

**Exploring the Health Benefits of Canoe and Paddle Building: A Case Study of  
Physically Active Lessons for Elementary Students**

A Dissertation

Presented in Partial Fulfillment of the Requirements for the

Degree of Doctor of Philosophy

with a

Major in Healthy Active Lifestyles

in the

College of Graduate Studies

University of Idaho

by

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May 2023

## Abstract

Americans have experienced declining health for decades (National Center for Health Statistics, 2019) and these poor health outcomes may be the result of increased sedentary behavior at school, work, and home (Keadle, Conroy, Buman, Dunstan, & Matthews, 2017). Intervention to reduce sedentary behavior may be needed in each of these settings, but schools may be an ideal place to begin because health habits formed in childhood are likely to persist into adulthood (Naylor & McKay, 2009; Cassar, et al., 2019). A qualitative exploratory case study was conducted to assess the potential health benefits of physically active canoe and paddle building lessons for elementary students at a rural charter school. The canoe project was designed to teach students about regional Native American history and culture by providing students with hands-on, physically active learning experiences that take place of the traditional classroom setting. Data were collected using individual interviews, focus groups, researcher observation notes, and photographic documentation of artifacts and reflexive thematic analysis was used to analyze the data. The findings indicate that the canoe project may be able to provide students with health-enhancing experiences while still meeting educational standards. Some of the health benefits reported during the canoe project included improved motor skills, stronger relationships, enhanced learning, positive emotional experiences, and character development. Since this study was merely exploratory, further research will be needed to more thoroughly assess the extent to which the canoe project or similar physically active lessons impact specific health outcomes for students.

*Key Words:* physically active lessons, school health intervention, student health

## **Acknowledgments**

This dissertation was made possible through the expertise, guidance, and hard work of David Paul, Chris Meyer, Cate Egan Loiacono, and Sharon Stoll. Additionally, this dissertation would not have been successful without the teachers, students, and volunteers who helped make the canoe project a positive experience for all participants.

### **Dedication**

This dissertation is dedicated to my grandpa, Don Harrell, whose support, role modeling, and love has been a persistent gift throughout my life.

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## **Chapter 1: Introduction**

The purpose of this qualitative case study was to explore the holistic health benefits of physically active canoe and paddle building lessons at a public elementary school. An emphasis was placed on spiritual health because a paucity of studies exists on the topic of school-based spiritual health (Cañadas, Veiga, & Martinez-Gomez, 2014), especially for studies pertaining to the spiritual health benefits of physically active lessons. Chapter one of this document briefly introduces the topic, identifies a gap in the literature, describes the theoretical framework, provides rationale, and gives an overview of the methods section.

### **Background**

The United States' population has experienced declining health for decades, marked by a decrease in life expectancy at birth, an increase of obesity and obesity-related illness, an increase in deaths from suicide and drug overdose (National Center for Health Statistics, 2019), and more recently, an increase in deaths from communicable disease (Ahmad & Anderson, 2021). Existing evidence shows that living a healthy, active lifestyle can reduce the likelihood of many adverse health events such as type 2 diabetes, heart disease, cancer, depression, anxiety, dementia, premature death, and all-cause mortality (World Health Organization, 2020). Unfortunately, most schools, workplaces, and home environments in the United States are not conducive to being physically active (Keadle, Conroy, Buman, Dunstan, & Matthews, 2017). Attending modern schools and workplaces often results in sedentary behavior, such as sitting in desks for extended periods of time (Keadle, Conroy, Buman, Dunstan, & Matthews, 2017), which is detrimental to the health and wellbeing of students and workers (World Health Organization, 2020). If society at large is to reduce



sedentary behavior, we must drastically restructure our schools and workplaces to become conducive to physical activity (Keadle, Conroy, Buman, Dunstan, & Matthews, 2017).

Schools may be an ideal place to begin this restructuring because health habits formed in childhood are likely to persist into adulthood (Naylor & McKay, 2009; Cassar, et al., 2019) and because schools reach large populations of children across all ethnicities, genders, and social classes (Naylor & McKay, 2009). Based on reports of poor student health by researchers such as Pate et al. (2006) and Kraak, Liverman, & Koplan (2005), the Centers for Disease Control and Prevention (CDC) released the Whole School, Whole Community, Whole Child (WSCC) model to promote the development and reinforcement of health-enhancing habits in school-aged youth (National Association of Chronic Disease Directors, 2017). The WSCC model uses an integrated, collaborative, and holistic approach to improving student health by involving all school staff, students' families, and the local community (National Association of Chronic Disease Directors, 2017). The WSCC model also addresses many dimensions of health, including social, emotional, cognitive, and physical health (CDC, 2021). The WSCC Model has 10 components, one of those components is physical education/physical activity. Nestled within the physical education/physical activity component is the Comprehensive School Physical Activity Program Model (CSPAP). The CSPAP model has five strands designed to work together to help children achieve 60 minutes a day of physical activity. One of the strands, During School Physical Activity, specifically focuses on increasing classroom time physical activity through physically active lessons (PALs).

One evidenced way in which schools can use the CPASP model to increase physical activity levels is to regularly implement PALs (Naylor & McKay, 2009; Cassar, et al., 2019).

PALs are one of several movement integration (MI) strategies, which aim to incorporate PA, at any level of intensity, into normal classroom settings (Michael, et al., 2019). PALs are MIs designed to get students out of their seats while they are engaging with academic content so that students can learn without experiencing the detrimental effects of sedentation (Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015). Although the definition of PALs is broad, existing studies show that PALs have the potential to improve the physical, social, and emotional health of students while having no detrimental impact on academic achievement (Naylor & McKay, 2009; Cassar, et al., 2019; Naylor, et al., 2015).

Using Hjelm's Five-Dimensional Model of Health (Hjelm, 2010), health and wellbeing can be divided into five interconnected dimensions: physical, social, emotional, intellectual, and spiritual health. According to Hjelm (2010), each of these dimensions of health must synergize in order for a person to be considered optimally healthy. According to Hjelm (2010), spiritual health generates a sense of personal fulfillment and peace with oneself that is developed through experiences of love, joy, and a sense of purpose. Spiritual health involves the formation of personal ethics, values, and morals that give our lives meaning, which may or may not involve religious faith (Hjelm, 2010). Spiritually healthy people know how to forgive others, experience love, spread joy, live peacefully, remain optimistic in the face of challenges, maintain hope for the future, and live their life according to a code of personal values (Hjelm, 2010). According to Hjelm (2010), spiritual health is an essential component of optimal health because our values overlap and interact with all other dimensions of health. Therefore, it may be more difficult for a person to achieve optimal physical, social, intellectual, or emotional health if they are struggling with the spiritual dimension of health (Hjelm, 2010).

To delve deeper into what it means to be spiritually healthy, Fisher (2011) developed the four domains model that connects spirituality, health, and wellbeing. According to Fisher (2011), spiritual health can be divided into four domains: 1) the personal domain; 2) the communal domain; 3) the environmental domain; and 4) the transcendental domain. The personal domain of spiritual health pertains to meaning, purpose, and values and is expressed as joy, fulfillment, identity, creativity, integrity, and self-worth (Fisher, 2011). The communal domain addresses morality, culture, and religion and is expressed as love, forgiveness, justice, hope, trust, and faith in humanity (Fisher, 2011). The environmental domain pertains to care, nurturing, and stewardship of physical, social, and natural environments. The environmental domain is expressed as valuing nature and having a sense of awe and wonder (Fisher, 2011). The transcendental domain addresses faith and appreciation for cosmic forces. For theists, the transcendental domain is expressed as worship and attunement with a deity and for nontheists, the transcendental domain is expressed as a sense of being a single piece of a vast universe (Fisher, 2011).

## **Backdrop**

The site of research for this study was an expeditionary learning charter school in a rural Northwest university town. The school's mission statement is to engage the children and the community in a rigorous and collaborative education of the highest standard by fostering a spirit of inquiry, a persistence towards excellence, a responsibility for learning, and an ethic of service. The school has made a public declaration to provide an inclusive, respectful, and supportive learning environment that involves discovery, reflection, collaboration, responsibility, ethical practices, and student autonomy. The school also publicly states that they want students to be physically and emotionally safe at school,

connect with the natural world, and experience diverse perspectives. The school has a significantly lower percentage of students from low-income families than other schools in the region and the vast majority of students identify as White.

The PALs at the heart of the study involved building canoe and canoe paddles to better understand the history and the culture of the Nimiipuu people. The lessons were designed to meet state history standards for fourth grades students. History standard 1 for fourth grade states that students should, “Build an understanding of the cultural and social development of the United States.” More specifically, history standard 1.2 contains objectives asking students to “Discuss the treaty period for Idaho’s federally recognized tribes including causes, events, and results” and “Analyze and describe the effects of westward expansion and subsequent federal policies on Idaho’s American Indian tribes”. Furthermore, history standard 1.3 contains objectives students to “Compare and contrast past and current American Indian life in [the state]” and “Describe the preservation of American Indian resources, including cultural materials, history, language, and culture” (Idaho State Department of Education, 2023).

The canoe project has been part of the fourth-grade curriculum at the charter school for several years and it has frequently received positive feedback from school administrators, community members, and the families of students. This year, the canoe project spanned nine weeks and most lessons were conducted at a local environmental institute. All canoe and paddle building activities occurred at this environmental institute, but some lessons about culture and history occurred at the school due to poor weather. Most of the canoe project’s lessons were taught after school, but some occurred during school hours. All fourth-grade students are expected to participate in canoe building activities at least twice per week, but

additional activities were also provided on weekends for those students who wanted to spend more time working on the project.

Students' families were strongly encouraged to be a part of the canoe project and many parents volunteered to help. During most lessons, the students, teachers, and parent volunteers would use hand tools to work on the dugout canoe and canoe paddles and then learn about Nimiipuu culture and history. The leaders of the canoe project also partnered with community members and local organizations in order to acquire funding, materials, and other resources. The canoe program was co-taught by the charter school's fourth grade teacher and the founder of a local non-governmental organization that promotes the culture and values of the Nimiipuu People. For the purposes of this study, the students' fourth-grade teacher is referred to as the Classroom Teacher and the founder of the NGO is referred to as Standing Red Bear. Since the charter school sits on lands that were traditionally used by the Nimiipuu, aspects of Nimiipuu culture and history were incorporated into all lessons. These lessons involving Nimiipuu culture and history were used to meet several fourth-grade state standards for history.

Prior to starting the canoe project, the Classroom Teacher, Standing Red Bear, university researchers, and parent volunteers met several times to create a plan of action. Most of the planning was done in one-on-one meeting between the Classroom Teacher and Standing Red Bear and then larger meetings would occur to inform all other parties involved in the canoe project. During this planning phase, the university researchers met with both the Classroom Teacher and Standing Red Bear to discuss the purpose of the study, to select the health-related questions that participants would be asked, and to determine the methods used throughout the study.

## **Positionality Statement**

The point of view from which I approached this dissertation proposal is influenced by my personal experiences growing up in a working-class family in the rural Northwest and as the first person in my lineage to obtain a college degree. Additionally, my perspective is influenced by my work as a K-12 teacher, especially because I briefly worked for the charter school that served as the research site. Having worked as a K-12 teacher, I have experience with managing fourth-grade students and working with their parents in order to meet the unique needs of all learners. I have a general understanding of the knowledge, skills, and abilities that can be observed in fourth-grade students which likely helped me build rapport with students, create appropriate focus group questions, and communicate effectively. Since I briefly worked for the charter school that served as the research site for the project, I have connections with teachers, school staff, and school administrators. Being a certified K-12 teacher and having familiarity with school employees provided me with privileges such as being seen as trustworthy, professional, and approachable.

My point of view is also influenced by my personal experiences with health and wellness. My interest in healthy, active lifestyles began when I was able to overcome childhood obesity in middle school. Later in life I became a personal trainer, coach, and then a health and PE teacher before pursuing a PhD in Health Active Lifestyles. Therefore, I know firsthand what it feels like to be an unhealthy child and I personally know the difficulty of changing one's lifestyle from unhealthy living to healthy living. This knowledge helped me understand the perspectives that some students may have had about health, especially if they are struggling with their own health.

Finally, I am also a former resident and teacher on the Nez Perce (Nimiipuu) Reservation, and I wish to return to the Nez Perce reservation to live and work in the near future. This should be noted because the study occurred traditionally Nimiipuu lands, the project involved a non-governmental organization that advances Nimiipuu causes, and the products from this canoe project were used in Nimiipuu ceremonies and events. Both my personal and professional experiences with health and wellness strongly impacted my understanding of what it means to be holistically healthy while living in a rural Northwest community on traditionally Nimiipuu land.

### **Study Purpose and Research Questions**

Ample evidence exists showing the physical, social, and intellectual health benefits of PALs (Naylor & McKay, 2009; Cassar, et al., 2019; Naylor, et al., 2015), but less evidence exists for the emotional health benefits of PALs (Martin & Murtagh, 2017) and virtually no scholarly evidence appears to exist explicitly showing the spiritual health benefits of PALs. Therefore, this study sought to explore the holistic health benefits of a physically active canoe lesson at an expeditionary learning elementary school, but a slight emphasis was placed on spiritual health. For the purposes of the study, holistic health was viewed through the lens of Hjelm's Five-Dimensional Model of Health (Hjelm, 2010) and spiritual health was informed by Fisher's Four Domains Model of Spiritual Health and Wellbeing (Fisher, 2011). The study attempted to answer the following research questions:

- *In what ways might participating in physically active canoe and paddle building lessons make students healthier?*
- *What spiritual health benefits are reported for students who participate in physically active canoe and paddle building lessons?*

## Methods

A qualitative exploratory embedded single-case study design (Yin, 2014) was employed with three subunits of analysis: the students, the teachers, and the parents of students. Single case-studies, such as the methodology, seek to investigate a specific phenomenon in detail and are best suited for examining programs that deviate from normal, everyday occurrences (Yin, 2014). The canoe project at the heart of this study was considered unique because it was comprised of lessons that were unlike most educational experiences found in most public schools. The program also took place within a school that follows an uncommon (e.g., EL) model of education, so a single-case study appeared to be an appropriate fit methodologically. The single-case study was embedded, which means that the case included distinct subunits that were analyzed individually before returning to the larger unit of analysis (Yin, 2014). In the study, the largest unit of analysis was the canoe project and the subunits of analysis were: a) the students in the program; b) the teachers leading the program; and c) the parents of students involved in the program.

The participating elementary school was a small charter school in a rural inland northwest university town. All student participants in the study were selected through a convenience sample of fourth-grade students from one intact classroom. All parents of students were asked to participate in the study, especially if they volunteered to assist with the project. Additionally, the Classroom Teacher and Standing Red Bear were asked to participate. Prior to data collection, University Institutional Review Board (IRB) permission and school permissions was obtained.

After IRB and school permission was granted, data was collected using four data collection methods: a) focus group interviews; b) individual interviews; c) researcher



observation notes; and d) an analysis of physical evidence/artifacts (O'leary, 2017; Given, 2008). Data from students was collected using student-only focus groups (See Appendix A) and an analysis of student artifacts. Parents were allowed to sit-in on the student focus groups, but none chose to do so. Data from parents were collected using parent-only focus groups (See appendix B) and data from the Classroom Teacher and Standing Red Bear were collected using individual interviews (See appendix C). Over the 9-week canoe program, focus groups and interviews were conducted during weeks three and nine. Photos of the student created artifacts were taken after each lesson and were later used in the artifact analysis. All participating researchers also completed researcher notes based on prompts after every lesson (See Appendix D). These researcher notes were primarily taken to add context and to ensure that each of the canoe project's lessons included enough physical activity to be considered a PAL.

### **Analysis**

All focus groups and individual interviews were audio recorded and then transcribed using intelligent verbatim transcription. All personally identifiable data was removed at the transcript level and all students, parents, and teachers were assigned pseudonyms. The data collected via individual interviews and focus groups were analyzed using a thematic reflexive analysis (Braun & Clarke, 2021). Student artifacts were analyzed using an artifact analysis (Given, 2008; Trausan-Matu & Slotta, 2021). To ensure trustworthiness, the researchers sought to thoroughly contextualize the lives, perspectives, and experiences of the study participants (Ravitch & Mittenfelner Carl, 2021) as well as use established research practices that demonstrated precise, systematic, consistent, and exhaustive data collection and analysis

(Nowell, Norris, White, & Moules, 2017). Member checking was used throughout the reflexive thematic analysis process as well (Ravitch & Mittenfelner Carl, 2021).

## Chapter 2: Literature Review

According to National Center for Health Statistics (2019), life expectancy at birth fell by more than two months between 2014 and 2018, and were further decreased by the events of COVID-19, especially for ethnic minorities (Andasfay & Goldman, 2021). Between 1959 and 206, life expectancy in the U.S. rose steadily from 69.9 years to 78.9 years, but in 2014 a turning point was reached (Woolf & Schoomaker, 2019). Each year after 2014, life expectancy for Americans has declined, likely due to the rise in midlife mortality associated with drug overdoses, alcohol abuse, suicides, obesity, and organ system disease (Woolf & Schoomaker, 2019; NCHS, 2019). Prior to 2019, deaths from major diseases such as cancer, diabetes, and heart disease appeared to be declining (NCHS, 2019), largely due to advances in medicine and large-scale public health efforts (Lopez & Adair, 2019). However, some evidence suggests that heart disease may be on the rise again in the U.S. (Lopez & Adair, 2019), even when accounting for COVID-19's impact on heart health. Although deaths from diseases may be down, deaths from suicide, drug overdoses, alcohol-related organ failure, and other deaths of despair were on the rise before the COVID-19 pandemic (NCHS, 2019), and evidence suggests that the pandemic may have exacerbated the problem (Kuehn, 2021).

The purpose of this literature review is to first inform the reader about the trajectory of health and wellness outcomes for Americans through an examination of vital statistics, rates of overweight and obesity, prevalence of diseases and mental illnesses, and levels of physical activity. Promising approaches to improving health and wellness outcomes for Americans will then be presented, including approaches for personal changes in lifestyle and for the restructuring of societal institutions, such as offices and schools. Finally, a unique

real-world educational program will be described and examined as a possible solution to the increasingly negative health outcomes experienced by Americans.

### **Impacts of Overweight & Obesity**

COVID-19 has had a devastating effect on wellbeing throughout the world, but even before the pandemic, most Americans were on an unhealthy trajectory. For example, in 1994, roughly 55% of all Americans were overweight or obese and in 2018 that number rose to nearly 73% (NCHS, 2019). Over the same timeframe, the rate of overweight and obesity almost doubled for children and adolescents, going from only 10% of the population to roughly 19% (NCHS, 2019). Overweight and obesity are one of the most important health statistics to follow because overweight and obesity correlates with at least 20 major health outcomes, including a myriad of cancers, stroke, heart disease, diabetes mellitus, kidney disease, osteoarthritis, low back pain, and more (Bovet, Chiolero, & Gedeon, 2017).

Obesity has also been linked to mental health outcomes as well. For example, depressive symptoms can be induced by inflammatory markers and cytokines, which are small proteins used for cell signaling (Shelton & Miller, 2011). Overweight and obesity has been linked to increased levels of inflammation because adipose tissue appears to be a strong producer of these inflammatory factors, resulting in depressive reactions (Shelton & Miller, 2011). In addition to depression, anxiety disorders may be exacerbated, or even triggered, by overweight and obesity. Anxiety disorders are the most prevalent mental disorders in developed countries, affecting one in every four people (Garipey, Nitka, & Schmitz, 2010). A 2010 meta-analysis by Garipey, Nitka, & Schmitz showed that generalized anxiety disorder, panic disorder, post-traumatic stress disorder, phobias and similar disorders may be worsened by overweight and obesity (Garipey, Nitka, & Schmitz, 2010). Some studies even show an

increased risk for developing an anxiety disorder among those who are overweight or obese compared to those who maintain a healthy weight (Garipey, Nitka, & Schmitz, 2010). Mental health disorders associated with binge eating, body image, self-esteem, and mood have also been associated with overweight and obesity (Talen & Mann, 2009). Adolescents are especially susceptible to developing self-esteem issues, disordered eating, and problems with body image when overweight or obese (Talen & Mann, 2009). Unfortunately, mental disorders and obesity have a cyclical relationship in which obesity appears to contribute to poor mental health and poor mental health contributes to obesity; a vicious cycle that is difficult to break (Talen & Mann, 2009; Garipey, Nitka, & Schmitz, 2010; Shelton & Miller, 2011).

In addition to physical and mental health, social health can be impacted by overweight and obesity. In American society, physical appearance plays a strong role in social success, especially for women (Wellman & Friedberg, 2002). People who are overweight or obese are often stereotyped as being gluttonous and lazy, but this may be a false assumption (Wellman & Friedberg, 2002). Due to social stigma, people who are overweight or obese suffer social consequences such as discrimination in the job market, at school, and in social situations, producing feelings of shame and rejection (Wellman & Friedberg, 2002). To put it into perspective, Rand & Macgregor (1991) asked formerly obese patients to compare obesity to other handicaps. Self-reports showed that 100% of formerly severely obese patients preferred to be deaf, dyslexic, diabetic, have heart disease, or bad acne than to be obese again (Rand & Macgregor, 1991). Also, 91.5% preferred leg amputation, 89.4% preferred blindness, and 100% of respondents preferred to be a healthy

weight and earn an average income rather than be a severely obese multimillionaire (Rand & Macgregor, 1991).

Family functioning appears to be impacted by overweight and obesity as well. According to Talen & Mann (2009), family income, culture, eating habits, role modeling, parenting style, and physical activity levels are all linked to overweight and obesity. In some cases, unhealthy family behaviors lead to overweight and obesity, and in other cases overweight and obesity lead to unhealthy family behaviors. Therefore, unhealthy family behaviors and obesity appear to be cyclical, much like the vicious cycle between mental health and obesity. Unfortunately, this indicates that the unhealthy cycle may be passed down from generation to generation, (Talen & Mann, 2009).

Overweight and obesity also appear to be associated with declines in cognitive health. Having a high percentage of body fat is associated with impaired cognitive performance, accelerated cognitive decline, and neurodegenerative pathologies such as dementia (Louise, Boyle, Champ, & Lawton, 1017). Although cognitive decline is more closely linked to older adults, young and middle-aged adults are also susceptible to cognitive impairment (Louise, Boyle, Champ, & Lawton, 1017). Obesity and its comorbidities have been linked to structural alterations in the neural architecture of the brain, gray matter atrophy, reduced integrity of white matter throughout the brain, and decreased blood flow to the brain (Louise, Boyle, Champ, & Lawton, 1017). People with obesity have been shown to have less functional working memory compared to those of healthy weight as well (Louise, Boyle, Champ, & Lawton, 1017). Many of the structural and functional changes in the brain may be caused by high levels of proinflammatory cytokines, which are secreted by adipose tissue (Louise, Boyle, Champ, & Lawton, 1017).

Although studies on obesity and its effect on spiritual health are very limited, existing evidence shows a negative relationship between the two, typically modulated by emotional and family health (Djalalinia, Qorbani, Peykari, & Kelishadi, 2015). Lowered spiritual wellbeing is associated with unhealthy behaviors, such as emotional eating (Djalalinia, Qorbani, Peykari, & Kelishadi, 2015), and increased alcohol use and smoking, which in turn may lead to poor health outcomes (Reeves, Adams, Dubbert, Hickson, & Qyatt, 2012). The association between spirituality and weight gain has been given less attention than the aforementioned dimensions of health (physical, emotional, social, & cognitive), but it deserves further investigation using longitudinal studies (Reeves, Adams, Dubbert, Hickson, & Qyatt, 2012).

### **Deaths of Despair**

Although overweight and obesity may be associated with many negative health outcomes, Americans have been experiencing a rising number of health-related issues that may or may not be related to having high body fat. In recent years, deaths of despair (NCHS, 2019), or deaths resulting from substance abuse and suicide, have become more common. For example, the total number of drug overdose deaths nationwide nearly doubled between 2008 and 2018, going from 11.9 deaths to 20.7 per 100,000 (NCHS, 2019). With the rise of fentanyl and the mental health crisis exacerbated by the COVID-19 pandemic, the rate of overdose deaths has accelerated between 2019 and 2020 (Kuehn, 2021). A record-breaking number of overdose deaths were reported during this timeframe, with opioid, cocaine, and methamphetamine overuse deaths increasing by 38%, 27%, and 35%, respectively (Kuehn, 2021). Alcohol, a more commonly accepted drug, has also seen a rise in abuse since 2019 (Grossman, Benjamin-Neelon, & Sonnenschein, 2020). Alcohol is the fourth leading

preventable cause of death in the United States and is associated with violence, crime, poverty, and disease (Grossman, Benjamin-Neelon, & Sonnenschein, 2020). Unfortunately, alcohol is often used as a coping method for people who experience stress and preliminary research shows that the COVID 19 pandemic may have led to increased alcohol use (Grossman, Benjamin-Neelon, & Sonnenschein, 2020).

Suicide is another death of despair, and it is also on the rise. Between 2008 and 2018, the age-adjusted suicide rate increased by an average of 2% every year, with rates going from 11.6 deaths to 14.2 deaths per 100,000 (NCHS, 2019). At 14.2 deaths per 100,000, 2018 set the record for the most suicides documented by the CDC's National Center for Health Statistics report, which has been collecting data on suicide since 1950 (NCHS, 2019). When the COVID-19 pandemic hit in 2020, a higher prevalence of self-harming behaviors was reported across Europe and the USA (Pirkis, Appleby, & Morrissey, 2020). A survey conducted by The Kaiser Family Foundation revealed that 45% of adults reported that their mental health was negatively impacted due to worry and stress over the coronavirus and 11% reported thoughts of suicide (Panchal, et al., 2021). However, no conclusive data have been reported at this point indicating changes in suicide rate (Sher, 2020). Hopefully future studies will provide a clearer picture of suicide rates in the U.S.

## **Disease**

Although obesity and deaths of despair were on the rise prior to the COVID-19 pandemic and were then likely worsened by the pandemic, some of the most common deadly diseases decreased in prevalence prior to 2019. For example, deaths from heart disease, cancer, diabetes, and HIV were all lower in 2018 than in the previous 20 years (NCHS, 2019). Unfortunately, in 2019 and 2020, COVID-19 rose to become the third leading cause



of death in the US, just behind heart disease and cancer (Ahmad & Anderson, 2021). COVID-19 makes tracking trends in disease mortality more difficult because many who have died from COVID-19 were already afflicted by diseases such as diabetes, cancer, and heart disease (American Heart Association, 2021). Although, deaths from heart disease in the U.S. may be decreasing slightly, the American Heart Association predicts that heart disease will remain the leading cause of death for many years to come because of the lasting effects of COVID-19 on the heart (American Heart Association, 2021). Additionally, the spike in hospitalization of COVID-19 patients appears to have led to fewer medical visits for those with chronic conditions, such as diabetes, hypertension, and hyperlipidemia because physicians and nurses have been too busy to meet the needs of all patients (American Heart Association, 2021). It may be years before researchers thoroughly understand the full effects of COVID-19 and its impact on mortality trends for other diseases (American Heart Association, 2021).

### **Sedentary Behavior**

The World Health Organization recommends that adults participate in regular physical activity, accumulating at least 300 minutes of moderate-intensity physical activity or 150 minutes of vigorous-intensity physical activity each week (World Health Organization, 2020). Regular physical activity has been shown to decrease virtually all causes of mortality as well as reduce risk for hypertension, cancer, and diabetes (World Health Organization, 2020). Regular physical activity appears to reduce symptoms of anxiety and depression, improve cognitive health and functioning, help maintain healthful sleep habits, manage chronic pain, and reduce adiposity as well (World Health Organization, 2020). The World Health Organization strongly recommends replacing sedentary time, or waking time spent

being inactive, with physical activity, even if that physical activity is only light intensity (World Health Organization, 2020).

Although the benefits of physical activity are well known, the risks sedentary behavior are less studied. Evidence exists showing a relationship between sedentary time and cardiovascular disease mortality, cancer, type-2 diabetes, and various other causes of mortality (Ekelund, et al., 2019; Keadle, Conroy, Buman, Dunstan, & Matthews, 2017; World Health Organization, 2020). Unfortunately, recent studies show that between 2007 and 2016 sedentary behavior in the U.S. increased from an average of 5.7 hours per day to 6.4 hours per day (Yang, et al., 2019), and may have been as high as 8.5 hours per day in 2017 (Keadle, Conroy, Buman, Dunstan, & Matthews, 2017). The COVID-19 pandemic then exacerbated the situation. A recent systemic review by Stockwell et al. (2021) concluded that quarantines, lockdowns, and other barriers to physical activity brought on by the COVID-19 pandemic have ultimately led to an even greater increase in sedentary behaviors across several populations.

Although physical activity and sedentary behavior are linked, they are two separate behaviors with unique health consequences. Physical activity and sedentary behavior have a time-inverse relationship, meaning that a person cannot spend their time being physically active and sedentary simultaneously (Keadle, Conroy, Buman, Dunstan, & Matthews, 2017). However, people may spend large amounts of time being sedentary and also spend large amounts of time being vigorously active, which results in a mix of positive and negative health outcomes. For example, one study by Ekelund et al. (2019) found a dose-response association between sitting time and cardiovascular disease mortality for those who were not regularly physically active. However, the associations between sedentary behavior and

cardiovascular disease mortality were less consistent when compared to participants who were highly active, even when the amount of reported sedentary behavior were the same (Ekelund, et al., 2019). Also, another study by Marshall et al. (2002) showed that sedentary behaviors appear to be able to coexist with physical activity because each behavior has a unique set of barriers and determinants. Therefore, those seeking to improve their health should consider both their levels of physical activity and sedentary behavior as overlapping, but separate mediators of health that is determined by both personal and societal factors. As Keadle et al. (2017) explain,

It has become clear that the environmental, social and individual level-determinants for sedentary time are distinct from those linked to the adoption and maintenance of MVPA. As a result, novel intervention strategies that focus on sitting and lower intensity activities by leveraging the surrounding environment (e.g., workplace, school, home) as well as individual-level cues and habits of sedentary behavior are being tested to increase the potency of interventions designed to increase overall physical activity (p. 1).

Based on the evidence presented thus far, the problem of poor health in America appears to be enormous. If the people of the U.S. want to alter the course for the better, then the response must be of a similar scale; large problems require large solutions. As Keadle et al. (2017) suggest in the quote above, this may take the form of completely restructuring schools, workplaces, and homes in order to eliminate sedentary behavior and increase physical activity.

### **Schools as a Site of Intervention**

Public schools may be a great place to initiate the shift towards a healthier population because schools are designed to prepare students for their adult lives, which includes preparing them to maintain a healthy, active lifestyle (SHAPE America, 2015a). Schools are regularly used as sites for health interventions because they reach large populations of children and adolescents across all ethnicities, genders, and social classes (Pate, Davis, Robinson, Stone, & McKenzie, 2006). Furthermore, students spend almost half of their waking hours in schools, so this creates many opportunities for children and teens to develop healthy habits (Fox, Cooper, & McKenna, 2004). Schools may also be considered promising sites of intervention because behavior changes early in life may have a large impact over a lifespan, which is much more efficient than implementing interventions later in life (McKenzie, et al., 2000).

Schools may already serve as sites for health promotion and maintenance, since modern health education classes are designed to provide students with health-enhancing skills, and a safe and supportive environment to practice those skills (SHAPE America, 2015b). Physical education courses are focused on developing physically literate students who have the knowledge and motivation to pursue a lifetime of healthful physical activities (SHAPE America, 2015a). School-based sports may also have a lasting impact on the health of participating students as well. A longitudinal study by Logan et al. (2020) showed significantly higher levels of physical activity in adults who played sports throughout school compared to the adults who did not participate in sports.

Although schools are hypothetically a great site for intervention, not all health interventions in schools have been successful. Schools are complex, busy places where social

factors, geography, economics, and politics play a role in student outcomes (Naylor, et al., 2015). A meta-analysis by Naylor et al. found at least 22 unique factors which influence the implementation school-based physical activity programs, with time, resources, and school climate being the top three factors respectively (Naylor, et al., 2015). With so many variables to consider, it is no surprise that the impact of most school health and physical activity intervention are small (Russ, Webster, Beets, & Philips, 2015) and often unsustainable (Herlitz, MacIntyre, Osborn, & Bonell, 2020). Most school-based health interventions report positive relationships between the intervention and at least one health outcome (Naylor, et al., 2015), but a systemic review showed that almost no school health interventions were sustained entirely after an intervention study was concluded (Herlitz, MacIntyre, Osborn, & Bonell, 2020). The primary reasons for the unsuitability of these interventions as reported by Herlitz et al. (2020) were turnover of senior staff, lack of training for new staff, and a decrease in motivation for continuing the delivery of health promotion. Additionally, Cassar et al. (2019) suspect that sustainability may also be impacted by the use of experimental interventions designed and led by researchers, rather than real-world interventions conducted by teachers and school staff. As Cassar et al. explain, “real-world interventions require a better understanding of the complex systems in which contextual factors, including organizations, intervention agents (i.e. implementers), target population and setting level social influences (e.g. organizational culture)” (p. 2).

Alongside the potential problem of sustainability is the question of effectiveness. Most school-based health intervention studies show some kind of positive impact, but these impacts are often small (Russ, Webster, Beets, & Philips, 2015) and rarely show improvements in the prevalence of critical health issues such as obesity. BMI and body

composition appear to be very difficult problems for schools to address (Harris, Kuramoto, Schulzer, & Retallack, 2009; Safron, Cislak, Gaspar, & Luszczynska, 2011). According to a 2008 literature review on school-based obesity interventions, “no persistence of positive results in reducing obesity in school-age children has been observed” (Shaya, Flores, Gbarayor, & Wang, 2008, p. 1). In a meta-analysis of school-based interventions for controlling and preventing obesity, the authors concluded that two decades of large-scale school-based obesity interventions have only yielded mixed results (Khambalia, Dickinson, Hardy, & Baur, 2012).

As mentioned previously, many factors appear to play a role in the success of school-based health interventions (Naylor, et al., 2015; Cassar, et al., 2019), one of which may be dosage (Brown, et al., 2013; Caballero, et al., 2003). The beneficial effects of healthful eating physical activity are widely accepted, but the dose-response relationship between health behaviors and health benefits is less clear (Brown, et al., 2004). Therefore, a likely, yet simplistic reason for the lack of success in obesity interventions could be insufficient dosage and/or quality of intervention. Keeping both efficacy and sustainability in mind, it seems like school-based health interventions may need to be scaled up to increase the dosage of health-enhancing behaviors and these interventions must also be designed around real-world environments, practices, and resources.

### **Physical Education to the Rescue?**

Although many schools already have health and physical education classes, the levels of participation in these classes may not be high enough to have a significant impact on the prevalence of societal health problems. Many states require only one semester of health education and one semester of physical education in high school, and several states do not

require students to take these courses at all (Education Commission of the States, 2021). According to the most recent reports by SHAPE America (2016), only one state met the national recommendations for weekly time in physical education at both elementary and middle school levels.

Evidence exists showing the positive impact of physical education courses on decreasing sedentary time (Kerli, et al., 2017), improving mental health (Amatriain-Fernández, Murillo-Rodríguez, Gronwald, Machado, & Budde, 2020), and maintaining overall wellbeing (SHAPE America, 2016), which seems promising. However, some physical education scholars are highly skeptical of physical education's ability to address large-scale health problems such as the prevalence of obesity. For example, Gard (2004) explains that "there is a distinct possibility that the 'war on obesity' will turn out to be a bridge too far. If history tells us anything, it is that physical education's contributions to the health of a nation is, at best, impossible to assess and, at worst, marginal or zero" (p. 77). Gard (2004) then posits that the prevalence of obesity is a complex problem that involves many social, cultural, political, and economic factors that cannot be addressed through physical education alone, especially as it is implemented today. Therefore, schools may need to think bigger, broader, and more holistically if they wish to influence societal health outcomes.

### **Comprehensive School Physical Activity Programs (CSPAP)**

Based on reports of poor student health by researchers such as Pate et al. (2006) and Kraak, Liverman, & Koplan (2005), the Centers for Disease Control and Prevention (CDC) released the Whole School, Whole Community, Whole Child (WSCC) model to promote the development and reinforcement of health-enhancing habits in school-aged youth (National

Association of Chronic Disease Directors, 2017). The WSCC model uses an integrated, collaborative, and holistic approach to improving student health by involving all school staff, students' families, and the local community (National Association of Chronic Disease Directors, 2017). The WSCC model also addresses many dimensions of health, including social, emotional, cognitive, and physical health (CDC, 2021). The WSCC Model has 10 components, and one of those components is physical education & physical activity. Nestled within the physical education & physical activity component is a model of school-based physical activity promotion called Comprehensive School Physical Activity Programs (CSPAPs).

Since physical education classes alone may not be providing students with enough opportunities to accumulate recommended levels of moderate-to-vigorous physical activity (MVPA), CSPAPs have been promoted as a way to get more physical activity in schools (Kuhn, Stoepker, Dauenhauer, & Carson, 2021). The purpose of CSPAPs is to give students more opportunities to be physically active at school (e.g., before school, after school, in physical education class, and throughout the school day) and to engage school staff, families, and community members in physical activity (CDC, 2019). CSPAPs appears to be effective in promoting physical activity in schools and can provide students with a variety of other positive outcomes, such as improvements in cognitive functioning and on-task behavior (Kuhn, Stoepker, Dauenhauer, & Carson, 2021).

Although the benefits of CSPAPs are clearly evidenced in scholarly literature, many schools still do not provide a CSPAP. In a 2017 literature review by Hunt & Metzler, several barriers to CSPAP implementation are discussed. Some of the barriers to implementing a CSPAP includes: a) time limitations; b) socioeconomic factors; c) lack of space/facilities; d)



low motivation among teachers and staff; e) cultural barriers; f) lack of knowledge among teachers and staff; g) lack of administrative support; h) logistical constraints; and i) legislative/policy constraints (Hunt & Metzler, 2017). In the same literature review, the authors indicate that the effectiveness and viability of CSPAPs appear to be linked to the motivation and qualifications of physical activity leaders, the training of teachers and staff, administrative buy-in, family and community support, and the amount of available resources and funds (Hunt & Metzler, 2017).

### **Physically Active Lessons**

Like other school-health interventions, CSPAPs seem to flourish or fail based on many complex social, cultural, economic, and political factors (Hunt & Metzler, 2017). However, it seems that schools that have limited resources or restrictive policies may still benefit if they can implement at least two of the five key elements of CSPAP (high quality physical education, physical activity before and after school, physical activity during the school day, staff involvement, or family and community engagement) (Kuhn, Stoepker, Dauenhauer, & Carson, 2021). Perhaps one of the most promising solutions to in-school sedentation that is promoted by CSPAPs are Physically Active Lessons (PALs), which are part of the During School component of CSPAP (Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015). PALs provide students with opportunities to accumulate physical activity while simultaneously engaging in academic learning, which may or may not take place in the traditional classroom (Miller, Gildea, Sloan, & Thurston, 2015). PALs may be structured using formally recognized models, such as TAKE 10! or Physical Activity Across the Curriculum (PAAC) (Gibson, et al., 2008), but PALs may be less formally structured as well. For example, Webster et al. (2015) explain that many movement integration strategies

are altered to fit the teacher's classroom routines, teaching skills, existing curriculum, and other idiosyncratic factors. Providing teachers with flexibility in their implementation of PALs appears to be advantageous if they have adequate training and administrative support (Webster, Russ, Vazou, Goh, & Erwin, 2015). However, when there is a lack of teacher accountability or when teachers are undertrained, more structured, pre-packaged PALs (such as Take 10!s) appear to provide better experiences for both students and teachers (Miller, Gildea, Sloan, & Thurston, 2015; Webster, Russ, Vazou, Goh, & Erwin, 2015).

Although the number of high-quality studies on PALs is limited, existing evidence shows potentially positive effects for both academic and health outcomes for students (Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015). Norris et al. (2015) concluded that all PAL studies reviewed found improvements in levels of physical activity for students. Additionally, each study either found a significant improvement or no difference in academic outcomes between students who were taught using PALs and students who were taught using inactive teaching methods (Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015). This means that, if implemented correctly, teachers who use PALs can reasonably expect students to become healthier while learning as much or more than students who are learning in a traditional sedentary classroom.

### **PALs and Experiential Learning**

The potential academic benefits associated with PALs may be partially due to the experiential nature of PALs (Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015). Experiences, especially hands-on experiences, appear to be highly conducive to learning as explained by Experiential Learning Theory (ELT) (Kolb, Boyatzis, & Mainemelis, 2014). ELT is a holistic model of learning that emphasizes the central role that

experience plays in the learning process. Although the ELT model is multilinear and complex, it is often summarized as “learning by doing” (McCarthy, 2016, p. 96). According to Kolb et al. (2014), knowledge is gained through the grasping of experience and the transforming of experience. Grasping an experience involves having a concrete, tangible, sensory experience or through thinking about, and analyzing an abstract conceptualization of experience. Transforming an experience involves reflective observation or active experimentation. When a person grasps an experience and then transforms the experience, new knowledge is gained (Kolb, Boyatzis, & Mainemelis, 2014).

Therefore, the overall effectiveness of the PALs may be explained, at least in part, by the hands-on experiences that many PALs offer. These hands-on experiences may help students to either grasp an experience (e.g., through concrete experiences) or to transform an experience (e.g., through active experimentation) or both (Kolb, Boyatzis, & Mainemelis, 2014). Although the relationship between PALs and experiential learning seems highly theoretical, the idea that PALs promote experiential learning is evidenced. In a systematic review by Norris et al. (2015), the authors acknowledge that the most effective PALs appear to follow the principles of ELT because students who engage in PALs “learn through action and experience as opposed to via rote” (p. 4).

### ***PALs as Place-based Education***

The term “physically active lessons” is very broad and currently has many interpretations (Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015; Daly-Smith, et al., 2018), but most teacher-led academic lessons that get students out of their desks may be considered PALs (Miller, Gildea, Sloan, & Thurston, 2015). PALs can range from structured classroom activities, such as TAKE 10!s (Kibbe, et al., 2011) to field trips (Naylor

& McKay, 2009) and even virtual field trips (Norris, van Steen, Direito, & Stamatakis, 2020). One highly experiential and physically active approach to learning is place-based education. In place-based education, students leave their classroom to learn in a culturally, historically, and/or contextually important location, such as a historic site or landmark. Place-based education has no universal framework or approach and is largely based on the local context in which the lessons are occurring (Ormond, 2013). Place-based education seems to be naturally suited for PALs because it involves physically active, hands-on, real-world learning experiences that develop learners' appreciation for the natural world and connect them to their local lands and communities (Sobel, 2004). Since place-based education encourages field trips to natural environments to enhance academic lessons (Smith, 2002), place-based lessons may be considered prime examples of PALs.

Place-based education has been shown to have many benefits for students. Place-based education allows students to be physically active while exploring natural environments, which may contribute to both physical health and academic improvements (Tal, Lavie Alon, & Morag, 2014). Students who engage in outdoor lessons may also experience benefits in Vitamin D levels, reduced risk of obesity, improved fitness, and reduced near sightedness (Christiansen, Hannan, Anderson, Coxon, & Fargher, 2018).

Place-based education may also challenge students to engage in meaningful introspection about their place in the ecosystem and about their identities, which might elicit growth towards spiritual health. Research on adult memories of childhood spaces shows that special places hold meaning throughout one's life, which means that the knowledge acquired during place-based lessons may have more longevity compared to the knowledge acquired in the traditional classroom (Ormond, 2013). Research also shows that educational experiences

that take place in local natural environments are associated with environmental stewardship, likely because people incorporate place-based experiences into their identities and then develop an attachment to those places (Ormond, 2013). Also, since place-based education takes place in multiple environments, students must adapt their thinking to the unique characteristics of particular places and to think about their role in relation to each particular location (Ormond, 2013).

Place-based education in outdoor settings may also have a positive impact on the emotional wellbeing of students. In a summary of current research, Christiansen et al. (2018) reported several evidenced emotional benefits of outdoor PALs, which include: a) improved resilience and relationship skills; b) reductions in stress, anger, and anxiety; c) reduced symptoms of attention deficit and hyperactivity disorder; and d) restoration of positive emotions. Therefore, place-based PALs may help students develop as healthy, knowledgeable community members who find meaning in caring for local the environment.

### ***PALs and Interdisciplinary Learning***

PALs are also well suited for interdisciplinary lessons, which may provide yet another explanation as to why PALs are associated with academic achievement. Interdisciplinary lessons are characterized by the synergistic integration of multiple subject areas into a central theme (Ivanitskaya, Clark, Montgomery, & Primeau, 2002). When students are regularly asked to concurrently engage in multiple subject areas, they can see the interconnectedness of different disciplines, and seem to develop enhanced critical thinking ability, metacognitive skills, and advanced epistemological beliefs as well (Ivanitskaya, Clark, Montgomery, & Primeau, 2002). PALs commonly integrate health and physical education knowledge with traditionally sedentary lessons such as mathematics, science, and

English, with benefits for both student health and academic performance (Kitchen & Kitchen, 2013; Gortmaker, et al., 1999). If the PAL is place-based, then topics such as environmental stewardship, climate, and biology can easily be integrated into many lessons as well (Ormond, 2013). With time being a limited resource in schools, interdisciplinary learning may provide a way to teach multiple subjects simultaneously (Naylor, et al., 2015). Therefore, physically active interdisciplinary lessons have the potential to resolve time conflicts between academic subjects all while reducing sedentary behavior in schools (Kitchen & Kitchen, 2013; Gortmaker, et al., 1999; Bensten, Mygind, Elsborg, Nielsen, & Mygind, 2021).

### ***PALs Improve Student Behavior***

In addition to the physical health and academic benefits, PALs may also increase prosocial behavior in students. In a systemic review of classroom-based physically active lessons, Daly-Smith et al. (2018) concluded that physically active lessons appear to improve classroom behavior by reducing student disruptions and increasing time-on-task. This systemic review revealed nothing new about the ability of PALs to improve student behavior, though; Daly-Smith et al. (2018) reaffirmed the findings of previous meta-analyses and systemic review (Watson, Timperio, Brown, Best, & Hesketh, 2017; Owen, et al., 2016; Naylor, et al., 2015). One specific study by Kibbe et al. (2011) found that TAKE 10!s (a specific type of PAL) reduced off-task behavior by more than 20% in elementary school classrooms, which is a remarkable improvement in student behavior. Another study showed a link between physically active classrooms and a variety of prosocial behaviors among students (Spitzer & Hollmann, 2013). Across the literature, there appears to be a link between PALs, behavioral improvements, and academic performance (Daly-Smith, et al.,

2018). This association may be explained by the more efficient use of class time that occurs when students spend more time on-task and classroom disruptions are limited.

### *Summary of PAL benefits in the Context of the Five Dimensions of Health*

Most research on PALs is relatively recent, so many elements of PALs have yet to be examined (Daly-Smith, et al., 2018). Since the term “physically active lesson” is very broad and currently has many interpretations, making uniform comparisons between the few existing studies is very difficult (Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015; Daly-Smith, et al., 2018). Due to the small number of high-quality, comparable studies that draw firm conclusions (Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015), many of the likely benefits of PALs remain unknown or unconfirmed. Using Hjelm’s (2010) holistic model of health, the overall health benefits of PALs may be evaluated by examining five interconnected dimensions of health: physical health, intellectual health, social health, emotional health, and spiritual health. Existing studies consistently show that participation in PALs may improve several of Hjelm’s (2010) five dimensions of health, especially physical health and intellectual health. Fewer studies exist for the social health and emotional health benefits of PALs, and little-to-no studies exist showing the relationship between PALs and spiritual health unless the definition of PALs is expanded to include outdoor, place-based education.

**Physical Health.** As explained by Hjelm (2010), many definitions and descriptions of physical health exist, but most emphasize body composition, body functionality, absence of disease, absence of injury, maintenance of nutritional needs, physical hygiene, and longevity. Physically healthy people engage in health habits which include eating healthful foods, exercising regularly, getting enough sleep, maintaining a healthy body composition, and

avoiding alcohol and other harmful drugs (Hjelm, 2010). The physical health benefits of PALs appear to be the most evidenced, with studies showing improvements in aerobic fitness (Seljebotn, et al., 2019), speed-coordination, and static strength (de Greef, et al., 2016). In addition to the positive physical health benefits, PALs also reduce or prevent sedentary behaviors that are associated with negative health impacts (Grieco, Jowers, Errisuriz, & Bartholomew, 2016; Vetter, O'Connor, O'Dwyer, Chau, & Orr, 2020). Although most meta-analyses show little correlation between health interventions and body composition (Safron, Cislak, Gaspar, & Luszczynska, 2011; Harris, Kuramoto, Schulzer, & Retallack, 2009), some researchers believe PALs can positively influence body composition with the right methods and dosage (Donnelly, et al., 2009). If the definition of PALs is expanded to include outdoor, place-based education, then additional physical health benefits may include the aforementioned increased Vitamin D levels, reduced risk of obesity, improved fitness, and reduced near sightedness (Christiansen, Hannan, Anderson, Coxon, & Fargher, 2018).

**Intellectual Health.** In addition to physical health improvements, clear evidence exists showing an association between intellectual health and PALs. According to Hjelm (2010), intellectual health involves the ability to think and learn from life experiences, reason objectively, critically think, connect thoughts sequentially and logically, make healthful decisions, express oneself clearly, be open to new ideas, and act based on new information. Intellectually healthy people avoid high risk behavior, learn from their mistakes, select healthy hobbies, manage their time effectively, embrace curiosity, and engage in activities that are conducive to personal growth. Roughly half of all PAL studies show either no detrimental impact on academic performance or a significantly positive impact on academic performance (Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015; Daly-Smith,



et al., 2018; Martin & Murtagh, 2017; Bedard, St John, Bremer, Graham, & Cairney, 2019). The determining factor between an academically neutral PAL and an academically positive PAL seems to be the amount of structure in the lesson. For example, one study by study by Donnelly et al. (2009) showed great improvements in reading, math, and spelling scores when teachers used a structured PAL method known as Physical Activity Across the Curriculum (PAAC). Another study by Kibbe et al. (2011) also showed significant improvements in reading, math, and spelling scores after regularly implementing TAKE 10!s. As evidenced by the aforementioned studies and explained by an executive summary by Miller et al. (2015), structured PALs appear to provide better experiences for both students and teachers, which includes increased academic outcomes. This does not mean that all unstructured PALs are ineffective, but the efficacy of unstructured PALs is less evidenced.

**Social Health.** Along with the physical and intellectual health benefits of PALs, some social health benefits appear to be clearly evidenced in the scholarly literature as well, mostly in the form of prosocial classroom behavior (Spitzer & Hollmann, 2013; Daly-Smith, et al., 2018). Social health has many aspects, but typically involves building and maintaining positive relationships, communicating effectively, sustaining support networks, giving and receiving respect, sharing intimate moments, and the ability to adapt to a variety of social situations (Hjelm, 2010). Socially healthy people listen to others without judgement, express themselves clearly, form healthy bonds with others, maintain long-term intimate partners, follow social norms and customs, and find a place for themselves in society (Hjelm, 2010). As mentioned previously, PALs seem to increase prosocial behavior in students (Spitzer & Hollmann, 2013), primarily by increasing the time students spend on-task and decreasing time spent engaging in unproductive or disruptive behaviors (Daly-Smith, et al., 2018; Kibbe,

et al., 2011). According to study by Grieco et al. (2016), PALs appear have the potential to reduce time spent: a) reading or writing inappropriate or unassigned material; b) leaving the desk without teacher permission; c) talking to or looking at other students when not part of a given assignment; d) gazing off; and e) placing head on the desk.

Research examining the extent to which PALs affect social health appears to be limited, but the social health benefits of general school-based physical activity are strongly evidenced (Poitras, et al., 2016; Taras, 2005; Story, Nanney, & Schwartz, 2009). School-based physical activity, although not in the form of a PAL, has been shown to improve student conduct, peer relationships, social skills, and social responsibility (Poitras, et al., 2016; Taras, 2005; Story, Nanney, & Schwartz, 2009). Again, if the definition of PALs is expanded to include outdoor education and place-based learning, students may also see additional improvements in social skills and prosocial behavior (Mygind, et al., 2019). Therefore, PALs may have the potential to improve many aspects of social health, but only limited research has been done on the subject.

**Emotional Health.** Emotional health is another vitally important dimension of health that primarily involves situationally appropriate expressions of emotions, empathy for others, coping with stress, openness to conflict resolution, comfortably adjusting to changes, facing challenges when they arise, enjoying life, and developing emotional intelligence (Hjelm, 2010). Emotional intelligence is the ability to understand the feelings and emotions of oneself and of others, motivate ourselves, and manage our emotions in our relationships with others (Hjelm, 2010). Emotionally healthy people are honest, have high self-esteem, accept themselves, know how to have fun, are humble, can maintain intimate relationships, do not manipulate others, are able to grieve, and achieve life balance (Hjelm, 2010).

Similar to the research on PALs and social health, plenty of evidence exists showing an association between general school-based physical activity and emotional health (Smedegaard, Christiansen, Lund-Cramer, Bredahl, & Skovgaard, 2016), but there seems to be few high-quality studies that focused specifically on PALs and emotional health. One of the few studies that evaluated PALs and emotional health reported increased student and teacher enjoyment when lessons were physically active (Martin & Murtagh, 2017). Although enjoyment is only a singular aspect of emotional health, it has been shown to influence the effectiveness of physical activity interventions in schools (Martin & Murtagh, 2017), so the power of enjoyment should not be underestimated. However, school-based physical activity has been associated with reductions in student stress, anxiety, and depressive symptoms (Biddle, Ciaccioni, Thomas, & Vergeer, 2019; Brown, Pearson, Braithwaite, Brown, & Biddle, 2013), so PALs may have the potential to improve more than just enjoyment. Once again, if the definition of PALs is expanded to include outdoor and place-based education, then there may be additional mental health benefits such as improved resilience, reductions in stress, reductions in anger, reductions in anxiety, and the restoration of positive emotions (Christiansen, Hannan, Anderson, Coxon, & Fargher, 2018). Hopefully future studies may be needed to explore the specific relationship between emotional health and PALs.

**Spiritual Health.** According to Hjelm (2010), spiritual health generates a sense of personal fulfillment and peace with oneself that is developed through experiences of love, joy, and a sense of purpose. Spiritual health involves the formation of personal ethics, values, and morals that give our lives meaning, which may or may not involve religious faith (Hjelm, 2010). Spiritually healthy people know how to forgive others, experience love, spread joy, live peacefully, remain optimistic in the face of challenges, maintain hope for the future, and

live their life according to a code of personal values (Hjelm, 2010). Spiritually healthy people successfully may also manage antisocial emotions and behaviors, often with the aid of mindful practices such as meditation or prayer (Hjelm, 2010). Spiritually healthy people also live out their virtues, which develops character. Strong character has been associated with happier, well-behaved citizens who are more resistant to negative peer pressure (Hjelm, 2010; Lickona, 2009). For this reason, developmental psychologists such as Thomas Lickona have argued for *Character Education* in schools, which is intended to provide students with experiences to grow morally as well as academically (Lickona, 1991).

Despite evidence and sound reasoning for the potential benefits of promoting spiritual health in schools, there seems to be a paucity of studies conducted on the impact of school-based activities on students' spiritual health (Cañadas, Veiga, & Martinez-Gomez, 2014), let alone on the spiritual health benefits of PALs. The link between school-based physical activities and spiritual health appears to be markedly understudied (Cañadas, Veiga, & Martinez-Gomez, 2014) despite the fact that spiritual health is often considered a fundamental piece of holistic health (Hjelm, 2010). One of the few contexts in which PALs are documented to have a relationship with health is when they take the form of outdoor, place-based lessons. In his 2013 book *Place-Based Education in Practice*, Ormand (2013) explains that place-based education can provide students with meaningful memories that last a lifetime, a feeling of being connect to the natural world, and a sense of identity in relation to the earth's ecosystem. Considerably more research will need to be done to better understand the relationship between school-based physical activities and spiritual health (Cañadas, Veiga, & Martinez-Gomez, 2014), especially for PALs.

### ***Barriers and Facilitators to PALs***

Although the many benefits of PALs have been evidenced, implementing, and sustaining PALs in schools may not be easy. For example, teachers were asked about perceived barrier to implementing PALs, to which the teachers reported: a) a lack of planning time; b) the limited availability of resources such as model lesson plans and equipment; and c) concern about performance on standardized tests if more time was spent away from a desk (Bartholomew & Jowers, 2011). A systemic review of PAL methods and results by Norris et al. confirmed that a perceived lack of time was the most common reason why teachers did not include PALs in their curriculum (Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015). Later, in a more focused study on the acceptance, barriers, and facilitators for PAL implementation, Dyrstad et al. (2018) reported the primary barriers as: a) unclear expectations; b) lack of knowledge; c) lack of time to plan the PAL; d) and lack of time to implement the PAL (Dyrstad, Kvalø, Alstveit, & Skage, 2018). Additional barriers to PALs that are mentioned in the academic literature include lack of teacher confidence, concerns over space, additional paperwork, and conflict with other school demands (Daly-Smith, et al., 2018; McGann, et al., 2020). In a broader systemic review examining several types of movements integration strategies (PALs, active transitions, and physical activity breaks), Michael et al. (2019) reinforced the idea that lack of time, resources, space, and administrative support were likely the largest barriers to movement in the classroom.

Despite the many barriers, teachers have expressed support for implementing PALs as long as the teachers could be given the support and resources needed to sustain the PALs (Bartholomew & Jowers, 2011; Dyrstad, Kvalø, Alstveit, & Skage, 2018; Daly-Smith & Kime, 2018). According to Dyrstad et al. (2018), the primary facilitators of PALs are: a)

active leadership; b) teacher support; c) high-teacher self efficacy with PALs; d) synergy with curriculum; and e) a positive reception of the PALs by students. Additionally, Michael et al. (2019) report that movement integrations, which include PALs, are likely facilitated by the perception that physical activity is valuable, perceived ease of implementation, and teacher confidence in implementation. Therefore, it seems like PALs may be more difficult to plan and implement than traditional lessons, but with proper training and continued support, regular use of PALs in school may be feasible, healthful, and productive (Bartholomew & Jowers, 2011; Dyrstad, Kvalø, Alstveit, & Skage, 2018).

### **Expeditionary Learning Model**

Massive changes in the traditional school environment may be required to more regularly implement and sustain PALs, but some models of schooling may be better equipped to incorporate PALs than others. Expeditionary Learning (EL) Schools, for example, take a highly active approach to learning that involves hand-on, experiential learning with an emphasis on learning within the natural world (EL Education, 2021). The concept of EL education was developed in 1991 when the Harvard Graduate School of Education partnered with Outward Bound to develop an experiential model of education that infuses character development, teamwork, courage, and compassion (EL Education, 2021). The 10 principles used to guide EL schools are: 1) the Primacy of Self-Discovery; 2) The Having of Wonderful Ideas; 3) The Responsibility for Learning; 4) Empathy and Caring; 5) Success and Failure; 6) Collaboration and Competition; 7) Diversity and Inclusion; 8) The Natural World; 9) Solitude and Reflection; and 10) Service and Compassion (EL Education, 2021).

In EL Schools, the Primacy of Self-Discover means that students are challenged to discover their abilities, values, passion, and responsibilities by undertaking tasks that require

perseverance, fitness, craftsmanship, imagination, self-discipline, and significant achievement. The Having of Wonderful ideas entails the fostering of students' curiosity about the world by creating a learning environment that motivates critical thinking and experimentation. Responsibility for Learning means that students are encouraged to become increasingly responsible for directing their own personal and collective learning. Empathy and Caring means that the teachers create and maintain an environment of caring, that students feel physically and emotionally safe, and that older students mentor younger students. Success and Failure requires students to build the confidence and capacity to take on difficult tasks and to turn disabilities into opportunities. Collaboration and Competition encourages both individuals and student groups to compete against their own personal bests and rigorous standards. Diversity and Inclusion incorporates multiple values and cultures into the classroom in order to increase the richness of ideas and problem-solving abilities of the class. The Natural World means that students develop a direct and respectful relationship with the natural world to refresh the human spirit and learn about their role in preserving the ecosystem. Finally, Solitude and Reflection involves the partitioning of time for students to reflect, explore their own thoughts, make their own connections, and create their own ideas. And Service and Compassion means that students serve their schools and communities by engaging in acts of consequential service to others (EL Education, 2021).

Although not explicitly stated, the 10 guiding principles of EL education seem conducive to PALs by developing the physical, intellectual, social, emotional, and spiritual health of students. Physical health is clearly addressed through hands-on learning, and an emphasis on personal fitness, intellectual health may be met through the promotion of critical thinking and scientific experimentation and social health may be developed through

cooperating with others and inclusionary practices. Emotional health is addressed through empathy and emotional safety, and spiritual health may be met through respect, self-discipline, exploration of oneself, and involvement with the natural world. EL schools also promote character development (EL Education, 2021), which is a core part of spiritual health (Hjelm, 2010).

### ***Character Education as Health Promotion in EL Schools***

If it is not already apparent, EL schools are concerned with student outcomes that go beyond state test scores (Andrea, Clark, Barker, Germeroth, & Apthorp, 2010). The foundational elements of EL education are teamwork, courage, and compassion, which are expressly intended to help students develop personal values and build character (EL Education, 2021). Although many traditional schools may display posters and have assemblies about school values and student character, EL Schools incorporate character education into each and every activity (Andrea, Clark, Barker, Germeroth, & Apthorp, 2010). Broadly speaking, character education is cultivation of virtue that involves the understanding, developing, and then applying moral values (Lickona, 2009). Commonly valued virtues include prudence, justice, fortitude, temperance, obedience, sincerity, industriousness, responsibility, generosity, self-control, sociability, respect, patriotism, humility, flexibility, optimism, and care (Lickona, 2009). The overarching goal of character education is to develop good people, good schools, and a good society (Lickona, 2009).

Through character education, EL schools hope to mold citizens who are respectful, responsible, collaborative, and compassionate (EL Education, 2021). EL schools explicitly recognize character growth as an important dimension of student achievement because it helps students become effective learners, develop personal and social ethics, and contribute



to their communities. EL Schools openly embrace the work of the developmental psychologist and leading expert in character education, Thomas Lickona (EL Education, 2021). Much of Lickona's writings about character education is present in the stated goals of EL education, such as the inclusion of mentorship models, a focus on cooperative learning, giving students responsibility, fostering students' value of learning, teaching conflict resolution, creating time for self-reflection, allowing student experimentation, and emphasizing hard work and perseverance (Lickona, 2009; EL Education, 2021).

Character education also has a great deal of overlap with the development and maintenance of social, emotional, and spiritual health. For example, prosocial behaviors such as collaboration and respect are integral to character education but are also positive indicators of social health (Hjelm, 2010). Similarly, the ability to feel compassion and empathy is equally important for developing both strong character and emotional health (Hjelm, 2010). Since spiritual health is concerned with living a purposeful life, expressing oneself, being optimistic, and to living virtuously (Hjelm, 2010), character education appears to be a logical way to improve spiritual health. In fact, John Hjelm devotes a section of his book *The Dimensions of Health: Conceptual Models* to the spiritual health benefits of virtue and character (Hjelm, 2010). In this section, Hjelm (2010) discusses the health benefits of virtues such as courage, temperance, justice, purpose, love, and connectedness, saying "high levels of spiritual health exist among people of character who feel connected to the people around them and have identified meaning and purpose in their lives" (p. 88).

With an emphasis on concepts such as teamwork, cooperation, service, responsibility, care, and generosity, it should be no surprise that character education is built around parental involvement. According to Thomas Lickona (1991), it is the responsibility of each

community to support their local schools and take an active role in shaping educational outcomes. To this end, Lickona suggests that parents and teachers regularly meet to democratically determine the values that should be emphasized in local schools, taking culture, geography, and context into consideration (Lickona, 1991). Similarly, EL schools strive to get parents and families fully involved, often by opening the school to provide opportunities for the whole family to learn and have fun on nights and weekends (EL Education, 2021). Parents may also be brought in as experts, guest speakers, or financial supporters and may then be recognized with awards or plaques (EL Education, 2021). EL educators are even encouraged to make family involvement easy by providing “pre-signed letters verifying attendance for those parents who need them for their employers; being intentional and clear about what events are and why they are important; and offering transportation, childcare, and of course food” (EL Education, 2021, p. 8). Family volunteerism and financial support is especially important for EL schools because character education cannot be done by schools alone (Lickona, 1991) and the hands on, place-based learning promoted by EL school can be expensive and logistically challenging.

### **Family-Community-School Partnerships**

To be healthful, character-building, institutions of academic achievement, schools may need to utilize community partnerships. The support of families and community organizations is crucial to providing students with the best education possible, since higher levels of levels of family and community support have been associated with better student attendance, higher graduation rates, and increased academic performance (NEA, 2021). Therefore, it should be no surprise that school-family-community partnerships are advocated by many leading educators, scholars of pedagogy, and educational organizations. For

example, Lickona's (1991) call for families and community leaders to help guide the moral development of youth by creating a school culture based on virtues such as respect and responsibility. Also, many large education organizations promote a concept called *Community Schools* in which students, families, educators, and community members develop a grassroots vision for their schools and then work collaboratively towards achieving their vision (NEA, 2021). According to the National Education Association (NEA) (2021), "community schools provide not only tremendous opportunities for learning and success for students, but they also offer hope, opportunity, and transformation to entire communities" (p. 2).

In addition to the NEA, the National Association of School Psychologists (NASP), The Institute for Educational Leadership (IEL), and The Coalition for Community Schools (CCS) have also endorsed the idea of community schools. A joint effort between the NASP, IEL, and CCS unanimously promotes community schools as a way to address student mental health, physical health, and overall wellness (Roche & Strobach, 2019). In this document, the three organizations describe nine elements of effective community school partnerships for improving student wellness, which include: 1) Creating a school leadership team comprised of school and community stakeholders; 2) conducting needs assessments for student health and wellness; 3) assigning a school-community coordinator at each school; 4) creating clear expectations and accountability measures for the school and community partners; 5) leveraging community resources to provide high-quality health and wellness services to students; 6) providing ongoing comprehensive professional development for school leaders, staff, and community partners; 7) creating detailed plans for long-term sustainability; 8) regularly evaluating the effectiveness of school health and wellness programs; and 9)

creating plans for frequent communication between all stakeholders to provide progress reports and innovative ideas for overcoming challenging (Roche & Strobach, 2019).

According to the NAPS, IEL, and CCS, these nine elements of effective school community partnerships are integral to the wellness outcome of students because they address the many needs of students, enrich their lives, provide them with hope for the future, give students structure, and encourage relationship-building and networking (Roche & Strobach, 2019).

Many potential community-school partnerships exist, including private for-profit, private non-profit, and government organizations. Examples of private for-profit community partners for school include banks, small local businesses, large corporations, private entrepreneurs, and chambers of commerce. Examples of private non-profit partners include local neighborhood councils, teachers' unions, education foundations, charities, and the YMCA. Examples of government community partners are state universities, parks and recreation bureaus, the department of human services, and city councils (Blank, Jacobson, & Melaville, 2012). Tribal governments and private Native American organizations have the potential to make excellent school partners as well, especially if the schools serve a Native American community or is located on or near a reservation (Beesley, et al., 2012).

### ***Tribal Partnerships with Schools***

Many tribal communities and governments have a unique and complex history with schooling in the U.S. For most tribes, the first experience with schooling was disastrous and the negative impact still lingers more than 100 years later. After what Duran et al. (1998) call America's Subjugation and Reservation Period in which Native Americans were forced to live within the confines of reservations, came the Boarding School Period. In the Boarding School Period, the U.S. government decided to mandate boarding school for all Native

American youth in order to erase and replace Native languages, religions, and cultural practices with those of the White, Christian settlers (Duran, Duran, Yellow Horse Brave Heart, & Yellow Horse-Davis, 1998). In these boarding schools, Native American children were reportedly starved, chained, beaten, and forced to live in unhealthy, overcrowded housing, which resulted in immense trauma (Duran, Duran, Yellow Horse Brave Heart, & Yellow Horse-Davis, 1998). Duran et al. (1998) believe that the trauma from colonization, including forced boarding schools, created an intergenerational *Soul Wound* that will not be healed until the sovereignty and culture of Native Americans are restored. Therefore, tribal leaders have reason to be skeptical of the cultural assimilation that may occur in schools, even to this day (Brayboy, 2005).

Although Native American tribes have suffered from oppressive schooling practices, many modern U.S. schools are becoming more cognizant of Native American sovereignty and culture (McCarty & Lee, 2014). Federally recognized tribes are considered sovereign nations who maintain a special government-to-government relationship with the U.S., which means that tribal leaders and citizens have special rights and privileges beyond those of non-Native citizens (McCarty & Lee, 2014). These tribes have the right to self-government and self-education, including the rights to linguistic and cultural expression (Lomawaima & McCarty, 2002). Many tribes have expressed their sovereignty by enacted specific education laws, codes, and ordinances that guarantee high-quality educational services for tribal youth (NARF, 2021).

It is also common for tribal governments to provide their own Tribal Education Departments who ensure tribal education laws are being followed and create educational curriculum, standards, and programs, both with and without the help of local schools. Tribal

governments often play a role in the accreditation processes, educational budgets, construction of educational facilities, transportation, and access to land as well (NARF, 2021). Although some tribal education laws only pertain to schools funded by the Bureau of Indian Affairs, many of these laws pertain to state public schools that serve tribal students, therefore it is imperative that tribes and state public schools work together to best meet the needs of all students (NARF, 2021). The ways in which tribal governments and schools collaborate is dependent on many factors, though, so there is no one-size-fits-all approach (McCarty & Lee, 2014). Instead, school administrators and educators should collaborate closely with tribal governments to ensure all parties are satisfied with the goals and educational practices in each school (Anthony-Stevens, Stevens, & Nicholas, 2017).

In addition to tribal governments, many private Native American organizations promote, fund, and implement education and health programs as well. For example, the Association of American Indian Affairs (AAIA) assists with drafting laws for Native American child welfare and education, the American Indian Society of Washington DC (AISDC) was established to preserve American Indian culture through promoting customs and tribal health education, and the Native American Rights Fund (NARF) fights for tribal sovereignty and Native American human rights, which includes the right to a high-quality education (NIH Office of Equity, Diversity, & Inclusion, 2021). Private Native American organizations are vital because tribal governments are sometimes limited in their capacity for action due to social, political, economic, or legal reasons. For this reason, the mission statement of Nimiipuu 54, a private non-governmental Nimiipuu organization, states:

In the fight to protect Mother Earth and The People from disastrous events, corporations, government intrusions, and bring light to Treaty Reserved Rights, and

Mother Earth Law, sometimes you need a Treaty Heir to speak when our Tribal Governments can't or won't offer support to the people and the Land. We are seeking to bridge that gap between traditional ways and the current imperfect form of government, so that we can enjoy the benefits from the sovereignty our ancestors sought to protect from the US Government. We retain sovereignty and we will speak to that when Tribal Government will not or can't (Nimiipuu 54, 2021, p. 2).

Many private and governmental Native American organizations are willing to partner with schools to improve both academic and health outcomes for youth (NIH Office of Equity, Diversity, & Inclusion, 2021). With a bit of effort, school administrators and teachers could find Native American partners that may be able to maximize social, emotional, and academic learning, especially Native American students (Anthony-Stevens, Stevens, & Nicholas, 2017). Partnering with Native American organizations may also be conducive to increasing the number of PALs that teachers provides, because many Native American pedagogies promote place-based (Johnson J. T., 2012), holistic education that addresses all student needs (Morcom, 2017). Holistic approaches to education are commonly advocated by Indigenous educators throughout the world because the traditional Western model of schooling compartmentalizes learning into subject areas that rarely overlap. The same compartmentalization occurs for health as well.

In contrast, many Indigenous communities advocate for a more balanced approach to schooling that seeks to simultaneously improve students' intellectual, emotional, physical, and spiritual health (Morcom, 2017). To this effect, some tribes will use traditional teaching tools such as the Medicine Wheel to educate others about balanced living. The Medicine Wheel is a circle divided into four equal parts which may represent various aspects of life but

is most commonly used to discuss the relationship between our emotions, body, intellect, and spirit (Morcom, 2017). Not all tribes use the medicine wheel, but they may have other traditional knowledge systems that may be utilized to enhance student learning and wellbeing (McCarty & Lee, 2014). Therefore, teachers and school administrators are encouraged to work collaboratively with local Tribal communities, sharing resources and social power (Anthony-Stevens, Stevens, & Nicholas, 2017) so that all students may benefit from a more holistic and healthful education.

## **Conclusion**

Most Americans are currently unhealthy, and the future looks bleak. Life expectancy is down, the prevalence of obesity is higher than ever, deaths from drug overdose, suicide, and disease have increased, largely due to the COVID-19 pandemic (NCHS, 2019). Even though deaths from heart disease appeared to be declining prior to 2019, new evidence suggests that heart disease may be on the rise again potentially due to COVID's impact on the heart (Lopez & Adair, 2019). This rise in unhealthy outcomes for Americans may be explained, in part, by the dramatic decline in regular physical activity coupled with the steady rise in sedentary behaviors (World Health Organization, 2020). Regular physical activity appears to improve all aspects of physical health, reduce symptoms of anxiety and depression, improve cognitive health and functioning, help maintain healthful sleep habits, manage chronic pain, and reduce adiposity (World Health Organization, 2020). Therefore, it appears that virtually all dimensions of health may be improved by replacing sedentary behaviors with more physically active behaviors. Replacing most sedentary behaviors with physical activity is not a simple task, but large-scale problems require large-scale solutions. As Keadle et al. (2017) explain, if we are to become a healthier nation, we must stringently



evaluate our personal behaviors, our thought processes, and our environments; workplaces, schools, and homes must be completely restructured in order to improve our health, not diminish it (Keadle, Conroy, Buman, Dunstan, & Matthews, 2017).

If correcting the health trajectory of American society requires a complete restructuring of our environments, then the change needs to start somewhere; schools may be the optimal place to begin the restructuring. School may be considered great sites of intervention because behavior changes early in life have a large impact over a lifespan, which is much more efficient than implementing interventions later in life (Naylor & McKay, 2009). Schools also reach large populations of children and adolescents across all ethnicities, genders, and social classes (Naylor & McKay, 2009), so the impact of universal changes across all school could be quite large. Schools already address health and wellness as well. Schools are the place where students are prepared for their adult lives, which includes preparing them to maintain a healthy, active lifestyle through physical education, health education, sports, and other activities (SHAPE America, 2015a). Additionally, large-scale school health interventions are already common and most school-based health interventions report positive relationships between the intervention and at least one health outcome (Naylor, et al., 2015). Many school health interventions have only showed small effects on student health, though, and many of the interventions were found to be unsustainable (Herlitz, MacIntyre, Osborn, & Bonell, 2020). The lack of efficacy may be related to the small size of health interventions (Brown, et al., 2013; Caballero, et al., 2003) and the lack of sustainability may be attributed to a lack of teacher training and support (Herlitz, MacIntyre, Osborn, & Bonell, 2020) as well as the unrealistic, highly experimental environments created during interventions (Cassar, et al., 2019). Keeping both efficacy and sustainability in mind,

it seems like school-based health interventions may need to include three key components. First, school health interventions need to be scaled up to increase the dosage of health-enhancing behaviors. Second, school health interventions must provide teachers with the education and support needed to both implement and sustain the intervention. Third, the intervention must be designed around real-world environments, practices, and available resources.

One way schools can increase the dosage of health-enhancing behaviors in a real-world environment is to regularly implement PALs. PALs have been shown to improve the physical (Grieco, Jowers, Errisuriz, & Bartholomew, 2016; Vetter, O'Connor, O'Dwyer, Chau, & Orr, 2020; Seljebotn, et al., 2019), intellectual (Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015; Daly-Smith, et al., 2018; Martin & Murtagh, 2017; Bedard, St John, Bremer, Graham, & Cairney, 2019), and social health of students (Spitzer & Hollmann, 2013; Daly-Smith, et al., 2018). Less evidence exists linking PALs to emotional health, but school-based physical activity is generally associated with improved emotional health (Smedegaard, Christiansen, Lund-Cramer, Bredahl, & Skovgaard, 2016), and both teachers and students who have engaged in PALs reported enjoyment (Martin & Murtagh, 2017), which is a component of emotional health. Unfortunately, there seems to be a paucity of studies conducted on the impact of school-based activities on students' spiritual health (Cañadas, Veiga, & Martinez-Gomez, 2014). More studies on the impact of PALs on spiritual health may be warranted.

Regular use of PALs seems to be a potential step towards healthier school environments, but it would require rethinking and restructuring both the curriculum and the environment. Although this rethinking and restructuring is an extremely large task for most

schools to undertake, some models of schooling may be able to adopt PALs more easily. For example, EL schools, promote involves hand-on, experiential learning with an emphasis on learning within the natural world (EL Education, 2021), which is conducive to PALs. EL schools take a more holistic approach to schooling as well, in which teachers are expected to plan lessons that improve the critical thinking ability, empathy, and physical fitness of students (EL Education, 2021). EL schools also promote character education, which has the potential to expand the health benefits of PALs beyond the well-evidenced physical and intellectual dimensions of health by including the less evidenced social, emotional, and spiritual dimensions. Examining the social, emotional, and spiritual dimensions of PALs in an EL setting may be a worthwhile endeavor.

Regardless of the model of schooling, regularly implementing PALs is challenging. Therefore, teachers will need plenty of support from administrators, families, and community members to make real, healthful changes. The support of families and community organizations is especially crucial to providing students with the best education possible, since higher levels of levels of family and community support have been associated with higher student attendance, graduation rates, and academic performance (NEA, 2021). Community support may come from private or government organizations such as the YMCA, state universities, chambers of commerce, city councils, (Blank, Jacobson, & Melaville, 2012) and local Native American tribal organizations (Beesley, et al., 2012). Local tribes can make great partners because they may be able to provide additional resources, have access to unique places, and utilize traditional indigenous pedagogies that involve holistic approaches to education that are likely conducive to implementing PALs (Morcom, 2017).

In summary, potential solutions to America's enormous health crisis exist, but some of these solutions may require drastic restructuring of office, school, and home environments to make them more conducive to obtaining high levels of daily physical activity. One solution may be the regular use of PALs in schools, which appear to provide students many short- and long-term health benefits. Although PALs have potential to fundamentally change schooling, they require resources, training, and community partners to be successful. For this reason, some models of schooling (such as EL schools) may be more suitable for piloting innovative PALs because they already emphasize holistic learning, student wellbeing, and community partnerships. EL schools may also be an optimal place to experiment with enhanced, innovative PALs because they focus on more than just the physical and intellectual health of students. Currently, there is ample evidence for the physical, intellectual, and social health benefits of PALs, but the emotional and spiritual health benefits of PALS are less clear because only a few high-quality research published on the topic. Therefore, a need exists to explore the emotional and spiritual health of students as they engage in PALs in a real-world environment.

### **Chapter 3: Methods**

This chapter describes the research methodology used in this qualitative exploratory embedded single-case study (Yin, 2014). The purpose of the study was to examine the potential holistic health benefits of physically active canoe building lessons for elementary students. An emphasis was placed on the spiritual health benefits of the physically active lessons due to a paucity of research on the topic (Cañadas, Veiga, & Martinez-Gomez, 2014). The exploratory embedded single-case study allowed the researchers to collect data from young children on the highly complex topic of holistic health within a real-world context with many variables (Yin, 2014). The research plan, including the collection of data, analysis of data, and reporting of findings is presented in this chapter.

#### **Research Questions**

The specific research questions for this study were:

- *In what ways might participating in physically active canoe and paddle building lessons make students healthier?*
- *What spiritual health benefits are reported for students who participate in physically active canoe and paddle building lessons?*

#### **Methodology**

A qualitative exploratory embedded single-case study design (Yin, 2014) was employed with three subunits of analysis: the students, the teachers, and the parents of students. A qualitative approach is appropriate when researchers want to answer questions about experiences, meaning, and perspective, especially from the standpoint of the participant(s) within a given situation (Hammarberg, Kirkman, & de Lacey, 2016). Furthermore, a case study is a form of qualitative research that is best suited

for investigating a contemporary phenomenon in its real-world context, “especially when the boundaries between the phenomenon and context may not be clearly defined” (Yin, 2014, p. 2). Single case studies, such as the methodology used in this study, seek to investigate a specific phenomenon in detail and are best suited for examining atypical programs (Yin, 2014). In this study, the canoe building program was considered unique from other typical school experiences and the program took place within a school that uses an uncommon (e.g., Expeditionary Learning) model of education. Therefore, a single case study was considered an appropriate methodology.

Case studies can include single or multiple cases and each case may be holistic or embedded (Yin, 2014). In this study, the single-case study was embedded, which means that the case included distinct subunits that were analyzed individually before returning to the larger unit of analysis (Yin, 2014). In this study, the largest unit of analysis was the canoe project and the subunits of analysis were a) the students in the program; b) the teachers leading the program; and c) the parents of students involved in the program. In other words, the researcher collected and analyzed the data from the teachers, students, and students’ families (subunits of analysis) separately before making comparisons between the subunits of analysis. Then an analysis of the canoe project (the largest unit of analysis) was conducted after synthesizing the findings from all subunits.

### **The Researchers**

The lead researcher was a doctoral student in a local university’s department of movement sciences who was working towards a PhD in Healthy Active Lifestyles. The lead researcher had worked in education for six years prior to starting the study, first as a health, psychology, and physical education teacher in k-12 public schools and then as an

instructor at the university. The lead researcher learned the basics of building model canoes, canoe paddles, and full-size dugout canoes at a local Tribal School that collaborates with the local university. The lead researcher was involved in the study as a participant observer, meaning the researcher was immersed in the canoe building activities as both a researcher and as a facilitator of activities.

The lead researcher was also a former resident and teacher on the Nez Perce (Nimiipuu) reservation and the researcher wishes to return to the Nez Perce reservation to live and work in the near future. This should be noted because the study took place on traditionally Nimiipuu lands, the project involved a non-governmental organization that advances Nimiipuu causes, and the products from this canoe project may be used in future Nimiipuu ceremonies and events.

The lead researcher was also assisted at the worksite by four other researchers who were recruited from the local university. Two of the assisting researchers were professors and two of the researchers were graduate students in the movement sciences department. One of the assisting researchers had several years of canoe-building experience prior to starting this study, one had a single year of experience with canoe-building prior to this study, and the other two had no canoe-building experience prior to this experience. All of these researchers, regardless of experience, spent time practicing the craft of paddle carving and canoe building in the months leading up to the study.

Two additional researchers were asked to assist in refining codes during the data analysis. When the lead researcher had transcribed and generated initial codes, those codes were presented to two other researchers who provided feedback for refinement. This code

checking process occurred twice and the discussion about coding continued via email and in-person until the final codes were determined.

### **Participants**

Two teachers, 24 students, and the students' parents were asked to participate in the study. To protect the privacy of the families, the Classroom Teacher was used as an intermediary between researcher and parents and the exact number of parents contacted was not disclosed to the researchers. However, two teachers, 23 students, and 15 parents agreed to participate in the study. Of the two teachers who participated, one teacher was the fourth-grade classroom teacher and the other was a guest teacher who was invited to teach canoe and paddle building lessons. This guest teacher, Standing Red Bear, was invited to lead lessons because he was the founder of a non-governmental organization that seeks to preserve, protect, and promote the culture of the Nimiipuu people. Parent consent and student assent was obtained from all interested students and consent was obtained from all parents and teachers who participated in the study.

The participating school was a public k-8 charter school in a rural university town. The school used an EL education model, which is uncommon. EL Education schools combine scholastic achievement, character education, and project-based expeditions to engage students in challenging academic work (EL Education, 2021). The participating school was also unique because the number of students who qualify for free or reduced lunch was significantly less than the state average. Only one participant other than Standing Red Bear identified as Native American and they were a student. Students were not asked to disclose their racial identity, so this information was given voluntarily.



The school partnered with a local environmental institute that provided a space for the students to work on the canoe and the canoe paddles. The environmental institute was a community-based non-profit organization that occupies nearly eight acres within city limits. By having the canoe project at the local environmental institute, students to work outside with plenty of space to move around. The environmental institute also had a playground that was used by students before each carving session and whenever students needed a break from carving. The environmental institute sometimes provided brief lessons to students about sustainability and environmentalism.

### **Data Collection**

The canoe project consisted of two 90-minutes canoe and paddle building lessons each week for a total of nine weeks. All canoe and paddle building lessons occurred outside at an environmental institute that provided students with a space to carve. The project began with a cultural ceremony led by Standing Red Bear, and it ended with a river trip that allowed students to use the canoe and the paddles that they created. Data was collected from the first week of the project until the final interview that occurred two months after the end of the project. Prior to data collection, University Institutional Review Board permission and school permissions were obtained. Data collection included: a) focus groups; b) individual interviews; c) researcher observations; and d) analysis of physical evidence/artifacts (O'leary, 2017).

### ***Focus Groups***

All focus groups were audio recorded and then transcribed using intelligent verbatim transcription. The audio files were uploaded to Otter.ai (Otter.ai, 2023) which provided ai transcription. All transcripts were then refined through human transcription. All personally

identifiably data were removed at the transcript level and all parents and students were assigned gender neutral pseudonyms.

Three initial and follow-up focus groups were conducted to collect data from the students who participated in the canoe project. All student focus group questions were worded at a fourth-grade level using the Flesch Kincaid Grade Level Readability Index to enhance participant comprehension. The focus groups took place at the participating school during normal school hours. The Classroom Teacher determined how the students were divided into each of the initial and follow-up focus groups and each group was taken to the counselor's office where the focus group was conducted by the lead researcher. When one group was finished, they returned to the classroom and the next group was invited to the counselor's office. Due to absences, four students only attended one of the focus group sessions, but all participating students attended at least one focus group. The same focus group scripts were used for both the initial and follow-up focus groups. Refer to appendix A to see the student focus group script and questions.

The three initial focus groups with students were conducted during week three of the canoe project and each focus group was comprised of six to seven students. The first initial focus group included six students, the second included seven students, and the third included six students. The total number of students who participated in the initial focus groups was 20 and the average number of students per per-focus group was 6.6. The first initial focus group lasted 25 minutes, the second lasted 14 minutes, and the third lasted 20 minutes. The average length of the initial student focus groups was 23 minutes.

The three follow-up focus groups with students were conducted during week nine, which was the week after the paddles were finalized and the canoe was launched at the river.

The follow-up focus groups were comprised of four groups of four to five students. The first follow-up focus group included five students, the second included five students, the third included five students, and the fourth included four students. The total number of students who participated in the follow-up focus group was 19 and the average number of students per focus group was 4.75. The first follow-up focus group lasted 14 minutes, the second lasted 29 minutes, the third lasted 22 minutes, and the fourth lasted 12 minutes. The average length of the follow-up student focus groups was 19.25 minutes.

Initial and follow-up focus groups were also conducted to collect data from the parents who were involved with the canoe project. To protect the privacy of the families, the Classroom Teacher limited access to the parents' contact information. She contacted parents via email, asking them to participate in the focus groups. The lead researcher supplemented this by asking parents in person during the canoe lessons. Two initial focus groups with parents were conducted in order to provide them with two options to attend, which allowed the parents to participate whichever initial focus group that fit into their schedule. Both initial focus groups with parents took place on week four, the first occurring on a Monday and the second occurring on a Thursday immediately after the canoe lessons ended. Both of the focus groups took place at the environmental institute where the canoe lessons were taught. Six parents attended the first initial focus group, and it lasted 28 minutes. Three other parents attended the second initial focus group, and it lasted 25 minutes. The total number of parents who attended the first initial focus groups was nine, the average number of parents who participated in the initial focus groups was 4.5, and the average length of the initial parent focus groups 26.5 minutes.

Only one follow-up focus group was conducted with parents. The follow-up focus group with parents occurred at a riverside park immediately after the canoe was launched on week nine. Since many parents attended the canoe launch, it was determined to be an optimal time to gather parents for a follow-up focus group. Eleven parents attended the follow-up focus group, and it lasted 26 minutes. Although all parents were encouraged to attend both focus groups, only three of the 15 participating parents attended both the initial and follow-up focus group sessions. The same focus group scripts were used for both the initial and follow-up focus groups with the parents. Refer to appendix B to see the parent focus group script and questions.

### ***Individual interviews***

All individual interviews were audio recorded and then transcribed using intelligent verbatim transcription. Otter.ai transcription services were used to generate the initial transcripts and then all transcripts were refined through human transcription. All personally identifiable data were removed at the transcript level and the teachers became known as ‘the Classroom Teacher’ and the ‘Standing Red Bear’. The teachers were not given first name pseudonyms like the other participants to ensure their roles in the canoe project were clearly understood.

Individual initial and follow-up interviews were conducted with the Classroom Teacher as well as Standing Red Bear. The initial interview with the Classroom Teacher occurred on week four and lasted roughly 70 minutes. The interview took place at the environmental institute where the canoe lessons were taught, and it was conducted immediately after one of the lessons. The follow-up interview with the Classroom Teacher

occurred one week after the canoe project concluded. The interview took place at the participating charter school, and it lasted roughly 100 minutes.

The initial interview with Standing Red Bear occurred on week four and lasted roughly 25 minutes. The interview took place at the environmental institute where the canoe lessons were taught, and it was conducted immediately after one of the lessons. The follow-up interview with Standing Red Bear occurred two months after the canoe project concluded because Standing Red Bear was traveling throughout the summer. Once he returned, the follow-up interview took place at the environmental institute where the canoe lessons were taught, and it lasted roughly 50 minutes. The same interview scripts were used for both the initial and follow-up interviews with the Classroom Teacher and Standing Red Bear. Refer to appendix C to see the individual interview script and questions.

### ***Researcher Observation Notes & Journaling***

Data was also collected using researcher observation notes. Five researchers from the local university were involved in the canoe project. All researchers were either students or faculty associated with the fields of health and kinesiology. All researchers were given training sessions to help them lead students through the canoe and paddle building process and to collect observational data. The observational data were collected using researcher observation notes. Prompts were provided to focus the observation notes on reporting only relevant behaviors and the researchers were asked to submit their observation notes electronically within 24 hours of completing a lesson. The observation data were collected via Qualtrics and then exported to Microsoft Excel for analysis. Refer to Appendix D to see the researcher observation prompts.

The lead researcher also maintained a personal journal regarding the canoe project and the ongoing study. One to three entries were made each week using a tablet and the logs documented the experiences, interactions, and feelings of the lead researcher. Important events such as ceremonies and classroom visits were also documented in detail within the journal. The researcher journal was kept to help add context to the other data collection and it was frequently referenced during the data analysis.

### ***Documentation of Artifacts***

Physical evidence, or artifacts, were documented by taking photographs at regular intervals throughout the project in order to evaluate student progress and to help contextualize all other data. Photos of all student artifacts were taken immediately after the last lesson of each week during the project. The artifacts documented included the canoe paddles, dugout canoe, and the prayer ties created by students. Whenever possible, the weekly photographs were taken from the same angles and same location to allow for better comparison between photographs. All personally identifiable indicators were excluded or removed from the photographs to ensure participant confidentiality.

### **Data analysis**

The data collected from individual interviews, focus groups, and researcher observation notes were transcribed using intelligent verbatim transcription, coded, and then analyzed using a thematic reflexive analysis (Braun & Clarke, 2021). According to Braun & Clark (2021), a thematic analysis is a method of qualitative data analysis that seeks to identify, analyze, and interpret patterns of meaning, or themes, within qualitative data. Thematic analyses are highly diverse and vary from case to case, but Braun & Clark (2021)

identify three primary typologies of thematic analysis: 1) Coding reliability; 2) Codebook; and 3) Reflexive.

This study used a *reflexive* thematic analysis because it is the best suited typology for research involving subjectivity, lived experience, and phenomenology. Additionally, reflexive thematic analyses are “concerned with exploring the truth or truths of participants’ contextual situated experiences, perspectives and behaviors” (Braun & Clarke, 2021, p. 14), which aligns with the goal to keep the research setting natural and authentic. Regardless of the typology of the thematic analysis, all thematic analyses require a conceptually coherent design with theoretical underpinnings (Braun & Clarke, 2021, p. 14). Therefore, the Theory of Expanded, Extended, and Enhanced Opportunities (Beets, et al., 2016) was used as a theoretical underpinning and both Hjelm’s five-dimensional model of health (Hjelm, 2010) and Fisher’s four domains model of spiritual health (Fisher, 2011) were used to inform the researcher during thematic analysis.

### ***The Coding Process***

After the data was collected from individual interviews, focus groups, and researcher observation notes, the lead researcher listened to each audio recording at least three times to become familiar with the data. The audio recordings were then transcribed, and the lead researcher read through each of the transcripts at least three times in order to become even more familiar with the data. The coding process then began with the lead researcher generating codes for all focus group, interview, and observation data that was relevant to the research question. A constant comparative method (Glaser & Strauss, 1999) was used to help sort and organize raw data into coherent groups of data with shared attributes. One hundred and seventy-six initial codes were generated and then each coded datum was given one of the

following tags: 1) physical health; 2) social health; 3) emotional health; 4) intellectual health; 5) spiritual health; or 6) negative case. Five of the seven tags corresponded to Hjelm's five-dimensional model of health (Hjelm, 2010) and a sixth tag, negative case, was created for codes that might contradict the research question (Roulston, 2014). For example, a negative case tag was given to any code that indicated potentially unhealthy experiences such as frustration, stress, fear, or amotivation.

To achieve investigator triangulation (Denzin, 2009), the lead researcher invited two university professors to participate in the coding process as co-researchers. The two university professors were asked to review the reflexive thematic analysis process and to achieve researcher consensus on codes, categories, themes, and subthemes. An initial meeting was conducted with the three researchers after all initial codes were generated and tagged. After receiving feedback from the professors, the lead researcher developed four potential themes, each with three to four subthemes. The lead researcher once again met with the two university professors and the potential themes and subthemes were further refined. All three researchers met until all disagreements were resolved and consensus was reached. This collaboration of researchers is integral to the process of investigator triangulation (Denzin, 2009). The potential themes and subthemes were then sent to teachers and parents so they could provide feedback to the researcher about the face validity of each theme. After considering input from the professors and the participants, the data analysis yielded three themes and each of these themes were comprised of three sub-themes.

### **Artifact Analysis**

The photographic documentation of student artifacts was analyzed using artifact analysis (Given, 2008; Trausan-Matu & Slotta, 2021). In the context of qualitative research,



artifacts are written documents, art, or physical objects created by the individuals or groups included in a study (Given, 2008). As explained by Given (2008), “Artifacts become data through the questions posed about them and the meanings assigned to them by the researcher” (p. 23). Artifact analysis was considered a valuable tool for the project because, according to Trausan-Matu & Slotta (2021), “artifacts are semiotic mediators that can serve as a basis for student progress and achievement within educational contexts” (p. 1). There are many ways to approach artifact analyses depending on the context and object under analysis, but in all cases, the researcher’s primary objective is to uncover the story surrounding the artifact: who made the artifact, how it was used, who used it, and the values associated with it (Given, 2008). Artifact analyses involve a high degree of inference, since the researcher is attempting to make judgements about the meaning and context of each artifact under investigation (Given, 2008). However, since the artifacts were created in the presence of the researcher, the context was well documented in the researchers’ notes and journal.

In this study, the artifacts under investigation were the physical objects created by students during the canoe building program, which included canoe paddles, a dugout canoe, and prayer ties. During the canoe project, the Classroom Teacher encouraged students to personalize their individual canoe paddles by trying new designs and by woodburning meaningful symbols into the wood. Similarly, the dugout canoe was designed collectively by the students and teacher. These design choices became integral to conducting a rich artifact analysis. Additionally, the students, teachers, parents, and researchers created prayer ties during two of the canoe ceremonies. All of these artifacts were analyzed using a series of questions outlined by Given (2008) in *The SAGE Encyclopedia of Qualitative Research Methods* in order to convert participant-created artifacts into data. According to Given

(2008), all artifacts have “a story to tell about the person who made it, how it was used, who used it, and the beliefs and values associated with it” (p. 23). The series of artifact questions provided by Given (2008) was used to uncover these stories.

### *Canoe Paddles*

During the project, students were able to personalize their individual canoe paddles by designing the overall size and shape of the paddles and by woodburning animal prints into the blades of the paddle. High quality cedar wood boards obtained from a local supplier were used in the construction, however, several students made catastrophic errors while carving and this required them to start a new paddle from scratch. At one point, the supply of cedar boards was exhausted, so two students used decking boards. The difference between the original boards and the decking boards was subtle, but noticeable to the students who had to use the decking boards. In this way, the type of wood identified at least two students who had made unrecoverable mistakes while carving their paddle.

Virtually all of the work on the paddles was done by students using hand tools. Since hand tools are more difficult to use than many power tools and the students were novice woodworkers, tool marks can be found on every paddle. Additionally, there were very few paddles that had perfectly straight lines on the blades, handles, or shafts; most had waves, divots, bumps, and other imperfections which indicated that the paddles were likely carved by non-experts with a limited amount of time. Despite the blemishes and flaws, almost every paddle was functional, light, smooth, and comfortable to use. Many of the students, teachers, parents, and volunteers said they found the final products impressive given the circumstances and the age of the paddle carvers.

The primary purpose of the paddle was to give students hands-on learning experiences that may help them better understand Nimiipuu culture and state history. The creation of the paddles was part of an educational unit that met several state education standards as well as school-specific goals for character development. Students were learning about state history and Nimiipuu culture as part of a unit in school. Most sessions occurred after school, but some occurred during school hours. This project is well-known in the school and is seen as an event that all 4<sup>th</sup> grade students get to participate in. Although the paddles were primarily created for the sake of learning, the project culminated in a canoe trip that allowed students to use the paddles they created. Therefore, the paddles had to be functional as well as historically relevant and culturally appropriate.

The paddles were created during canoe building lessons at a public site, so all paddles were constantly in view and could be observed by all other students and any parents, researchers, volunteers, teachers, or visitors. Therefore, students engaged in social comparisons that seemingly affected the paddle designs, which typically resulted in students conforming to designs that were more popular. All designs were semi-structured because the teachers gave students examples of traditional Northwest Native American paddles as a basis to begin their designs. Standing Red Bear then created guidelines and regulations to instill at least some level of historic and cultural accuracy. For example, Standing Red Bear did not want students to use paint because paint was not traditionally used by the Native American Tribes in the region. He said that not all paddles had to be the same, but the general design should be “inspired by Northwest Tribes” (Standing Red Bear Member Check). He also wanted all students to use the same materials and to embellish the paddles in the same location. The students used wood burners to place unique, student-drawn animal prints on

their paddle's blade. In this way, there was room for individuality, but there was also uniformity among all of the paddles created at this year's canoe camp.

The canoe paddles now serve as a reminder of this experience. The toolmarks and imperfections in the wood can remind students of their hard work and perseverance in taking on a difficult task. The students have learned to accept these mistakes and to reject perfectionism. The uniformity among the canoe paddles can remind students that they were part of a group who shared a single goal. Any student who was a part of this group will have a paddle that matches the paddles created by their peers. The paddle will also serve as a reminder of Nimiipuu culture and history. Every student who participated now has an artifact designed and created under the guidance of Standing Red Bear, who shared his culture and his spirituality in a meaningful endeavor.

### *Dugout Canoe*

The communally built dugout canoe was primarily designed by Standing Red Bear, who was interested in functionality and historical accuracy but was receptive to input from all those involved in building the canoe. The overall design was highly influenced by limitations in time, the tools available, the size of the log, and the condition of the log. Wood rot was present in the log, so the canoe had to be designed around the log's unusable sections, resulting in a small canoe that Standing Red Bear referred to as a "chipmunk" canoe. According to Standing Red Bear, these chipmunk canoes were traditionally used by children and small individuals who needed to cross a river.

The log used came from a Douglas fir tree that was originally cut to be firewood. The log was later donated to the canoe program, but it has been sitting in a damp log pile long enough to accrue wood rot in several places. The canoe was crafted using hand tools for the

vast majority of the work, but power tools were used when the hand tools were not able to do the job safely or expediently. Due to the wood rot and several large cracks that were present in the log, wooden dowels, butterflies, and adhesives were used to repair the canoe as needed. The repairs were clearly visible on the final product, but the canoe was functional and waterproof once varnish was applied.

The log was transformed into a canoe over a span of roughly four months with the help of researchers, students, parents, teachers, and other volunteers. Some of the most dangerous and difficult aspects of carving were reserved for Standing Red Bear and the more experienced volunteers, but the students were encouraged to engage in any carving tasks that were deemed suitable for the children. Dozens of people with varying levels of woodworking skills were involved in the project because Standing Red Bear and his co-leaders wanted the canoe to be created by a community. Since many carvers were involved, the canoe is not completely symmetrical or uniform. For example, the outside of the canoe was textured by cutting small dimples on the entire exterior of the canoe, but some carvers made deeper dimples than others. Also, some carvers had less woodworking skills and created tear-outs in the places they carved. Therefore, you can see indicators that parts of the canoe were carved out by experienced canoe builders while other parts were carved out by non-experts. This inconsistency was generally considered a feature of the canoe, not a flaw.

Any canoe-building task that was deemed high-risk was reserved for the most experienced canoe builders. These higher risk tasks, such as using a chainsaw or pouring epoxy, were done when students were not present to reduce the risk of injury to a student. However, many low-risk, simple tasks were saved for students. For example, students were asked to dig out the interior of the canoe using small adzes, sand all surfaces with sandpaper,

and texture the outside of the canoe using small scorp knives. Between one and three students worked on the canoe at a time and they were always overseen by at least one adult. If a student ever became bored of working on their paddle, they were invited to work on the canoe. Additionally, if a student was progressing much faster than their peers, that student would be asked to work on the canoe in order to allow their peers to catch up.

The canoe was created as part of an educational unit for fourth-grade students who were learning about state history and Nimiipuu culture. For the project, the students partnered with a Standing Red Bear who wanted to educate students about Nimiipuu culture and develop regional awareness about salmon and the breaching of the lower Snake River dams. The canoe was intended to be a symbol that could be put on display to start conversations about salmon conservation efforts, so all parties involved knew that the canoe was going to be seen by the public. The canoe was on display at a public environmental institute while it was being built, it then was front-and-center at a public ceremony in a public park when it was launched, and then it went on display at a local art gallery. The canoe is currently on display at a local university.

### ***Prayer Ties***

Standing Red Bear asked students, parents, researchers, and volunteers to participate in several ceremonies throughout the canoe project and two of these ceremonies involved the creation of prayer ties. Standing Red Bear used the prayer ties to teach students about Nimiipuu culture and spirituality, but he said that secular students could view the prayer ties as symbols of hope and good intentions rather than supernatural items. The prayer ties were created by taking small handfuls of woodchips from the dugout canoe, wrapping them with cloth, and then binding them with string. Once the prayer ties were created, the participants

would hold them during a group prayer session and be asked to put their hopes and good intentions into them.

The prayer ties were created and used at two different locations. On the day before the launching of the canoe, prayer ties were created at the site where the canoe was carved. A ceremony was held to celebrate the completion of the project and once the prayer ties were crafted, they were hung in a tree. Standing Red Bear said that the prayer ties should remain on display and not removed from the tree by any person. He said that nature would decide when to release the prayer ties from the trees. The second batch of prayer ties were created during the canoe launching ceremony which took place at the banks of the river. Immediately after concluding a group prayer, this batch of prayer ties were tied to a large rock and sunk into the river.

The prayer ties were used for educational and spiritual purposes for the students involved with the canoe project. The prayer ties were primarily seen by the teachers as an educational tool used as part of a cultural and spiritual learning experience. The teachers told students, parents, and researchers that the ceremonies were opportunities for students to participate in cultural activities and to create cultural items. The participants were told that participation was voluntary, and the prayer ties could be viewed as purely secular if the participants were not interested in spiritual experiences. However, the teachers also said that no parents or students would be judged if they wished to accept the spiritual nature of the ceremonies. Several of the parents and students reported spiritual feelings during and after participating in the prayer tie activities.

## **Trustworthiness**

Trustworthiness describes the processes and approaches which qualitative researchers use to establish credibility and ensure rigor in their research (Ravitch & Mittenfelner Carl, 2021). To exhibit trustworthiness in qualitative research, researchers must thoroughly contextualize the lives, perspectives, and experiences of the study participants (Ravitch & Mittenfelner Carl, 2021) in addition to using established research practices that demonstrate precise, systematic, consistent, and exhaustive data collection and analysis (Nowell, Norris, White, & Moules, 2017). To ensure trustworthiness during the study's thematic analysis, the researcher used Nowell et al.'s (2017) "step-by-step approach for conducting a trustworthy thematic analysis" (p. 4), which assesses trustworthiness during each of the key phases in the thematic analysis process. The means of establishing trustworthiness during the thematic analysis process included prolonged engagement, keeping organized records of all data collected, reflexive journaling, use of a coding framework, and researcher triangulation (Nowell, Norris, White, & Moules, 2017). Nowell et al.'s step-by-step approach was frequently referenced by the researcher during each phase of the thematic analysis process, and all means of establishing trustworthiness were used whenever applicable.

Researcher triangulation was achieved by including multiple researchers in the data collection and data analysis process. Five researchers other than the lead researcher collected observation data and two researchers other than the lead researcher were involved in refining the themes and subthemes. Member checking, also known as participant validation strategies (Ravitch & Mittenfelner Carl, 2021), was used throughout the entire study as well. Teacher feedback was initially sought regarding the research questions, data collection methods, and the protocols for interviews, focus groups, and researcher observation notes. Member



checking also occurred with both parents and teachers during data transcription and data analysis. Member checking occurred once again after the findings were drafted.

To establish trustworthiness during data collection and analysis of student created artifacts, the researcher used several other established techniques. First, prolonged engagement (Lincoln & Guba, 1985) was used to become informed about the context in which the artifacts were created and then a thick description (Geertz, 1973) of the context was included in the researcher's journal and then refined in the final report. The researcher also used self-critical reflexive journaling to manage biases bolster the researcher's understanding of the context in which the artifacts were created (Ravitch & Mittenfelner Carl, 2021). The weekly photographs taken during each stage of the building process were also made available to participants.

### **Ethical Concerns**

The researcher strove to make ethical practices a top priority throughout the study. First, all research practices were scrutinized by the University's Institutional Review Board (IRB) and were approved by the IRB prior to collecting data or interacting with student participants. Since the study did not alter the participants' school curriculum or environment, the potential for an undesirable impact on student learning was minimal or non-existent. All risks to human subjects were kept to a minimum based on IRB recommendations. The researcher used informed consent forms and child assent forms constructed using the official University consent and assent forms. Informed consent was provided to all participants before any data was collected and participants were allowed to end participation in the study at any time. Additionally, informed consent was read aloud to all participants prior to each

interview and verbal consent/assent was obtained. All recorded materials will be erased after five years, minimizing any future risks related to confidentiality.

## Chapter 4: Findings

Students, teachers, and parents discussed their experiences with physically active canoe and paddle building lessons for fourth grade students. Based on their subjective reports of potential health outcomes for students, three major themes emerged: 1) relationships; 2) experiences; and 3) personal growth.

### **Relationships**

The first theme, relationships, emerged from the data as participants described how the canoe project improved relationships with peers, mentors, family members, organizations, and nature. Relationships has three subthemes: 1) bonding; 2) cultural involvement; and 3) nature.

### ***Bonding***

The first relationships subtheme, bonding, focuses on how the canoe project facilitated bonds between people, expanded social networks, enabled cooperation, fostered community building, elicited prosocial behaviors, and strengthen connections with friends and family. As evidenced by the following paragraphs, parents, students, and teachers all reported ways in which the students experienced bonding through the canoe project. One of most common social benefits reported by parents was learning how to cooperate with their peers. During the focus groups, several parents described how the canoe project provided students with a shared goal that enabled students to navigate the intricacies of cooperation (Ari, Rory, Pat, Parent Focus Group 1.1; Corey & Rowyn, Parent Focus Group 2). The idea of teamwork was exemplified by one of the parents, Ari, who said, “[The students] have to learn how to share, talk amongst each other, and work together” (Parent Focus Group 1.1). Furthermore, Spencer said, “I’ve definitely noticed them helping out, they’ll go across to

another person and ask for help or give help” (Parent Focus Group 1.1) and Harper stated, “The ones who were really fast would pause and help the ones who were further behind. They realized that they were all doing this project together, but they all had different levels of ability” (Parent Focus Group 2).

The concept of community was also reported by several participants in interviews and focus groups (Rory, Casey, Pat, Parent Focus Group 1.1; Sky, Taylor, Student Focus Group 2.1, Classroom Teacher Interview 1 & 2; Standing Red Bear Interview 1 & 2). For example, Rory (a parent) said that the active playtime the students engage in during the canoe project was “part of community building” (Parent Focus Group 1.1) and another parent, Rio, explained “This project helps with community building” (Parent Focus Group 1.1). Two of the students, Sky and Taylor, also shared their thoughts about the canoe project and community building. During a focus group Taylor describes how he, “felt like I was helping out my community and other communities” (Student Focus Group 2.1) and Sky stated that she “hope(s) that everyone will remember that we're all a community and that we gave the canoe to a good cause” (Student Focus Group 2.1).

During one of the interviews, the Classroom Teacher also explained that their charter school strives to create a sense of community by nurturing relationships between students whenever possible. She explained, “We have a shared culture in our school, in our crew, and it's a very strong kind of community culture. We are a community who works together as a team for the common good” (Classroom Teacher Interview 1, member checked). In the EL education model used by the charter school, the community building process is called *crew*. The purpose of crew is to help students feel a sense of belonging at school, to work as a team for the common good, and allow a space for building relationships (EL Education, 2021).

The Classroom Teacher illustrates the principles of crew were woven into all lessons throughout the project and when students were expected to come together as a community, they would be reminded that they were part of a crew (Classroom Teacher Interview 1). As the Classroom Teacher explained, “No one is forcing them to do this, they have their own work ethic. We encourage them, but the collective ethic of the crew is to work hard and get this done” (Classroom Teacher Interview 1).

During the focus groups, many participants described other ways in which the canoe project could lead to stronger relationships between the students (Peyton, Hayden, Student Focus Group 2.4; Reese, Dallas, Student Focus Group 1.2; Shiloh, Student Focus Group 1.3; Peyton, Shiloh, Riley, Student Focus Group 2.2; Cameron, Rey, Student Focus Group 2.3; Hayden, Student Focus Group 2.4; Rory, Casey, Parent Focus Group 1.2; Terry, Dillon, Parent Focus Group 1.2; Corey, Parent Focus Group 2; Classroom Teacher Interview 1 & 2, Standing Red Bear Interview 1). As one parent, Rory, explained, “[the students] are bonding over these new activities, so they can talk about it outside of canoe camp. It helps them form deeper connections” (Parent Focus group 1.1). In this statement, Rory expresses their belief that the canoe project gave the students a rich and novel shared experience that may elicit bonding between peers. The students also spoke about the canoe project’s potential for deepening peer relationships and one example of this can be found in a comment made by a student named Shiloh. Shiloh stated,

[The canoe project] will help us socially because we are learning about each other.

We learn what offends us, what helps us, what we need, and what we want for everyone...It helps us combine as a group. We get to know each other more and understand each other more. (Student Focus Group 1.3)

Several of the participants also spoke about the ways in which the canoe project may have deepened familial relationships as well (Jordan, Student Focus Group 1.1; Reese, Student Focus Group 1.2; Casey, Parent Focus Group 1.1; Harper, Parent Focus Group 1.2; Ari, Parent Focus Group 2; Classroom Teacher Interview 1 & 2; Nimiipuu Interview 2). As one of the students, Jordan, explained, “Our family hasn't really done this before, so we can talk about it because it’s cool. Building the canoe is something that a lot of families didn't ever do, so you can talk about that”. Casey, one of the parents, made a similar statement about family engagement:

It's been really nice to be doing this together. I feel really connected with my son, the school, and the project that way. I think it gives us a lot to talk about at home. We can bring it home and work through stuff. I think it's really powerful to have whole-family involvement. (Parent Focus Group 1.1)

The Classroom Teacher and Standing Red Bear also discussed family involvement during their interviews. The Classroom Teacher explained that the canoe project “connects [the students] to their family and crew” (Classroom Teacher Interview 1) and that “every year, there are families who get a lot out of [the canoe project] (Classroom Teacher Interview 2). Both the Classroom Teacher and Standing Red Bear shared stories about a particular family who came together during the project. As Standing Red Bear explained,

We had a younger student here. This student affected his entire family because he had faced so many obstacles in his life that impacted his emotional wellbeing. During this project, I think he learned to put emotions aside and put effort into producing something tangible, something material. This project has overlapping effects, not just with us and the kids, but with the kids than their families. By the end of the project,

this kid's mom was in tears because she saw that her child had been well-behaved and that he had been putting the effort into the paddle. I was talking to his sister and she was emotional talking about how her brother had changed because of this project, too. (Standing Red Bear Interview 2)

Standing Red Bear then went on to explain other aspects of bonding. He stated, "One of the things that they'll be doing here is forming a paddle, but they're also forming relationships prior to that... they're also forming partnerships with each other. It's an exercise in both learning and in sharing with others" (Standing Red Bear Interview 1). This quote emerged from a larger conversation with Standing Red Bear where he expounded the many layers of the canoe project. To paraphrase Standing Red Bear, the canoe project may seem like a simple woodworking lesson, but when taking a deeper look, students were also learning about forming and maintaining relationships (Standing Red Bear Interview 1). Several students also discussed forming new relationships. For example, Hayden described how the canoe project helped with, "meeting new people and bonding with them" (Student Focus Group 1.1), Peyton elaborated, "Some people need help making friends... and [the canoe project] helps" (Student Focus Group 2.2) and Cameron summarized, "I am glad because we made a lot of good memories and lots of good friends" (Student Focus Group 2.3).

The Classroom Teacher also explained ways in which the canoe project may have helped the students' bond with people outside of the classroom. She said, "I think a special part of this project is for the kids to build relationships with other people and adults... like the relationships with the university helpers and the relationship with [Standing Red Bear]" (Classroom Teacher Interview 1). This quote alludes to the idea that the canoe project can

help to build relationships, like the relationships with Native American organizations, canoe builders, university researchers, and environmentalists. The students were able to socialize with these outside partners during the canoe project, which gave them an opportunity to develop a network that reaches beyond the walls of the school building.

The parents also seemed to appreciate the mentor-mentee relationships made available by the canoe project. For example, Pat said, “Believing in an adult that is not their parents is also a benefit” (Parent Focus Group 1.1) and Rowyn stated, “There were a lot of older mentors who helped with this project. The kids had to communicate not just with their own peer group, but also with adults. It's a process of growth for them.” (Parent Focus Group 2). During the focus groups, other parents added their thoughts about mentorship; for example, several of the parents discussed the respect students displayed towards the mentors (Wren, Parent Focus Group 1.1; Harper, Parent Focus Group 1.2; Terry, Parent Focus Group 2). As Terry stated,

It was interesting to watch the kids respond to the canoe instructors because they all listened in the same way that they would listen to [the Classroom Teacher]. It was really good to see that the kids were socially mature enough to listen when it was time to listen. (Parent Focus Group 2)

Another parent, Wren, also discussed the respect students gave the instructors, explaining that, “An adult or mentor would show [the students] how to use a very sharp, potentially dangerous tool. I never saw anyone horsing around, it looked like everybody took it seriously” (Parent Focus Group 1.1). By the end of the canoe project, Standing Red Bear’s mentoring appeared make an impression on at least one of the students, who said, “I feel



excited because we got to meet [Standing Red Bear] and I want to be more like him” (Parker, Student Focus Group 1.1).

Based on participant reports, the canoe project strengthened relationships between the students and their peers, parents, instructors, and members of the community. Several participants also reported the formation of new relationships as well. During the canoe project, the students seemingly expanded their social networks, practiced cooperation, engaged in community building activities, and displayed prosocial behaviors. Therefore, the canoe project appears to have facilitated student bonding or has at least provided a foundation for future relationships.

### ***Cultural Involvement***

The second relationships subtheme, cultural involvement, focuses on how the canoe project engaged students in cultural activities that informed them about other ways of life and encouraged them to support Standing Red Bear’s mission to preserve, protect, and promote the culture of the Nimiipuu people. Parents, students, and teachers all reported ways in which the students may have been exposed to alternative perspectives while participating in activities involving Nimiipuu culture. Cultural involvement was personal for one particular student, Aspen. Aspen stated, “[the canoe project] made me a better person because it taught me the ways of my culture” (Student Focus Group 2.3). Throughout the project, Aspen spoke proudly about their heritage and their personal connection to Native American culture. Furthermore, non-Native students reported a sense of involvement in Nimiipuu culture. Ira described this involvement when they said, “It feels good helping [Standing Red Bear] and donating the canoe to his organization so they can use it to teach people about Nimiipuu culture” (Student Focus Group 2.1). In this statement, Ira is referring to one of the many

reasons for creating the dugout canoe, which was the promotion of Nimiipuu culture and values. Similarly, another student named Peyton stated, “I hope that [Standing Red Bear] and his organization achieve their goal. I hope they get their rights back. I hope that the canoe helps them spread Nimiipuu culture as well” (Student Focus Group 2.2).

Parents appeared to appreciate the cultural aspect of the project as well. For example, Harper said, “[The students] recognize how important [the canoe project] was to [Standing Red Bear] and his culture. The kids knew he was sharing something that was really meaningful to him. The kids loved it” (Parent Focus Group 1.2). Other parents shared similar sentiments, expressing gratitude to Standing Red Bear for educating their children about the Nimiipuu people and their culture (Pat, Parent Focus Group 1.1; Dillon, Terry, Harper, Parent Focus Group 1.2; Wren, Terry, Corey, Harper, Parent Focus Group 2). Some parents also reported a high level of cultural curiosity among students (Spencer, Parent Focus Group 1.1; Terry, Wren, Parent Focus Group 2). For example, a parent name Wren reported, “[Standing Red Bear] was explaining his culture and the meaning of this project...after he spoke, so many hands shot up into the air because the kids were just so inquisitive about everything he was saying” (Parent Focus Group 2). Furthermore, one parent even said they observed their child engaging in self-directed research about Native American culture. Rio reported, “My son looked up other paddles to see how he wants it designed and maybe painted. He's interested in Native American paddles and researching Indians” (Parent Focus Group 1.1).

Standing Red Bear and the Classroom Teacher also discussed cultural involvement. For many of the students, the canoe project was their first time directly collaborating with an Indigenous organization. As the Classroom Teacher explained,

Most of us who are non-native don't have an entry point into the native world, so it can be hard to really understand and be connected to that culture. It's special to be invited in and have a meaningful way to engage with native peoples and organizations. (Classroom Teacher Interview 1)

Throughout the canoe project, Standing Red Bear routinely expressed his desire to use this project to advance the goals of his non-governmental organization: “to preserve, protect, and promote the ways and the culture of the Nimiipuu people” (Standing Red Bear Interview 2). Some of Standing Red Bear’s stated goals were to expose young people to Nimiipuu culture, provide them with opportunities to meet Tribal Elders, and invite them to participate in activities that may expand their understanding of another culture (Standing Red Bear Interview 2). After the completion of the project, Standing Red Bear proudly stated, “We've culturally indoctrinated the children into our ways, just a little bit... hopefully the kids felt that they belonged to an entire community, the community that was involved with this canoe” (Standing Red Bear Interview 2). In this statement, Standing Red Bear appeared to be using the word *indoctrinate* in a tongue-in-cheek manner, trying to be intentionally provocative and humorous, while remaining serious about promoting Nimiipuu culture (Researcher Field Notes).

### ***Nature***

The third relationships subtheme, nature, focuses on feeling personally connected to nature, experiencing a sense of unity with plants and animals, and/or revering the natural world. Many of the students, parents, and teachers indicated that students may have developed some sort of relationship with the natural world while participating in the canoe project (Emery, Parker, Quinn, Peyton, Student Focus Group 1.1; Dakota, Taylor, Student

Focus Group 1.2; Aspen, Shiloh, Student Focus Group 1.3; Taylor, Student Focus Group 2.1; Riley, Shiloh, Jordan, Student Focus Group 2.2; Rey, Cameron, Student Focus Group 2.3; Casey, Spencer, Rio, Parent Focus Group 1.1; Harper, Dillon, Terry, Parent Focus Group 1.2; Corey, Terry, Harper, Parent Focus Group 2; Classroom Teacher, Interview 1 & 2, Standing Red Bear Interview 1 & 2) . As one parent, Corey, explained,

My daughter started talking to trees. She already saw the beauty in life, but this project has taken that to another level. I think she feels like it's okay and safe to talk to trees in front of her classmates now, because of this experience. (Parent Focus Group 2)

Corey's daughter is a pronounced example of the relationships that students may have developed with nature. Several of the parents acknowledged the connections to nature that were fostered throughout the canoe project. As one of the parents, Terry, explained, "Having a connection to nature seems to be [Standing Red Bear]'s main point of focus (Parent Focus Group 2).

Several students also shared statements declaring relationships to trees, such as Peyton, who said, "You can connect with the trees more and connect with the canoe as well just by hearing and understanding how the tree got here" (Student Focus Group 1.1) and Dakota, who stated, "The log for the canoe was cut down from a beautiful tree. You can talk to that tree and that helps you connect with nature" (Student Focus Group 1.2). Several other students reported building personal relationships with trees, wood, and anything made from materials that came from nature (Emery, Quin, Peyton, Student Focus Group 1.1; Taylor, Student Focus Group 1.2; Aspen, Student Focus Group 1.3). For example, a student named Rey, stated, "We're talking to the canoe, which was originally a log." (Student Focus Group

2.3) and another student named Taylor talked about how they felt “connected to the wood” (Focus Group 1.2). Furthermore, Emery also stated, “We’re going to build a relationship with the wood and the paddles” (Student Focus Group 1.1) and Quinn summarized, “[I am] building a relationship with this piece of wood, so I can carve it into an amazing paddle” (Student Focus Group 1.1).

Standing Red Bear discussed the students’ connection to nature during his second interview as well. He explained that students spend a great deal of the day surrounded by natural materials like wood, but they may never take the time to connect the materials to their origins in nature. He said that students live and learn in buildings made of wood, they write with pencils made of wood, and they sit at desks made of wood, but they rarely think about the wood’s past. Standing Red Bear said that one of his learning objectives for students was for them to consider the background of the everyday materials around them and to understand that nature should be appreciated for all that it provides. To this point, he stated,

Here, [the students have] created a cultural piece that they know is significant to my tribe. They've worked with their paddle in a very intimate way...Because of this project, these children formed a relationship with the wood, and they now have respect for the tree’s story, knowing that this tree was a grandfather. It was a big male tree. They didn't know that before. They didn't know trees are male and female, but now they do. I think that's one way that they have developed a relationship with nature. (Standing Red Bear Interview 2)

Standing Red Bear went on to say that students who participated in the canoe project were able to familiarize themselves with the natural world and its elements through sensory experiences like smell, touch, sight, and hearing (Standing Red Bear Interview 2).

Throughout the canoe project, he reminded students that trees are living, sentient beings who have relationships with other flora and fauna, including humans (Researcher observation notes).

As evidenced by the data reported thus far, the relationships theme explains how the canoe project may have improved relationships with peers, mentors, family members, organizations, and nature. The relationships theme is comprised of three subthemes: 1) Bonding; 2) Cultural Involvement; and 3) Nature. Data collected from participants throughout the canoe project indicate varying levels of bonding between participants, their families, and adults involved in the canoe project. The data also suggests that students felt a cultural connection to the Native American ideas, activities, and people associated with the project. Additionally, participants reported ways in which students developed or deepened a connection to nature after participating in the canoe project.

## **Experiences**

The second theme, experiences, focuses on participation in activities or events that may trigger a health-enhancing spiritual, emotional, or physical response. As participants described profound experiences with the potential to elicit positive health outcomes, three subthemes of experiences emerged: 1) spiritual experiences; 2) emotional experiences; and 3) physical experiences.

### ***Spiritual Experiences***

The first experiences subtheme, spiritual experiences, centers on engagement in activities that could elicit a profound spiritual reaction, build understanding for spirituality, and/or instill a sense of meaning and purpose. In every focus group and interview, participants reported that students engaged in at least one spiritual experience that had the

potential to improve health, particularly when ceremonies were conducted (Emery, Quinn, Parker, Student Focus Group 1.1; Reese, Cameron, Dakota, Taylor, Student Focus Group 1.2; Shiloh, Aspen, Jaime, Student Focus Group 1.3; Jaime, Ida, Taylor, Sky, Ira, Student Focus Group 2.1; Shiloh, Riley, Jordan, Peyton, Student Focus Group 2.2; Rey, Cameron, Aspen, Student Focus Group 2.3; Quinn, Student Focus Group 2.4; Rory, Pat, Casey, Spencer, Parent Focus Group 1.1; Dillon, Terry, Harper, Parent Focus Group 1.2; Kodi, Corey, Wren, Terry, Ari, Harper, Parent Focus Group 2; Classroom Teacher Interview 1 & 2; Standing Red Bear Interview 1 & 2). The reported spiritual experiences typically involved a reverence for nature, being part of something greater than oneself, or participating in ceremonies that included prayer and reflection.

As previously mentioned, many participants discussed the relationships that students developed with nature, including trees and wood. Although some of the relationships with trees and wood could be explained as secular, some participants reported that students were attempting to connect with the spirits of the natural world. This concept was expanded upon by a student, Rey, who stated, “there is a spiritual talking” (Student Focus Group 2.3) that occurs between students and tree spirits during the canoe project. Students alluded to tree spirits on multiple occasions and the students often showed reverence for the life of the tree used for the canoe (Parker, Peyton, Student Focus Group 1.1; Dakota, Reese, Student Focus Group 1.2; Aspen, Student Focus Group 1.3; Sky, Student Focus Group 2.1; Peyton, Student Focus Group 2.2; Rey, Cameron, Student Focus Group 2.3). For example, a student named Cameron explained that the tree used for the canoe was originally intended to be harvested for firewood but was then donated to the canoe project instead. Cameron then said, “the spirit of the tree is better now than it would have been... We saved it and gave it a better life”

(Focus Group 2.3). Another student, Sky, also explained that the canoe project involved “carving out a tree that’s a spirit. If we cut down a tree, it will basically die, but the spirit of that tree will help the land and the animals” (Student focus Group 2.1). Additionally, a student named Aspen expanded on the concept of tree spirits by saying,

We asked a grandfather tree to help us... [we said] ‘We need you. We need to take your life for something important. We will cherish it forever and not use it inadequately’... Thankfully, the grandfather tree replied to our wishes, and said that it was okay... it said that we can take its life and let its spirit run free, so we did. (Focus Group 2.3).

The students’ reverence for tree spirits may have been introduced by Standing Red Bear who regularly educated students about traditional Nimiipuu beliefs. He explained that,

When I give [the students] the knowledge from my people, that this is a living, sentient being and all of the other trees knew when this tree got cut down, that puts something into their mind. The kids may or may not believe it, but now they've experienced it, and they have knowledge of it. The kids know that the wood they're working with came from a tree. They know that, if you look at it in the big scheme of things, they're looking at something that died by someone else's hands, and yet, we're going to make something beautiful out of it. I think that's a big part of the spiritual side of this exercise. (Standing Red Bear Interview 1)

The parents who were involved in the program discussed the sacrality of trees as well. Spencer, who was a parent volunteer, stated, “The kids know that that the tree gave its life to this project” (Parent Focus Group 1.2). Spencer’s statement acknowledges that a sacrifice has



been made for the canoe project and that the students were cognizant and appreciative of this sacrifice. Additionally, a parent named Ari shared that, “[Standing Red Bear] explained the importance of the trees, they give us the air and they're alive” (Parent Focus Group 2) and another parent, Dillion, said that the students appeared to be particularly receptive to message about the ways in which “life was all connected” (Parent Focus Group 1.2).

Standing Red Bear spoke of the interconnectedness of all living beings on multiple occasions. Lectures about the reverence for life sometimes occurred at the end of lessons, but much of this spiritual knowledge was imparted during ceremonies. Over the course of the project, five ceremonies were conducted: a tree cutting ceremony, a ceremony initiating canoe project, a ceremony inviting the students to begin work on the canoe and paddles, a ceremony finalizing the canoe and paddles, and a ceremony for the launching of the canoe. During each ceremony, songs and prayers were used to show respect for nature, the Nimiipuu people, and the participants in the canoe project (Researcher Observation Notes).

Prayers were presented by Standing Red Bear at each of the ceremonies and the Classroom Teacher explained that the exposure to prayer was intended to be a cultural experience (Classroom Teacher Member Check). She said, “We want to understand the culture and life of the native peoples on this land. This is the most powerful way to learn, by interacting directly with Native people in a way that is authentic to them.” (Classroom Teacher Interview 2). She went on to say that students are invited to participate in voluntary ceremonies and are free to interact with prayers in any way they like. The Classroom Teacher and Standing Red Bear told their students that prayers can simply be hopes, wishes, or good intentions, which allows all observers to participate in any way that they choose (Classroom Teacher Interview 2, Standing Red Bear Interview 2). Along with prayer sessions, the

ceremonies typically involved group singing, pauses for reflection, and a lesson about Nimiipuu culture (Researcher Observation Notes). Two of the ceremonies involved the sprinkling of tobacco onto the canoe by all participants, and two ceremonies involved the creation of prayer ties, which are Nimiipuu traditions for stating positive wishes for the world. One set of prayer ties was hung in a tree while the other set was tethered to a rock and sunk to the bottom of the river before the canoe was launched (Researcher Observation Notes).

Several parents, students, and teachers spoke positively about the spiritual aspects of the canoe project, including prayer and ceremony. When asked about the spiritual nature of the canoe project, one parent, Casey, stated, “The kids are creating something that has a shared meaning and, in some ways, this is essentially all spiritual work” (Parent Focus Group 1.1). Another parent, Pat, then added, “Part of this project is being spiritual with yourself” (Parent Focus Group 1.1). Casey then expanded on the conversation by saying, “The group understands this is bigger than each of them individually and, to me, that's very spiritual. That sense that you are a part of something greater than yourself is the essence of what spirituality is to me” (Parent Focus Group 1.1). This conversation between these two parents indicated that they agreed with the potential spiritual health benefits, with some benefits being derived from individual work and some benefits being derived from contributing to a greater cause.

### ***Emotional Experiences***

The second experiences subtheme, emotional experiences, is characterized by engagement in activities that may evoke a strong emotional response or provide opportunities for students to process their feelings. Many students described emotional experiences that

occurred throughout the canoe project and virtually all of these instances were reported as positive (Quinn, Peyton, Hayden, Parker, Student Focus Group 1.1; Dakota, Reese, Taylor, Cameron, Student Focus Group 1.2; Blake, Shiloh, Aspen, Student Focus Group 1.3; Sky, Jaime, Student Focus Group 2.1; Shiloh, Peyton, Riley, Jordan, Student Focus Group 2.2; Aspen, Cameron, Emery, Parker, Rey, Student Focus Group 2.3; Quinn, Student Focus Group 2.4). Parents and teachers also reported many moments in which they observed emotional reactions from students, with almost all of them being interpreted as positive (Pat, Rory, Casey, Rio, Parent Focus Group 1.1; Terry, Dillon, Harper, Parent Focus Group 1.2; Terry, Wren, Rowyn, Ari, Corey, Parent Focus Group 2; Classroom Teacher Interview 1 & 2; Nimiipuu Interview 1 & 2). In the few occasions where emotional experiences were interpreted as negative, students reported feelings of frustration with carving, anxiety about unknown outcomes, and sadness regarding historic injustice (Jordan, Parker, Quinn, Emery, Student Focus Group 1.1; Reese, Student Focus Group 1.2; Shiloh, Blake, Student Focus Group 1.3; Peyton, Shiloh, Student Focus Group 2.2, Aspen, Emery, Cameron, Student Focus Group 2.3, Quinn, Student Focus Group 2.4). However, most parents and teachers who discussed these negative emotions saw them as a necessary step in the process of emotional growth (Rory, Casey, Ari, Spencer, Parent Focus Group 1.1; Harper, Pat, Dillon Terry, Parent Focus Group 1.2; Wren, Parent Focus Group 2; Classroom Teacher Interview 1 & 2; Standing Red Bear Interview 1 & 2).

While participating in the canoe project, the most common emotional states reported by students were excitement, enjoyment, and calmness. Throughout the entire nine-week project, several students reported a sense of excitement, (Hayden, Quinn, Parker, Student Focus Group 1.1, Cameron, Student Focus Group 1.2; Rey, Student Focus Group 2.3). This

sense of excitement was corroborated by the researchers who described the ways in which students arrived at the worksite to begin each canoe building lesson. In almost every entry, the researchers reported that the students would sprint off the bus towards the work area, loudly laughing, smiling broadly, and screaming with excitement (Researcher Observation Notes). As a student named Hayden explained, “I feel great. Normally my parents wouldn't let me do something like this, so I'm happy and excited for taking the canoe out on the water” (Student Focus Group 1.1). Hayden, like many other students, was focused on the end-goal, which was the launching of the completed canoe. Other students, like Rey and Quinn, were more interested in the day-to-day process. For example, Rey said, “I am always very excited to work on a paddle” (Student Focus Group 2.3) and Quinn said, “Whenever I work on my paddle, I'm really excited” (Student Focus Group 1.1).

Several parents also spoke about the excitement they witness in the children (Rowyn, Ari, Shannon, Parent Focus Group 2). For example, Rowyn reported, “[the students] were excited to go to canoe camp. There was an eagerness to participate in it on every day that they could” (Parent Focus Group 2). The students’ excitement was likely magnified because the canoe project has become a well-known endeavor for fourth graders. As one parent, Ari explained,

Our daughter knew about the program for a year before we got here, and she was so excited. She said, “I'm going to be in fourth grade, and I get to build a canoe, it's going to be so awesome!” It was amazing seeing that come into fruition. (Parent Focus Group 2).

In this quote, Ari was describing the anticipation experienced by their daughter a full year before starting the canoe project. The students apparently sustained the excitement

throughout the program as well, as reported by another parent named Shannon, who explained, “The kids are excited to [work on the canoe project] during school, after school, and on the weekends, too” (Focus Group 2).

Another emotion commonly reported by students was enjoyment (Reese, Taylor, Dakota, Student Focus Group 1.2; Blake, Shiloh, Student Focus Group 1.3; Cameron, Aspen, Student Focus Group 2.3). As one of the students, Reese, simply put it, “It helps us mentally. I just enjoy it” (Student Focus Group 1.2). Two other students, Emery and Cameron also discussed what they enjoyed about the canoe project. During a focus group, Emery explained that “it helps your emotions when you do something that you like to do, and I know a lot of people liked making their paddles” (Student Focus Group 2.3) and Cameron then shared that “It was just super cool to be a part of something. I had fun” (Student Focus Group 2.3).

In addition to excitement and enjoyment, several students also reported sensations of calmness (Quinn 1.2; Blake, Shiloh, Student Focus Group 1.3; Cameron, Aspen, Student Focus Group 2.3). Quinn, one of the students, said that when they carve on their paddle, they “feel sort of calm” (Student Focus Group 1.1) and another student, Shiloh, stated that working on the canoe project “makes me feel calm in my body” (Student Focus Group 1.3). Additionally, a student named Aspen stated that the project, “lets us connect with our inner peace, outer peace, and peace in general” (Student Focus Group 2.3). All of the above statements indicate that a calm emotional state was experienced by some students who participated in the canoe project. Even though this sense of peace may have been internal, at least one parent, Dillon, observed this state of calm. Dillon reported that “[The carving] looks like it's meditative for the kids. It looks like they're thinking. I don't know if they're thinking about carving or if they're thinking about other things in life” (Parent Focus Group 1.2).

In addition to evoking positive emotional states for participants, one of the students, Blake, said that the project also provided a space for them to process emotions (Blake, Student Focus Group 1.3). As Blake explained,

When I start working, I feel most of the emotions that I felt earlier in the day that I just hadn't realized yet. I had no time to realize them. My mind is switching gears.

When my mind switches gears, I can realize my emotions. (Student Focus Group 1.3).

Another student, Aspen, shared sentiments about the potentially therapeutic nature of the project, which allowed them to notice their emotions (Student Focus Group 2.3). To this effect, Aspen shared,

[The canoe project] helps me feel the emotions that I need to feel instead of having to hide them. When I'm working on [the canoe project], if I'm physically doing something, I feel more comfortable expressing how I feel instead of stuffing up those emotions. (Student Focus Group 2.3)

Participants also spoke about practicing empathy and recognizing the needs of others (Peyton, Student Focus Group 1.1; Shiloh, Student Focus Group 1.3; Aspen, Cameron, Student Focus Group 2.3; Hayden, Student Focus Group 2.4; Classroom Teacher Interview 1 & 2; Standing Red Bear Interview 2). For example, one student explained, “[the canoe project] helps you see what your friends are capable of, and you get to see their emotions. You see when it's time to help them, if they need help” (Hayden, Student Focus Group 2.4). The Classroom Teacher also spoke about empathy, “[the canoe project] is building emotional capacity and emotional awareness of self and others” (Classroom Teacher

Interview 1) and then later adding, “[the canoe project] allows the kids to understand others’ emotions and they show empathy all the time. They notice when others are struggling, when others are uncomfortable, and they go help each other” (Classroom Teacher Interview 2).

In addition to developing emotional awareness, students reported that the canoe project provided a place for them to practice emotional regulation, often dealing with frustration (Peyton, Student Focus Group 1.1; Blake, Student Focus Group 1.3; Aspen, Student Focus Group 2.3, Quinn, Student Focus Group 2.4). For example, a student named Peyton stated, “If you make a mistake and get angry, you can learn how to fix it by changing into a different mindset” (Student Focus Group 2.2) and another student, Quinn, stated, “When I was doing the project and working hard on it, I noticed that my emotions were a bit more in check. My emotions were more under control” (Quinn, Student Focus Group 2.4).

The process of emotional regulation seemed to be visible to parents as well, because several parents validated the experiences reported by students (Rory, Parent Focus Group 1.1; Harper, Terry, Dillon, Parent Focus Group 1.2; Terry, Parent Focus Group 2). As one parent explained, the students “learn to be okay with being frustrated. Frustration is a natural emotion, and they need to learn how to get over that either by themselves or with their friends” (Harper, Parent Focus group 1.2). Both the Classroom Teacher and Standing Red Bear also alluded to the benefits of learning to cope with frustration (Classroom Teacher Interview 1 & 2; Standing Red Bear Interview 2). The Classroom Teacher explained,

When kids start feeling upset about making a mistake with their paddle or something's not working for them, and they start getting frustrated, they have to pause, put the sharp tool down, think about it, and go ask for recommendations or

help with their emotions. They're practicing that here. (Classroom Teacher Interview 1)

Based on the experiences and observations reported above, the canoe project appears to have elicited many emotional responses, with most of the emotions being viewed as positive. The primary positive experiences reported were excitement, enjoyment, and calmness. In the instances where students reported negative emotions, such as frustration, several of the parents and teachers believed that the coping process gave the students a chance to grow.

### ***Physical Experiences***

The third experiences subtheme, physical experiences, centers on participation in activities that may enhance physical well-being and/or provide hands-on experiential learning opportunities. Many students, parents, and teachers described activities that may elicit physiological development such as improved metabolism, motor learning, and strength (Hayden, Jordan, Parker, Student Focus Group 1.1; Cameron, Taylor, Student Focus Group 1.2; Jaime, Student Focus Group 1.3; Jaime, Student Focus Group 2.1; Jordan, Shiloh, Riley, Student Focus Group 2.2; Emery, Rey, Aspen, Student Focus Group 2.3; Quinn, Hayden, Student Focus Group 2.4; Rory, Spencer, Casey, Pat, Ari, Parent Focus Group 1.1; Harper, Terry, Dillion, Parent Focus Group 1.2; Terry, Wren, Harper, Parent Focus Group 2; Classroom Teacher Interview 1 & 2, Standing Red Bear Interview 1 & 2). Several participants also felt the students benefited from spending time outside (Cameron, Student Focus Group 1.1; Peyton, Jordan, Student Focus Group 2.2; Quinn, Student Focus Group 2.4; Rory, Ari, Parent Focus Group 1.1; Terry, Parent Focus Group 1.2; Corey, Terry, Parent Focus Group 2; Standing Red Bear Interview 1; Classroom Teacher Interview 2).



Additionally, one of the parents discussed ways in which the canoe project may have led to healthier eating habits and two parents described the ways in which the canoe project may have improved sleep quality (Pat, Parent Focus Group 1.2; Corey, Parent Focus Group 2).

In an interview with Standing Red Bear, he described in detail the physicality involved with carving a paddle (Standing Red Bear Interview 2). He explained that students are required to stand for long periods of time while using various tools that require both force and precision. He said, “Carving is a holistic action, and it starts from the ground. Whether propelling yourself forward or propelling a blade forward, propulsion starts in the toes” (Standing Red Bear Interview 2). Standing Red Bear went on to describe how virtually every muscle is used during the canoe project and he said students must also learn how to carve using both their dominant and non-dominant hands. He expanded on this by saying,

In a classroom, most kids are always writing with their right hand, always pointing with their right hand, always raising their right hand. But here, we have repeated actions with the left side of their bodies, which is building connections to the right side of the brain. I think in that aspect, they've made connections that they normally wouldn't get in the classroom, or even on a playground. We made that connection from the right side of the brain to the left side of the body, and vice versa. (Standing Red Bear Interview 2)

In addition to the reports from Standing Red Bear, parents also discussed the potential for the canoe project to enhance the students' motor development (Rory, Casey, Pat, Ari, Parent Focus Group 1.1; Harper, Terry, Parent Focus Group 1.2; Harper, Parent Focus Group 2). For example, one parent, Pat, explained that the students who engage in the canoe project are “building fine motor skills and gross ones. They learn how to hold and use the tools.

They push, they pull, they learn when to change directions. I think the motor skills are going to be improved in here” (Parent Focus Group 1.1). Two other parents, Rory and Casey, agreed, saying “I think it’s been very beneficial for [my child] to develop fine motor skills by using the chisel and concentrating on specific areas to carve” (Rory, Parent Focus Group 1.1) and “When we work on the canoe, there’s gross motor stuff, too. I think they are building both gross and fine motor skills” (Casey, Parent Focus Group 1.1).

During both the initial and follow-up focus parent focus groups, one of the parents also spoke about the ways in which the canoe project could improve balance. In the first focus group, this parent, Harper, explained that “[The students] have to be balanced and coordinated. They have to realize when their worktable becomes off balance, and then be able to compensate for that” (Parent Focus Group 1.2). Later, this parent spoke of balance once again immediately after the students were able to test their hand-crafted paddles during the canoe outing. Harper said, “Today at the river, they were testing their balance. Some of those canoes are really tippy” (Parent Focus Group 2). Standing Red Bear also spoke about the challenges to balance that students experienced during the canoe project. He stated,

[The students] are using all of the muscles in their ankles and knees for balance. They’re engaging their entire body to make a paddle and they don’t even realize it... They work the stabilizer muscles in their ankles, feet, toes, and knees. Here, as the children are growing, they’re at a critical time in their development and we’re providing exercise right now. We don’t tell them that they need good balance, but they’ve found that out on their own. (Standing Red Bear Interview 1)

Although none of the students reported improvements in motor development per se, they did discuss physical exertion, improved athleticism, and potential strength gains elicited

by the canoe project (Hayden, Jordan, Parker, Student Focus Group 1.1; Cameron, Taylor, Student Focus Group 1.2; Jaime, Student Focus Group 1.3; Jaime, Student Focus Group 2.1; Jordan, Shiloh, Riley, Student Focus Group 2.2; Emery, Rey, Aspen, Student Focus Group 2.3; Quinn, Hayden, Student Focus Group 2.4). As one of the fourth-grade students, Parker, explained, “I think that this is kind of like an athletic activity where you get to use lots of saws and chisels. The sawing motion, you can tire yourself out just from doing something like that” (Student Focus Group 1.1). One of the students, Quinn, also stated that the canoe project activities could help them in sports. They said that the canoe and paddle building activities “makes us stronger, faster, more healthy, and able to play football better” (Student Focus Group 2.4).

Although no physiological measurements were taken during the study, multiple students reported perceptions of gaining strength (Jordan, Student Focus Group 1.1; Reese, Student Focus Group 1.2; Shiloh, Student Focus Group 2.2; Emery, Rey, Aspen, Student Focus Group 2.3; Quinn, Hayden, Dallas, Student Focus Group 2.4). For example, a student named Hayden said, “It made our bodies healthier because you could feel the burn when you're spokeshaving. Your fingers get stronger” (Student Focus Group 2.4) and another student, Jordan, explained, “While you're working on the canoe, you're getting stronger” (Student Focus Group 1.1). Furthermore, Rey and Aspen reported, “[the canoe project] can make you physically stronger, in your arms” (Rey, Student Focus Group 2.3) and “Working on the canoe project might make us stronger physically, because we're moving. When we're sawing, it makes our arm stronger” (Aspen, Student Focus Group 2.3).

Participants also reported potential health benefits derived from spending time outside (Cameron, Student Focus Group 1.1; Peyton, Jordan, Student Focus Group 2.2; Quinn,

Student Focus Group 2.4; Rory, Ari, Parent Focus Group 1.1; Terry, Parent Focus Group 1.2; Corey, Terry, Parent Focus Group 2; Standing Red Bear Interview 1; Classroom Teacher Interview 2). As the Classroom Teacher explained, “We spent a lot of time just being outside and I think that helps with physical health. They got to be outside moving around” (Classroom Teacher Interview 2). Several parents made similar statements, with one parent saying the project was good for student health because, “They are working outside in the fresh air (Rory, Parent Focus Group 1.1) and another parent saying, “Being outside is really good for the kids, whether they're appreciating the playground, the woodworking space, or river” (Terry, Parent Focus Group 2). A parent named Corey also added,

[The canoe project] was a really positive thing for [my daughter]; being outside, moving, and having to work a little bit harder than she wanted to...I don't know if it's just being outside or if it's this whole experience, but not having to be in a classroom all the time, seems to be positively benefiting her (Corey, Parent Focus Group 2).

Some of the students also commented on the potential health benefits of being outside (Cameron, Student Focus Group 1.1; Peyton, Jordan, Student Focus Group 2.2; Quinn, Student Focus Group 2.4). For example, one student said, “[The canoe project] is physically healthy, because you're outside. You're outside and the fresh air is helpful” (Peyton, Student Focus Group 2.2) and another student said, “We got to be outside a whole lot, instead of going inside and being lazy, sitting around doing nothing” (Jordan, Student Focus Group 2.2). Additionally, a student named Quinn reporting that, “We were outside a lot and that gives us fresh air and sunshine, so that makes us more physically healthy (Quinn Student Focus Group 2.4)”

One of the parents also discussed ways in which the canoe project may have led to healthier eating habits and two parents described the ways in which the canoe project may have improved sleep quality (Pat, Parent Focus Group 1.2; Corey, Parent Focus Group 2). A parent named Pat explained that after each canoe lesson,

[My child] will eat the food they get and not get whiny, they won't complain [about eating their vegetables]. They're much less likely to say, 'I don't like that'. They will say, 'I'm hungry, I'm going to eat'. Getting tired to that point sometimes is not a bad thing (Parent Focus Group 1.2).

Pat also reported that “[my child] will go to sleep earlier” on the days when they work on the canoe and paddles (Parent Focus Group 1.1). The potential improvements in sleep were also reported by another parent, Corey, who stated, “My daughter was always tired after [working on the canoe project], and she would sleep well.” (Parent Focus Group 2).

In addition to the potential improvements in physical fitness that were discussed, several parents and both of the teachers seemed to appreciate the hands-on learning that the students were getting from the canoe project (Harper, Terry, Parent Focus Group 1.2; Terry, Kodi, Parent Focus Group 2). As one parent, Harper, explained, “[the students] are doing something that's very hands-on, which is really good for all the different types of learning. They're not just reading about it, they're not just listening to a teacher, they're actually doing it” (Student Focus Group 1.2). To this effect, a parent named Terry also said that “[the canoe project] mixes what the kids are learning in the classroom with what they learn from [Standing Red Bear] and it becomes hands-on learning” (Terry, Parent Focus Group 2). Standing Red Bear also shared his support for the hands-on learning experiences saying,

In the classroom, the kids' teacher talks to them about the history of the Nez Perce tribe, the army, and all those things. However, that's all in a book or it's from their teachers' mouth. When the kids start to produce these objects, they really start to understand. (Nimiipuu Interview 2)

Standing Red Bear and the Classroom Teacher worked together to ensure that the learning in the classroom synergized with the learning that occurred during the canoe-building lessons. According to the Classroom Teacher, this collaboration between educators allowed students to better understand history through kinesthetic modes of learning. She explained that "The kids know that the discussions we're having in the classroom are connected to what they're doing here with their hands" (Classroom Teacher Interview 1) and "[the students] are there to connect our learning of history to something real that we can carry with us in the form of a paddle" (Classroom Teacher Interview 2).

As evidenced by the data reported thus far, the experiences theme explains how the canoe project provided a space for students to participate in activities or events that may trigger health-enhancing spiritual, emotional, and/or physical responses. The experiences theme is comprised of three subthemes: 1) spiritual experiences; 2) emotional experiences; and 3) physical experiences. Data collected from participants throughout the canoe project indicate that some students may have benefitted from participation in spiritual ceremonies and from exposure to alternative perspectives on life and death from another culture. Participants also self-reported or observed positive emotional states, such as excitement, enjoyment, and calmness in those students who participated in the canoe project. Participants reported that the students were provided with a safe environment where they could practice coping with negative emotions as well. Additionally, the students who took part in the canoe

project were engaged in experiential learning and physical activities that may have improved their motor skills, balance, and strength.

### **Personal Growth**

The third theme, personal growth, is characterized by participation in processes that encourage the acquisition of life skills (WHO, 2022), the development of virtues (EL Education, 2023), and the practice of higher-level cognition. The personal growth theme contains three subthemes: 1) character development; 2) thinking & learning; and 3) perseverance.

#### ***Character Development***

The first personal growth subtheme, character development, focuses on the process of acquiring prosocial virtues. The most common components of the character development subtheme are responsibility, respect, leadership, and virtuous behavior. In every interview and focus group, participants were asked about the canoe project's potential to spur the development of responsible behavior in students. Students reported several ways in which the canoe project required them to be responsible and some of most common responses were about safety (Parker, Emery, Hayden, Peyton, Student Focus Group 1.1; Reese, Dakota, Student Focus Group 1.2; Shiloh, Blake, Student Focus Group 1.3; Ira, Student Focus Group 2.1; Peyton, Riley, Student Focus Group 2.2; Cameron, Student Focus Group 2.3). One of the students, Reese, said that "You need to know where to you put your hands to make sure that you don't put your hands in a dangerous place" (Student Focus Group 1.2) and another student, Emery, explained "You learned to be responsible because, if you like make any mistakes, it could kill someone with one of those saws. You could gravely injure them" (Student Focus Group 1.1). Many of the parents and both of the teachers also discussed tool

safety (Casey, Rory, Ari, Parent Focus Group 1.1; Dillon, Harper, Terry, Harper, Parent Focus Group 1.2; Kodi, Wren, Parent Focus Group 2; Classroom Teacher Interview 1 & 2; Standing Red Bear Interview 2). For example, one parent explained that “[The students] are using real tools and that can be dangerous, so they need to be really careful and mindful of others” (Casey, Parent Focus Group 1.1) and another said,

An adult or mentor would show them how to use a very sharp, potentially dangerous tool. I never saw anyone horsing around. It looked like everybody took it seriously. Later on, the kids were all using woodworking tools all by themselves. I thought it was impressive that they realized how dangerous the tools could be and they rose to the occasion. (Wren, Parent Focus Group 2).

Along with being responsible for using the tools safely, participants also reported the ways in which students were responsible for treating the tools with respect (Dallas, Student Focus Group 1.2; Shiloh, Blake, Student Focus Group 1.3; Cameron, Student Focus Group 2.3; Rory, Ari, Parent Focus Group 1.1; Harper, Parent Focus Group 1.2; Kodi; Rowyn, Parent Focus Group 2). As a student named Dallas explained, “You have to respect the tools. Don't just throw them into the bin when you're done” (Dallas, Student Focus Group 1.2). Parents also discussed being responsible with the tools. One parent, Rory, said “They have to be safe with the tools and they also have to be respectful of the tools. They cannot damage them or misuse them in any way.” (Parent Focus Group 1.1)

Students also explained that the canoe project involved self-directed learning, so each student was expected to take some responsibility for their own learning (Peyton, Student Focus Group 1.1; Reese, Student Focus Group 1.2; Jaime, Shiloh, Aspen, Student Focus Group 1.3). Jaime said, “We have a responsibility to learn because learning is a really



important thing” (Student Focus Group 1.3) and another student, Shiloh, said, “We all have to take responsibility for our actions, our tools, and our learning” (Student Focus Group 1.3). Two of the students, Peyton and Riley, also indicated that the canoe project sometimes involved a shared responsibility, too. As Peyton explained, “You have to have responsibility for what you are making because there are only so many adults that can help. You can help a friend, too, but the paddles are your responsibility, and the canoe is everyone's responsibility” (Student Focus Group 2.2) then Riley responded, “with the canoe, you have to be responsible because it's everybody's project, not just yours” (Student Focus Group 2.2). One of the parents, Terry, also spoke about this blend of individual and shared responsibility by saying,

The kids are also responsible for their part in building the canoe and making their own paddles. Even if they may not feel like doing Canoe Club today, and they would rather be playing, it's still their responsibility to do their part for a little while. Then they can play afterwards. (Parent Focus Group 1.2)

Standing Red Bear also spoke about student responsibility. He said that responsible behavior emerges naturally during the canoe project because students are trusted to work together to meet a timebound goal while representing their community (Standing Red Bear Interview 1 & 2). To this effect he stated, “I could put up a sign that says, ‘We're going to learn responsibility, perseverance, and patience’, but it doesn't mean they will learn these things. We gave the children this project, and they made it happen” (Standing Red Bear Interview 2).

In addition to responsibility, Standing Red Bear spoke about the potential for the canoe project to build leadership skills for some students (Standing Red Bear Interview 1 &

2). He spoke of multiple occasions in which he saw the more advanced or more capable students helping the students who were struggling. For example, Standing Red Bear said, “Some of [the students] have already noticed the size difference between students, and the big ones are finding that they can help the smaller ones. They've taken on a leadership role, walking over and helping the small one” (Standing Red Bear Interview 1). In a follow-up interview, Standing Red Bear discussed student leadership once again. He said, “Although the paddles were individual to each student, the making of the paddles was really a group project. Some of them have learned that they’re leaders now” (Standing Red Bear Interview 2).

The Classroom Teacher and Standing Red Bear also spoke generally about the canoe project’s ability to develop the students’ character (Classroom Teacher Interview 1; Standing Red Bear Interview 1). As the Classroom Teacher explained, “[The canoe project is] a great opportunity for the kids to learn about character and the values...completing this project takes character” (Classroom Teacher Interview 1). Standing Red Bear also weighed in on the topic of character development, saying, “A lot of the kids have expanded their character... [some students] have given up their time to go help someone else... that's all part of the character building here”.

### ***Thinking & Learning***

The second personal growth subtheme, thinking & learning, is characterized by engagement in activities that might challenge students to think critically, utilize reasoning skills, keep an open mind, and embrace curiosity in order to obtain new knowledge and skills. Throughout the study, students, parents, and teachers were able to describe ways in which the canoe project could improve the student's cognitive ability (Hayden, Quinn,

Parker, Emery, Student Focus Group 1.1, Cameron, Dakota, Reese, Taylor, Student Focus Group 1.2; Blake, Shiloh, Aspen, Jaime, Student Focus Group 1.3; Sky, Jaime, Taylor, Student Focus Group 2.1; Riley, Jordan, Shiloh, Peyton, Student Focus Group 2.2; Cameron, Aspen, Emery, Parker, Rey, Student Focus Group 2.3; Hayden, Dallas, Student Focus Group 2.4; Ari, Pat, Casey, Spencer, Rio, Rory, Parent Focus Group 1.1; Terry, Dillon, Harper, Parent Focus Group 1.2; Wren, Kodi, Terry, Shannon, Ari Parent Focus Group 2; Classroom Teacher Interview 1 & 2; Standing Red Bear Interview 1 & 2). Reports of obtaining new knowledge, acquiring new skills, cultivating curiosity, and developing introspection constituted the subtheme of Thinking & Learning.

From the students' perspective, the canoe project's most prominent cognitive objective was to learn about the history and culture of the Nimiipuu people. Many students said that they were grateful for the chance to interact with Nimiipuu people, who were able to share their linguistic, cultural, and historical knowledge with the class (Hayden, Quinn, Parker, Emery, Peyton, Student Focus Group 1.1; Aspen, Student Focus Group 1.2; Aspen, Rey, Student Focus Group 2.3; Hayden, Student Focus Group 2.4). As an example, Hayden, one of the one of the fourth-graders, said, "We learn about different tribes, different things that are new to us" (Student Focus Group 1.1) and another student, Quinn, said "we are learning things from a community of native experts, like learning a bit of their language... so, someday I could teach other kids some of this language when I'm an adult (Student Focus Group 1.1)". Additionally, another student named Aspen stated, "The project teaches others the Nimiipuu way. They've had a really rough past, but that doesn't mean there's not other sides to the story" (Student Focus Group 2.3).

The parents and teachers also discussed the knowledge of the Nimiipuu people that students obtained while participating in the canoe project (Rio, Pat, Parent Focus Group 1.1; Dillon, Harper, Parent Focus Group 1.2; Kodi, Wren, Terry, Parent Focus Group 2; Classroom Teacher Interview 1 & 2, Standing Red Bear Interview 1 & 2). For example, one parent said, “The kids get a realization from Standing Red Bear’s stories, that we have not had a perfect past. It helps them understand why people might be angry or upset about certain things in the past” (Pat, Parent Focus Group 1.1) and another parent, Dillon, said, “They’re learning a lot about the native people in our country” (Dillon, Parent Focus Group 1.2). The Classroom Teacher also discussed the learning that occurred during the canoe project. She said that “[the canoe project] is about curiosity. This project is helping the kids become curious about all of these connections between subject matter, time, place, and people” (Classroom Teacher Interview 1) and in a later interview she explained that by the end of the canoe project, “[the students] learned about history, about their families, about the Nimiipuu... they get the history and the meaning” (Classroom Teacher Interview 2).

In addition to cultural and historic knowledge, participants also discussed the acquisition of woodworking knowledge and skills (Parker, Student Focus Group 1.1; Dakota, Reese, Cameron, Taylor, Student Focus Group 1.2; Blake, Shiloh, Student Focus Group 1.3; Jamie, Student Focus Group 2.1; Shiloh, Riley, Student Focus Group 2.2; Dallas, Student Focus Group 2.3; Pat, Casey, Spencer, Parent Focus Group 1.1; Terry, Dillon, Harper, Parent Focus Group 1.2; Wren, Terry, Parent Focus Group 2; Classroom Teacher Interview 1). As one student, Dakota, explained, “[The canoe project] helps you learn woodworking and how to use saws. It’s really cool to know how to do that” (Student Focus Group 1.2). Two other students also said, “It’s very important to remember these skills because it allows us to build

stuff ourselves” (Riley, Student Focus Group 2.2) and “The canoe project gives me hope that we'll have a good canoe and that I'll have a good life, knowing how to build canoes and other things” (Cameron, Student Focus Group 1.2). Parents also made statements about the acquisition of woodworking knowledge and skills. For example, a parent named Spencer said, “Both of my girls have been very interested in learning more about woodworking. They wanted to go back to our house to try carving. It stimulated their interest and their potential in that area” (Spencer, Parent Focus Group 1.1). Another parent, Terry, also stated,

[My daughter] has never done anything like that before, not any woodworking at all. I think it's a good skill to have. She's learning the names of all the different tools and how to use them... [the kids are] doing any kind of woodworking, figuring out how to use the clamps, learning how hard to push down, and how deep to chisel. I think this whole project is a great intellectual challenge. (Parent Focus Group 1.2)

The Classroom Teacher also spoke about the woodworking done during the canoe project, saying, “We're there to carve our own paddle and to learn woodworking skills, and we're there to participate in the revival of the traditional canoe movement” (Classroom Teacher Interview 1). She later added,

I know several parents who have said, ‘My kid wants to be carving more paddles’, or ‘My kid now wants to do woodworking’. The kids now have this potentially physically active hobby. They could, in theory, do wood carving instead of doing more sedentary activities after school and on the weekends.” (Classroom Teacher Interview 2)

Along with obtaining knowledge and skills, participants reported ways in which the canoe project may have promoted other cognitive processes such as curiosity, imagination, and/or introspection (Quinn, Student Focus Group 1.1; Aspen, student Focus Group 1.3; Jordan, Peyton, Student Focus Group 2.2; Parker, Student Focus Group 2.3; Spencer, Pat, Parent Focus Group 1.1; Terry, Wren, Student Focus Group 2; Classroom Teacher Interview 1 & 2; Standing Red Bear 1 & 2). Regarding the ways in which the canoe project could elicit curiosity, a student named Parker stated, “This project helps you be more curious about how things are made. It helps you be more thoughtful, and say, ‘Oh, that's how that works’” (Student Focus Group 2.3) and another student, Jordan, said, “I think it made us intellectually healthier because we got to use new tools. I was curious about how they worked” (Student Focus Group 2.2). The Classroom Teacher corroborated these statements by saying, “There's never a moment where your intellectual curiosity is not piqued” (Classroom Teacher Interview 2) and “I think [these lessons] help change [the students’] brains, their hearts, and their mindset to be more curious about culture, race, and ethnicity” (Classroom Teacher Interview 1).

In addition to curiosity, participants also spoke about ways in which the canoe project could spur imagination (Quinn, Student Focus Group 1.1; Terry, Parent Focus Group 2; Standing Red Bear Interview 1 & 2). For example, a parent named Terry said that the students “had to envision what [the wood] was going to turn into. They had to have a critical mind, think about it, and then do the work to end up with a paddle and a canoe” (Parent Focus Group 2) and Standing Red Bear also spoke about imagination in both of his interviews. In the first interview he stated,

The canoe wasn't even up on the stands, it was sitting on the gravel, and [the students] were already expressing an interest in sitting in it and imagining what this is going to do in the water. They've already imagined the trip and we didn't prompt them to do that, so imagination is in high gear here. (Standing Red Bear Interview 1)

Once the canoe project had concluded, Standing Red Bear spoke once again about the students' use of imagination during the project. In a follow-up interview, he said,

We got down to the river and the children used their paddle, that was its purpose. The kids had their tool to use with the canoe and it puts them into an interlocking puzzle. That experience, I think, is something that is very intellectual. The experience requires imagination that really took off once they got into the boat and imagined what it was going to be like before we even went to the river. (Standing Red Bear Interview 2)

Along with other cognitive processes, some participants also discussed ways in which the canoe project could elicit introspection and the acquisition of self-knowledge (Aspen, Student Focus Group 1.3; Pat, Parent Focus Group 1.1; Classroom Teacher Interview 1 & 2; Standing Red Bear Interview 2). At least one parent and one student made comments about the self-knowledge elicited by the canoe project. Aspen, one of the fourth-graders, said, “[the canoe project] will help us learn more about ourselves” (Student Focus Group 1.3) and Pat, one of the parents, said, the canoe project “is about knowing yourself” (Parent Focus Group 1.1). The idea of fostering self-knowledge was also supported by Standing Red Bear, who stated,

In order for the children to be connected to nature, they have to be connected to who they are, they have to find out who they are. I tried to lead them through that using the songs and stories... Through this project, the children had that realization of self.

They learned where they are in this world, and where they are in relation to the older people. (Standing Red Bear Interview 2)

The Classroom Teacher also spoke about self-knowledge during her interviews. She said the canoe project is “a great opportunity for the kids to learn about their character and their values” (Classroom Teacher Interview 1) and that it “builds emotional awareness of self and others” (Classroom Teacher Interview 1). She also explained that by the end of the canoe project, “[The students] learned how to understand themselves a little more” (Classroom Teacher Interview 2) and “They learned to understand their own ideas and their comfort level with making mistakes” (Classroom Teacher Interview 2).

### ***Perseverance***

The third personal growth subtheme, perseverance, focuses on the ability to put forth a sustained effort while working towards an objective despite the presence of persistent challenges. The perseverance subtheme primarily involves working through frustrating situations, rejecting perfectionism, accepting mistakes, and adopting a growth mindset. Perseverance became a recurring topic in lectures, stories, and activities and it was mentioned or alluded to by parents, teachers, and students throughout the project (Jordan, Quinn, Student Focus Group 1.1; Blake, Student Focus Group 1.3; Jaime, Student Focus Group 2.1; Riley, Shiloh, Peyton, Student Focus Group 2.2; Rey, Emery, Parker, Student Focus Group 2.3; Rory, Parent Focus Group 1.1; Harper, Dillon, Terry, Parent Focus Group



1.2; Shannon, Terry, Corey, Parent Focus Group 2; Classroom Teacher Interview 2; Standing Red Bear Interview 2).

As reported in the emotional experiences section above, the canoe project evoked emotional responses from many students. Although the majority of emotions reported by students were positive, some uncomfortable emotions were discussed. Across several focus groups, students mentioned feeling anxious, scared, or frustrated several times during the project (Jordan, Quinn, Peyton, Student Focus Group 1.1; Blake, Shiloh, Student Focus Group 1.3; Peyton, Shiloh, Student Focus Group 2.2; Aspen, Emery, Student Focus Group 2.3; Quinn, Student Focus Group 2.4). Two students, Quinn and Jordan, reported feeling uneasy about taking the canoe on the river. Quinn said, “I’m actually nervous about the current catching the canoe and dragging us away so we can’t find our way back” (Student Focus Group 1.1) and Jordan said, “I feel a bit scared that maybe if we put the boat on the water, something really bad will happen... What happens if someone crashes the boat? What happens if the teacher falls off?” (Student Focus Group 1.1).

Several students also said they felt uneasy because the success of the project was not guaranteed (Jordan, Student Focus Group 1.1; Shiloh, Student Focus Group 1.3; Peyton, Student Focus Group 2.2; Emery, Student Focus Group 2.3). For example, a student named Emery said, “[the canoe project] made me feel a tiny bit stressed because in the back of my head I thought, “what happens if the boat sinks or my paddle breaks?”” (Student Focus Group 2.3) and another student, Peyton said, “In the beginning, you don’t know what’s going to happen, you don’t know if you’re going to mess up, you don’t know if the canoe will get ruined and not float” (Student Focus Group 2.2). Two other students also reported feeling uncomfortable about the limited amount of time they had to complete the canoe project

(Shiloh, Peyton, Student Focus Group 2.2). While explaining the canoe project, the Classroom Teacher said that “[the students] know if you don't put in the time and the work, your paddle won't get done, so they show up ready to do the work” (Classroom Teacher Interview 1) and this time crunch may have caused some anxiety for students. For example, a student named Peyton said, “When you were at the end of the project, if you mess up and have to restart, you can't really restart because there's not enough time” (Student Focus Group 2.2) and a student named Shiloh said,

You want to take your time, but we have such a small amount of time that it seems like pressure is being weighed on everyone's shoulders. I also felt a little bit unhappy at times, like when I had a hard time going with the wood grain or when I needed help sanding. It got me really upset, but as soon as you get that part done, it feels so satisfying. (Focus Group 2.2)

This quote from Shiloh shows that satisfaction can be gained from persevering through a difficult task and some of the adults involved in the canoe project agreed. Although the above quotes by Shiloh, Quinn, Jordan, and Peyton indicate distress, the teachers and several parents endorsed a small dose of adversity, insisting that students would benefit from the challenge (Rory, Casey, Pat, Parent Focus Group 1.1; Harper, Dillon, Terry, Parent Focus Group 1.2; Shannon, Terry, Wren, Corey, Parent Focus Group 2; Classroom Teacher Interview 1 & 2; Standing Red Bear Interview 2). As the Classroom Teacher put it, “The kids learned how to ask for help, but also how to solve a problem on their own. Everybody's learning and everybody's struggling and that's exactly what we want. We want everyone to struggle productively” (Classroom Teacher Interview 2). Some of the parents also discussed persisting through adversity with one parent saying that the canoe project was healthy for the

students because “They’re dealing with frustration” (Dillon, Parent focus Group 1.2) and another parent saying, “Even if there were challenges along the way, they’ll know that they did this really cool thing” (Terry, Parent Focus Group 1.2). Another parent, Corey, also added that “[the canoe project] was a really positive thing for [my daughter]; being outside, moving, and having to work a little bit harder than she wanted to” (Parent Focus Group 2). Parents also reported seeing “resiliency” (Harper, Parent Focus Group 2) and “perseverance” (Terry, Parent Focus Group 2) in the students and at the end of the project “They got to see the fruits of their efforts” (Rowyn, Parent Focus Group 2).

In addition to building resiliency, several parents said that the canoe project may have helped the students move away from perfectionism (Casey, Ari, Parent Focus Group 1.1; Corey, Parent Focus Group 2). One parent said, “Even though [the paddle] won’t be exactly what [the students] wanted, they can work on it. I think it’s been really good for my son because he’s kind of a perfectionist” (Casey, Parent Focus Group 1.1) and another parent shared,

My daughter is a bit of a perfectionist, and she is sad a lot of the time. She was really upset because her etching on the paddle didn’t go as planned, but we were just out on the water, and it was neat to see that it was functional. Once she saw that, all of the little things that she was worrying about were washed away. (Corey, Parent Focus Group 2)

Throughout the canoe project, both the Classroom Teacher and Standing Red Bear indicated that seeking perfection was not the goal for students in the project (Classroom Teacher Interview 1 & 2; Standing Red Bear 1 & 2). To this effect, the teachers developed a motto which was often repeated to parents and students when perfectionism appeared to

cause distress. Quoting Standing Red Bear, the motto was “There is no right way to do things, there are only good ways” (Standing Red Bear Interview 2). From experience with previous projects, the Classroom Teacher and Standing Red Bear knew that students would need reassurance about imperfections and mistakes. In fact, learning to deal with mistakes was one of the most frequently reported benefits mentioned by students, parents, and teachers throughout the canoe project (Peyton, Jordan, Student Focus Group 1.1, Peyton, Jordan, Student Focus Group 2.2; Parker, Rey, Emery, Cameron, Student Focus Group 2.3; Casey, Ari, Pat, Spencer, Parent Focus Group 1.1; Harper, Parent Focus Group 1.2; Wren, Corey, Parent Focus Group 2; Classroom Teacher Interview 1 & 2; Standing Red Bear Interview 1 & 2).

Several students shared their experiences with making and then coping with mistakes ((Peyton, Jordan, Student Focus Group 1.1, Peyton, Jordan, Student Focus Group 2.2; Parker, Rey, Emery, Cameron, Student Focus Group 2.3). Students often showed self-confidence and optimism when discussing the mistakes they made throughout the canoe project. For example, a student named Jordan explained, “If you make a mistake on your paddle, then you become experienced with that kind of mistake. You learn from that and you learn that it's okay to make mistakes, and just try to fix it” (Student Focus Group 1.1) and a student named Peyton said,

If you make a mistake and get angry, you can learn how to fix it by changing into a different mindset. You have to understand that mistakes are going to happen, and then be happy about it and not as stressed. (Student Focus Group 2.2)

Several other students shared what they learned about accepting mistakes during the canoe project as well. For example, one of the students said, “I cut my paddle a little bit over the

line, but I like it now. I think it made it look better. I don't think the mistakes should be judged because it could lead to a really good thing" (Cameron, Student Focus Group 2.3) and another student said, "I made a mistake [on my canoe paddle], but it makes it look more unique. It gives it character. It's the imperfections that make it perfect" (Parker, Student Focus Group 2.3).

Several parents also spoke about the benefits of learning to deal with mistakes in a healthy way (Casey, Ari, Pat, Spencer, Parent Focus Group 1.1; Harper, Parent Focus Group 1.2; Wren, Corey, Parent Focus Group 2). For example, a parent named Spencer explained, "If you make a mistake, it's your mistake and that's okay. [The students] are learning to deal with that" (Parent Focus Group 1.1) and another parent, Harper, said, "[The students] see their mistakes as a way to learn and grow" (Parent Focus Group 1.2). Additionally, a parent named Rory said that "[The students] can see they've made a mistake or that something's gone wrong, but then they manage their emotions and get through it, they're still continuing, not giving up" (Rory, Parent Focus Group 1.1) and another parent, Wren, said,

Certain things don't go as planned. I think they had to cope with making a mistake. They had to learn that it's not the end of the world, that they can fix mistakes, they can sand it or change the paddle's shape a little. (Wren, Parent Focus Group 2)

As part of the larger discussion about accepting mistakes, a parent named Ari commented on the asymmetrical handles that several students ended up with, even though they originally planned on making a symmetrical paddle. Ari said,

I've noticed that many of the paddles have a straight handle at the end because of a mistake. It's not perfect, but that's a good lesson because life is not perfect. We have

to adapt. I think it's probably hard for them when they first make a mistake, but they've figured out that it still works even though it's not perfect. (Parent Focus Group 1.1)

These asymmetrical handles became a symbol of accepting mistakes because every student had designed a symmetrical handle at first, but symmetrical handles are difficult to make. When students were shaping their handles, several students accidentally removed too much wood and were forced to redesign their handle to be asymmetrical. Asymmetrical handles are functional and have some benefits, so the quality of the paddle did not change, only the design. Fortunately, some of the students said they liked the final design even more after making a mistake (Rey, Parker, Student Focus Group 2.3).

Coping with mistakes became a common occurrence during the canoe project and Standing Red Bear shared his thoughts about the topic during the final interview. He said, "In this project, [the students] learned to be okay with making mistakes. Many of the children came here fearing mistakes and were afraid to do something new if they didn't think they could do it perfectly" (Standing Red Bear Interview 2). Standing Red Bear then decided to elaborate on how students accepted mistakes by sharing an anecdote. He said,

While singing a song story at one of the canoe lessons, I was drumming on the canoe with a student's paddle and part of the handle broke off. I apologized to her. We told her we could glue the broken piece back on or she could just leave it the way it is, the choice was up to her. Later on, that student spoke at the canoe launching ceremony, and she brought it up. She told the story about me drumming and said she realized that a mistake was made and that a portion of her paddle was gone. She said, "When [Standing Red Bear] broke my paddle, it didn't really bother me. I just looked at it

and decided that I liked it the way it is now. It looks unique'. She handled it with grace. She was able to move on from a mistake and she provided an example for everyone else to follow.

In Standing Red Bear's anecdote, the student demonstrated the ability to deal with mistakes in an exemplary way. Not only did the student deal with a mistake, she dealt with a mistake made by another person that damaged the paddle she had been arduously working on for weeks. For the teachers, this represented the personal growth outcomes they were hoping for when designing the canoe project.

## Chapter 5: Discussion and Conclusions

The purpose of this study was to explore the holistic health benefits that elementary students may receive through their participation in a series of physically active lessons that involved building a dugout canoe and canoe paddles. A slight emphasis was placed on the spiritual health benefits due to a paucity of studies on the topic. For the purposes of the this study, holistic health was viewed through the lens of Hjelm's Five-Dimensional Model of Health (Hjelm, 2010), while spiritual health was further informed by Fisher's Four Domains Model of Spiritual Health and Wellbeing (Fisher, 2011). The study employed a qualitative exploratory embedded single-case study design (Yin, 2014) and sought to answer the following research questions: 1) In what ways might participating in physically active canoe and paddle building lessons make students healthier?; and 2) What spiritual health benefits are reported for students who participate in physically active canoe and paddle building lessons?

Data were collected using focus groups, semi-structured interviews, researcher surveys, researcher field notes, and photographic documentation of artifacts. The data were then analyzed using a thematic analysis which uncovered three themes: 1) relationships; 2) experiences; and 3) personal growth. The relationships theme is characterized by engagement with people, organizations, or entities that may develop or deepen meaningful connections. The experiences theme is characterized by the participation in activities or events that may trigger a health-enhancing spiritual, emotional, or physical response. The personal growth theme is characterized by engagement in processes that encouraged the acquisition of life skills (WHO, 2022), the development of virtues, and the practice of higher-level cognition.



Each of these themes are comprised of subthemes describing the many ways in which the canoe project may have positively impacted the students' health.

### **Holistic Health Benefits**

The data suggest that students may have received numerous health benefits through participation in the canoe project while still meeting scholastic learning objectives. Using Hjelm's Five-Dimensional Model of Health (Hjelm, 2010), health and wellbeing can be divided into five interconnected dimensions: physical, social, emotional, intellectual, and spiritual health. Reports from participants indicate that each of these five dimensions of health were impacted, with certain dimensions of health being reported more than others. Many of the participants' claims appear to align with current health research, but some claims appear to be uncorroborated by scholarly literature.

### ***Physical Health***

As explained by Hjelm (2010), many definitions and descriptions of physical health exist, but most emphasize body composition, body functionality, absence of disease, absence of injury, maintenance of nutritional needs, physical hygiene, and longevity. No physiological or anthropometric assessments were conducted during this study, but based on participant reports, the canoe project may have improved the physical health of students by providing them with novel physical activities in a natural environment. Instead of being sedentary in a classroom, the students were outside using many different hand tools to carve a canoe and paddles out of wood. Additionally, if students lost focus during a carving session, they were allowed to play on a nearby playground, which provided even more opportunities for physical activity. Therefore, the majority of students who participated in the canoe project were physically active for up to 90 minutes each session.

According to the Centers for Disease Control and Prevention (CDC, 2022), elementary-aged children should engage in at least 60 minutes of moderate-to-vigorous physical activity (MVPA) each day. Although not all canoe and paddle building activities would be considered MVPA, some activities such as adzing or carving with an inshave could be considered moderate intensity exercise if done with vigor. However, these activities were almost always done at a lower intensity. The majority of carving activities involved low-intensity repetitive movements involving multiple muscle groups while standing in one place. Based on research notes and participant accounts, it is reasonable to assume that most of the students engaged in at least low-intensity physical activity 60 minutes or more each lesson. Therefore, it is unlikely that students met CDC recommendations for MVPA through the canoe project, but they were able to avoid sedentary behavior by moving their bodies in novel ways. Since sedentary behavior is associated with cardiovascular disease mortality, cancer, type-2 diabetes, and various other causes of mortality (Ekelund, et al., 2019; Keadle, Conroy, Buman, Dunstan, & Matthews, 2017; World Health Organization, 2020), the students may have been improved by simply avoiding sedentary behavior.

Students also used a variety of hand tools during the canoe project, which may have improved the students' gross and fine motor skills. The acquisition of motor skills is unique to each learner, and it is influenced by the complexity of the performance tasks, the amount of time spent practicing those tasks, and the physical maturity of the learner (Goodway, Ozmun, & Gallahue, 2019). Gross motor skills use several large muscles while performing a task (e.g., jumping, running, climbing) and fine motor skills use several small muscles to perform a task (e.g., writing, tying knots, drawing) (Goodway, Ozmun, & Gallahue, 2019). Existing literature suggests that "competence in fundamental motor skills facilitates physical

activity participation and is important for children's holistic development" (Bolger, et al., 2020, p. 717) and that motor skill competence developed in childhood may contribute to health-related fitness into adolescence (Stodden, Gao, Goodway, & Langendorfer, 2014).

During the canoe project, students worked on their fine motor skills by drawing canoe paddle designs, measuring and marking fine lines on the paddles, wood burning images into their paddles, brushing their paddles with varnish, tying knots for the prayer ties, and making small adjustments to tools. Students worked their gross motor skills by removing wood from the paddles and canoe with saws, chisels, mallets, adzes, spokeshaves, inshaves, rasps, and other tools. Although the specific motor skills acquired during the canoe project may not be useful in the everyday life of most students, motor skills can be positively transferred to new contexts, but this positive motor skill transfer is more likely to occur if the new skills are similar to the movements used to carve canoes and paddles (Müssgens & Ullén, 2015). Therefore, the motor skills gained through hours of carving may help students acquire other motor skills more rapidly in the future, especially if the new motor skills are similar to carving. Based on participant reports and existing research, the claim that the students were able to develop motor skills through the canoe project appears to have some merit.

Participants also perceived improvements in physical strength, particularly in the hands, arms, and legs. Regular strength training can provide children with improvements in health, a reduced risk of injury, and increased physical literacy (Stricker, Faigenbaum, & McCambridge, 2020) and the CDC recommends that children engage in muscle-strengthening activities on three or more days each week (CDC, 2022). Strength training is not limited to lifting weights, but optimal strength gains are induced when the participants are experiencing high levels of resistance that fatigues the muscles and nervous system

(Stricker, Faigenbaum, & McCambridge, 2020). Despite participant reports of strength gains, very few of the carving tasks performed by students involved high levels of resistance. Most of the carving tasks involved low-resistance, highly repetitive movements spanning long durations which is more similar to muscular endurance training than strength training (American College of Sports Medicine, 2009). Therefore, it is unlikely that students gained muscular strength, but it is possible that students improved muscular fitness to some extent.

In addition to improvements in physical fitness, parents discussed potential improvements in sleep quality and appetite. Previous studies have shown positive correlations between physical activity and sleep quality (Jurado-Fasoli, et al., 2020; Mendelson, et al., 2015; Uchida, et al., 2012). Physical activity has also been linked to healthier dietary behaviors (Christofaro, et al., 2021; Sallis, Prochaska, & Taylor, 2000) and most of the students who participated in the canoe project spent more than 60 minutes being physically active during each lesson. Therefore, it is feasible that the students who participated in the canoe project experienced improved sleep quality and more healthful eating habits due to increased levels of physical activity.

In addition to improvements in fitness, dietary habits, and sleep quality, participants reported physical health benefits from exposure to sunshine and fresh air. No measures of air quality were taken at the participating school or at the canoe project worksite, so reports of air quality were all based on participant reports. In general, air quality in and around school buildings varies greatly depending on many factors, including particulate matter, volatile organic compounds, and oxidative gasses (Johnson, Lynch, Floyd, Wang, & Bartels, 2018). The quality of indoor air is highly dependent on the quality of ventilation, and poor ventilation can continuously circulate viruses and pollutants, posing a risk to those who are

exposed to the contaminated air (van den Berg, 2005). The quality of air outdoors is mostly dependent on the levels of pollution and particulate matter, which often come from nearby vehicles or industry (Johnson, Lynch, Floyd, Wang, & Bartels, 2018). Since the canoe project took place at an environmental institute, the students were surrounded by gardens and orchards, and separated from motor vehicles, which may have decreased localized air pollution. The students were also exposed to sunlight during most lessons, which some participants considered healthy. Sun exposure was not measured in this study, but exposure to sunlight has been associated with vitamin D synthesis, decreased blood pressure, decreased risk of certain types of cancer, and other health benefits (Razzaque, 2018; Holick, 2016). Therefore, it is possible that students received some health benefits from working outside in the sunlight and fresh air for several hours each week.

When examining the existing literature on PALs in general, physical health benefits appear to be the most evidenced, with studies showing improvements in aerobic fitness (Seljebotn, et al., 2019), speed-coordination, and static strength (de Greef, et al., 2016). PALs also reduce or prevent sedentary behaviors that are associated with negative health impacts (Grieco, Jowers, Errisuriz, & Bartholomew, 2016; Vetter, O'Connor, O'Dwyer, Chau, & Orr, 2020) and may positively influence body composition with the right methods and dosage (Donnelly, et al., 2009). Additionally, have the potential to increase Vitamin D levels, reduce risk of obesity, improve fitness, and reduce near sightedness if done outdoors (Christiansen, Hannan, Anderson, Coxon, & Fargher, 2018).

### ***Social Health***

According to Hjelm's Five-Dimensional Model of Health (Hjelm, 2010), social health is characterized by the formation and maintenance of healthy relationships with others, self-

expression, interpersonal skills, and the presence of social support systems. Based on participant reports, the canoe project may have improved the social health of students by providing a space for them to meet new people, practice prosocial behavior, learn from mentors, and collaborate with friends and family members. Research shows that having friends dramatically impacts happiness, wellbeing, and longevity with the quality and size of our social network correlating with our overall health (Dunbar, 2018). Inversely, loneliness and social isolation is linked to serious health conditions such as smoking, obesity, physical inactivity, dementia, heart disease, stroke, anxiety, depression, and suicide (National Academies of Sciences, Engineering, and Medicine, 2020). Therefore, making strong and long-lasting connections with others appears to be an imperative part of attaining optimal health.

Friendships may begin or become strengthened when two or more individuals provide each other with support, express similar interests or beliefs, work towards a shared goal, learn from one another, and/or experience enjoyable interactions (Lee & Lok, 2012). Participants in the canoe project reported a sense of community among students that stemmed from having many shared goals. These shared goals involved the creation of canoe paddles and a dugout canoe, the promotion of Standing Red Bear's organization, and the meeting of educational standards for history. Participants also reported many positive interactions between students that included helping others, providing emotional support and motivation, making each other laugh, and having constructive conversations about ethics and culture. Based on participant reports and a review of scholarly research, it seems feasible that the canoe project could have elicited or strengthened friendships. However, the quality and

quantity of interactions varied from one student to another, which may have determined the extent to which the canoe project impacted friendships between students.

Participants also discussed the canoe project's potential for improving familial relationships. Similar to having friends, closeness with family members is associated with numerous health benefits and can provide people a sense of meaning and purpose (Dunbar, 2018; Thomas, Liu, & Umberson, 2017). Additionally, familial relationships appear to be very resistant to relationship decay, meaning the bonds between family members can remain strong despite the impact of distance and time (Roberts & Dunbar, 2015). However, the strength of a relationship, familial or otherwise, is strongly associated with the level of effort invested in the relationship (Roberts & Dunbar, 2015). Strong families often put effort into providing each member with love, support, and care while avoiding arguments and excessive criticism (Thomas, Liu, & Umberson, 2017).

The parents and guardians who participated in the canoe project often provided their children with encouragement and support and refrained from belittling the work that was put into the paddles and the canoe. Parent volunteers regularly helped the children with following safety procedures, managing equipment, and woodworking. Many of the parents involved in the canoe project would arrange their schedules so they could participate during school, after school, and on weekends. Most of the parents also found the time to meet at the river for the canoe launching despite the launch occurring during work hours on a weekday. Furthermore, participants reported having family conversations about the canoe project and several parents said they supported their child's interest in the project by allowing them to participate in woodworking at home.

Several of the students also invited a sibling to participate in the project, allowing their brother or sister to share in the experience. The siblings involved in the project either helped their brother or sister to create their paddle or they carved their own paddle side-by-side with their sibling. Based on participant reports, it seems as though many parents and siblings put forth an effort to support the students involved with the canoe project. Since existing research correlates loving, supportive, and non-judgmental family interactions with positive health outcomes, it is possible that some students benefitted from family involvement with the canoe project.

Participants also discussed the canoe project's potential to expand the social network of students, allowing them to interact and learn from people with diverse backgrounds. The canoe project allowed students to learn about Native American culture from Standing Red Bear, woodworking from university researchers, and sustainability from local environmentalists. Therefore, students had to learn how to follow directions and show respect for different mentors who had their own unique way of teaching. Research indicates that mentors are able to provide youth with supportive relationships and guidance during development that can have a significant and long-lasting positive impact on the mentees (DuBois, Portillo, Rhodes, Silverthorn, & Valentine, 2011). For example, mentors can provide youth with experiences that spur social and emotional development by serving as a role model, displaying compassion, providing support for healthful decision making, and challenging negative views held by youth (Dubois & Karcher, 2005). However, the effectiveness of mentoring is dependent on the strength of the interpersonal connection between the mentor and mentees and the level of support provided by the mentor (Dubois & Karcher, 2005).



During the canoe project, the mentors spent roughly three hours per week with the students over a span of nine weeks, but due to scheduling conflicts some mentors were more present than others. Additionally, the mentors would sometimes visit the students' classroom to teach the students about the canoe project or to simply build rapport. By the end of the project, the mentors knew each student by name, and they got to understand a bit about each students' personality, sensitivities, and individual needs. Some of the mentors even developed connections with the students' families to better understand the students' backgrounds. Since the canoe project occurred at least twice per week over a period of nine weeks, some of the mentors may have spent enough time with at one or more students to develop a mentor-mentee relationship with them. If these mentors were able to build a relationship with students based on trust, support, positive role modeling, then students may have experienced positive social health outcomes.

Additionally, existing literature suggests that PALs increase prosocial behavior in students (Spitzer & Hollmann, 2013), primarily by increasing the time students spend on-task and decreasing time spent engaging in unproductive or disruptive behaviors (Daly-Smith, et al., 2018; Kibbe, et al., 2011). PALs appear have the potential to reduce time spent: a) reading or writing inappropriate or unassigned material; b) leaving the desk without teacher permission; c) talking to or looking at other students when not part of a given assignment; d) gazing off; and e) placing head on the desk (Grieco, Jowers, Errisuriz, & Bartholomew, 2016).

### ***Emotional Health***

Emotional health is a dimension of health that primarily involves situationally appropriate expressions of emotions, empathy for others, coping with stress, openness to

conflict resolution, comfortably adjusting to changes, facing challenges when they arise, enjoying life, and developing emotional intelligence (Hjelm, 2010). No psychological or neurological assessments were conducted during this study, so all findings were based on observations and self-reports. Based on those observations and self-reports, participants either witnessed or personally experienced positive emotional states including excitement, enjoyment, and calmness. Participants also reported that students became more familiar with their own emotions, displayed empathy, and practiced emotion regulation.

Existing research shows that positive emotional experiences are positively correlated with improved wellbeing, resistance to psychopathologies, and upward spirals of lifestyle change (Fredrickson & Joiner, 2018; Gloria & Steinhardt, 2016; Trompetter, de Kleine, & Bohlmeijer, 2016). Regularly experiencing and expressing positive emotions is associated with a health-enhancing cycle that builds motivation for improving one's health and wellbeing, which in turn leads to more frequently experiencing positive emotions (Fredrickson & Joiner, 2018). Positive emotional experiences also appear to provide people with resilience against stress and symptoms of depression and anxiety (Gloria & Steinhardt, 2016). Additionally, when people learn to cope using positive emotions, they often experience improved mental health (Trompetter, de Kleine, & Bohlmeijer, 2016). Since the canoe project participants often reported excitement and enjoyment among students, it stands to reason that at least some of the students may have received the emotional health benefits associated with positive emotions.

Several canoe project participants also reported a sense of calmness and relaxation in the students while they were working on their canoe and paddles. Calmness and relaxation often indicate the absence of stress, and stress can be detrimental health. According to the

CDC (2023), stress can cause headaches, stomach aches, skin rashes, trouble sleeping, mental anguish, and worsen a myriad of chronic health problems. Stress can be dealt with in many healthful ways, including connecting with others, exercising, and taking time to do enjoyable activities (CDC, 2023). Based on participant reports, the canoe project allowed students to socialize while engaging in an enjoyable physical activity. Therefore, it is feasible that students may have experienced reduced stress levels when participating in the canoe and paddle building activities.

According to the participants, the canoe project elicited many positive emotions, but some negative emotions also emerged which required students to practice emotion regulation. Emotion regulation is the ability of an individual to manage or modify their emotional state, typically in order to produce a more positive outcome (APA, 2023). Research indicates that effective emotion regulation is associated with resistance against psychopathologies (Trompetter, de Kleine, & Bohlmeijer, 2016), and that emotion regulation may mediate the relationship between adverse childhood experiences and health outcomes (Cloitre, et al., 2019). Several participants discussed moments in which students had to successfully regulate undesirable emotions such as frustration, anger, and sadness in order to continue with the canoe project. These moments were reported to be most salient after making a mistake or failing at a task. Based on participant reports and existing research regarding emotion regulation, the opportunity to practice emotion regulation in a supportive environment may have provided the students with some emotional health benefits.

In addition to positive emotional experiences and emotion regulation, several participants reported displays of emotional intelligence and empathy. Emotional intelligence is the ability to process emotional information and effectively make use of that information

(American Psychological Association, 2023). Emotional intelligence has been correlated with useful life skills such as social competence, emotion regulation, and empathy (Ciarrochi, Chan, & Bajar, 2001). Empathy is the ability to understand another person's frame of reference or vicariously experience another person's feelings, perceptions, and thoughts (APA, 2023). Empathy may have some health benefits since it has been associated with improved ability to manage stress, cope with negative emotions, and effectively maintain relationships with others (de Vignemont & Singer, 2006; Eisenberg, Smith, & Spinard, 2011; Wagaman, Geiger, Shockley, & Segal, 2015). According to the Classroom Teacher, the canoe lessons frequently involved empathy and several participants reported observing or practicing empathic behaviors during the canoe project. Based on participant reports, it is possible that some students may have had the opportunity to hone their emotional intelligence or empathy skills. If this is the case, those students may have improved specific emotional skills which have the potential to improve their health outcomes in the future.

School-based physical activity has also been linked to the emotional health of students (Smedegaard, Christiansen, Lund-Cramer, Bredahl, & Skovgaard, 2016). School-based physical activity has been associated with reductions in student stress, anxiety, and depressive symptoms (Biddle, Ciaccioni, Thomas, & Vergeer, 2019; Brown, Pearson, Braithwaite, Brown, & Biddle, 2013). Furthermore, Research by Martin & Murtagh (2017) suggest that PALs can increase student and teacher enjoyment during lessons and outdoor and place-based education, such as the canoe project lessons, can provide mental health benefits such as improved resilience, reductions in stress, reductions in anger, reductions in

anxiety, and the restoration of positive emotions (Christiansen, Hannan, Anderson, Coxon, & Fargher, 2018).

### *Intellectual Health*

Intellectual health involves the ability to reason objectively, think critically, connect thoughts sequentially and logically, learn from life experiences, make healthful decisions, express oneself clearly, be open to new ideas, and/or change behaviors based on new information (Hjelm, 2010). Participants reported several ways in which the students' intellectual health could be improved through participation in the canoe project, including the acquisition of new knowledge and skills, the practice of curiosity, the use of imagination, and the exposure to alternative perspectives. Intellectual health, which is sometimes referred to as cognitive health, has a strong influence on quality of life and overall wellbeing across one's lifespan (Medalia & Erlich, 2017). Undertaking intellectual challenges can provide individuals with mental exercise that spurs the growth of new neurons and strengthens neural connections, which helps to prevent or delay cognitive decline (Melnyk, 2018). Improvements in intellectual health are also associated with improvements in physical health (e.g., lower rates of obesity) and mental health (e.g., resistance to depression and anxiety) (Medalia & Erlich, 2017; Dye, Boyle, Champ, & Lawton, 2017).

At its core, the canoe project was a history unit designed to teach students about the history and culture of regional Native American tribes. One of the primary tasks that students were asked to complete during the canoe project involved designing and creating a functional canoe paddle that incorporated elements of Northwest Native American paddles. According to Bloom's taxonomy, which is a framework for understanding the complexity of cognitive learning processes, the ability to create is a highly cognitive task (Adams, 2015). This task

was made even more challenging by the fact that most students started the project with little-to-no woodworking experience, which meant they had to acquire the necessary woodworking knowledge and skills as part of the process. Many students also began with a limited understanding of Northwest Native American culture and paddle designs, so they had to learn about culture and design from Standing Red Bear and other mentors as the project progressed.

Since the canoe project involved a variety of learning tasks, students may have also benefitted from experiencing multiple modes of learning. Learning materials can be presented to students in many ways, such as visually, auditorily, kinesthetically, or through writing; some students prefer specific modes of learning over others (Fleming & Baume, 2006; Willingham, Hughes, & Dobolyi, 2015). The canoe project involved learning from Standing Red Bear's stories, creating visual designs of the canoe paddle, reading about historic accounts, and getting hands-on experiences with crafting a dugout canoe and paddles. Many participants felt that the students' learning was enhanced through these multiple modes of learning, specifically the hands-on experiences. These hands-on learning experiences, also known as experiential learning, enhance learning outcomes because students are more engaged in the lessons, especially those students who prefer kinesthetic learning (Andresen, Bound, & Cohen, 2020; Austin & Rust, 2015). Therefore, it may be reasonable to assume that some students may receive additional intellectual benefits from the hand-on learning that occurred throughout the canoe project.

Participants also discussed ways in which the canoe project could have prompted students to use other cognitive processes such as curiosity and imagination. Curiosity has been associated with improvements in wellbeing because it promotes learning, development,

and adaptation throughout one's lifespan (Reio & Sanders-Reio, 2020). Curiosity is also positively correlated with growth-oriented behaviors and finding meaning in life (Kashdan & Steger, 2007). Research indicates that imaginative ability can play a role in achieving and maintaining health behavior as well, typically through improved goal setting behaviors (Gamble, Tippett, & Addis, 2021). Since imagination appears to be an important part of visualization, motivation, and planning for the future, it has been linked to progress towards physical and mental health goals (Gamble, Tippett, & Addis, 2021). Therefore, it seems as though both curiosity and imagination are worth cultivating for those interested in optimizing health outcomes.

Participants frequently discussed the cognitive abilities required to successfully complete the canoe project. As the Classroom Teacher liked to remind participants, the canoe project was first and foremost an academic endeavor meant to meet state educational standards of history. Students, parents, and teachers all reported a growth in student knowledge related to history, culture, woodworking, and environmental sustainability. The participants also reported observing or experiencing instances of curiosity and imaginative thinking. Based on existing research and participant reports, the students who participated in the canoe project could have received multiple health benefits if the activities involved intellectual challenges or promoted curiosity and imagination. However, it is difficult to say whether or not students would have received an even greater intellectual challenge had they remained in the classroom.

Existing research indicates that PALs have either no detrimental impact on academic performance or they have a positive impact on academic performance (Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015; Daly-Smith, et al., 2018; Martin & Murtagh,

2017; Bedard, St John, Bremer, Graham, & Cairney, 2019). The determining factor between an academically neutral PAL and an academically positive PAL seems to be the amount of structure in the lesson (Donnelly, et al., 2009; Kibbe, et al., 2011). Structured PALs appear to provide better experiences for both students and teachers, which includes increased academic outcomes (Miller, Gildea, Sloan, & Thurston, 2015). Therefore, teachers and volunteers who lead PALs should be given the resources and training needed to successfully structure the lessons (Miller, Gildea, Sloan, & Thurston, 2015; Webster, Russ, Vazou, Goh, & Erwin, 2015).

### ***Spiritual Health***

Spiritual health involves the formation of personal ethics, values, virtues, and morals that give our lives meaning, and it may or may not involve religious faith (Hjelm, 2010). Spiritual health also involves the nurturing of others, stewardship the natural environment, and experiences of awe and wonder when contemplating one's place in the universe (Fisher, 2011). Spiritually healthy people often experience a sense of personal fulfillment and inner peace that is developed through experiences of love, joy, and purpose (Hjelm, 2010). Participants in the canoe project discussed potential spiritual health benefits that students may have received through participation in ceremonies, experiences with nature, and character education.

Spiritual health does not require believing in a higher power, but participation in religious or spiritual activities has been associated with improved quality of life and general well-being (Panzini, 2017; Fisher, 2011). Those who report having spirituality in their lives are more likely to have higher self-esteem and increased resistance to depression, anxiety, substance abuse, and suicidal behaviors (Koenig, 2015). Those who identify as being



spiritual are also more likely to be physically active, maintain healthier diets, and avoid risk-taking behaviors, which may explain why spiritual individuals often experience lower rates of heart disease and cancer (Koenig, 2015). Although the canoe project was not intended to instill a sense of spirituality in the students, the Classroom Teacher and Standing Red Bear wanted to expose students to Nimiipuu ceremonies as part of the learning experience. These ceremonies often involved prayers and symbolic gestures, such as spreading tobacco on the canoe and hanging prayer ties. Participants said the students were engrossed in the ceremonies, appearing to embrace the spiritual aspects of the canoe project. Several participants also reported either witnessing or experiencing a change in perspective about cycles of life or the connection between humans and nature. Since existing literature associates many health benefits with spirituality, those students who participated in the spiritual ceremonies may have been exposed to health-enhancing experiences.

Participants in the canoe project also discussed ways in which students may have developed a deeper connection to nature, which is often considered an aspect of spirituality. Existing research indicates that interacting with nature positively influences children's mental health, specifically by improving self-esteem and bolstering resistance to stress and depression (Tillman, Tobin, Avison, & Gilliland, 2018). Having access to natural environments is also associated with improvements in motor skills, increased vitamin D production, healthier body composition, improvements in concentration, reduced risk of psychopathology, and a greater appreciation for the natural world (Chawla, 2015). Therefore, it is possible that students received some health benefits if they felt a stronger connection to nature after participating in the canoe project, especially if they spent more time outside because of it.

The development of personal ethics, values, virtues, and morals is another aspect of spiritual health (Hjelm, 2010) that may have impacted the students who participated in the canoe project. The intentional process of developing these traits is called character education, and those who exhibit positive character traits often see improvements in happiness and interpersonal relationships (Hjelm, 2010; Lickona, 2009). Character strengths have also been associated with life satisfaction, positive affect, and overall wellbeing (Toner, Haslam, Robinson, & Williams, 2012; Azañedo, Artola, Sastre, & Alvarado, 2021). Character education can also involve the development of perseverance, which was one of the most commonly observed character traits reported by participants of the canoe project. Many participants felt that the students would benefit from experiencing and then overcoming challenges. Existing research indicates that perseverance may play a role in overall subjective wellbeing and personality strength (Disabato, Goodman, & Kashdan, 2018). Grit, which is a combination of passion and perseverance, is also associated with self-esteem, positive identity, goal attainment, harmony in life, and psychological wellbeing (Vainio & Daukantaitė, 2016; Weisskirch, 2019). Therefore, students may have experienced some health and wellness benefits if they developed character strength such as perseverance while participating in the project.

### **Practical Applications for the Findings**

The United States population has experienced declining health for decades, marked by decreases in life expectancy at birth and increases in obesity, obesity-related diseases, communicable diseases, drug overdoses, and suicide (National Center for Health Statistics, 2019; Ahmad & Anderson, 2021). Existing evidence shows that living a healthy, active lifestyle can reduce the likelihood of many adverse health events such as type 2 diabetes,

heart disease, cancer, depression, anxiety, dementia, premature death, and all-cause mortality (World Health Organization, 2020). Unfortunately, most schools, workplaces, and home environments in the United States are not conducive to being physically active (Keadle, Conroy, Buman, Dunstan, & Matthews, 2017). Therefore, workplaces, schools, and home environments may need significant restructuring to improve health outcomes for Americans.

In 2014 the CDC released the Whole School, Whole Community, Whole Child (WSCC) model to promote the development and reinforcement of health-enhancing habits in schools (National Association of Chronic Disease Directors, 2017). The WSCC model uses an integrated, collaborative, and holistic approach to improving student health by involving all school staff, students' families, and the local community (National Association of Chronic Disease Directors, 2017). The WSCC model also addresses many dimensions of health, including social, emotional, intellectual, and physical health (CDC, 2021). During the canoe project, the participant school did not consider the WSCC model when planning the physically active canoe and paddle building lessons, but the lessons appear to align with the WSCC model. The physically active lessons (PALs) investigated in this study utilized community resources to provide an experience that may have impacted the students' physical, social, emotional, and intellectual health while avoiding sedentary behavior and encouraging family engagement. Schools looking to implement a similar project may benefit from aligning their PALs with the WSCC model.

This study examined a series of PALs that involved building a dugout canoe and canoe paddles to learn about the history and culture of regional Native American Tribes. Based on the findings, these lessons gave students hand-on learning experiences that met state education standards for history while engaging in health-enhancing activities. Some of

the health benefits could be attributed to the physical activity that students received through the lessons, but the students may have also received health benefits from the atypical lesson structure. The lessons involved experiential learning, high levels of socialization, novel learning environments, spending time in a natural setting, and character education, which may provide some health benefits independent of being physically active. The majority of students, parents, and teachers felt that the canoe project provided students with valuable, health-enhancing experiences that should continue to be implemented at the school. In sum, the findings show that students who participated in the canoe project may have received numerous health benefits while still accomplishing academic objectives.

Although the canoe project was considered worthwhile by most participants, those who organized and managed the canoe project expended a great deal of time and resources to make it successful. When discussing PALs in general, the most commonly reported barriers to success are lack of time and resources (Bartholomew & Jowers, 2011; Norris, Shelton, Dunsmuir, Duke-Williams, & Stamatakis, 2015). The canoe project faced these barriers as well, but those involved with the project were able to find the time and resources to make it successful. Any organization wishing to implement a similar project should know that any PALs will likely require more effort and resources, but they have the potential to yield health benefits for students without sacrificing academic improvement.

Knowing that each U.S. generation is becoming less healthy than the one before and that the decline in health may be related to physically inactive environments, schools may need to drastically restructure the way lessons are implemented. Instead of spending the majority of time sitting at a desk, students should spend most of their day engaged in health-enhancing hands-on learning experiences that increase physical activity time and decrease

sedentary behavior. If most lessons throughout the school day were physically active, students could accumulate plenty of physical activity time, significantly reduce sedentary behavior, and potentially see improvements multiple dimensions of health while maintaining or even boosting academic outcomes.

This restructuring would require schools to alter their environments, acquire new teaching implements, and change the way teachers, administrators, and school staff are trained. For PALs to become the norm in schools, additional school staff may need to be hired as well. Teacher education programs in colleges would also need to be changed in order to make PALs the standard format for lessons. These changes would be costly for schools, which means massive investments in education. However, since obesity alone is estimated to cost the United States \$173 billion each year (CDC, 2022), the investment may be worth the cost from a purely economic standpoint, but PALs also have the added benefit of improving wellbeing (Norris, van Steen, Direito, & Stamatakis, 2020).

### **Limitations**

This study employed an exploratory single-case study design (Yin, 2014), which is useful for investigating a contemporary phenomenon in its real-world context, but there are some drawbacks to this design. For example, case studies are difficult to replicate and often lack the ability to be generalized. This study examined a series of lessons involving people and cultures specific to a particular region and several parts of the project were strongly influenced by family dynamics. Additionally, the participating school was unique because it is a public charter school that uses an EL education model and the number of students who qualify for free or reduced lunch is significantly less than the state average. Additionally, this study involved researcher subjectivity in planning, implementing, and interpreting the results.

Measures were taken to ensure researcher trustworthiness, but any level of researcher subjectivity has the potential to allow biases to emerge. Therefore, the results of this study may be challenging to replicate elsewhere.

This study was intended to examine PALs, but no quantitative data was collected to show the levels of physical activity. Instead, physical activity levels were assessed using researcher observation notes about the duration and estimated intensity of physical activity. Although several of the researchers involved in this study specialized in youth physical activity, knowing the precise levels of student physical activity could have been beneficial.

This study used definitions of spiritual health from Fisher (Fisher, 2011) and Hjelm (Hjelm, 2010) as part of the theoretical framework and referenced a myriad of other authors regarding spiritual health. However, these authors predominantly discuss spiritual health from a Euro-American perspective and these perspectives may not align with Nimiipuu spirituality. Much of the spiritual health research referenced in this study was conducted in societies that are predominantly Judeo-Christian and biases towards a Judeo-Christian perspective on spirituality may exist.

This study also referenced multiple authors when defining character development, character education, and character strengths. Some authors, such as Thomas Lickona, clearly state that character education is a moral mission (Lickona, 1991), while other sources, such as EL Education, refrain from using the word ‘moral’ and instead choose to use words such as ‘virtuous’ and ‘ethical’ (EL Education, 2023).

This study used a convenience sample made up of an entire fourth grade class and no control group was used. The sample of participants was somewhat small, with only 23 students, 15 parents, and two teachers. This study also used focus groups and interviews that began on weeks three and four of the program. Perhaps it would have been more useful to have a pre-interview and a post-interview that sought to examine changes in participant perceptions. Furthermore, not all parents attended both the initial and follow-up focus groups and not all students attended both the initial and follow-up focus groups. Of the 15 parents to participated, only four attended both focus groups. Of the 23 students who participated, 18 attended both focus groups.

Additionally, some of the health-related interview and focus group questions that participants responded to were preceded by brief definitions derived from Hjelm's five-dimensional model of health (Hjelm, 2010). Both the researchers and the teachers determined that the participants may need some prompting in order to fully understand the questions asked, but this may have resulted in questions that were leading. Refer to appendices A, B, and C to see the interview and focus group protocols.

### **Recommendations for Future Research**

Since this study solely employed qualitative research methods, additional research using quantitative or mixed methods may be needed to further understand the relationships between holistic health and the canoe project or similar PALs. Quantitative measures may be especially helpful in understanding claims about improvements in physical fitness, learning, and levels of physical activity.

This study examined holistic health, which resulted in data with more breadth than depth, so future studies may be needed to better understand the specific mechanisms by

which the canoe project or similar PALs impact student health. Future studies will also be needed to examine the extent to which PALs such as the canoe project impact student health. Therefore, multiple in-depth studies may be needed to further explore how the canoe project or similar PALs impact each of the five dimensions of health for students. Furthermore, since the two most common barriers to implementing PALs are a lack of time and resources, additional research could be conducted exploring the ways in which the canoe project mustered the resources and found the time needed to successfully implement PALs.

### **Concluding Summary**

The purpose of this qualitative case study was to explore the holistic health benefits of physically active canoe and paddle building lessons at a public elementary school. The canoe project was designed to teach students about regional Native American history and culture by providing students with hands-on learning experiences outside of the traditional classroom setting. Throughout the study, students, parents, and teachers reported ways in which the canoe program may have enhanced the physical, social, emotional, intellectual, and spiritual health of students. After all data were analyzed using a thematic analysis, three themes emerged from the data analysis: 1) relationships; 2) experiences; and 3) personal growth. Each of these themes are comprised of subthemes describing the many ways in which the canoe project may have positively impacted the students' health. The findings indicate that the canoe project or similar physically active lessons may be able to provide students with health-enhancing experiences while still meeting educational standards. Some of the health benefits reported during the canoe project included improved motor skills, stronger relationships, enhanced learning, positive emotional experiences, and character development. Since this study was merely exploratory, further research will be needed to



more thoroughly assess the extent to which the canoe project or similar physically active lessons impact specific health outcomes for students.

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## **Appendix A: Focus Group Protocol with Students**

### Purpose (for the researchers only)

The purpose of this qualitative case study is to explore the holistic health benefits of physically active canoe-building lessons at an EL Education (formerly known as Expeditionary Learning) K-8 school. An emphasis will be placed on spiritual health because a paucity of studies exists on the topic of school-based spiritual, especially for studies pertaining to the spiritual health benefits of physically active lessons.

### Introduction (to be read to the participants)

Hi, everyone. My name is X and I'm a student researcher at the University of X. If it is okay with you, I would like to ask you some questions about your thoughts and experiences with the canoe program here at Palouse Prairie Charter School. I am most interested in the health benefits that you might get from working on the canoe-building project.

For the study, I would like to record our conversation so that I may review it later and learn from it. I won't share the recording with anyone else; I'll be the only one that listens to the recording. Is okay if I record?

This should only last about 25 minutes, then you will be able to return to class. Would it be ok if we start now?

### Focus Group Questions:

There are many ways to be healthy. Diet and exercise can make our bodies healthy, friends and family can help us feel socially healthy, politely expressing our feelings can make us emotionally healthy, being curious and learning new things can make our minds healthy, and our spirit can become healthier when we feel like we are being a good person or when we are helpful. So my first question is:

1. *How might working on the canoe project make you healthier?*
2. *How do you feel when you work on the canoe project?*
3. *How might working on the canoe project give you hope for the future?*
4. *When you work on the canoe project, what do you learn about responsibility?*

We are almost done now; we have just one more question to answer.

5. *How might the canoe project help you feel connected to nature?*

### Closure (to be read to the participants)

We are all finished now. Thank you so much for helping me with my study. You may return to class now.



## **Appendix B: Focus Group Protocol with Parents/Guardians**

### Purpose (for the researchers only)

The purpose of this qualitative case study is to explore the holistic health benefits of physically active canoe-building lessons at an EL Education (formerly known as Expeditionary Learning) K-8 school. An emphasis will be placed on spiritual health because a paucity of studies exists on the topic of school-based spiritual health, especially for studies pertaining to the spiritual health benefits of physically active lessons.

### Introduction (to be read to the participants)

I would like to conduct a focus group today about your thoughts and experiences with the canoe-building program at Palouse Prairie Charter School. In particular, I am investigating the potential holistic health benefits for students participating in the canoe-building program. In the focus group, I will ask questions about five separate, but overlapping dimensions of health: physical health, social health, emotional health, intellectual health, and spiritual health. A slight emphasis will be placed on the spiritual dimension of health, which, for the purposes of this study, is characterized by hope, responsibility, and a personal connection to nature. Spiritual health, along with the other four dimensions of health will be defined in greater detail later in the focus group.

We will conduct focus groups this week and I would like to conduct one more focus group after the project ends. The date for the final focus group has yet to be determined.

I will transcribe this focus group and send all participants a copy of the transcript for feedback and revisions within the next several months. To maintain confidentiality, individual names or any other identifying information will not be used in any reports of this research. At this point, I would like to confirm that it is okay if I tape-record your responses. Would that be okay with you?

The focus group will start when we are ready and I will bring it to a close, even if we don't address all of the questions, no later than 30 minutes from now. Would you like to begin the focus group now?

### Interview Questions:

*1. What emotions do you see the students display when they work on the canoe project?*

For the purposes of this study, we are using John Hjelm's 5-dimensional model of health which identifies five distinct, but overlapping dimensions of health: Physical health, social health, emotional health, intellectual health, and spiritual health. I will now introduce a dimension of health, define it, and then ask about how this project might affect that particular dimension of health. We will start with physical health.

Physical health typically involves physical fitness, mature motor development, healthy eating habits, getting adequate sleep, and healthy body system functioning.

*2. In what ways might working on the canoe project affect the students' physical health?*

Social health typically involves listening skills, self-expression, forming healthy relationships with others, and developing and maintaining a network of social support.

*3. In what ways might working on the canoe project affect the students' social health?*

Emotional health typically involves the ability to understand and manage one's own emotions, the ability to understand the emotions of others, utilizing feelings for developing motivation to work towards one's goals, and the ability to express our emotions in a healthy way.

*4. In what ways might working on the canoe project affect the students' emotional health?*

Intellectual Health typically involves the ability to learn from our experiences, openness to new ideas, curiosity, critical thinking, and reasoning ability,

5. *In what ways might working on the canoe project affect the students' intellectual health?*

Spiritual health typically involves personal fulfillment, self-acceptance, a sense of purpose and meaning, developing character, living our personal values, and the ability to see the beauty in life. This may or may not include a belief in a higher power as well.

6. *In what ways might working on the canoe project affect the students' spiritual health?*

7. *In what ways might participating in this canoe project teach students about responsibility?*

We are nearing the end of your interview we have just two questions left.

8. *What role might this canoe project play in helping students feel connected to nature?*

Last question:

9. *In what ways might participating in this canoe project give students hope for the future?*

Closure (to be read to the participants)

This concludes the interview. Please feel free to contact me if you have any questions or concerns moving forward. Thank you for your time.

## Appendix C: Interview Protocol with Classroom Teacher & Standing Red Bear

### Purpose (for the researchers only)

The purpose of this qualitative case study is to explore the holistic health benefits of physically active canoe-building lessons at an EL Education (formerly known as Expeditionary Learning) K-8 school. An emphasis will be placed on spiritual health because a paucity of studies exists on the topic of school-based spiritual, especially for studies pertaining to the spiritual health benefits of physically active lessons.

### Introduction (to be read to the participants)

I would like to interview you today about your thoughts and experiences with the canoe-building program at Palouse Prairie Charter School. In particular, I am investigating the potential holistic health benefits for students participating in the canoe-building program. In the interview, you will be asked about five dimensions of health: physical health, social health, emotional health, intellectual health, and spiritual health. A slight emphasis will be placed on the spiritual dimension of health, which, for the purposes of this study, is characterized by hope, responsibility, and a personal connection to nature. Spiritual health, along with the other four dimensions of health will be defined in greater detail later in the interview.

I will transcribe this interview and send you the transcript for your feedback and any revisions within the next several months. To maintain confidentiality, your name or any other identifying information will not be used in any reports of this research. At this point, I would like to confirm that it is okay if I tape-record your responses. Would that be okay with you?

The interview will start when you are ready and I will bring it to a close, even if we don't address all of the questions, no later than 60 minutes from now. Would you like to begin the interview now?

### Interview Questions:

10. *What kinds of activities did students engage in during the canoe project?*

For the purposes of this study, we are using John Hjelm's 5-dimensional model of health which identifies five distinct, but overlapping dimensions of health: Physical health, social health, emotional health, intellectual health, and spiritual health. I will now introduce a dimension of health, define it, and then ask about how this project might affect that particular dimension of health. We will start with physical health.

Physical health typically involves physical fitness, mature motor development, healthy eating habits, getting adequate sleep, and healthy body system functioning.

11. *In what ways do you think working on the canoe project affected the students' physical health?*

Social health typically involves listening skills, self-expression, forming healthy relationships with others, and developing and maintaining a network of social support.

12. *In what ways do you think working on the canoe project affected the students' social health?*

Emotional health typically involves the ability to understand and manage one's own emotions, the ability to understand the emotions of others, utilizing feelings for developing motivation to work towards one's goals, and the ability to express our emotions in a healthy way.

13. *In what ways do you think working on the canoe project affected the students' emotional health?*

Intellectual Health typically involves the ability to learn from our experiences, openness to new ideas, curiosity, critical thinking, and reasoning ability,

14. *In what ways do you think working on the canoe project affected the students' intellectual health?*

Spiritual health typically involves personal fulfillment, self-acceptance, a sense of purpose and meaning, developing character, living our personal values, and the ability to see the beauty in life. This may or may not include a belief in a higher power as well.

15. *In what ways do you think working on the canoe project affected the students' spiritual health?*

16. *What do you think students may have learned about responsibility after completing the canoe project?*

17. *How do you think this canoe project may have helped students feel connected to nature?*

18. *How do you think this canoe project may have helped help students build character?*

We are nearing the end of your interview we have just two questions left.

19. *How do you think this canoe project may have helped help students feel hope for the future?*

Last question:

20. *Is there anything else that you would like to add about the potential health benefits of this canoe project?*

Closure (to be read to the participants)

This concludes the interview. Please feel free to contact me if you have any questions or concerns moving forward. Thank you for your time.

### **Appendix D: Prompts for Researcher Observation Notes**

1. What was taught to students during today's canoe lesson?
2. Please describe the physical environment that you observed today. E.g., were students outside or inside? What was the weather like? What equipment was available? Etc.
3. Please describe the social environment that you observed today. E.g., how well were students getting along? How well were students communicating with each other? Etc.
4. Please describe the emotional environment that you observed today. E.g., What emotions did you observe in students? What did you hear students say about how they feel? Etc.
5. What physical activities did students engage in today?
6. Please estimate the amount of time in minutes that students spent being physically active today.

## Appendix E: IRB Outcome Letter



March 25, 2022

To: David Richard Paul

Cc: Andy Martin, Catherine Loiacono, Ph.D. , Hayley McKown

From: University of Idaho Institutional Review Board

Approval Date: March 25, 2022

Title: Exploring the holistic health benefits of physically active canoe-building lessons for elementary students

Protocol: 22-076, Reference: 016937

Exempt under Category 1 at 45 CFR 46.104(d)(1).

On behalf of the Institutional Review Board at the University of Idaho, I am pleased to inform you that the protocol for this research project has been certified as exempt under the category listed above.

This certification is valid only for the study protocol as it was submitted. Studies certified as Exempt are not subject to continuing review and this certification does not expire. However, if changes are made to the study protocol, you must submit the changes through [VERAS](#) for review before implementing the changes. Amendments may include but are not limited to, changes in study population, study personnel, study instruments, consent documents, recruitment materials, sites of research, etc.

As Principal Investigator, you are responsible for ensuring compliance with all applicable FERPA regulations, University of Idaho policies, state and federal regulations. Every effort should be made to ensure that the project is conducted in a manner consistent with the three fundamental principles identified in the Belmont Report: respect for persons; beneficence; and justice. The Principal Investigator is responsible for ensuring that all study personnel have completed the online human subjects training requirement. Please complete the *Continuing Review and Closure Form* in VERAS when the project is completed.

You are required to notify the IRB in a timely manner if any unanticipated or adverse events occur during the study, if you experience an increased risk to the participants, or if you have participants withdraw or register complaints about the study.

IRB Exempt Category (Categories) for this submission:

Category 1: Research, conducted in established or commonly accepted educational settings, that specifically involves normal educational practices that are not likely to adversely impact students' opportunity to learn required educational content or the assessment of educators who

**Appendix F: CITI Program Certificate**

Completion Date 02-Jan-2023

Expiration Date 02-Jan-2026

Record ID 49238927

This is to certify that:

**Andy Martin**

Has completed the following CITI Program course:

Not valid for renewal of  
certification through CME.

**Investigators**  
(Curriculum Group)  
**IRB Investigators and Student Researchers**  
(Course Learner Group)  
**2 - Refresher Course**  
(Stage)

Under requirements set by:

**University of Idaho**

**CITI**  
Collaborative Institutional Training Initiative

101 NE 3rd Avenue, Suite 320  
Fort Lauderdale, FL 33301 US  
[www.citiprogram.org](http://www.citiprogram.org)

Verify at [www.citiprogram.org/verify/?wec035ef8-4ac1-4b34-b389-3db71cb7d3d6-49238927](http://www.citiprogram.org/verify/?wec035ef8-4ac1-4b34-b389-3db71cb7d3d6-49238927)