.

Structured to promote deep understanding of content.

Engages students in investigation, inquiry and problem solving.

Interdisciplinary.

Notes:
Appendix C

CBAM ASSESSMENT –PLACE (2018)

A. Using a scale of 1 to 10 described below, enter your level of concern for each item in the table.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Concern</th>
<th>Confidence</th>
<th>Commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LOW</td>
<td>LOW</td>
<td>LOW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Briefly describe the major CONCERN(S) you experienced this to this point. (Use back if needed)

B. Using a scale of 1 to 10 described below, enter your level of confidence for each item in the table.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Concern</th>
<th>Confidence</th>
<th>Commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>LOW</td>
<td>LOW</td>
<td>LOW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Briefly describe factors affecting your CONFIDENCE to this point. (Use back if needed.)

C. Using a scale of 1 to 10 described below, enter your level of commitment for each item in the table.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Concern</th>
<th>Confidence</th>
<th>Commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>LOW</td>
<td>LOW</td>
<td>LOW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Briefly describe factors affecting your COMMITMENT to this point. (Use back if needed.)
On each category below rank your overall sense of your practice of place-based teaching by circling the appropriate choices.

<table>
<thead>
<tr>
<th>Learning</th>
<th>Choices</th>
<th>Learning about local places is grounded in and supports the development of a love for one’s place.</th>
<th>Learning about local places is regular and fosters developments of connection to place</th>
<th>Learning about local places is connected to the rest of the curriculum and investigates students’ relationship to place</th>
<th>Learning about local places is the total curriculum and students feel a strong connection to place</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Learning is focused on local issues.</td>
<td></td>
<td>No learning about local places</td>
<td>Occasional learning about local places</td>
<td>Learning about local issues is discussed in relation to students’ lives</td>
<td>Students involve themselves in local issues as a participant</td>
</tr>
<tr>
<td>2. Learning is supported by strong and varied partnerships with local organizations, agencies, businesses, and government.</td>
<td></td>
<td>No attempt to develop relationships; focus is on schooling of students</td>
<td>Guest speakers are invited to the classroom</td>
<td>Students learn about local issues by interacting with local partners</td>
<td>Students study local issues and report findings to panels of local experts</td>
</tr>
<tr>
<td>3. Local learning serves as the foundation for understanding and participating appropriately in regional and global issues.</td>
<td></td>
<td>This approach never considered (that’s taught in civic/government class)</td>
<td>Students learn about the complexities of relationships in local, regional and global issues in the classroom</td>
<td>Students use role-play and simulations to understand relationships between local, regional and global issues in the classroom</td>
<td>Students practiced in addressing real issues, repeatedly at spiraling levels, scaffolded with content and tools, at multiple levels (local/global)</td>
</tr>
<tr>
<td>4. Learning takes place on-site in the schoolyard, and in the local community and environment.</td>
<td></td>
<td>Always inside</td>
<td>1-5 days/year outside</td>
<td>5-10 days/year outside</td>
<td>10+ days/year</td>
</tr>
<tr>
<td>5. Learning is personally relevant to the learner.</td>
<td></td>
<td>No connection to learner</td>
<td>Packaged curriculum which may or may not be relevant to learner</td>
<td>Teacher prepared curriculum which may or may not be relevant to the learner – but the intent is there</td>
<td>Teacher &amp; students plan curriculum together</td>
</tr>
<tr>
<td>6. Learning is oriented, so learners feel positive and in control.</td>
<td></td>
<td>Content leaves students feeling helpless and overwhelmed</td>
<td>Content does not consider the readiness and experience of students</td>
<td>Content leaves students ambivalent about their community</td>
<td>Content leaves students feeling positive but not ready to take action in community</td>
</tr>
<tr>
<td>7. Learning is structured to promote deep understanding of content.</td>
<td></td>
<td>Presentation of content is only a broad overview of factual and/or procedural knowledge</td>
<td>Content begins to develop understanding of the “why” behind some concepts</td>
<td>Content is presented in ways that allows opportunities to build and connect between concepts</td>
<td>Content is presented in ways that demonstrate connections between concepts.</td>
</tr>
<tr>
<td>8. Learning engages students in investigation, inquiry, and problem solving.</td>
<td></td>
<td>Instruction provides one or two opportunities for students to engage in inquiry or investigation</td>
<td>Instruction provides numerous learning opportunities that engage students in problem solving, direct investigation, inquiry and analysis of data</td>
<td>Classroom norms support discussion, debate and ongoing refinement of ideas as inquiry progresses</td>
<td>Students have multiple opportunities to make their learning visible through demonstrations and representations</td>
</tr>
<tr>
<td>9. Learning is interdisciplinary.</td>
<td></td>
<td>Content is presented as discrete disciplines and disconnected parts</td>
<td>Content is presented with links to other disciplines, but they are not made explicit</td>
<td>Students begin to explore interdisciplinary connections of content</td>
<td>Interdisciplinary connections are emphasized</td>
</tr>
<tr>
<td>10. Learning is interdisciplinary.</td>
<td></td>
<td>Content is presented as discrete disciplines and disconnected parts</td>
<td>Content is presented with links to other disciplines, but they are not made explicit</td>
<td>Students begin to explore interdisciplinary connections of content</td>
<td>Interdisciplinary connections are emphasized</td>
</tr>
</tbody>
</table>
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Appendix D

Codes for Qualitative Analysis

Level 5: Student learning outcomes
- Assessing student learning

Level 4: Participants’ use of new knowledge and skills
- Assessing degree and quality of implementation
- Objective 3: Expand knowledge of K12 science education reform and *implement* ideas in PLACE work
- Objective 2: Develop knowledge & *incorporate* principles of Place-based education in district science curriculum

Level 3: Organization support and change
- Assessing organizational advocacy, support, accommodation, facilitation, recognition
- Objective 4: Increase understanding of leadership and become a leader in PLACE

Level 2: Participants’ learning
- Assessing new knowledge and skills
- Objective 3: *Expand* knowledge of K12 science education reform and implement ideas in PLACE work
- Objective 2: *Develop* knowledge & incorporate principles of Place-based education in district science curriculum
- Objective 1: *Increase* knowledge about science inquiry

Level 1: Participants’ reactions
- Assessing initial satisfaction with experience