Doctoral Dissertation:
Teaching and learning nature-based physical activity in Physical and Health Education: From pre-service teachers to K-12 students

by

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B.Ed., University of Victoria, 2006
M.A., University of Victoria, 2013

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I acknowledge and respect the lək̓ʷəŋən peoples on whose traditional territory the university stands and the Songhees, Esquimalt and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day.

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Abstract

The overall aim of this dissertation was to better understand the learning and teaching of NBPA in PHE experiences for teachers and adolescent students. A secondary aim was to better understand the learning and teaching cycle for NBPA reform in PHE. To achieve these aims, I conducted three interrelated studies that explored: (a) how pre-service teachers learn to teach NBPA in PHE, (b) in-service educators' perspectives on learning and teaching NBPA, and (c) adolescent student experiences with NBPAs in and beyond PHE. These three studies explored the learning cycle from pre-service instruction, to in-service professional development, to, finally, the impact on the students' learning. Individual findings are discussed in each of the three studies, and two overarching themes are discussed as findings for the overall body of research: (a) NBPA as a conduit for place- and land-based education; and (b) NBPA as an effective form of PHE reform.

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Acknowledgments

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body of work as well as the source of my motivation for wanting to care for this earth. I want to envision a world where you and nature are intrinsically and lovingly woven.

Dedication

This is dedicated to my supervisor, teacher, mentor, friend, colleague and auntie to my child. This dissertation, and my entire career, would not exist as they are without you Sandy. The positive impact you have had on my life is immeasurable.

Chapter 1 - Introduction

In Canada, as in many other countries, there is a growing concern about the health of children and youth. Results from the 2019 Canadian Health Survey indicated that 4% of children and youth aged 1 to 17, as reported by their parents, had fair or poor mental health, one year prior to the COVID-19 global pandemic. The survey also found that poor mental health among children and youth was associated with adverse health, learning and social outcomes, such as lower grades and difficulty making friends. Recently released crowdsourced data suggest that the perceived mental health of Canadian youth has declined during the pandemic, with over half (57%) of participants aged 15 to 17 reporting that their mental health was somewhat worse or much worse than it was prior to the implementation of physical distancing measures (Statistics Canada, 2020). Additionally, in 2019, only 2 out of 5 children and youth aged 5 to 17 met the recommended physical activity target of 60 minutes of moderate to vigorous physical activity per day. Boys (52%) were two times as likely as girls (26%) and children aged 5 to 11 (47%) were 1.5 times as likely as youth aged 12-17, (31%) to meet the recommendations (Statistics Canada, 2019).

Children and youth between the ages of 5 and 16 will spend approximately 43% of their waking hours in school (Higgins, 2001). Since all Canadian youth spend a large proportion of their time in school, the school domain could play an important role in promoting daily healthy behaviours including mindfulness, proper nutrition, and physical activity for all children. Physical and health education (PHE), in particular, offers an avenue for learning healthy behaviours and participating in physical activity. PHE is one of the few institutions responsible for promoting lifetime physical activity and health for all youth at school. Specifically, in British Columbia (BC), PHE “focuses on well-being — the connections between physical, intellectual,

mental, and social health" and directly addresses not only physical activity, but also physical literacy, healthy and active living, social and community health, and mental well-being (British Columbia Ministry of Education, 2016).

It has been suggested, however, that PHE, particularly at the secondary school level, is not meeting the responsibility of promoting health and physical activity for young people (McNamee & Timken, 2017). It is true that students' physical activity and health behaviours are complex and multifaceted, and PHE alone cannot ensure young people meet national physical activity recommendations. However, some in the field believe PHE could be doing more to promote lifelong physical activity and health. One critique is that PHE is too reliant on one category of physical activity — traditional team sports (Fairclough & Stratton, 2005b; Trost, 2006). Fairclough et al. (2002) suggested that PHE within "schools place a significant emphasis on team games, often at the expense of lifetime activities" (p. 69). Trost (2006) stated that PHE has enormous potential to promote physical activity and to prepare young people for a lifetime of physical activity and health engagement; however, programs have not "delivered the goods" when it comes to promoting lifelong physical activity. Low motivation to participate in traditional or team sports, apathy toward competitive environments, and a low rate of transfer of skills to lifetime activities and wellness can be barriers for students' pursuit of lifelong physical activity and health (Nguyen, 2015). Dyson (2014) argued for "a more holistic approach to [PHE] coming from a broader conception…[PHE] is much broader than just physical activity, and we harm the future potential of our field if we adopt a narrow agenda" (p. 149).

For many young people, their engagement with physical activity outside of school is antithetical to the physical activity experiences provided to them through their formal PHE curriculum (Macdonald, 2003). Students have criticized PHE for being disconnected from their

lifestyle contexts and for lacking relevance and meaning (Enright & O'Sullivan, 2010; Gibbons & Humbert, 2008). Students struggle to engage with detached pedagogies that fail to recognize their lived experiences of physical activity and often provide less challenge, responsibility, and autonomy than they are familiar with in their lives outside school (Enright & Sullivan, 2013). Lived experiences can be defined as the stories individuals tell about their lives, how they represent themselves and other social actors in their accounts, and co-construct the associations to which they belong (Glover, 2004).

Lifetime activities are those that people continue to participate in throughout life because they can be done individually or with others, require little organization and minimal equipment (Fairclough et al., 2002). Many of these activities occur outside and in nature: walking, running, hiking, swimming etc. As a result, it is relevant to investigate whether alternative teaching practices, such as nature-based physical activity (NBPA), in PHE could provide solutions to increase children and youth's physical activity as well as provide the link between physical activity *within* PHE and lifetime physical activity *beyond* PHE. NBPA refers to physical activities that are done in natural areas, require little specialized equipment, deemphasize competition, can be participated in by the majority of youth, are cost-efficient and can be implemented by teachers on a regular basis (Gruno & Gibbons, 2020). For the purpose of this dissertation, I have employed the umbrella definition of 'natural areas' to indicate areas with a prominence of vegetation cover like forests and mountain shrubs or grasslands, and the absence or near absence of more intrusive land-uses, such as built areas and intensive agriculture designed for maximum profit and output (Frascaroli, 2013).

Current literature strongly supports students' interaction with nature, outlining several benefits ranging from increased physical activity and cardiorespiratory fitness (Gray et al., 2015)

to prosocial behaviours (Bølling et al., 2019), life satisfaction, mindfulness (Mutz & Muller, 2016) and mental wellbeing (Tillmann et al., 2018). Additionally, teaching using place-based education carries advantages, namely experiential learning and an appreciation for the local environment. Sobel (2004) succinctly summarizes place-based learning by stating, "Get teachers and students into the community, into the woods and on the streets – closer to beauty and true grit" (p. 7). Gruenewald (2003) believes that place-based pedagogies are needed so that the education of citizens might have some direct bearing on the wellbeing of the social and ecological places people actually inhabit.

The purpose of this dissertation was to explore the learning and teaching cycle of NBPA in PHE from pre-service instruction, to in-service professional development, to, finally, impact on the students' learning. This cycle is outlined in three studies dedicated to the exploration of learning and teaching NBPA in PHE (see Figure 1):

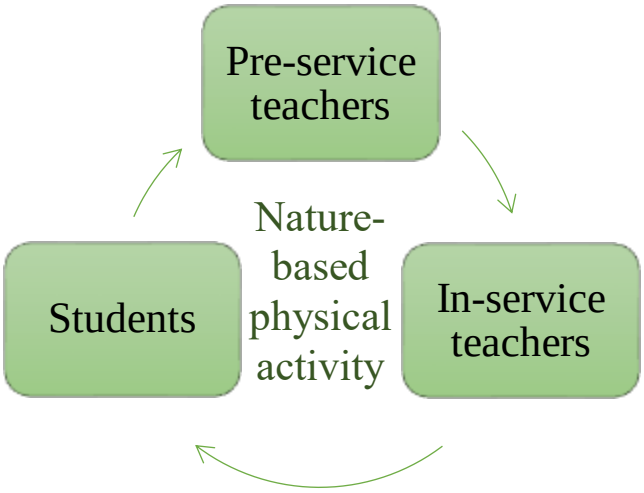
1. *Learning to teach nature-based physical activity in Physical and Health Education: A study with pre-service teachers*
2. *Educators' perspectives on learning and teaching nature-based physical activity: Applying the Interconnected Model of Teacher Professional Growth*
3. *Using their (Photo)voice: Student experiences with nature-based physical activities in and beyond Physical and Health Education*

This figure is depicted as a cycle because professional development for in-service teachers has the potential to impact learning experiences for K-12 students. Learning experiences in K-12 education, in turn, can impact the type of students who choose to pursue PHE teacher education. Finally, a student's experience in PHETE may then impact the instructional strategies they choose to employ as an in-service teacher. For the purposes of this dissertation, the focus was on

adolescent students (students aged 9-18) and their teachers because many adolescents are disengaged by school-based learning (Blad, 2014). Additionally, adolescence in general marks a decline in physical activity, and specifically 'the middle years' (9–14 years of age) shows a significant drop in physical activity (Doolittle, 2016). Experiential involvement in active, in-context NBPA can be exciting and emotionally engaging for youth and can consequently lead to more effective learning (Breunig et al., 2015; Scott & Colquhoun, 2013). Therefore, NBPA offers a promising way to engage youth in healthy behaviours and promote engaging physical activity (Gray et al., 2015).

Figure 1

Nature-Based Physical Activity in PHE: The Learning and Teaching Cycle



Operational Definitions

Nature-based physical activity: Physical activities that are done in natural areas, require little specialized equipment, deemphasize competition, can be participated in by the majority of youth, are cost-efficient and can be implemented by teachers on a regular basis (Gruno & Gibbons, 2020). In this dissertation, I rely on my previous research to define NBPA as teachers view it: beyond the walls of the school, place-based, and having nature as the focus (Gruno & Gibbons,

2021). I define NBPA as different to outdoor education (see below) in that NBPA is "less skill-based," more accessible, and "less equipment dependent" than outdoor education (Gruno & Gibbons, 2021, p. 12). For the context of this body of research, I am focused on NBPA as occurring within curricular PHE and its potential to translate to leisure time NBPA outside of school.

Outdoor education: One widely accepted definition of outdoor education is offered by Donaldson and Donaldson (1958): "education in, about and for the outdoors" (p. 17). Similarly, according to Priest and Gass (2017), outdoor education takes place mostly in the outdoors with the natural environment, and can include environmental education and adventure education. An all-encompassing definition of outdoor education is challenging due to different meanings, understandings and practices within various research areas, countries and cultures (Allison, 2016). However, one key characteristic of BC and Canadian PHE Outdoor Education courses is "the big trip" (Gruno & Gibbons, 2022, p. 16), or the "the extended field trip, the camping trip" (Potter & Henderson, 2004, p. 79). Outdoor education has its roots in PHE, and both disciplines would acknowledge their militaristic origins, however, outdoor education is often considered a discrete discipline separate from PHE (Martin & McCullagh, 2011).

Place-based education: "The process of using the local community and environment as a starting point to teach concepts…across the curriculum. Emphasizing hands-on, real-world learning experiences, this approach to education…helps students develop stronger ties to their community, enhances students' appreciation for the natural world, and creates a heightened commitment to serving as active, contributing citizens" (Sobel, 2005).

Pre-service teachers: Students enrolled in teacher education programs and are not yet licensed as teachers (Timken & McNamee, 2012).

Chapter 2 - Literature Review

Teaching and learning in PHE is complex and multifaceted. Researchers have called for change in PHE pedagogy (McKenzie & Lounsbery, 2009; 2014); however, this change, in and of itself is challenging for a multitude of reasons. When looking at reform in any area of education, it is important to look at the entire picture. Therefore, this section will provide a literature review covering why this current body of research is targeting PHE in particular, why change is needed in PHE, the benefits of being active in nature and the potential benefits of incorporating NBPA in PHE. Finally, this section will highlight possible ways of bringing this particular PHE reform to light: through education at the pre-service teacher level, professional development at the in-service teacher level, and listening to the voices of young people engaged in NBPA in PHE.

PHE is Well Situated to Teach Lifelong Physical Activity and Healthy Behaviours

Although we cannot expect schools to solely increase physical activity participation in students as multi-sector efforts are needed, school PHE is well positioned to help increase adolescents' physical activity as well as encourage healthy behaviours. For 13 years, Canadian children and youth spend a significant proportion of their waking day in school, and over time, experiences at schools affect nearly the entire population (McKenzie & Lounsbery, 2009). PHE is widely offered in schools (Pate et al., 2006) and PHE is the only required subject that theoretically provides moderate-to-vigorous physical activity to virtually all students (Sallis et al., 2012). PHE is also the only subject in which lifetime physical activity is a primary outcome (McKenzie & Lounsbery, 2009; 2014). A well-developed PHE program can encourage engaging physical activity and teach students how to work cooperatively with others, develop habits associated with an active lifestyle and an understanding of physical activity guidelines, and

enhance learning of skills and fitness to prepare students for physically active lifestyles (Ennis, 2017; Solmon & Garn, 2014).

Providing physical activity during PHE is one possible indicator of PHE quality because participating in physical activity has so many well documented health benefits. For example, PHE has the potential to contribute to chronic disease prevention because it can provide up to 18% of a child's recommended daily physical activity (Morgan et al., 2007). The need for schools to provide and promote physical activity is great. Today, some children and youth are at increased risk for having low levels of physical activity, particularly minorities (especially girls), those living with disabilities, and those living in neighborhoods where activity is restricted by safety concerns or inadequate facilities Institute of Medicine, 2013). Schools, unlike most other venues for physical activity, are in place to provide opportunities for physical activity regardless of children's socioeconomic status. However, PHE is not just about providing students with physically active classes. A comprehensive PHE program involves teaching social, cognitive, and physical skills, and achieving other goals through movement.

Holistic Methods of PHE Instruction

In some regions of the world, including many provinces in Canada, PE was relabelled Physical Education and Health (Sweden), Health and Physical Education (Australia) or PHE (BC, Canada) (Lynch & Soukup, 2016; Mong & Standal, 2019). This change of name makes the point that the subject is more than sports, and that health is emphasized more in the curriculum than previously. This shift has occurred on numerous occasions throughout history, but most recently began as a complex counter discourse to those associated with the "body as object" philosophy (Lynch & Soukup, 2016). This holistic discourse has important implications for PHE teachers and students, because its attention to social and cultural influences on health puts it in

opposition to notions which locate responsibility for health almost solely in the individual and their decisions (Cliff, 2012). This discourse changes the perception of the body as a separate object, to that of the "whole person;" body, mind, spirit and well-being, along with their social and cultural context.

Although physical activity and health have always had a role in PHE, they have not always been its primary focus. In fact, the main focus of PHE in schools has changed to reflect societal demands so frequently that it has been referred to as the chameleon of all curricula (McKenzie, 2001). From the 1950s to 1990s, numerous curricular and instructional models, including developmental education, humanistic education, movement education, kinesiology studies, play education, and personal meaning, made their way into PHE (Siedentop & van der Mars, 2011). These various models still impact what is taught in PHE and how it is delivered today, and instructional techniques shift to accommodate these different models. Two instructional models that are currently popular include Hellison's self-responsibility model (Hellison, 2011), which focuses mainly on concepts such as teamwork, cooperation, self-responsibility, problem solving, and cultural awareness; and Siedentop's sport education model (Siedentop, 1994; Siedentop & van der Mars, 2011), which views sport as an important component of North American culture and is designed to prepare students to master diverse sporting roles (e.g. player, coach, referee, manager). Irrespective of specific theoretical models, sport skill instruction has been the mainstay of most PHE programs in secondary schools (Ferry & McCaughtry, 2013; McKenzie & Lounsbery, 2009). Sport is definitely an important venue for many children to be physically active, but it certainly is not the only one, and over one's life span the opportunities to engage in sports diminish for most people (McKenzie & Lounsbery, 2014).

Many researchers are critical of the biomedical understanding of health in PHE as 'increased physical activity = better health' (Azzarito et al., 2016; Gray et al., 2015; Mong & Standal, 2019). Armour and Harris (2013) presented arguments for making a change in how health is presented and taught in PHE. They argued that even though health has been expressed differently over time, there is little evidence that the pedagogies have changed. Thus, they argue for the development of a new 'PE-for-health,' where the teaching must start with the young learner. This shift includes that teachers' focus must be on how the individual child can learn most effectively and that the content of learning must go beyond teaching sports or fitness. Even though their argument is mainly theoretical, there is a third instructional model, health-related PE (Sallis et al., 2012; Sallis & McKenzie, 1991), that addresses many of these arguments. The main goal of health-related PE is the development of lifelong physical activity, a concept aligned with public health objectives. In Canada and other parts of the world, PHE curricula has shifted from focusing solely on "the body" (Lynch & Soukup, 2016) to adopting a sociocultural approach, more aligned with health-related PE, and includes a philosophical shift to a more "holistic" discourse in PHE. Whereas it is unclear how commonly used this instructional model is, it is at least showing a potential for a change in the approach to teaching PHE.

PHE is Not Living Up to its Potential

Despite all of the potential of PHE described in the previous section, for a number of years there has been international concern about the status and future of this subject area (Dunn, 2009; Kirk, 2010). In 2009, McKenzie and Lounsbery explained that if physical activity is medicine, PHE is the "pill not taken" (p. 223). Many PHE programs in North America include instructional practices that do not promote student learning of knowledge and skills for engagement in lifetime physical activity and healthy behaviours (Bulger & Housner, 2009;

Kretchmar, 2006; Lee et al., 2007). This has led public health experts and leaders in PHE pedagogy to call for reform and urge PHE teachers to change (American Heart Association, 2012; Kohl & Cook, 2013; Kretchmar, 2006; McKenzie & Lounsbery, 2014; Pate et al., 2006; UNESCO, 2021). When looking at the main areas for concern in PHE, they fall within systemic and instructional categories. Systemic issues include the fact that for many schools PHE does not occur every day for the full school year and therefore cannot meaningfully contribute to daily moderate-to-vigorous physical activity; in many provinces in Canada, and other parts of the world, PHE is not a required course in the senior grades of secondary school; there is a lack of PHE teachers, especially at the elementary and middle school levels; even though PHE is a core curricular subject similar to mathematics and science, it is often confused with other school programs that contribute to children's physical activity (e.g., recess, intramurals, varsity sports, and club programs); and PHE, in general, suffers from low subject status and esteem (McKenzie & Lounsbery, 2009; McKenzie & Lounsbery, 2014).

This current body of research, however, focuses on the instructional concerns that exist in PHE. Those concerns that can be, at least in part, remedied by teachers. These instructional concerns include the fact that students often do not engage in recommended levels of moderate-to-vigorous physical activity during PHE; PHE often does not engage nor meet the needs of all genders equally; and PHE often focuses too heavily on competitive team games and sports while sacrificing a focus on lifetime physical activity (Gibbons, 2009; Gibbons & Humbert, 2008; Gruno & Gibbons, 2020; Gruno & Gibbons, 2018; McKenzie & Lounsbery, 2009; McKenzie & Lounsbery, 2014; van Daalen, 2005).

The holistic, health-related PE, as described in the previous section, can help remedy many of these problem areas in PHE instruction. However, it requires a redirection from fitness

and sport skill training to motivating students to engage in physical activity, including physical literacy skills, and other healthy behaviours, during and outside of class time. This suggests that PHE should be an engaging experience during which students learn generalizable movement skills that will transfer into diverse activities, sports, and games offered at school, in the community, and later in life (McKenzie & Lounsbery, 2009; 2014). To further influence the promotion of physical activity, PHE teachers need to redesign their courses and instructional behaviours to promote out-of-class physical activity, modify the school environment so students have opportunities to be active on campus outside of PHE lessons, and work to develop physical activity linkages in the community (McKenzie & Lounsbery, 2014). Being active in nature during and outside of PHE can help meet these specific instructional goals and will be discussed in the next two sections. Many PHE curriculum documents that have been developed in the past 20 years, including all PHE curriculum documents within Canada (Kilborn et al., 2015), contain requirements for including activities in alternative environments (beyond the gym, weight room, field and track) as part of a PHE program. However, it is important to recognize that although curriculum documents may indicate that these outdoor activities are meant to be included in PHE programs, often-times, they are not, at least not adequately (Hall et al., 2020).

The Benefits of Being Active in Nature

> *This is when it occurred to me: the "more nature" movement is also the "more movement" movement. More nature comes with more movement; less nature comes with less movement. If we want our kids to move more, they need to get a little wild* (Bowman, 2021).

Within most current public education, the classroom is and has been the primary place of formal learning. Most students in Canada attend 13 years of public education, approximately 180 days per year, 6.5 hours per day (over 15,000 hours total). Students report spending an average of one hour per school day outdoors (Larouche et al., 2016). However, this time outdoors often occurs during lunch break and recess and not during instructional time. Even including break times, these statistics imply that the average student is spending 85% of their hours at school inside a classroom. As discussed previously, increased time spent outdoors is positively correlated to improved physical and psychosocial health (Larouche et al., 2016). Placing such an emphasis on the classroom as the place of learning creates often unexamined value statements. Classrooms, or more specific to PHE, gyms, are highly controlled and often lifeless spaces. Temperature and lighting are consistent regardless of time of year, teachers generally decide what is displayed on walls and how furniture is arranged. Classrooms separate learners from the natural environment, further affirming encultured beliefs that we are separate from and can exert our will over nature. Classrooms can become placeless places; a classroom in Vancouver, in Nunavut, in Prince Edward Island; in October, in January, in June can be very similar spaces. Classrooms are also physically separate spaces from communities, creating a division between school life and real life. Classrooms can help emphasize hierarchies; abstract knowledge over experienced, enacted, and felt knowledge, visual learning over auditory, over tactile, over olfactory and taste. While classrooms (at least within the current model of formal learning) do play an essential role in education, what might be a more balanced and diverse approach towards learning spaces? One that has the potential to benefit learners, educators, communities, and environments? Connecting with the natural world could help foster a lifelong love of wild spaces

among children and youth (Sheldrake & Reiss, 2020), encouraging them to take advantage of the physical, mental, and cognitive benefits of being outdoors.

Educators worldwide now recognise the importance of human-nature connection as a determinant of children's and youth's health and wellbeing (Braus & Milligan-Toffler, 2018). The benefits of participating in outdoor learning include enhanced social skills (Asfeldt et al., 2018; Asfeldt & Hvenegaard, 2014; Beames, 2004), improved social-emotional functioning and behavioural health (Gustafsson et al., 2012; Hartmeyer & Mygind, 2016), increased physical activity (Mygind, 2016), enhanced academic learning and cognitive functioning (Dyment, 2005; Fägerstam & Blom, 2013; Fägerstam & Samuelsson, 2014; Fiennes et al., 2015; Rickinson, 2001), improved knowledge of culture and local histories (Newbery, 2012; Root, 2010), increased motivation for learning (Fägerstam & Grothérus, 2018), and environmental awareness (Asfeldt & Hvenegaard, 2014; Beames, 2004; Hutson & Weber, 2008). Furthermore, educational time outdoors is recognized as a way of teaching sustainability (Beames et al., 2012).

Even though outdoor learning has clear potential for supporting children's health and wellbeing, it struggles to establish a strong foothold in the Canadian education system (Potter & Dyment, 2016) due to a range of barriers that previous research has identified such as: teachers feeling unprepared and lacking confidence to teach outdoors (Gruno & Gibbons, in review), concern for classroom management and children's safety (van Dijk-Wesselius et al., 2020), lack of support, funding and resources (Edwards-Jones et al., 2018), feeling constrained by a traditional view on teaching (Passy, 2014), and inflexible daily teaching schedules (van Dijk-Wesselius et al., 2020).

In this doctoral dissertation, I propose NBPA as an instructional technique in PHE in order to realize many of the above-mentioned benefits while mitigating many of the challenges.

Before discussing NBPA in PHE it is important to provide a thorough rationale specifically for the inclusion of NBPA. Average time spent outdoors has declined to approximately two hours per day for Canadian children (Larouche et al., 2016). On average, all people are spending far less time outdoors, with 90% of our time being spent inside (Klepeis et al., 2001). While inside, adolescents in North America now spend an average of 45 to 60 hours per week on screens, which has dramatically increased in recent years (Boers et al., 2019; Rideout & Robb, 2019). High rates of screen time are correlated with increasing rates of depression, anxiety and loneliness (Boers et al., 2019).

The significance of young people's engagement with nature cannot be underestimated. Much has been written of the power of nature for youth's growth and change (Louv, 2005, 2008, 2011). Additionally, a substantial body of research, including meta-analyses and systematic reviews, has indicated that children's and youth's active engagement within the natural environment is associated with a large range of cognitive, physical, affective, and moral developmental benefits not limited to self-confidence, social skills, motivation and academic attainment (Adams & Savahl, 2017; Allender et al., 2006; Cason & Gillis, 1994; Hattie et al., 1997; Mygind et al., 2019; Rickinson et al., 2004). In addition to these benefits, Martin (2004) found that another advantage of time in nature for young people is the approval of nature protection. In addition to cultivating environmental appreciation, empathy and stewardship, connections and interactions with nature are essential to children's overall physical health and well-being (Bell et al., 2008; Ewert et al., 2005). Mannion et al. (2006) reported that young people valued outdoor experiences for this very reason: "because of the ways in which three dimensions are interrelated: the inter-personal dimension, the activity dimension and the spatial dimension (or outdoor location)" (p. 3).

In order to thoroughly discuss the large range of positive attributes of being active in nature, this section organizes the benefits of physical activity in nature into three categories and these categories also align to many PHE curricular outcomes across the globe: (a) personal affective and cognitive outcomes, encompassing attitudes, focus, values, beliefs and self-perceptions; (b) interpersonal/social outcomes, including cultural diversity, a sense of relatedness, communication skills, leadership and teamwork; and (c) physical/behavioural outcomes, relating to physical activity, fitness, and physical skills. In addition to these categories, a fourth category will also be discussed, (d) environmental outcomes, encompassing the desire of young people to protect nature. Although only indirectly addressed in some PHE curricula, this fourth category should be considered of importance in all curricula, across all subject areas, and in all grades during this critical time of climate change.

Personal Affective and Cognitive Outcomes

For adolescents who are struggling to find their own identity and establish themselves as adults, the challenge to find meaning and establish values is increasingly complex. Young people are bombarded with millions of messages. Family, friends, teachers, coaches, television, radio, movies, social media, billboards and hundreds of other 'educators' all eagerly vying for influential status. Taking students away from the chaos of the modern world and often urban existence and into natural places allows for a 'time-out.' It provides a chance for youth to escape the powerful reaches of advertising driven media to a place where money has no immediate value and life's basic necessities of warmth, food, shelter, and water are suddenly of primal importance and relevance (Hakokӧngäs & Puhakka, 2021; Piller, 2002). Despite the benefits of being in contact with nature, researchers have also found natural settings to be uncomfortable,

distressing or threatening for some young people (Milligan & Bingley, 2007; Woodgate & Skarlato, 2015)

Nature is considered an affordable, upstream health promotion intervention (Maller et al., 2006), in that it is an available avenue that decreases barriers and improves supports that allow people to achieve their full health potential (Fish, 2014). Childhood exposure to nature has been associated with increased mental health later in life (Dibben et al., 2017; Engemann et al., 2019). In our fast paced, media-driven world, and especially during the global pandemic, mental health challenges in young people, now and in the future, are a concern (Statistics Canada, 2020). Mutz and Muller (2016) found that outdoor education and wilderness programs can foster mental health in young adults. Their evidence comes from two pilot studies, one in which 14-year-old participants reported an increase in life satisfaction, mindfulness and a decrease in perceived stress after a successful nine-day hike through the German, Austrian, and Italian Alps. However, a limitation of this study is the lack of a control group, so it can be argued that the results are caused, at least to some degree, by selection effects of the participants or by test-retest effects, which may occur when the same questionnaire is answered more than once. Moreover, it cannot be ruled out that it was not the outdoor adventure itself, but simply the interruption of usual school routines for nine days that may have caused the effects. Additionally, follow-up measures could not be collected due to the participants' summer break, hence it can only be speculated if the changes found immediately after returning from the excursion were permanent or just a short-term eruption of well-being and post-trip elation. However, other research has found that regular exposure to natural environments when young can have profound effects on mental health that often last well into adulthood (Tillmann et al., 2018).

Feda et al. (2015) found in their cross-sectional study with 68 adolescents that percentage of park area predicted perceived stress among adolescents. Access to neighbourhood parks buffered adolescents against perceived stress after controlling for socio-economic status and physical activity. However, the authors were unable to measure the length of time needed to establish the relationship between parks and perceived stress and they also had a small number of participants in the study. With a greater number of participants, they may have been able to detect stronger associations or associations more specific to the type of park.

Substantial evidence in the form of a review of 150 research papers on outdoor learning published between 1993 and 2003 (Rickinson et al., 2004) exists to indicate that being active in nature, when properly conceived, adequately planned, well taught and effectively followed up, offers learners' opportunities to develop their knowledge and skills in ways that add value to their everyday experiences in school. Specifically, time in nature can have a positive impact on long-term memory due to the memorable outdoor setting. Effective lessons in nature, can lead to individual growth and improvements in social skills. More importantly, there can be reinforcement between the affective and the cognitive, with each influencing the other and providing a bridge to higher order of learning (Rickinson et al., 2004). Additionally, a few studies indicate that cognitive performance can be enhanced after walking (Schutte et al., 2017; Taylor & Kuo, 2006) and after various types of physical activity (van den Berg & van den Berg, 2011) in natural environments compared to urban environments.

Although their study was conducted with adults, White et al. (2019) examined associations between recreational nature contact in their participants' last seven days and self-reported health and well-being and found that when compared to no nature contact the previous week, the likelihood of reporting good health or high well-being became significantly greater

with contact ≥120 mins. The pattern was consistent across key groups including older adults and those with long-term health issues. It did not matter how the 120 minutes of contact a week was achieved (e.g., one long vs. several shorter visits/week) (White et al., 2019). However, their data were observational and cross-sectional, and thus, they were unable to rule out the possibility that the association is, at least in part, due to healthier, happier people spending more time in nature. Similar studies are needed to see how generalizable any potential "threshold" is across a range of situations, including educational contexts, and to see how long an individual needs to maintain a certain amount of weekly exposure to achieve health and well-being gains.

Rose et al. (2018) examined the extent to which participation in structured outdoor programs is associated with improvements in adolescent health and well-being. They found that levels of fear decreased after their adolescent participants returned from camp, whereas levels of self-efficacy increased. Positive changes were also evident for peer and school connectedness, although these effects were less pronounced. However, Rose et al.'s (2018) study, like others discussed in this literature review, has some limitations. They set out to examine benefits associated with prototypical outdoor programs, as defined by a set of core program characteristics, however, they included only three such programs in the study. Future research might usefully seek to extend and replicate studies discussed in this section by expanding the sample of types of outdoor programs examined.

Interpersonal/Social Outcomes

With BC's recent shift in curriculum, and its focus on First Peoples' Principles of Learning (Chrona, 2014), Indigenous ways of learning now have a prominent place in PHE as well as all other aspects of the curriculum. Example principles include: "Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the

ancestors"; and "Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place)" (Chrona, 2014). The right to education is inextricably connected to all human rights, including the rights to lands. However, calls for access to a high-quality education that is culturally respectful, responsive, sustaining and revitalizing, and that is relational involving communities and youth in decisions of curriculum and pedagogies, are a challenge to actualize. Indigenous peoples are still challenging new forms of colonization and neoliberal actions through decolonizing efforts (Battiste, 2013). It is important to recognize that nature in an educational setting allows for the sharing of cultural diversity, and increases the space for local cultural heritage and traditional relations with nature. As Humberstone (2008) stated, "We all lose if we fail to acknowledge different ways of engaging with nature that may have been a part of a nation's and diverse culture's traditions" (p. 217). She also described how we need to value diverse cultures and landscapes, making sure that we share equally diverse outdoor cultures, affirming those that might otherwise become hidden by the "commercialization" and "individuation" of predominately English-speaking nations (Humberstone, 2008, p. 218).

Within a traditional Indigenous worldview, the land is vital to education; engaging in land-based cultural activities is central to Indigenous students' mental, physical, emotional, and spiritual development (Bell & Brant, 2015; Greenwood & de Leeuw, 2007). When it comes to education for Indigenous youth in Canada, less than 40% of Métis (people of mixed European and Indigenous ancestry) earn a university or college degree, while 18% do not finish high school (Statistics Canada, 2018). Our present colonial system and general absence of land-based practices that were once a key to Indigenous culture has led to a loss in cultural knowledge and connection amongst Indigenous peoples and their lands. As a settler-scholar, I recognize my

implication in the processes of oppression that occurred and continue to occur within BC's education system. I acknowledge my lack of understanding of Indigenous perspectives, which means I must step back and become learners of such knowledge from those who hold it. The Truth and Reconciliation Commission of Canada (2015) defines reconciliation as "establishing and maintaining a mutually respectful relationship between Aboriginal and non-Aboriginal peoples in this country" (p. 6). There is now an awakened acknowledgement of the centrality of Indigenous peoples and culture that pervades outdoor learning. For certain programs there is a developed sense of acknowledgement and inquiry into Indigenous spiritual practices to accompany the more obvious Indigenous peoples' role of providing technologies for shelter, travel and survival best suited to the Canadian landscape.

In a recent study by Kirk and Spencer (2018), the participants in their study, adolescent females, stressed the importance of support from friends and family to feel safe in challenging norms and stereotypes while being active. The participants discussed their perceptions that "everything is gendered" and that there are activities girls are "supposed to do." They talked about sometimes feeling excluded from sports dominated by boys, and expectations around what girls should wear while being active (para. 7). When they discussed challenging these norms, they mentioned "engaging in non-traditional physical activities like…climbing trees in skirts" (para. 8). However, there was also a surprising finding: the emphasis they placed on being active outside in nature with friends and family. The researchers learned that nature provided an important context for the young women to feel connected, comfortable, safe and confident to navigate the complex gender norms around physical activity. This sense of connectedness to classmates and the teacher can also be referred to as relatedness. Relatedness is defined as an individual's inherent desire to feel connected to others (Deci & Ryan, 2000). There is persuasive

evidence that relatedness is a key ingredient in PHE motivation (Cox et al., 2009; Standage et al., 2005). Students' social recognition and status goals have also been found to significantly positively predict extra-curricular physical activity participation (Wallhead et al., 2013). Additionally, Mann et al. (2021) report that learning in nature has been proven to foster communication, reasoning, and interactional abilities, while also enhancing 21st century skills such as resilience, collaboration, conflict resolution, and self-regulation. Additional benefits attributed to participation in outdoor learning include: building a sense of identity, analytical skills, life ownership, stress relief (Mygind et al., 2018), and increasing social connectedness (Gray & Pigott, 2018; Mygind, 2009; Prince, 2020; Scott & Colquhoun, 2013; Sjöblom & Svens, 2019).

Physical/Behavioural Outcomes

As the world grows ever more complex, a fundamental truth becomes increasingly evident: human health and wellbeing is enhanced through meaningful connections between people and places. Unfortunately, our predominantly urban lifestyles have distanced individuals and communities from rural and natural environments. As homes become larger and gardens evolve into concrete entertaining areas, the health and wellbeing benefits of being active in nature are gaining credibility as a valid and effective approach to improving health (Carpenter & Harper, 2015).

Enjoyment and pleasure are some of the reasons behind engagement in physical activity. Enjoyment in the context of physical activity is specifically defined as a positive cognitive state that involves feelings of pleasure and fun related to the practice of physical activity (Shaw & Shaw, 2014). The outdoors has become an ideal place to escape from society, routine, and life stress, and is thus an ideal place to return to the essence of being oneself (Fuentesal-García et al.,

2019). As people spend more free time engaging in physical activity in a natural environment, evidence shows that enjoying these natural environments increases our health benefits (Gascon et al., 2017). Feeling connected to nature and enjoying being in nature is also a strong predictor for both visit frequency to local green spaces and meeting physical activity guidelines in adults (Flowers et al., 2016). Additionally, one study among 10 to 12 year old youth found that for every additional hour spent outdoors, physical activity increased by 27 minutes a week (Cleland et al., 2008). Wood et al. (2014) showed that 20 minutes of orienteering was associated with enhanced levels of moderate-to-vigorous physical activity. A number of studies have found that a day of education outside the classroom conducted in green settings was associated with higher levels of moderate-to-vigorous physical activity than regular school (Dettweiler et al., 2017; Mygind, 2007, 2016). Averaged over three seasons, children were expected to spend 11.5 minutes longer in moderate-to-vigorous physical activity per two hour unit (Dettweiler et al., 2017).

In young children, evidence suggests that play in natural environments is associated with the development of motor skills such as balance and coordination, which in turn enable and predict physical activity levels (Fjørtoft, 2004). Kokkonen et al. (2021) found that more frequent parent–child nature visits with children aged 3-6 were associated with children's longer sleep duration at night, higher amounts of moderate-to-vigorous physical activity outside of preschool time and, among girls, good sleep consistency. Being active in nature not only has these immediate benefits for young people, but these childhood experiences may predict nature exposure and physical activity in a natural environment as an adult. Wood and Smyth (2020) conducted a study with 45 healthy adults who each wore a Firstbeat heart rate variability monitor for 24 hours. Participants also completed questionnaires assessing childhood and adulthood

nature exposure and physical activity within a natural environment, as well as current connectedness to nature, perceived stress and well-being. The authors found that childhood nature exposure and physical activity within a natural environment significantly predicted adult nature exposure and physical activity within a natural environment as well as connectedness to nature. After controlling for childhood nature exposure and physical activity within a natural environment, nature connectedness was negatively associated with the percentage of stress over the 24-hour period and positively associated with heart rate variability during sleep.

Environmental Outcomes

One goal of being active in nature is certainly the accumulation of physical activity. However, spending time in nature also often results in an affinity and care for the environment. The term nature connectedness suggests that spending time in nature will help an individual feel connected to nature, more inclined to care about nature, and, ultimately, protect nature. Chawla and Derr (2012) define nature connectedness as "a predisposition to take an interest in learning about the environment, feeling concern for it, and acting to conserve it, on the basis of formative experiences [in nature]" (p. 19).

Outdoor education in its widest sense, which includes, for example, NBPA, adventure education, and outdoor learning, has long been regarded as an important tool for public environmental concern (Sandell & Öhman, 2010). Adventure education can be facilities-based or nature-based, is focused on personal and social development, and is found all over the world with educators from other cultures developing methods and curricula that relate to their social, cultural and educational contexts (Nicol, 2002; Prouty et al., 2007). Outdoor learning and NBPA, on the other hand, only occur outdoors. In the last decade, several studies have been conducted on the relationship between nature experiences and environmentalism, with an emphasis on the

effect that educational participation in nature has on environmental knowledge, pro-environmental attitudes and behaviour, and their interconnection (Sandell & Öhman, 2013). For environmental education and education for sustainable development, nature experience is regarded as an important starting point (Bögeholz, 2006).

From an educator's point of view, it is important to acknowledge that learning *about* nature will not in itself lead us to act sustainably. This is because learning *about* nature externalizes it. All environmental problems are really people problems (Nicol & Higgins, 2008). Reading about something helps students maintain a distance from it. It becomes a problem but not their problem. It only becomes theirs when they accept that they are part of nature. Visiting a place allows another aspect of knowledge to affect us in a way that classroom learning often ignores. It is a type of knowing which cannot be gained in a cognitive way and instead is to do with how we feel about place. The Norwegian philosopher Arne Naess aligns with this perspective and contended that: "humanity is inseparable from nature" and "if humanity causes harm to the environment it causes harm to itself" (Næss, 1989, p. 2). Evidence suggests that social and environmental justice movements, movements which build upon environmental awareness, are frequently spawned by people's involvement in nature-based adventure (Humberstone, 2011; Thorpe & Rinehart, 2010). In a survey of environmental leaders, most environmentalists attributed their commitment to a combination of two sources in childhood or adolescence: Many hours spent outdoors in keenly remembered wild or semi-wild places, and a mentoring adult who taught respect for nature (Chawla, 2006).

Rich and positive experiences of nature and its diversity, complexity, and beauty are expected to lead to nature becoming something that people will want to protect and care for (Öhman & Sandell, 2015). In this way pedagogical time in nature may also lead to people

wanting to change their everyday habits and approaches that reduce the burden on nature and the environment (Sandell & Öhman, 2010). This use of nature in the education system thus builds on a strong belief on the connection between experiences in nature, care for nature, and an environmentally friendly way of acting (Chawla & Flanders Cushing, 2007; Ewert et al., 2005; Smith-Sebasto & Cavern, 2006).

Time in nature can also offer an alternative and valuable experience where meaningfulness, quality of life, and pleasure are not linked to consumption, material standards, or economic reward after basic needs are fulfilled, but to physical and mental freedom (Henderson & Vikander, 2007; Isberg & Isberg, 2007). This is illustrative that proximity to nature can encourage and influence a decrease on natural resources. Personal experiences in nature play an important role: personal landscape relationships that give human ecological references to people's dependence on the environment and how we, in a responsible way, ought to deal with that which is 'common' so that a more sustainable future can be created (Öhman & Sandell, 2015). Furthermore, if we accept that nature experiences are an indispensable foundation for the individual development of attitudes and values towards nature, and that children from socially disadvantaged family backgrounds often live in an environment that lacks opportunities for frequent and diverse nature experiences, it follows that these children tend to be deprived of the opportunity for such 'significant life experiences' to develop a connectedness with nature (Bögeholz, 2006; Chawla, 1998). Therefore, it is important to explore possible avenues for frequent time in nature that are inclusive for students from all socially economic backgrounds, such as NBPA in PHE.

Place- and Land-Based Education: Nature-Based Physical Activity in PHE

Internationally, there is not a clear definition of outdoor education. Therefore, it is not surprising that there is no one definition for outdoor education in the Canadian K-12 context, especially considering that education is a provincial and territorial responsibility as opposed to falling under federal jurisdiction. Henderson's and Potter's (2001) notion is that outdoor education in Canada is a form of organized learning that takes place outdoors. Specifically, Henderson and Potter wrote that outdoor education is an "overarching curricular enriching education in the outdoors that include both environmental and adventure education" (p. 69). Generally, environmental education aims to enhance knowledge about ecosystems and how humans interact with those ecosystems while adventure education is focused on developing personal and social skills. Nature-based physical activity can be seen as a merging of adventure and environmental learning; however, I believe it can instead align with place- and land-based education.

Often used interchangeably, the terms place-based and land-based education do differ. The aim of place-based education is to "ground learning in local phenomena and students' lived experience" (Smith, 2002, p. 586). When utilizing place-based education:

> "…the community and surroundings become regular sites of learning activities and reflection, breaking down the boundary between classroom and the world beyond. The division that…so often exists between the child's experience and what he or she encounters in school is reduced, and the result is higher engagement" (Smith, 2002, p. 589).

However, place-based education does not always acknowledge Indigenous history, cultural knowledge or that all places were once, and continue to be, Indigenous lands (Calderon, 2014).

Indigenous land-based learning, on the other hand, integrates ways of knowing, learning and being, while honouring the spiritual, ancestral and physical aspects of land (Styres et al., 2013). When educating using a land-based approach, something as seemingly benign as pulling invasive plant species from Indigenous homelands deemed "public parks" becomes a significant action towards regenerating Indigenous food systems (comprising all of the community relationships to land, water, plant and animal species that have sustained Indigenous peoples for generations) and land-based relationships (Corntassel & Hardbarger, 2019). These teachable moments tend to be de-emphasised in formal, institutional education settings. The ways in which learning occurs are as important as the content of particular courses: "Land-based learning fosters the remembering required to become a good ancestor, both on our own territories and as guests on the homelands of others" (Mowatt et al., 2020, p. 19).

This body of research proposes NBPA as a potential avenue for both place- and land-based education. With the numerous benefits discussed above, one would think nature-based learning in public schools would be a constant occurrence. However, as with all programming, it makes demands upon teachers, students, schools and other stakeholders (e.g., parents, communities). A few barriers for PHE teachers, in particular, include lack of teacher confidence and competence, safety concerns and risk management; lack of support, funding, transportation, and accessibility issues, student beliefs that physical activity in nature does not 'fit' PHE, and an inflexible school structure (Gruno & Gibbons, 2021). In addition, many educators and parents may feel uncomfortable with the idea of outdoor learning, possibly fearing that teachers will not be able to the address the curriculum in a suitable manner (Nelson, 2012).

There are still many effective PHE based outdoor education programs in British Columbia and Canada. However, because these programs tend to draw students who already

have experience in the outdoors, often have a fee associated with them, and have "…a focus on planning for trips and building skills" (Gruno & Gibbons, 2021), they only reach a select few students and are not a part of any student's long-term education. It has been proposed that NBPA in PHE is a means of realizing the numerous benefits of being active in nature because it can reach the majority of students in the K-12 school system (Gruno & Gibbons, 2020, 2021). Learning outdoors has been defined as taking students outdoors into their immediate or nearby surroundings to learn essential lessons of the curriculum, with four possible zones: (a) school grounds, (b) local neighbourhoods, (c) day excursions, and (d) overnight stays/residential camps and expeditions (Beames et al., 2012; Mann et al., 2021). NBPA utilizes the first two zones – areas easily accessible on a daily or weekly basis.

Teachers have frequently expressed the benefits of students' learning and students' self-concept during experiences in nature. However, often too many barriers exist for them to offer their students regular nature-based experiences. Bentsen and Jensen (2012) stated that there is a need for scholars and other advocates of outdoor learning to acknowledge the daily realities of teachers and schools, and consider what can realistically be accomplished within the context of schools. I feel that NBPA can be realistically accomplished as it is felt that "any competent PHE teacher can do [NBPA], which makes it more accessible for students and teachers, but the outcomes are still similar [to outdoor education]" (Gruno & Gibbons, 2021, p.12).

It remains a research challenge to demonstrate which PHE approaches are effective in increasing regular physical activity into adulthood (Sallis et al., 2012). PHE remains the primary societal institution for promoting physical activity among youth, and improvements can help respond to some of the today's most pressing health problems. Therefore, it is worthwhile to take stock of successes and make recommendations for accelerating progress (Sallis et al., 2012).

NBPA has been found to be one such success (Gibbons et al., 2020; Gruno & Gibbons, 2021; in review).

Fleming et al. (2011) highlighted the importance of integrating the formal curriculum with activities and experiences beyond the classroom in order to maximize positive and relevant impact on young people: "schools have the opportunity to focus on both academic and non-academic outcomes, including promoting multiple areas of competence, character, connections to others, caring, and contributions to society. Such approaches can enhance the academic process" (p. 55). Specifically, research shows that participating in physical activity programs in nature during adolescence can enhance body image (Barr-Wilson & Roberts, 2016), increase resiliency (Whittington et al., 2016), provide freedom from stereotypes (Whittington et al., 2011), and help students develop authentic relationships with their peers (Sammet, 2010). However, there is limited research on how to incorporate NBPA experiences in regular PHE for adolescent students and how the students themselves experience NBPA in PHE (Gibbons et al., 2020; Gruno & Gibbons, 2020, 2021). Due to the plethora of benefits of being active in nature, the purpose of this current body of research is to outline a specific type of PHE reform: the integration of NBPA. This proposed reform is outlined through three studies that follow the learning and teaching cycle: learning about NBPA as pre-service teachers, engaging in NBPA professional development as in-service teachers, and finally, and perhaps most importantly, how the adolescent students themselves experience NBPA in PHE as learners.

Nature-Based Physical Activity in PHE: A Form of Reform

"The current ethos that determines much of the curriculum from elementary through graduate school is predicated on representing the student as a rootless individual" (Bowers, 1992, p. 174).

Penney (2013) stated that there are "possibilities for developing [PHE] curriculum, pedagogy and assessment in ways that will mark a challenge to 'status quo'" (p. 7). This body of research proposes NBPA as a possible way to challenge the said status quo in PHE. Any discussion of change in educational instructional practices must look at the entire pathway: from pre-service PHE teacher education (PHETE), to in-service teacher professional development; to the experiences and voices of the learners themselves.

Pre-Service Teachers

Given the abundance of existing studies with in-service PHE teachers, it has been suggested that students' perspectives on PHETE should be specifically researched, in terms of how they perceive and engage with new curricular models (Wang & Ha, 2009). Although pre-service PHE teachers may lack actual teaching experience, Wang and Ha (2009) argue that these initial perspectives are vital as they inevitably shape future practices and attitudes within contexts of curricular innovation. McKenzie (2007) advocated that both PHETE students and in-service programs need to increase the diversity of field experiences (to include physical activity settings beyond PHE). Hall et al. (2020) identified the benefit of future research examining the impact of alternative environment activities education in PHETE on embracement by PHE teachers. In response, Gruno and Gibbons (in review), implemented a NBPA module in a PHETE course designed for elementary generalist teachers. The module consisted of the instructor teaching NBPAs in a natural location on a Western Canadian university campus once

every two weeks. The authors employed focus groups, observations, and document analysis as data collection and found that, overall, participants reported increased preparation and motivation to teach children NBPA in the future. Their motivation increased due to their experiences as learners and their ability to think as teachers.

Professional Development with In-Service Teachers

Researchers have long recognized that teachers' professional development is essential to changing classroom practice, improving schools, and enhancing pupils' learning outcomes (Borko, 2004; Day, 1999). Professional development can be defined as teachers' "learning, learning how to learn, and transforming their knowledge into practice for the benefit of their students' growth" (Avalos, 2011, p. 10); as well as the constant development of knowledge and professional skills throughout one's career in education (Bolam, 2002). Teachers' professional development activities can include experimenting, collecting new and up-to-date knowledge, attending courses and conferences with new insights, and self-reflection (Thoonen et al., 2011). These activities may be voluntary or mandatory, individual or collaborative, formal or informal (Kennedy, 2014). Specific to our provincial context, the British Columbia Teachers' Federation defines professional development as "a process of personal growth through programs, services and activities designed to enable members, individually or collectively, to enhance professional practice." The Federation further explains that "throughout the province, there is a variety of methods by which local members are served. Central to all local union provisions is the recognition of professional autonomy of members to plan and pursue their professional growth" (*Professional Development and Support*, 2021). It was within this context that the current body of research was conducted.

Professional learning often takes place in formal settings, such as professional development programs and workshops, teaching research groups, and formal mentoring programs (Timperley, 2011). Specifically for PHE teachers, professional development activities often include professional learning communities, conferences, workshops, staff development programs and reading journals and books (Tannehill et al., 2015). Professional development is a process in which the professional identity of the teacher is formed, and implicit knowledge becomes explicit; it is a process of personal and professional empowerment within the realm of one's expertise (Berliner, 2001; Kuijpers et al., 2010). Teachers must make progress in the course of their professional development, because of the many innovations and developments introduced in their fields of expertise over the years, and, as a result of the essential nature of the teaching profession, which not only enables, but also requires development, due to the dynamic and ever-changing work environment (Darling-Hammond, 2005). It is clear that the process of professional development takes place throughout the teachers' professional life; it is grounded in teachers' motivation and personal commitment, and it is affected by their personal perceptions; yet it is also the outcome of an imposed regulation, implemented and authorised by the system (Darling-Hammond, 2005), an outcome of a policy (Feiman-Nemser, 2001) implemented usually as part of a provincial or school system and is delivered from the top down (Fullan, 2007). Professional development allows for a balance between the needs of the school, the needs of the individual and provincial or national needs, and it aims for the promotion of knowledge, skills and values (Fraser et al., 2007). Both macro conditions, such as educational systems, policy reforms, and teacher working conditions, as well as school culture, including social traditions, beliefs and the administration impact professional development. Some school cultures are more appropriate and conducive to learning than others (Avalos, 2011). Therefore, for this body of

research, I felt there was a need to listen to teachers from a variety of school cultures and contexts within BC.

Despite the importance of professional development, associated changes in teaching are often subtle, and dramatic changes are rare (Ermeling & Yarbo, 2016). One reason for this nuance is that teachers construct visions of classroom practice based on deeply rooted cultural routines and preconceived notions of effective and ineffective teaching (Stigler & Hiebert, 1999). Teachers are often constrained by their observations and may need outside experts to expand their visions of what is possible; these experts can be local scientists, researchers, or university faculty (Ermeling & Yarbo, 2016). Not every form of professional development, even those with the greatest evidence of positive impact, is of itself relevant to all teachers. There is thus a constant need to study, experiment, discuss and reflect in dealing with teacher professional development on the interacting links and influences of the history and traditions of groups of teachers, the educational needs of their student populations, the expectations of their education systems, teachers' working conditions and the opportunities to learn that are open to them.

Historically, teacher change has been directly linked with planned professional development activities (Clarke & Hollingsworth, 2002). When professional development programs became popular, they were based on a training paradigm that implied a deficit in teacher skills and knowledge (Guskey, 1986), meaning professional development was meant to 'fix' something that was missing. Most professional development consisted of 'one-shot' workshops aimed at teacher mastery of prescribed skills and knowledge (Clarke & Hollingsworth, 2002). Researchers including Guskey (1986), have highlighted the ineffectiveness of professional development programs that have an overemphasis on this deficit approach. Others, including Fullan (2007) have provided convincing evidence of the failure of

‘one-shot’ professional development approaches. The clear ineffectiveness of attempts to effect teacher change through professional development programs based on the deficit-training-mastery model has provided the impetus for much research related to the process of change and professional development in recent years. A significant outcome of this research has been the shift in focus from earlier conceptions of change as something that is done to teachers (that is, change as an event with teachers as relatively passive participants), to change as a complex process that involves learning (Clarke & Hollingsworth, 2002). The key shift is one of agency: From programs that change teachers to teachers as active learners shaping their professional growth through reflective participation in professional development programs and in practice (Clarke & Hollingsworth, 2002).

Teachers’ level of dissatisfaction with current teaching and learning conditions is an individual disposition that may facilitate attempted pedagogical change (Maskit, 2013). In order to promote change in PHE, it is necessary to understand the change process and recognize that PHE teachers teach under very different teaching conditions than teachers in general education (Whipp et al., 2007). In particular, it is important to understand the factors that facilitate and impede pedagogical change so that appropriate measures can be taken in the future to support logical approaches to change. For the purpose of this body of research, pedagogical change is defined as any alteration to basic program elements: (a) curriculum; (b) instructional strategies; (c) class management techniques; (d) assessments; and (e) learning environment. This definition is consistent with Fullan's (2007) definition of pedagogical change described as alterations in “instructional resources, teaching approaches, and beliefs about pedagogy theory” (p. 30).

Coolahan (2002) identified certain desirable characteristics associated with successful in-service professional development that can influence pedagogical change: (a) it should

incorporate both on and off-site school dimensions; (b) teachers should have a greater role in setting the agenda and being actively engaged in an experiential process; (c) teachers can assist their peers as facilitators and team leaders; this gives rise to a sense of empowerment and confidence building which cultivates a strong culture of enthusiasm; and (d) collaborative, interactional techniques are very much in favour, rather than lectures to large groups (Coolahan, 2002, p. 27). Indeed, it has long been recognised that the success of curriculum reform efforts relies on teachers as institutional actors who enact prescribed curriculum and as change agents (Fullan, 2007), thus supporting our attempts to incorporate teachers' perceptions as a fundamental source of knowledge into the process of designing curriculum (Reid, 2006). External influences of change such as socializing agents (e.g., students, colleagues, and administrators) have the potential to facilitate or impede teachers' abilities to make pedagogical change (Curtner-Smith et al., 2008; McKenzie & Lounsbery, 2009).

When it comes specifically to professional development in NBPA in PHE, Hall et al. (2020) found that dedicated professional development regarding alternative environment activities was one of the only educator characteristics significantly associated with PHE teachers' embracement of physical activities in environments other than the gym, field or track in PHE. They commented on the fact that commonly accessed one-day professional development workshops are limited in both time and impact upon practice (Hunzicker, 2011). The researchers, therefore, do not call for single stand-alone professional development sessions, but instead request a "higher standard" such as "lengthy in-service courses" in order to enable more PHE teachers to better embrace outdoor activities in their teaching practice (Hall et al., 2020).

Student Experiences in PHE: Let Us Listen to What They Have to Say

> *Movement is currently counterculture. The way children move today has everything to do with the physical spaces and cultural practices we've collectively developed, as well as the values we've placed upon moving…and not moving* (Bowman, 2021).

Many researchers within the field of PHE have identified the importance of including student voice in research (Fisette, 2012; Gibbons et al., 2010; Gruno & Gibbons, 2016; Wattchow et al., 2014). Student voice "describes the many ways in which youth actively participate in the school decisions that shape their lives and the lives of their peers" (Mitra, 2007, p. 727). Student voice is about more than just listening to students; it is about listening to students with the intent of responding to what we hear (Cook-Sather, 2007; Fielding, 2004). Harnessing student voices in PHE has been identified as particularly important during COVID-19 in order to navigate the gaps in equity that have surfaced during the pandemic (Davis & Long, 2020). One way to directly involve students in sharing their experiences in PHE is participatory-action research (Brydon-Miller & Maguire, 2009).

Participatory action research has been used within educational settings, largely due to the work of Paulo Freire (2014) who studied oppressive educational environments in Brazil. In participatory-action research, the goal is to involve participants during the entire research project (Wang, 1999). Within the field of PHE, several studies have previously explored how participatory-action research can support students having their voices heard about their experiences in PHE (Enright & O'Sullivan, 2010; Lamb et al., 2018; Oliver & Hamzeh, 2010; Oliver et al., 2009). The primary aim in this body of research, particularly in Chapter 5, is to work with students to disrupt the perceived boundaries of what is possible in PHE, imagine what is possible, and work towards what could be (Oliver et al., 2009).

Photovoice is a participatory-action research methodology that was designed by Wang and Burris (1997) to provide insight on various global public-health issues based on the assumption that people are the experts of their own lives. Participants are provided a voice by placing cameras in their hands in order to document their lived experiences and to take a critical view of the world around them in an effort to advocate for social change in their own community at the grassroots level (Wang et al., 2004). Photovoice is an empowerment tool because it gives a voice to those who typically do not have a say in shaping policy, and it emphasizes both individual and community action (Wang, 1999). Photovoice has begun to be used in educational research and is valuable because it is an engaging tool for both teachers and students. Through the use of Photovoice, teachers can learn more about their students' experiences within PHE and their lives outside of school, and students feel valued because their voice can be heard by their teachers, classmates and policy makers.

Summary

Given PHE's enormous potential to prepare young people for a lifetime of physical activity and health engagement (Trost, 2006), it is worth exploring instructional techniques that can help educators and students realize this goal. NBPA, which is aligned with health-related PE (Sallis et al., 2012), offers an alternative to some of the issues identified in PHE research: It is not a commonly offered traditional team sport; it is cooperative rather than competitive in nature; and it offers an explicit connection between physical activity and health *within* PHE and *beyond* PHE (McKenzie & Lounsbery, 2014; Nguyen, 2015). Therefore, the overall aim of this dissertation is to outline NBPA as a form of PHE reform, and a potential avenue for teacher instructional strategy change. In order to reach this aim, I present three studies that explore the

NBPA learning cycle from pre-service instruction, to in-service professional development, to, impact on students' learning.

Chapter 3 – Study 1

Learning to teach nature-based physical activity in Physical and Health Education: A study with pre-service teachers

Abstract

This study explored the experiences of eight pre-service generalist and specialist teachers who were tasked with teaching PHE on their teaching practicums. The aim was to discover if they had the knowledge, means, and motivation after learning NBPA in their PHETE course at a Western Canadian university to incorporate NBPA in their teaching practice during practicum. NBPAs are those activities that can be done in natural areas and require little specialized equipment, can be done by the majority of children, deemphasize competition, are cost-efficient and can be implemented by teachers on a regular basis (Gruno & Gibbons, 2020, 2021). As part of the NBPA module in three PHETE courses at one university, questionnaires, observations, and document analysis were utilized for data collection with pre-service elementary and secondary teachers. All courses and data collection occurred virtually due to the global pandemic, COVID-19. Findings indicate that after learning NBPA through the virtual module, participants reported implementing NBPA in their teaching practicums. They believed that learning the module increased their preparation and motivation to teach children NBPA and enabled them to transition between learning as students and teaching as educators.

Background

It is natural for children and youth to learn through activities conducted outside of the school and classroom as they can be rich and engaging (Yıldırım & Akamca, 2017). Learning in the outdoors is carried out through structured activities in different environments such as nature

and living spaces outside the classroom (Bunting, 2006). Mygind (2007) determined that students' physical activity levels were significantly higher when a combination of indoor and outdoor environments were used. It is known that outdoor learning activities in particular improve students' psychological well-being by reducing their stress during the transition from primary to secondary school, and increase their physical activities by decreasing their sedentary time (Byrd-Williams et al., 2019; Slee & Allan, 2019). Additionally, Coll (2016) reported on designing effective pedagogy to enhance students' understanding on environmental education and its importance. Student assessment results revealed that mixed learning environments where learning management software, namely Moodle, and outdoor learning experiences were combined increased student achievement.

Canada has a particular educational system in that it does not have one system, but rather thirteen, or one for each of the three territories and ten provinces. Thus, since the British North America Act came into effect in 1867, when Canada was constituted as a federation of provinces, each of them became autonomous regarding educational policy (art. 93). Each province is responsible for its own educational system, and teacher education differs by province, as it is designed according to the specific realities and requirements of each educational system, as well as the socio-cultural reality of each province (Perlaza & Tardif, 2016). Unlike some other countries in the world (e.g. New Zealand, Denmark, Finland, Singapore) which provide mandatory Outdoor Education, Outdoor Education in British Columbia, Canada is mentioned in the PHE curriculum, and is offered as an elective course in grades 11 and 12; however, it is not mandatory. Therefore, learning how to teach in the outdoors is not always a requirement of PHETE. However, when teachers do elect to have their students learn outdoors in PHE, they play an important role in the implementation of outdoor pedagogies

as they are responsible for acting as supporters as well as ensuring that students learn (Kangas et al., 2014). From a theoretical and pedagogical point of view, nature can be perceived as an effective teaching and learning environment. Although outdoor environments offer a variety of learning opportunities, making predictions and planning for possible challenges is more difficult than in indoor environments (Glackin, 2016; Lindemann-Matthies & Knecht, 2011). For example, teaching indoors can make teachers feel that they have more control over students' learning as they can determine, to a certain extent, the students' movement, the temperature in the room, and safety hazards. Teachers have previously identified many challenges to teaching outdoors including a lack of teacher confidence and competence, safety concerns and risk management, lack of support, funding, transportation, and accessibility issues, student beliefs that physical activity in nature does not 'fit' PHE, and an inflexible school structure (Gruno & Gibbons, 2021). In addition, many educators and parents may feel uncomfortable with the idea of outdoor learning, possibly fearing that teachers will not be able to address the curriculum in a suitable manner (Nelson, 2012).

NBPA offers a teaching strategy that introduces students to the benefits of being active in nature while minimizing some of the challenges. NBPAs are those activities done in natural areas, require little specialized equipment, deemphasize competition, are cost-efficient, and can be implemented by teachers on a regular basis (Gruno & Gibbons, 2020, 2021). NBPA differs from other outdoor teaching models. Outward Bound (Cook, 2001) created in the UK, had the original aim to "hold the young through active and willing Samaritan service, demanding care and skill, courage and endurance, discipline and initiative" (Hahn, 1957, p. 10). The Project Adventure model from the US uses a variety of settings, both indoor and outdoor, to engage students in adventure education (Prouty et al., 2007). On the other hand, NBPA is more aligned

with Scandinavia's *friluftsliv* which translates as 'life in the open air' (Dahle, 2007; Gelter, 2000). The concept has the primary focus to seek out a meaningful relationship and connectedness with nature (Gelter, 2000). Traditional Norwegian *friluftsliv* is about people going for daily walks either alone, or with family and friends for physical activity, to interact socially and be close to nature. Other activities may occur during these walks including photography, berry picking, fishing or gathering mushrooms (Dahle, 2007). The definition of friluftsliv also implies that the idea behind it comprises more than physical activity. It also refers to being inspired by and experiencing nature an thus, physical activity alone is an insufficient explanation of friluftsliv, even though physical activity per se takes place in many types of friluftsliv (Lyngstad & Sæther, 2021). The experience is purely as a leisure pursuit with no elements of competition undertaken with a sense of freedom to enjoy the shared experience of the natural world, physical activity and companionship (Backman, 2011a, 2011b). Similar to NBPA, practicing *friluftsliv* is not dependent on high costs, traveling or equipment, nor is *friluftsliv* or NBPA dependent on organizations.

It has been argued in the friluftsliv literature that when friluftsliv becomes institutionalized, for example in school, friluftsliv becomes an activity that involves groups of people in the same place in nature. In these situations, negotiations take place and create social understandings and social practices, which become important for each group member (Hofmann et al., 2018). On the other hand, Dahle (2007) discussed contemporary change influencing the Norwegian tradition because schools and universities are 'teaching' *friluftsliv* through activities such as snowboard days, canoe expeditions and overnight snow caving which is altering the shape of *friluftsliv*. His concern was that the influence of an international leisure activity culture is introducing a wider range of outdoor pursuits that sells expeditions or adventures as an

experience package rather than a way of life. Dahle described this influence as the sportification of *friluftsliv* and was concerned that new activity trends may weaken the tradition or mean those in their teens or late twenties might abandon the tradition (Brookes & Dahle, 2007). This 'sportification' exists in many Outdoor Education programs in North America as well.

When it comes to the education of pre-service teachers, opinions exist that post-secondary institutions will be more successful using outdoor pedagogy (Rickinson et al., 2004). It is well established that preservice teachers' beliefs mediate the process of PHETE and their teaching, largely due to several years of personal experiences - as students themselves, as coaches, and as participants in various contextual, societal and cultural experiences (Hollingsworth, 1989; Goodman, 1988). These experiences, termed *apprenticeship of observation* (Lortie, 1975) or occupational or professional socialization (Curtner-Smith et al., 2008; Lawson, 1983a, 1983b; Schempp & Graber, 1992), can result in emotionally charged beliefs (Morine-Dershimer & Corrigan, 1997), leading to tacit or unconscious assumptions about teaching, learning, students, content and curriculum in PHE. Previous research indicates that PHETE is permeated by beliefs and values based on assumptions about what a competent PHE teacher should know (Kirk et al., 2006). Often, the description of a good PHE teacher still is today, as it has been historically, to be skilled at many different sports and have in-depth knowledge of human biology (Mordal-Moen & Green, 2014). These taken-for-granted beliefs are reflected in the content and the structure of some PHETE programs, the types of students who enrol, and the learning outcomes of the programs (Dowling, 2006; Dowling & Kåhus, 2011; Rossi et al., 2008). Some PHETE programs continue to deliver traditional PHE content (e.g., volleyball, basketball, soccer, etc.) reinforcing these beliefs. These assumptions are not always compatible with the work of teaching (Kagan, 1992), and when not challenged in PHETE, more

readily determine the degree to which new information is assimilated into teaching practices (Doolittle et al., 1993; Hollingsworth, 1989; Goodman, 1988; Placek et al., 1995).

Carlson and McKenna (2000), Deenihan et al. (2011), Hastie (1994), and Tannehill (2005), argued that pre-service teachers should "live the curriculum" during PHETE in that they should participate in a variety of activities as well as experience at least one model (e.g. sport education, health-related PE, or outdoor education) in an effort to be "better equipped to offer programs that are challenging, relevant, and meaningful to the children and youth with whom they will work" (Tannehill, 2005, p. 298). Collier and Hebert (2004) suggested undergraduate PHETE programs more closely examine their curricula to move beyond the traditional team and individual activities to those more lifetime oriented and to those activities having a higher "cool" factor (McCaughtry et al., 2008) for youth as well as the pre-service teachers in PHETE. Researchers have suggested that novel activities (activities beyond competitive team sports) within PHETE that are situated within a supportive environment can act as a catalyst for change (Carlson & McKenna, 2000; Hastie, 1994; Timken & McNamee, 2012). In Timken's and McNamee's (2012) study, their pre-service teacher participants came to realize the potential that outdoor activities provide for lifetime activity. This newfound realization was profound, as they seemed to realize for the first time that some of the traditional competitive team sport activities in PHE do not engender and/or fail to result in lifetime activity habits. To more fully engage in the conversation surrounding various public health and lifetime activity messages, pre-service teachers need to experience, firsthand, lifetime activities in their PHETE programs to be prepared to meet the most current and pressing demands (Collier & Hebert, 2004; Fairclough & Stratton, 2005; Prusak et al., 2011). As outdoor education, and NBPA more specifically, is widely accepted as an appropriate lifetime activity to teach in PHE (SHAPE America, 2013),

PHETE students need to participate in an adequate amount of coursework in this area so they are prepared to teach NBPA content to their students.

Learning to teach nature-based physical activity in Physical and Health Education: A study with pre-service teachers is the first study in this dissertation and builds on a previous study, "Implementing nature-based physical activity in physical and health education teacher education" (Gruno & Gibbons, in review). The purpose of the preceding study was to explore if a NBPA intervention in three PHETE courses increased pre-service (elementary and middle school level) teachers' preparation and motivation for teaching NBPA with their future students. The researchers found that, overall, participants reported increased preparation and motivation to teach children NBPA. Their motivation increased due to their experiences as learners and their ability to think as teachers. This current study extends the previous study by including both elementary/middle and secondary pre-service teachers as well as exploring if the pre-service teachers actually implemented NBPA in their teaching practicums. Four research questions were addressed in this study:

1. Do more elementary, middle school or secondary pre-service teachers report implementing nature-based physical activity during their practicum following this experience?
2. Do more pre-service teachers teaching at urban, suburban or rural schools report implementing nature-based physical activity during their practicum following this experience?
3. In what ways can a nature-based physical activity module in a physical and health education teacher education course impact pre-service teachers' implementation of

nature-based physical activity in physical and health education during their teaching practicums?

4. Do the pre-service teachers report feeling that learning through virtual means was effective in impacting their motivation and preparation to teach NBPA?

It is important to note the context for this study as the PHETE courses, as well as the NBPA modules, occurred during September 2020 and April 2021 amidst the global pandemic, COVID-19. The university, where the research took place, had switched to virtual learning platforms in order to continue studies. This, of course, added a distinct instructional challenge for the instructor, especially as the focus of this study is on the inclusion of experiential NBPA. All courses, modules, and data collection methods described below occurred virtually as opposed to in-person. All three courses were administered using the Brightspace Learning Management System (course materials, discussion forums etc.) and the video platform, Zoom (synchronous class meetings). The manuscript based on this chapter will be prepared for submission to the *Journal of Teacher Education and Educators*.

Method

This study aimed to uncover the experiences of pre-service generalist and specialist pre-service teachers who learned NBPA as part of their PHETE course. The pre-service teachers were tasked with teaching PHE on their practicums and I wanted to learn if they had the knowledge, means, and motivation after learning NBPA to incorporate NBPA in their teaching practice during practicum. In order to gain an in-depth understanding of the topic being investigated, the study was conducted qualitatively. Design-based research was used as the

methodology where the researcher created and evaluated novel conditions for learning while generating, organizing, and analysing a variety of data sources (Cobb et al., 2003).

Design-Based Research

Design-based research is a methodology designed by and for educators that seeks to increase the impact, transfer, and translation of education research into improved practice. In addition, it stresses the development of design principles that guide, inform, and improve both practice and research in educational contexts (Anderson & Shattuck, 2012). The characteristics of design-based research within which the current study fits are as follows: it was situated in a real education context (both PHETE and K-12 schools); it focused on the design, implementation, and reflection on an intervention (the NBPA module); it involved multiple iterations and evolution of design principles (the transformation of instructor-led lessons to student-created workshops and lessons); and it had a practical impact on practice (the implementation of NBPA during practicum) (Anderson & Shattuck, 2012).

As design-based research seeks innovations for future educational improvements, the current study focused specifically on the pre-service teachers' learning in the area of NBPA during a two-to-four-week NBPA module in a PHETE course, and any subsequent implementation of NBPA during their teaching practicums. Data were collected through an open-ended questionnaire, observation, and student developed documents: greenspace lesson plans and professional development workshops.

Participants

Purposeful sampling was used because I sought individuals for study because they could purposefully inform my understanding of their experiences learning NBPA in PHETE (Creswell, 2013). Pre-service teachers were sourced through the Bachelor of Education degree program and

the post-degree professional program at the university. The criteria for selection were being a pre-service teacher, either generalist or PHE specialist, currently enrolled in an education program taking a PHE methods course which contained a NBPA module. PHE specialists are those with a major or minor (teachable subject) in PHE, whereas generalists often complete a lone course in PHE pedagogy (Melnychuk et al., 2011). In most of BC, elementary PHE is taught by generalists and secondary PHE is taught by specialists. Of the three courses in this study, two are designed for elementary generalists and one is designed for secondary specialists. All three courses exist in the School of Exercise Science, Physical and Health Education (EPHE). I invited participants from the following courses: Cultural and Outdoor Physical Activity (EPHE 435), Curriculum and Instruction in Secondary School Physical Education (EPHE 764), and Overview of Elementary and Middle School Physical Education (EPHE 312). Students in EPHE 435 and 764 were in their final year of their Bachelor of Education degree program and students in EPHE 312 were in the eighth month of their 16-month post-degree professional program. Students were enrolled in the PHETE courses September-December (EPHE 435 and EPHE 764) and January to April (EPHE 312), and, therefore, completed their professional development workshops and greenspace lesson plans during these times. I distributed the questionnaire during their teaching practicums which ran February-May (EPHE 435 and 764) and April-May (EPHE 312). A total of 88 students were enrolled in the courses and all were sent the questionnaires. Six questionnaires were completed and two additional students responded, but did not complete the questionnaire as they were not allotted PHE as a teachable subject during their practicums (see Table 1 for participant details).

Table 1

Participant Details

Participant Pseudonym	University Course	Grade Levels Taught	Student Population at Practicum School	School Location Details
Skyler	EPHE 312	4/5	~430, grades K-5	Suburban/semi-rural
Remy	EPHE 312	4	~217, grades K-5	Suburban
*Jaylin	EPHE 312	3	--	Suburban
*Kai	EPHE 312	4/5	~250, grades K-5	Suburban
Charlie	EPHE 435	1/2	~90, grades 1-3	Suburban
Finley	EPHE 435	2/3	~400, grades K-7	Suburban, diverse cultures in an affluent community
Avery	EPHE 764	9, 10	~600, grades 9-12	Suburban
Jordan	EPHE 764	8, 10-12	~1500, grades 8-12	Urban, affluent community

Note. I selected gender-neutral names as the questionnaires were anonymous and gender was not a part of this inquiry. I also identify each participant as *their* "rather than assuming cisgender identities" (American Psychological Association, 2020, p. 138).

*Jaylin and Kai did not have a chance to teach PHE during their practicums, so could not complete the questionnaire; however, they still responded to the email and are, therefore, included in the study. Jaylin did not provide details regarding student population.

Course Information

Cultural and Outdoor Physical Activity (EPHE 435). This course is an elective course for pre-service teachers in the Bachelor of Education degree (Elementary) program. The course focuses on using PHE to contribute to community, culture, and the environment. This course builds on two previously required PHE method courses in the program. EPHE 435 provides the opportunity for students to develop an understanding and appreciation for a variety of outdoor physical activities and cultural movement forms suitable for elementary school children. The students learned NBPAs experientially in that they had to read about a variety of NBPAs, choose one to perform by themselves or with others, make a video performing the activity and then reflect upon the experience. The NBPA four-week module then consisted specifically of NBPA

readings, participating in the weekly NBPA challenges, discussion forums on the readings and challenges, and planning and delivering a professional workshop on an NBPA topic: Adapted Orienteering and Geocaching, Birdwatching and Nature Viewing, Gardening and Foraging, Mindfulness and Yoga, and Safety and Survival Skills. The orienteering and geocaching activities were adapted in order to fit the definition of NBPA in that they did not include specialized equipment or technologies and they were non-competitive in nature. All material and activities were delivered virtually due to COVID-19. Outdoor education has traditionally been a focus of this course; however, for the purposes of this study that focus shifted to NBPA.

Curriculum and Instruction in Secondary School Physical Education (EPHE 764). This course is designed and offered to students who have completed the prescribed teaching area (PHE) at the university as part of the Bachelor of Education degree (Secondary) program. As part of the course, students acquire the knowledge, skills, and attitudes to design instruction and activities that are challenging and meaningful, and allow for successful student learning experience; develop and implement an orderly and supportive learning environment in PHE; develop and implement teaching strategies that optimize student learning; develop an appreciation for a variety of professional challenges associated with effective teaching in PHE; and discuss the values and skills that contribute to their personal approach toward teaching PHE. The NBPA two-week module consisted of NBPA readings, participating in weekly NBPA challenges (e.g., geocaching, forest bathing), discussion forums on the readings and challenges, and planning and delivering a professional workshop on an NBPA topic: Incorporating Indigenous Activities, Overcoming Potential Barriers to Participation in Physical Activities, and Outdoor Yoga, Nature and Mindfulness. All material and activities were delivered virtually due

to COVID-19. NBPA and outdoor education has traditionally made up approximately 5% of the course; as part of this study, NBPA was increased to account for 20% of the course.

Overview of Elementary and Middle School Physical Education (EPHE 312).

Students in the post-degree professional (Elementary) program at the university are required to take one PHETE course and the purpose of this course is to provide a summary of the content and structure of the BC elementary and middle school PHE curriculum. Students are introduced to basic pedagogical skills necessary to implement a quality PHE program. Focus is on the learning of movement skills and on the developing child as a learner. Learning methods to incorporate and assess NBPA in PHE were incorporated in order to support students in meeting these outcomes. The NBPA two-week module consisted of NBPA readings, assessing NBPA resources, discussion forums on the readings and resources, participating in synchronous NBPA activities that focused on the embedding of local Indigenous pedagogy (e.g., Make the Stick Jump and Ring and Pin), and creating and presenting a PHE lesson plan for a local greenspace (topics selected by students included forest walks, building habitats, and Indigenous plant scavenger hunts). All material and activities were delivered virtually due to COVID-19. NBPA and outdoor education has traditionally made up approximately 5% of the course; as part of this study, NBPA was increased to account for 20% of the course.

The NBPA Module

As part of their larger education program at the university, students learn about philosophies such as place-based education where learning is based in local phenomena and students' lived experience (Smith, 2002) and First People's Principles of Learning where the community and natural environment are regarded as the "classroom" (Chrona, 2014). The aim of including this module in the students' PHETE courses was to provide them with hands-on

learning in an alternative teaching strategy in PHE in order to experience these philosophies in practice. The NBPAs were experiential in nature and, due to the virtual delivery, occurred weekly on, or adjacent to, the students' homes or work spaces. The module was two (EPHE 764 and EPHE 312) to four weeks (EPHE 435) in length and included a combination of readings on NBPA (e.g., Gruno & Gibbons, 2020; Nguyen, 2015; Tremblay et al., 2015), active challenges to complete during the students' own time (e.g. shelter building, scavenger hunts, traditional Indigenous activities), some synchronous activities during class time, discussion forums on the readings and challenges, and the creation and presentation of either a professional development workshop on a NBPA topic (EPHE 435 and EPHE 764) or a greenspace lesson plan (EPHE 312). An example of one of the synchronous NBPA lessons delivered by the instructor was entitled, *Respectfully Embedding PHE with Indigenous Contributions and Pedagogy: A land-based approach*. This lesson and activities were informed by the instructor's consultation of Indigenous faculty, attendance at multiple professional development conferences presentations hosted by Indigenous educators, as well as selected articles and reports (e.g., *Indigenous Land-Based Learning*, 2020; Lorusso et al., 2014; Lowan-Trudeau, 2019; Middlemiss, 2018; Mowatt et al., 2020; Redvers, 2020). The instructor went through a PowerPoint presentation over Zoom and facilitated students participating in a variety of traditional Indigenous activities outside (e.g., a stick catch game, Ring and Pin) and then returning to the screen to discuss them.

The emphasis in most approaches to outdoor education remains costly, equipment-intensive and time-demanding, whereas the NBPAs in this project focused on time and cost-efficient methods of getting children and youth active in nature on a regular basis. The NBPA module was grounded in Dewey's (1938) theory of experiential education. The module design considered *how* pre-service teachers learn to be just as important as *what* was to be learned; the

premise that engaging in novel NBPA experiences could be helpful in connecting pre-service teachers with previous (e.g., their own K-12 PHE) and future (i.e. teaching PHE) experiences that influenced their belief system (Panicucci, 2007). Kolb's (1984) experiential learning cycle of reflection was threaded throughout the module; students were continuously asked to reflect on their NBPA experiences and connect both personal and professional experiences with their future career as a teacher of K-12 PHE. The pre-service teachers journeyed through the following learning cycle: first they experienced the NBPAs as students through the active challenges, reflected on their learning, and then they planned and taught NBPA as a teacher to their peers through either a professional development workshop or a greenspace lesson.

Morine-Dershimer and Corrigan (1997) suggested creating four conditions by which to facilitate change in beliefs: time, dialogue, practice and support. These four conditions were present in this module in that pre-service teachers spent 2-4 weeks engaged specifically in novel NBPAs in which there was both written and verbal dialogue about teaching and learning NBPA within a supportive environment. This module also aligned with the program in Legge's (2020) study. She explained that while the physical experience of outdoor activities is important, the establishment of personal and group goals, experiencing nature, and being a group member and/or leader, are also significant aspects of outdoor learning. The hope was that being prepared to teach NBPA in PHE would help the future teachers offer variety and interdisciplinary options to their future students during practicum.

Data Collection

Ethical approval from the Human Research Ethics Board at the where the research took place was obtained prior to recruitment. It was made clear to all students in all three classes that their decision to participate, or to decline in the project, would not be shared with the course

instructor or affect their standing in the course in any way. Data for the study were collected through three means: questionnaires, observations, and document analysis.

Questionnaire. The questionnaire had six questions, five of which were open-ended. The questions were partly based on the findings from the previous focus group study (Gruno & Gibbons, in review). The open-ended questionnaires were administered through a third party, a department office staff member, via email. She informed the students that the first author and instructor of the course would not have access to the emails, or completed questionnaires, only the anonymized responses. The questionnaire (see Figure 2) was constructed by the researcher in order to directly address the research questions. Data collection was carried out between the months of April 2021 and May 2021 by means of the questionnaire being distributed to the 88 elementary, middle, and secondary school pre-service teachers from the university during their teaching practicums. The aim of the questionnaire was to gather descriptive information on the pre-service teachers' views of teaching NBPA and their inclusion of NBPA in their practicums. Information about voluntary participation, instructions on how to complete the questionnaire, and an assurance of confidential handling of personal data was also provided with the emailed questionnaire. Reminders to non-respondents were sent via email two weeks after the initial email.

Figure 2

Open-Ended Questionnaire

1. What grades are you currently teaching on practicum?

2. Briefly describe your school context (e.g., 600 students in grades 6-8, quickly developing neighbourhood). Would you describe your practicum school as urban, suburban or rural?
    - Rural = open and spread out with a small population.
    - Urban = consists of both living and working areas, high population.
    - Suburban = mainly residential area, larger population than rural areas.

3. Has your motivation and preparation to teach nature-based physical activities changed since taking EPHE 435: Cultural and Outdoor Physical Activity (course title will be changed per survey)? Increased or decreased or stayed the same? In what ways? Specific examples?

4. Which particular activities from the course have you implemented during your teaching practicum? E.g., Orienteering, traditional Indigenous activities, scavenger hunts, mindfulness, nature games. Why did you select these activities to teach?

5. Did you find learning these activities virtually during *EPHE 435 was effective in preparing you to teach nature-based physical activities during your practicum?

6. I am inviting you to add any additional comments about teaching nature-based physical activities that you have not had the opportunity to mention above.

Note. *Title changed dependent on the course.

Observation of Student Presentations. In EPHE 435 and EPHE 764, students were tasked with designing and delivering, virtually, a professional development workshop on a NBPA topic. Students were in groups of 3-7. The assignment description was as follows:

> The purpose of this assignment is to help you design and deliver a professional development workshop for your classmates on one of the specific nature-based PHE topics. Working in groups of [3-7], you will sign up for one of the topics. Of course, you have the added challenge of the global pandemic, COVID-19, so this pro-d workshop must be delivered virtually over Zoom. However, you are still required to have your participants learn experientially…You can ask workshop participants to come prepared

with certain easy-to-find materials/equipment in order to engage in hands-on learning during the workshop.

In EPHE 312, peer teaching episodes were observed to determine the students' ability to plan and deliver a NBPA lesson. The peer teaching episodes were part of an assignment entitled "Greenspace Lesson Plan." The instructions for this assignment were as follows:

> The purpose of this assignment is for you and a partner to develop a stand-alone 30–50-minute lesson plan for use in a greenspace on, or adjacent to, school grounds. Plan a 30-minute lesson for K-3 or a 40-to-50-minute lesson for grades 4-8. *The lesson must make significant use of natural materials and space* (this is not a lesson designed for the gym and simply moved outside).

In addition to the feedback provided by the instructor, peer feedback was shared after each teaching session, so the students could continually learn and improve their teaching of NBPA.

Document Analysis. The students' written materials for the professional development workshops and greenspace lesson plans were also assessed to determine their preparation in delivering sound NBPA activities and lessons. The instructor looked for specific and directly observable learning outcomes and assessment techniques as well as detail in the descriptions of the NBPAs.

Data Analysis

Content analysis was used to analyse the data consisting of a total of six questionnaire responses (Sandelowski, 2000) and the two additional responses as well as the observation notes and written course documents. The analysis was a stepwise process of categorisation of the data and maintaining the integrity of the data was crucial. Every written response to the five open-ended questions on the questionnaire was examined, coded and sorted into themes. Data from the

observation notes and written documents were then used to support these themes. The coding scheme was emergent, meaning that the scheme was created as coding ensued (Castleberry & Nolen, 2018). A combination of descriptive coding and "In Vivo" coding (Saldana, 2016) were used. Descriptive coding involved applying a code to a basic topic from the data and identified roles, processes, actions, and places. "In Vivo" coding used verbatim phrases from the participants to describe the unit of data rather than researcher-generated phrases, and provided insight into how participants talked about the topic since it used the participants' voices when developing units of code.

When all of the questionnaire responses were analyzed and coded independently, themes emerged, and this allowed the data to be understood in relation to the research questions. Care was taken to tell the story of the data and not arrange the data to support my research questions (Anderson, 2010). The researcher and her supervisor both reviewed the themes in order to validate that the groupings of data were consistent with the raw data. The analytical process had a continual back and forth movement between the emerging themes and the data in order to enhance trustworthiness and a comprehensive understanding of the participants' thoughts and experiences. Finally, the themes were revisited to make sure they were robust.

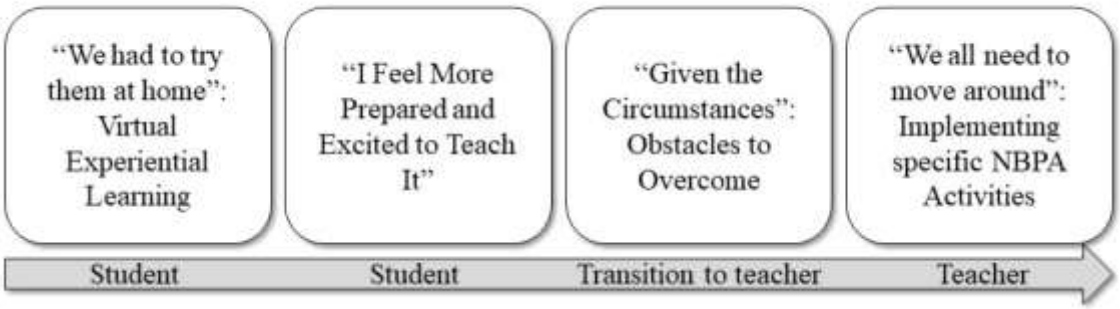
Findings and Discussion

This section contains a thematic map outlining the findings, a detailed description of each theme, and a discussion of how each theme relates to the literature. In order to summarize the findings visually, I developed a thematic map as a representation of the themes and their relationships (see Fig. 3). This map outlines the students' transition from student to teacher and answers the third and fourth research questions. This visual representation allowed me to place

the themes in the larger context of the phenomenon (Kuckartz, 2014) and allowed me to interpret how the themes related to each other.

Figure 3

Thematic Map of Themes and Their Relationships



I interpreted the data in order to answer my four research questions. With the limited number of questionnaire responses, I did not feel I could sufficiently discuss the first two questions: (1) *Do more elementary, middle school or secondary pre-service teachers report implementing NBPA during their practicum following this experience?;* and (2) *Do more urban, suburban or rural pre-service teachers report implementing NBPA during their practicum following this experience?* The majority of respondents taught elementary grades in suburban neighbourhoods; however, with only eight respondents I could not speak to percentages implementing NBPA. Therefore, this section focuses on my third and fourth research questions: (3) *In what ways can a NBPA module in a PHETE course impact pre-service teachers' implementation of NBPA in PHE during their teaching practicums?* (4) *Do the students report feeling that learning through virtual means was effective in impacting their motivation and preparation to teach NBPA?* I found that four themes emerged from the data in response to these two latter research questions. In order to increase transparency, dependability, trustworthiness and authenticity, I have relied on direct quotations from the participants (Sutton & Austin, 2015),

including the titles of the themes.

"We had to try them at home": Virtual Experiential Learning

This theme emphasizes that learning NBPA virtually was effective in engaging the pre-service teachers in their own learning. One aspect of the module that the students identified as key to increasing their motivation and preparation for teaching NBPA was the fact that they learned the activities experientially. Drawing on the work of John Dewey, within Kolb's four stage experiential learning cycle, an individual engages in a concrete experience, observes and reflects upon this allowing for the formation of abstract concepts, which can then be transferred to new situations beyond the original experience (Priest & Gass, 2007). The NBPA module was guided by this model in that the students learned the activities experientially so that they could transfer them to the new situation of their teaching practicums.

Despite learning the NBPA module virtually, the majority of the participants still felt they learned experientially through participating in NBPAs both synchronously and asynchronously. Charlie stated that they "had opportunities to use these activities in real-life scenarios and they went very well". As mentioned previously, students were to try a number of NBPAs at home and discuss the experience on the class discussion forum. Many students were limited to trying the activities with members of their own households due to the pandemic, but others were actively working with after-school groups at the time and had the opportunity to try the NBPAs with children. These 'real-life scenarios' that Charlie experienced may aid in making decisions with their future students. Galloway (2007) identified the need for novice leaders in the outdoors to have first-hand experiences in order to make meaningful decisions. However, the participants still recognized the fact that it "would have been great to practice these games and experience them in person before leading them in the classroom" (Charlie). Avery, similarly, felt that "if it

was in-person it would have been far more beneficial/easier… but we all made the best of it!" Jordan felt the module was "collaborative and engaging even with the reality we were in with online learning".

The participants mentioned that being provided with tangible resources also increased their preparation: "[The instructor] did an amazing job at providing us with resources, assignments that were practical and effective, and easily implemented with an understanding of why we are doing this" (Remy). Similarly, Finley mentioned their motivation and preparation "increased as [they] have more resources and activities to use when teaching nature-based PHE". Through Brightspace, the students could access the course from anywhere. Learners within the PHETE courses were spread throughout the province and in a few cases, the world. Since the asynchronous learning tasks took place independent of time and space, students could learn individually, or work in a learning environment that supported collaboration (Jedrinovi´c et al., 2019). They could access the resources, assignments and contribute to the discussion forum at any time and from anywhere.

Sutherland and Legge (2016), in their review of professional growth for pre-service teachers, found that teacher growth seemed to occur through the use of intentional instructional strategies for outdoor learning and reflective assignments (Sutherland et al., 2011; Sutherland et al., 2016; Sutherland & Stuhr, 2014; Timken & McNamee, 2012), and group debriefing (North, 2015). These strategies provided the pre-service teachers with opportunities to consider how the outdoor learning experiences influenced their growth as professionals in the areas of experience of K-12 students, the importance of creating a supportive environment, and the possibility of curricular change in PHE (Timken & McNamee, 2012). Other researchers found that some pre-service teachers felt that while they enjoyed their outdoor learning experiences in their PHETE

programs, they did not gain knowledge, understanding and experience in how to teach outdoor education within a school setting (Backman, 2011b; Moreri, 2011). This lack of specific content knowledge and pedagogical knowledge in the PHETE programs seemed to occur through the emphasis of the outdoor learning course/experience on participation rather than learning to teach (Atencio et al., 2015). This is similar to some research (e.g., Capel et al., 2011; Hayes et al., 2008) which revealed that many PHETE programs focused on content knowledge in the form of tactics, rules and individual skills in different physical activities like dance, swimming, games and different outdoor activities, as opposed to aspects related to the *how* of teaching. The participants in this study appeared to gain not only the experience of participating in NBPA, but also the specific content knowledge and pedagogical knowledge through discussion, reflection, peer-teaching, and the specific resources provided.

When learning there is often a desire to be *an active participant* rather than *an audience or listener* (Chelladurai, 1999). This philosophy can be defined as learning by applying and is based on the idea that optimal learning is to be gained by direct and purposeful participation in the experience (Priest & Gass, 2007). Previous researchers have proposed, "if using outdoor learning environments helps to improve prospective teachers' participation and success, then teachers may feel more confident in using outdoor learning as an effective and inexpensive teaching strategy" (Tekakpinar & Tezer, 2020, p. 4). According to the positive responses from participants in this study, learning through the NBPA module did provide them with confidence to implement this new teaching strategy.

"I Feel More Prepared and Excited to Teach It"

The title of this theme relates to the fourth research question, and reveals that the NBPA module was effective in preparing and motivating students to implement NBPA in their teaching

practicums. All six of the questionnaire respondents stated that both their preparation and motivation to teach NBPA increased due to the module they experienced in their PHETE courses. Even Jaylin who was unable to complete the questionnaire as they did not teach PHE on their practicum, still commented: “I would have loved the opportunity to have incorporated more of my learning into this practicum.”

Skyler explained the impact that the module had on their preparation and motivation: “It was incredibly helpful to have opportunities to explore the ways in which nature-based physical activities can be incorporated within a holistic PHE practice.” Remy also commented on this idea of ‘holistic PHE’ and wrote that their motivation increased because NBPA offered a “move away from ball sports and competitive games to be more inclusive of all students’ needs and interests.”

There have been professional calls to reorient, reconstruct or reconceive K-12 PHE (Doolittle, 2007; Trost, 2006). One intentional message of these PHETE courses in general and of the NBPA modules in particular, was the need for curricular change in PHE. Nicol (2002) discussed how learning outdoors enhances the personal and social development of students, helps them see the value of outdoor activities for lifetime recreation and leisure, and helps to develop an understanding of the environment. Tischler and McCaughtry (2014) found that counter to the usual masculinities present in boys’ PHE settings, participation in outdoor learning in the form of adventure PHE for a group of high school boys provided an opportunity for the reconsideration of social hierarchies and masculinities in PHE (Tischler & McCaughtry, 2014). In contrast to the sport-based PHE curriculum, the Tischler and McCaughtry’s (2014) participants felt that the usual social hierarchies and masculinities were nonexistent and when they did develop, they shifted based on the specific skills needed for each of the units in adventure PHE.

Interestingly, these comments regarding 'holistic PHE' both came from generalist elementary pre-service teachers. Previous research has found that secondary specialist PHE pre-service teachers' expectations and beliefs highlighted how they, throughout their degree, want to pursue their passion and taste for sport further (Capel et al., 2011; Maivorsdotter et al., 2014) and that their future teaching practices should lead to their students (even the uninterested ones) developing the same passion for sport (Larsson et al., 2018). Perhaps the generalist teachers did not share this same view of PHE for their elementary students.

Remy, along with Finley, felt that the timing of their NPBA learning was beneficial as COVID-19 "forced many students outside during PHE" (Remy) and "It was a great time to take this course as my PHE had to be done outside in nature due to the pandemic" (Finley). This push to learning in "surrounding forests, beaches and schoolyards," Remy felt, helped to "encourage creative and imaginative play" in the elementary school children. In fact, Remy felt so strongly about the positive impact of NBPA, that they believe the post-degree program should offer an additional nature-based course because "there is so much to cover and it is very much connected to First Peoples Principles of Learning." Skyler felt similarly and stated that the nature focused module "was very valuable, perhaps even deserving of a cross-curricular course of its own."

"Given the Circumstances": Obstacles to Overcome

This theme represents the participants' transition from student to teacher. While transitioning to teaching during their practicums, the teacher candidates identified two main challenges that acted as obstacles to overcome in their implementation of NBPA: "student expectations regarding what *gym* was supposed to be" (Skyler) and a lack of time. These are in line with Sutherland and Legge (2016) who explored a range of national and international perspectives on models-based practices in outdoor adventure education. They also found that

teachers' concerns centered on lack of physical activity time and student resistance. Students in EPHE 312 only had a six-week practicum, so incorporating NBPAs proved challenging. Skyler stated, "finding that balance between capture the flag and team orienteering was tricky." Jaylin and Kai, despite not teaching PHE during their practicums, also identified time to be a challenge as PHE at their practicum schools occurred "with a designated PHE teacher" (Jaylin) only once (Jaylin) or twice (Kai) a week. Despite time constraints, Skyler felt that NBPA should take priority in PHE:

> I feel that not only is incorporating nature-based physical activities within PHE a positive addition to [the students'] roster of physical activity experiences, but that it is important for fostering enduring understandings in other 'subject' areas and for providing opportunities for potentially disengaged PHE learners to participate.

As far as student resistance, Skyler found that "students who excelled in organized sports" did not always "buy into" the NBPA lessons. However, they decided to persist and spoke to the students "about how, though not every young person in the class would continue to play organized sports throughout their lives, they would all be active in their environment, be it walking these streets, hiking trails or camping." Interestingly, the same students who were not supportive of the NBPA lessons at the beginning, felt differently by the end of Skyler's practicum: "It was rewarding to see how many organized sports participants provided positive feedback regarding the nature-based physical activities by the end of the practicum, with only one specifically mentioning the lack of gym time."

One obstacle in the way of implementing outdoor education often identified in the literature is funding. The cost of specialized equipment such as climbing gear, tents, and cooking equipment, and the cost of running outdoor learning experiences in general within PHE has been

viewed as prohibitive (Backman, 2011b; Zink & Burrows, 2008). The fact that this was not identified by the participants in this study may speak to the nature of NBPA and the fact that it does not require specialized equipment or travel.

"We all need to move around": Implementing Specific NBPAs

This final theme explores the details of the activities that the pre-service teachers implemented during their practicums and addresses the third research question: *In what ways can a NBPA module in a PHETE course impact pre-service teachers' implementation of NBPA in PHE during their teaching practicums?* Experiencing the NBPA module as learners in their PHETE courses provided the participants with the confidence and the tools to implement certain NBPAs with their students on practicum. One question on the questionnaire asked them which particular activities they implemented. The most popular responses were scavenger hunts, mindfulness activities, Indigenous activities, nature games, and orienteering. Finley offered a rationale for these particular activity choices: "I selected these as I had the equipment to do so (we had very little equipment to use as we did not have access to the gym)." Remy felt that these types of activities connected the students to place and provided "self-regulation tools for mental health and well-being rather than only focusing on physical literacy skills". Jordan felt the students enjoyed the "social aspect of the activities," "being outside" and "being able to actually participate" in activities after the pandemic forced lock-down.

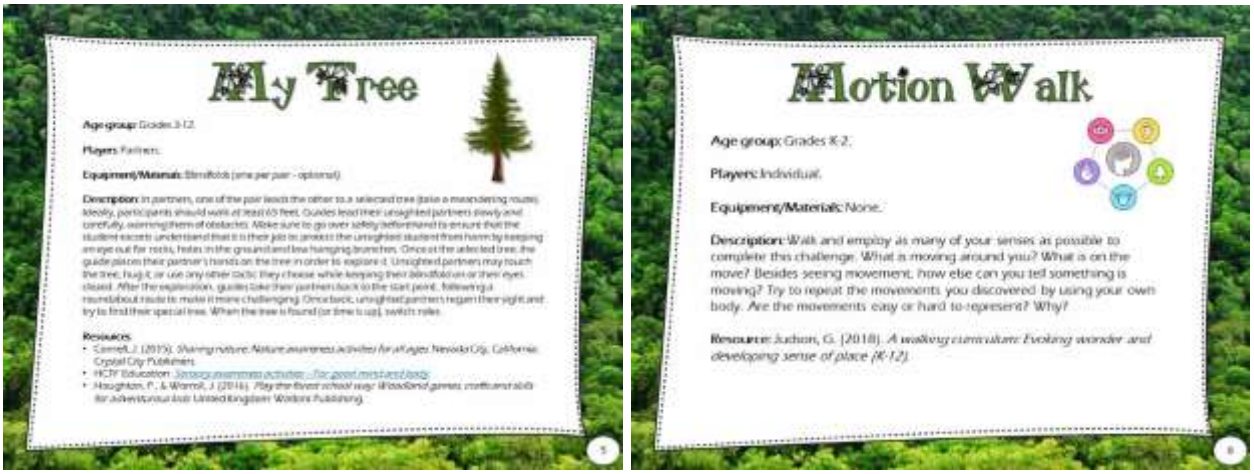
Jordan also saw the importance of introducing NBPA during COVID-19: "In a time like right now when students can't play sports, can't hang out with friends, rec centers closed…it is extremely hard for them to get that important aspect of 'play' in their lives. Charlie chose to facilitate play for their elementary students by replicating specific nature games and scavenger hunts introduced in class:

> I took my class on a nature scavenger hunt looking for different colours, and played a variety of outdoor games with them such as My Tree and Motion Walk (see Figure 4) and [the students] seemed very excited and engaged in these lessons.

Avery, who implemented "orienteering, scavenger hunts, nature games and some traditional Indigenous activities" with their class, said the "students loved to be out of the class setting exploring."

Figure 4

Descriptions of My Tree and Motion Walk from the Nature-Based Physical Activity Virtual Challenges (EPHE 435)



Due to COVID-19 restrictions, many local secondary schools adapted their schedules in order to limit student contact. As a result, high school students enrolled in only one or two courses at a time and lessons were upwards of two to three hours each. NBPA acted as a reprieve; Avery stated that the students "don't like sitting in a classroom and neither do I for three hours each class." Interestingly, neither of the secondary pre-service teachers commented on a lack of time to implement NBPA, perhaps due to the structure of these very long PHE classes. Avery felt, especially during the pandemic, that "every teacher should be getting out and using nature as much as they can no matter their course." Jordan also felt compelled to have their

students outside as much as possible as their practicum school "had big problems with COVID-19 exposures (600 in a week)." This certainly increased their motivation to implement NBPA, even though their motivation was high prior to the module as they "really enjoy the outdoors and believe it is a great environment for learning and for physical, mental and spiritual health."

Skyler embraced the chance to implement NBPA on their practicum and chose to focus on one type of activity, orienteering, and go in depth. They stated that one orienteering lesson "focused on a mindfulness related personal scavenger hunt" and the other lessons "were based on nature identification." Skyler introduced these topics in PHE and reinforced them "throughout [their] practicum, with information woven into other lessons (Language Arts and Science)." Pre-service teachers are often tasked with fostering student-centered, interdisciplinary learning in a hands-on and unpredictable environment (Becker et al., 2017), and NBPA provided a platform for Skyler in which this could be achieved. They provided a strong rationale for their specific NBPA choices:

> I selected orienteering because of its natural connection to place-based learning, and because it is a life skill…I selected the nature identification lessons, specifically native and invasive plant neighbour identification including the words for each plant in the language of the land where my practicum was taking place, because of the environmental, cultural, and social implications of feeling and being connected to what is around you. I believe that in the same way that any introduction leads to relationship building, knowing what is around you helps to promote a sense of belonging within the wider community."

For Charlie, the NBPA module served as a foundation and they were able "to adapt some games and create new nature-based physical activities as a result of the inspiration [they] got from EPHE 435." They provided a specific example:

> One game I play often with my class is partnering them up and having them find 3 items that match my criteria (example: find something smooth, find something human made, find something white) and students go off in their pairs and find these objects and share with the class and myself what they find. This is a great activity as it can be used for a PHE warmup, DPA [daily physical activity] break, or linked to other curricular areas.

Avery was also able to adapt what they learned in EPHE 764 to the specific context of their practicum school. They felt that many of the activities learned during the module were "more beneficial for middle and elementary schools," so Avery "adapted a few of them to make them more enjoyable for high school students." They look forward to implementing more "hiking, learning plant and animal identification, and playing games in nature" in their future teaching "so students get more comfortable with [NBPA]."

A focus of this NBPA module was to help future teachers think differently about learning and teaching in PHE, and about what activities can be included in a K-12 PHE curriculum. A goal of the larger PHETE courses was to connect pre-service teachers with one unfortunate reality - traditional PHE fails to be meaningful and relevant to at least some K-12 students (Ennis, 2000; McCaughtry et al., 2008). It was with hope that incorporating NBPA could make PHE meaningful for a greater number of students.

Limitations

It is important to note that I had developed a close, respectful relationship with many of my students in the three courses, and, because of this, some may have responded to the survey questions in a way that they thought would be pleasing to me as the researcher, thus skewing the data. Due to this close relationship, I also knew the students were under great burden transitioning from learning virtually to teaching practicum in person given that practicum is always a very busy time even prior to the pandemic. Therefore, I made the decision not to a complete a member checking process as I did not want to further add to their work load during this time and this can be considered a limitation to this study. Collecting the data during the pandemic may have also skewed the results due to the requirements for students to be outside. Additionally, not enough participants responded to the survey for saturation to occur; likely a greater number of participants would have added further to conceptualization (Corbin & Strauss, 2014).

Lastly, the 'one moment in time' approach of research has been subject to increasing critique in many areas of applied research (Nimon & Astakhova, 2015). Considering this study sought to answer questions about why and how a phenomenon occurred, a research design and research process that enables prolonged engagement, such as interviews or focus groups, would have likely offered a more rigorous answer to the questions posed (Anderson, 2017).

Conclusions and Implications

The COVID-19 pandemic has presented unprecedented challenges for PHETE instructors and pre-service teachers. However, this chapter outlined a successful experiential instructional module that engaged students virtually during the pandemic. This study explored the impact of a

NBPA module on pre-service teachers' preparation, motivation and implementation of NBPA during their teaching practicums. A goal being for the participants to engage in and then teach novel, lifetime and non-traditional physical activities (Morine-Dershimer & Corrigan, 1997) which might lead to the "thawing of preconceived notions" about PHE (Carlson & McKenna, 2000, p. 24). In support of our previous study (Gruno & Gibbons, in review), it would seem, at least for some pre-service teachers that this NBPA module elicited emotional responses and broadened their ideas of teaching and learning in PHE.

Similar to Hovey et al. (2020), my past study (Gruno & Gibbons, in review) showed that an NBPA module in PHETE can increase motivation and preparation in some pre-service teachers and research supports that increased self-efficacy may contribute to future teaching competencies (Fahlman et al., 2013). However, perception of confidence does not guarantee actual ability to teach. Although there was a small sample size, this follow-up study found that a successful NBPA module, even delivered virtually, can support actual implementation in K-12 PHE.

The prospective teachers stated that they learned NBPA better by doing, and that the activities were applicable to their teaching practicums because they had a chance to try them during their PHETE courses. It is possible that before they were able to reconsider the traditional PHE curriculum, the pre-service teachers had to first experience or "feel" firsthand what many K-12 students feel in today's PHE classes as well as "live" a new curriculum in and through PHETE (Carlson & McKenna, 2000; Collier & Hebert, 2004; Hastie, 1994; Prusak et al., 2011; Tannehill, 2005).

One implication from this study that is shared with O'Sullivan et al. (2009) is to encourage the analysis of PHETE program design and "engage teacher candidates in learning

new…physical activities…and use it as a platform from which to engage them in learning about the teaching of [PHE]" (p. 189). Physical and Health Education teacher-educators and researchers need to consider the professional socialization process of PHETE, lest we find ourselves unintentionally reinforcing pre-established beliefs and assumptions. The results of this study showed that NBPA may offer one alternative teaching strategy that allows pre-service teachers, and K-12 learners, to re-envision what PHE can be with elementary and secondary students.

Chapter 4 – Study 2

Educators' perspectives on learning and teaching nature-based physical activity: Applying the Interconnected Model of Teacher Professional Growth

Abstract

This study applied the Interconnected Model of Teacher Professional Growth to explore educators' experiences teaching nature-based physical activity (NBPA) in their Physical and Health Education (PHE) courses. Nature-based physical activities are those activities that can be done in natural areas and require little specialized equipment, can be done by the majority of children, deemphasize competition, are cost-efficient and can be implemented by teachers on a regular basis (Gruno & Gibbons, 2020, 2021). The aim of this study was to explore if the teachers described professional growth in the personal domain or the domain of practice and if they experienced any salient outcomes in their students' learning. All six participating teachers were members of an ongoing schools-university partnership. Open-ended interviews were utilized for data collection and all interviews occurred virtually due to the global COVID-19 pandemic. Findings indicated that after learning about, sharing, discussing, and then implementing NBPA, then reflecting on the process and enacting, participants reported changes in their professional vision, instructional practices and student learning.

Background

If we are to facilitate the professional development of teachers, we must understand the process by which teachers grow professionally and the conditions that support and promote that growth (Clarke & Hollingsworth, 2002). This chapter focuses on a form of professional development, the schools-university partnership. A successful schools-university partnership work embodies a deep commitment to create what Bruner (1996) called "communities of

learners" (p. 84): "not only a transformation of school as a learning culture, but also the transformation of the role of the teacher in that learning culture" (p. 85). A learning community is a group of teachers, teacher educators and/or researchers meeting periodically to discuss teachers' practices with different goals (Hennessy et al., 2011). Knowledge building in these contexts differs from expert-led teacher education professional development programs by focusing on dialogue among participants regarding central features of learning activities and considering the participants' experiences. Thus, they are more likely to contribute to teachers making sense of their practices and informing them of the newly built knowledge (Brown, 2005; Butler et al., 2004; Hennessy et al., 2011). Putting teachers' experiences in the center of the learning community's development allows the teachers to have their theories and pedagogies taken into account as a valid starting point for learning. This principle might seem evident when it comes to students' learning, but is often overlooked in teacher professional development programs (Clarke & Hollingsworth, 2002). Moreover, the discussions held during the meetings give the teachers, teacher educators, and researchers the opportunity to learn from each other's experiences, in a co-learning environment (Baumfield & Butterworth, 2007). The power teachers have to define the goals and topics of the program can vary, but it is important that there is recognition of the different types of knowledge that are present. Being part of a community also means being part of human relations that either foster or undermine the learning process, so it has been emphasised to build trusting relationships between participants (Grau et al., 2017).

There is strong evidence that professional development is best when embedded in the teachers' specific subject area (Wei et al., 2009), so the partnership outlined in this chapter involves specialist Physical and Health Education (PHE) teachers all teaching PHE at the middle or secondary school level. Adult learning requires that we acknowledge teachers as the heart of

decision-making around change—a key principle in understanding, engaging, and developing ownership in adult learning (Knowles et al., 2020). These specific teachers were interested in implementing nature-based physical activity (NBPA) in their PHE classes. Nature-based physical activities are those activities that can be done in natural areas and require little specialized equipment, can be done by the majority of children, deemphasize competition, are cost-efficient and can be implemented by teachers on a regular basis (Gruno & Gibbons, 2020, 2021).

Educators' perspectives on learning and teaching nature-based physical activity: Applying the Interconnected Model of Teacher Professional Growth is the second study in this dissertation. The manuscript based on this chapter will be prepared for submission to these possible journals: *Teaching and Teacher Education, Journal of In-Service Education,* or *Teachers and Teaching: Theory and Practice.* As the schools-university partnership and the Interconnected Model of Teacher Professional Growth are fundamental to this study, they are discussed in detail in the following sections.

Schools-University Partnerships

In the field of education, the disconnection between theory and practice is an issue that has often been addressed in the literature. McIntyre (2005) offered an explanation of this knowledge gap as relying on different and, sometimes, incompatible types of knowledge as well as the way these types of knowledge are generated, taught and learned. He characterised educators' knowledge about teaching K-12 students as crafted and context-bound. Conversely, university researchers' knowledge about teaching is abstract and decontextualized. He suggested different alternatives in which these kinds of knowledge could be integrated, which involves an explicit effort to collaborate from both sides. As a starting point, it must be acknowledged that

neither type of knowledge is inadequate, but both are "necessary for their purpose and also mutually complementary in potentially highly fruitful ways" (McIntyre, 2005, p. 362).

One way to bridge the gap between these two distinct types of knowledge involves the development of a schools-university partnership. This type of research partnership has been defined as a relationship of collaboration between a teacher, or group of teachers, a school, or a group of schools and a university researcher (or a research group), which leads to professional development, and the creation of practice-based research and knowledge (Baumfield & Butterworth, 2007; McLaughlin & Black-Hawkins, 2004). More recently, a schools-university partnership has also been defined as "an enterprise that is jointly created, developed and sustained in the midst of complex settings to advance educational practice, knowledge and understanding" (Day et al., 2021b, p. 24). Schools-university partnerships offer a locally driven, collaborative approach to educational improvement and transformation, in which researchers and teachers pursue improvement goals they define together, drawing on the expertise of each partner (Coburn et al., 2021). Some indispensable components have been established in the literature as key to developing a successful partnership: aiming to create long-term relationships rather than conducting a single research study (Coburn et al., 2021); giving priority to practitioners' concerns, questions, and challenges, rather than choosing topics designed to fill gaps in the literature (Burkhardt & Schoenfeld, 2003); obtaining mutual benefits, having common interests, having a shared purpose, establishing trusting relationships, and planning and engaging in collaborative activities (Day et al., 2021b; McLaughlin & Black-Hawkins, 2004).

Successful schools-university partnerships are truly *partnerships of learning* in which deep, dialogic thinking and reasoning of the knowledge in use inspires curiosity and fuels enthusiasm in all parties to commit themselves to improving the quality of practice and, through

this, further knowledge creation and development which meet teachers' own interests, needs and concerns in their contexts of use (Day et al., 2021a). Much has been written about how partnerships can be exciting and empowering experiences for those involved, and how close collaborations between researchers and practitioners bridge the cultural boundaries of learning and knowing, enhance professional thinking and practice, and contribute to capacity building in schools (Coburn & Penuel, 2016; Hargreaves & Fink, 2006; McLaughlin & Talbert, 2006). As part of this chapter, I discuss the particular schools-university partnership involved in this study, the PHE Research and Working Group.

The PHE Research and Working Group

In 2007, Dr. Sandra Gibbons formed a group of over 25 teachers from throughout (rural and urban) BC in order to conduct formative and participatory-action research, as well as provide teachers with current, research-informed, professional development opportunities. She reached out to past students as she had been a PHE teacher-educator for a number of years in BC. Members of the partnership consisted of middle and secondary specialist PHE teachers, pre-service PHE teachers, and teacher-educators and researchers in the field of PHE. The majority of members teach PHE 6-12 in public middle or secondary schools. The formation of this group was grounded in a commitment to the mutually beneficial relationship between researchers and teachers when it comes to making curricular and/or instructional change. The research conducted by this partnership was guided by the self-determination theory of motivation (Ryan & Deci, 2000) which suggests that motivation to engage in a particular behaviour, such as meaningful engagement in PHE, is influenced by an individual's need for autonomy, competence, and relatedness. From 2007-2013, the teachers brainstormed and implemented actions with their PHE classes which were associated with autonomy, competence, and relatedness.

During 2014-2017, the focus of the partnership was narrowed to relatedness as the teachers identified that relatedness supportive strategies are especially important for students in PHE, particularly for girls, and this was supported by research (Eime et al., 2013; Pfaeffli & Gibbons, 2010; Sammet, 2010; Shen et al., 2012). During these years, the teachers expanded specific strategies associated with relatedness and then documented the use of said relatedness strategies in their PHE classes (Gibbons, 2014). The researchers then identified the "least used relatedness strategies" (service learning strategies and use of technology) and invited the teachers to design projects that focused on one of these strategies to implement in their schools. The teachers shared these projects with one another, and two were disseminated to a larger audience through journal articles (Gruno, Gibbons, & Baker, 2018; Gruno, Gibbons, Condie, et al., 2018).

In 2018, to the present day, the focus shifted to NBPA as a source of relatedness in PHE. The teachers brainstormed the NBPAs they were already using and wanted to continue to use in the future, how NBPA can create a sense of relatedness for their students, and barriers to implementing NBPA in their schools. This information was then compiled in order to create a checklist. The checklist was then edited by members of the partnership to ensure that it was user-friendly and focused on the group's goals. For those teachers who chose to participate, they used this checklist to document their 'NBPA to support relatedness for students in PHE' actions in one or more PHE courses (Gruno & Gibbons, 2021, in review).

Despite spanning fourteen years, many of the research group's members have remained the same, and new teachers are welcomed each year as members of the partnership invite new colleagues and the researchers invite graduating education students. The format for the all-day annual meetings at the university, held every November, focus on the research agenda in the morning (focus groups, project sharing etc.), then lunch is provided (with time to chat and

network), and then the afternoon is dedicated to a professional development workshop, the topic of which is usually identified by the teachers. Consistent within this group is the idea of "shared leadership for learning" (McLaughlin & Black-Hawkins, 2004, p. 267) where the agenda is often co-created between the teachers and researchers. I also recognised throughout the partnership the necessity of ensuring a clear sense of shared ownership and the maintenance of "open communication" between all partners (McLaughlin, 2000, p. 85).

This ongoing research group characterizes the schools-university partnership described previously. Specifically, the group, as illustrated by McLaughlin and Black-Hawkins (2004) is considered an "across schools, individual teachers mentored by university 'research experts'" (p. 276) type of partnership. This type of partnership is characterised by research undertaken by individual teachers that is project based, confined to the school and limited in time. However, these individual teachers also form a larger group with other teachers from across a number of schools and school districts who are researching into related areas, in the case of this group, the implementation of NBPA. Research activities are predominantly led by the teachers and, at times, also led by groups of students. The overall topic, NBPA, was selected by the researchers, while the individual teachers decide, usually in consultation with students and administration, on their specific focus. Although the impact of such activities on the schools involved is often restricted to the classroom experiences of the individual teachers, the quality of the research itself is enriched by the range of knowledge and expertise shared amongst the group when debating wider issues. Teachers are supported by individual members of the university, including the lead researchers, other professors and graduate students, who take on the role of 'research experts' and mentors.

My Role in the PHE Research and Working Group

I began my teaching career in 2006 and quickly became a part of Dr. Gibbons' research group. I had shown interest early in my career in designing an alternative PHE course and Dr. Gibbons was fundamental in providing support that I could bring to my administration. She had invited me to the group as a result of my interest in the research and in alternative curriculum design. Therefore, I started off in the group as a participant, sharing ideas with colleagues from other schools and districts. I then began my Master's degree in 2011 and Dr. Gibbons asked me to take on a leadership role in the group. She would guide the research agenda in the morning of our all-day sessions and I would lead an active professional development workshop in the afternoon (e.g., teambuilding, dance, yoga etc.) that was guided by the research and the participants' professional interests. Then, in 2018, during my doctoral degree, I took over as the lead researcher in the group, co-creating the agenda with the teachers and planning the all-day sessions. I now aim to be a 'collaborative leader' of this group; one who believes that differences and diversities, when regarded as strengths to cherish rather than weaknesses to be overcome, make collaborations "richer, more innovative, and more valuable" (Ibarra & Hansen, 2013, p.13).

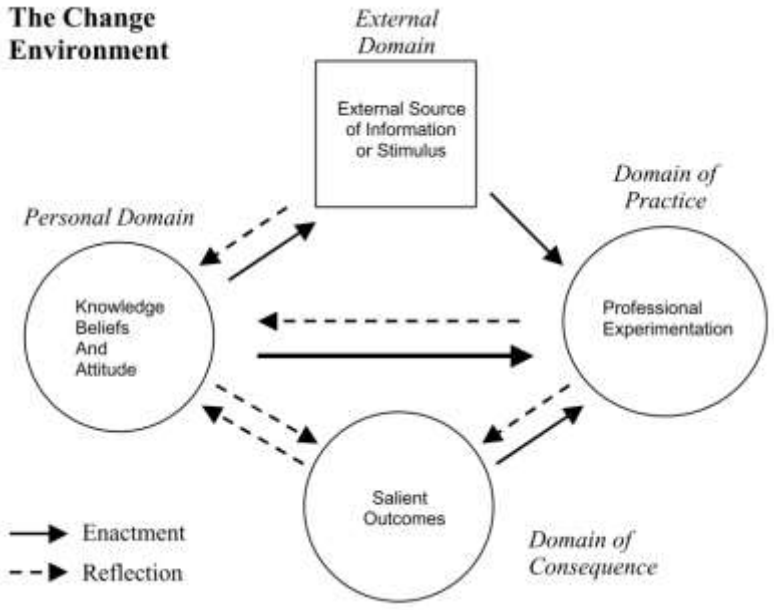
Teacher Learning Model

One aim of this chapter is to explore professional growth as a possible result of the teachers' participation in the schools-university partnership. In order to do this, I have adopted a model of teacher professional development, the Interconnected Model of Teacher Professional Growth (see Figure 5). Guskey (1986) argued that teacher professional development programs should start from changes in classroom practice. He stated that significant changes in beliefs and attitudes are likely to take place only after changes in student learning outcomes are evident, that

is, once teachers have 'field-tested' innovations in classrooms and experienced first-hand change in student learning. Only when these changes impact students' learning will teachers change their beliefs and attitudes. Developing Guskey's idea further, Clarke and Hollingsworth (2002) revised the Interconnected Model of Teacher Professional Growth, that proposes four domains: the personal domain (teacher knowledge, attitudes and beliefs), the domain of practice (professional experience), the domain of consequence (students' learning outcomes) and the external domain (information, support, etc.). Change occurs through two mediating processes: reflection (active and careful consideration) and enactment (translation of a belief into action), which can link the four domains. Hence, multiple growth pathways are recognised between the domains and change can occur in any of them. The term 'enaction' was chosen to distinguish the translation of a belief or a pedagogical model into action. Each action represents the enactment of something a teacher knows, believes or has experienced. On the other hand, simply 'acting' occurs in the domain of practice (Clarke & Hollingsworth, 2002).

Figure 5

The Interconnected Model of Professional Growth (Clarke & Hollingsworth, 2002)



Most teacher professional development programs have teacher change as their goal. Clarke and Hollingsworth (2002) suggested that teacher growth is a much more useful and appropriate goal. The Interconnected Model makes it clear that many change sequences are possible through teacher participation in professional development programs. Not all such sequences lead to lasting teacher growth. This model recognizes the complexity of professional growth through the identification of multiple growth pathways between the domains. Its nonlinear structure recognises the situated and personal nature of both teacher practice and teacher growth. This, and the fact that it recognizes professional growth as an inevitable and continuing process of learning, distinguishes this model from others identified in the literature. Clarke et al. (2013) further clarified:

> Our support for the process of teacher growth must offer teachers every opportunity to learn in a fashion that each teacher finds most useful. If our professional development programs are to recognize the individuality of every teacher's learning and practice, then we must employ a model of teacher growth that does not constrain teacher learning by characterizing it in a prescriptive, linear fashion, but anticipates the possibility of multiple change sequences and a variety of possible teacher growth networks (p. 99).

Clarke and Hollingsworth (2002) criticize what they call a 'deficit perspective' on teacher in-service education, which sees change as an event where teachers are generally passive. They claim for a shift of agency, moving from programs looking to change teachers to programs based on the conception of teachers as active and reflective participants in their professional development. In this chapter, I propose the schools-university partnership, the PHE Research and Working Group, as a professional development program that prioritizes teacher agency. Consistent with the model by Clarke and Hollingsworth (2002), I looked for evidence of changes

within the four domains as well as aimed to involve the teachers as active and reflective participants, and gain their perceptions on the domains and on professional development in general. Within the present chapter, the research questions are organized within each domain:

1. External domain: How do the teachers perceive their participation in the schools-university partnership? What particular aspects most impact their practice?
2. Personal domain: Which changes – if any – did they report in the personal domain? Did their beliefs/attitudes/values shift during the schools-university partnership?
3. Domain of practice: How have their NBPA instructional and assessment strategies changed?
4. Salient outcomes: Have they noticed any changes in their students (in terms of learning, behaviour, engagement) since beginning participation in the partnership?
5. Mediating processes: Which evidence can be found within the teachers' discourse in relation to reflection and enaction processes?
6. What do the teachers believe, in terms of professional development, could be done to further support teachers outside of this partnership?

Methods

The goal of this study was to explore if the teachers described professional growth in the personal domain or the domain of practice and if they experienced any salient outcomes in their students' learning. In the last decade, several researchers have explored teachers' perceptions of professional development by conducting qualitative analyses of their experiences (Avalos, 2011;

Brown & Weber, 2019; Leeder & Beaumont, 2021; Masuda et al., 2013), and this study builds on this research by applying a specific teacher growth model.

Participants

The schools-university partnership currently includes 32 teachers and two university researcher teacher-educators. Teacher participants in the schools-university partnership consist of middle and secondary specialist PHE teachers (n = 25), elementary generalist teachers (n = 5), and pre-service PHE teachers (n = 2) representing 21 different schools and seven different school districts. However, these numbers shift each year as current members invite new colleagues, teachers retire, and new pre-service teachers express interest in joining the partnership. The majority of participants currently teach PHE 6-12 in public middle or secondary schools with three members in the private school sector. The researchers are a PhD candidate and her supervisor.

I employed purposeful sampling as a technique since it is widely used in qualitative research for the identification and selection of information-rich cases (Patton, 2015). This technique involves identifying and selecting individuals who are especially knowledgeable about or experienced with the phenomenon of interest, in this case, participation in the schools-university partnership (Creswell & Plano Clark, 2011). All members of the group were invited to participate after partaking in two sessions of NBPA professional development and prior to a third session, and six teachers agreed to be interviewed. All six members had participated in two in-person workshops and one virtual professional development workshop dedicated to the learning and teaching of NBPA as part of their participation in the schools-university partnership (considered the external stimuli). For the in-person meetings, participating teachers attended all-day planning sessions with the mornings dedicated to research and the afternoons dedicated to

experiential NBPA professional development workshops. As for the research agenda, teachers brainstormed a wide range of NBPA curriculum actions and instructional strategies associated with relatedness. These ideas were then translated into concrete actions, in the form of an action checklist that teachers could utilize to increase meaning and engagement for students in PHE. All members of the university-schools partnership were then invited to use the checklist to document the 'NBPA to support relatedness in PHE actions' in one or more of their PHE courses the following term. A detailed description of the research and professional development activities participated in as part of the partnership has been described elsewhere (Gibbons et al., 2020; Gruno & Gibbons, 2021; in review). See Table 2 for details on each participant's teaching and partnership details.

Table 2

Participants' Teaching and Schools-University Partnership Details

Participant Name (Pseudonym)	Number of years teaching	PHE grades most commonly taught	Number of years as part of the schools-university partnership
Ava	17	8-10	6
Kyra	15	10-12	5
Alana	4	9-10	5
Elise	9	8-10	3
Keisha	15	9-10	7
Macey	12	10-12	4

Data Collection

Teachers' experiences of the partnership and subsequent changes in their growth domains were explored through semi-structured interviews (see Figure 6). The open-ended questions served to frame the topics related to the goals of the study. The interviews were conducted in addition to the yearly meetings of the group. Due to the global pandemic, COVID-19, the interviews were conducted, recorded, and transcribed via Zoom. The interviews lasted between

17 and 42 minutes long. Teachers were interviewed individually by the lead researcher on their perceptions of learning and reflections regarding their ongoing participation in the partnership, especially in relation to the model proposed throughout this study.

Figure 6

Semi-Structured Interview Guide

1. How long have you been a part of the schools-university partnership?
2. What PHE grades do you mostly teach?
3. How long have you been teaching?
4. Describe your experiences as part of this professional development group. What particular aspects most impacted your practice? (external domain)
5. Have your beliefs or attitudes or values associated with teaching NBPA changed due to your participation in this group? (personal domain)
6. How have your NBPA instructional and assessment strategies changed due to your participation in this group? (domain of practice)
7. Which particular NBPAs, if any, from the group have you implemented into your teaching? Why did you select these activities to incorporate? (domain of practice)
8. Have you noticed any changes in your students (in terms of learning, behaviour, engagement, motivation) as a result of your instructional changes since beginning participation in the group? (salient outcomes)
9. What, in terms of professional development, could be done to further support teachers outside of this research group?
10. I am inviting you to add any additional comments about teaching nature-based physical activities and/or professional development that you have not had the opportunity to mention above.

Data Analysis

After initial interviews were transcribed by Zoom, a research assistant and I compared the transcriptions to the audio recordings and corrected any inconsistencies. I then sent the edited transcripts to the participants to ensure that the written text reflected what they meant to say and their experiences. Member-checking procedures are an important feature of qualitative research to verify the fair representation and confirmability of participant voices and feedback (Choi & Roulston, 2015).

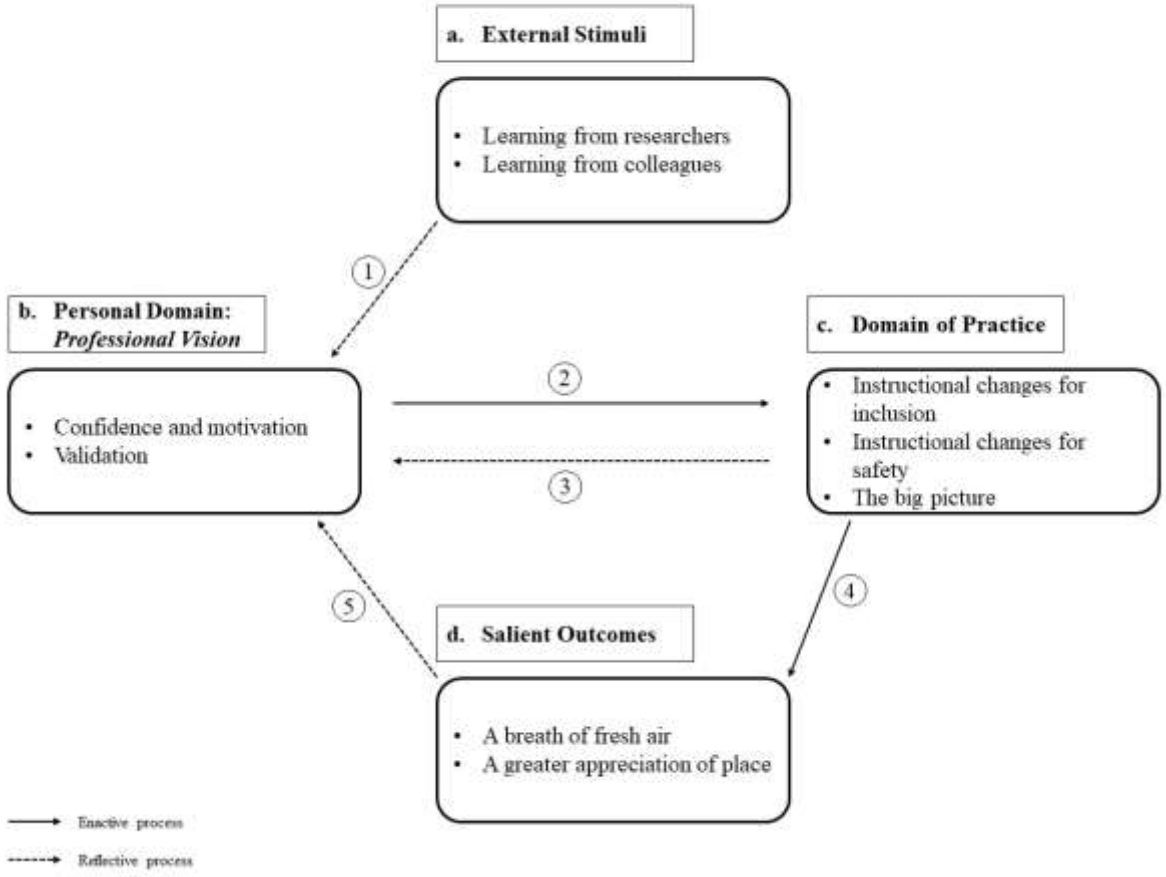
Thematic analysis was then used because it allowed the combination of both inductive

and deductive logic (Braun & Clarke, 2006). This process involved a familiarisation with the data, the independent generation of initial codes by the researcher, and subsequent grouping of codes according to their similarities. Codes were exemplified with quotes and the codes were checked using researcher triangulation with the researcher and her supervisor to reinsure the fit between the codes and the data (Cohen et al., 2011). Data triangulation was also secured by using the various data sets that emerged throughout the analysis process: raw material, codes, concepts and themes (Korstjens & Moser, 2018). Using the interconnected model of teacher professional growth as a guide, I then grouped the codes into relevant themes, and used the model to organise the themes according to their fit into one of the four main domains: (a) external domain, (b) personal domain, (c) domain of practice, and (d) salient outcomes, and their connecting processes (reflection or enaction). Each comment from a participant which related to an impact or outcome of the partnership was categorised into one of the four domains of change. For example, if a teacher described a new NBPA activity they tried in PHE that really engaged the students, that was placed under the domain of practice. If a teacher stated their beliefs in the importance of nature in PHE had changed, that was placed under the personal domain. If a teacher felt their students were more active in the forest than in the gym that was placed under the domain of consequence. This analysis provided a qualitative, evaluative snapshot of the impact of the partnership. The interconnected model was also used to trace ‘change sequences’ (Clarke & Hollingsworth, 2002) describing the learning of the participants. I identified participants’ reported learning from the partnership, located each outcome as already discussed in the appropriate domain of change and then linked these changes together into pathways. Grouping the themes using the Interconnected Model allowed me to link specific references to participants’ growth in a comprehensive scheme, linking changes across domains through

relevant reflections or enactions (Figure 7).

Figure 7

Participants' Change Patterns (based on Clarke & Hollingsworth, 2002)



Transferability is an expected feature of discussion in qualitative submissions (Walby & Luscombe, 2017). Whereas, statistical generalizability is not desirable or reasonable in qualitative research, qualities of 'thick or rich' description that present findings with themes that are appropriately defined and supported by sufficient data are expected. This was achieved below through the presentation of rich, direct quotations that convey a sense of the participants and their environments. This description can then provide the basis for consideration of the potential for application to other times, places, people, and contexts as a useful indicator of rigor.

Findings and Discussion

The first process reported by the teachers shows how their participation in the schools-university partnership resulted in their learning from the researchers and their colleagues (external domain). This learning subsequently promoted relevant changes in their motivation and confidence and provided validation (personal domain), and these changes inspired the teachers to implement new teaching strategies as well as revise 'the big picture' in their PHE classes. In order to explore the domains and themes at a more specific level, each are discussed in the detailed sections below.

The External Domain: External Source of Information or Stimulus

The model for professional development and its implementation presented here represents an innovative experience of continuous teacher education in the context of a schools-university partnership. The partnership was highly regarded by the teachers, and it was shown to foster reflection regarding students' learning and the possibilities of their own practice to impact their students' learning processes. In this study, the External Domain consisted of the schools-university partnership and activities within it that were designed and implemented by the members and research team. Teachers reported that they valued the meetings because they allowed them to learn in interaction with peers and researchers. This was salient for teachers as the method employed was novel. Within this domain the participants identified two themes that impacted their practice: learning theory from the researchers and learning from the discussion with fellow members. Learning in these two areas impacted change as defined by Clarke and Hollingsworth's (2002) original description, in that they were both new stimuli for the participants and drivers of change in the other domains.

Learning from Researchers. The key role of the researchers in the schools-university partnership is to provide a theoretical framework, conduct research with the participants, and act as facilitators. Alana described how being provided the research behind NBPA gave her a broader idea of what a PHE curriculum could encompass:

> And even the idea of nature-based [PHE], like that was not even on my radar, we were doing basketball, volleyball, soccer, and the sports, and that's the extent of it. So, I'll never forget, one person suggested doing yoga outside…like anyone can do that, right? And in my head, hearing the concept of nature-based, immediately I thought, well I don't know the trees, and the leaves, and the flowers, like I wouldn't be able to point that out, and that was my super narrow scope of what I thought nature-based [PHE] was.

Teachers can be sceptical about the perceived theory-bound obscure world of academia which contrasts with the practice-bound action worlds in which they work (Day, 1999). Also, differences in the professional and institutional *cultures* between the worlds of university researchers and those of school teachers can pose a particular challenge (Coburn et al., 2013). However, the members of this partnership found the theory to practice relationship valuable and the existing personal and practical knowledge of the school-based teachers and the research knowledge held by the university-based teacher-educators were regarded as complementary in their contributions to the success of the partnership's purposes (Day et al., 2021a).

As part of the facilitating role of the research team, we often ask our members to share their teaching ideas and we bundle them in order to create resources for the group. Ava spoke of how valuable this process was in changing her teaching practice:

> I really appreciate all of the resources that you share with us, by putting together things that people have brought and just all of the things you've done on your own. [Another

> member] and I were talking the other day about that resource package that we left with last week and having that at our fingertips and how valuable that is.

She also commented that this is "a different way of sharing than often what happens in the school. I find that some people have these great things, but they don't like other people doing them, or they don't like sharing them." It has been stated that leaders of schools-university partnerships must ensure that the participants are: convinced of their merits; feel a sense of ownership through participation in decision-making processes; and are provided with the intellectual, affective and practical support throughout (Day et al., 2021b). It appears through the responses of the members that they felt these three components in their participation in the partnership.

Learning from Colleagues. All six participants spoke of the power of meeting with "like-minded" (Ava and Kyra) colleagues who "share [their] passions" (Kyra) and have "similar values" (Macey). Alana felt that the partnership "is made up of these people that want to learn and want to better themselves, and we all have the same information moving forward, so that's what I appreciate about it." Ava also spoke of the positive impact of learning from her colleagues:

> I find that it's a really positive group…all too often it seems like when teachers get together there's a focus on more of the negative side where everyone looks at the roadblocks and the reasons why they're not doing things, and then it just becomes really a negative vibe. I never get that from our group. It seems like [we] are always willing to think outside the box and find ways to make things better, regardless of the kind of situations that we come from.

The positive appraisal of the partnership's learning environment was crucial as time and space to reflect with colleagues was scarce at many of the teachers' individual schools. Indeed, some teachers characterised their experience in the partnership as cathartic because they had the chance to release stress by talking about their professional problems. Elise explained that "teaching is hard" and one often "feel[s] like a silo," but when she left the partnership meetings, she felt supported:

> …this is why I do it, I love it…Just the support and how we give to each other, you know, ideas and energy and share; it's not competitive right it's not like oh at my school I'm doing this, it's like hey, do you want to try this because this worked for us…I love this group and I love the dynamic in the environment that you guys have created it's so significant.

Keisha echoed Elise's feelings with the following statement:

> I do like the opportunity to collaborate and hear what other people are doing with their classes because here at [my school] there's sometimes only two of us so there's not a lot of new insight coming in so I hear what other people are doing and then I share it with everyone here and it's like, yeah, I think that's important.

Kyra also felt that the partnership provided the collegiality that her school department did not: "I don't get much of that [shared passion], within my own department. It's been really nice to have this group available and share and learn new things from them that I can bring back to my own practice." Macey stated that the partnership removes her from her own "little bubble within [her] school" and say to herself, "actually, I can teach within my values." She felt that "just hearing other people's stories" was her "favourite part of being part of the group." Such healthy mutual connections are found to act as important "social glue" (Goodwin, 2005, p. 615) in partnerships,

helping to unblock "underlying patterns of isolation and immobilization" (Jordan, 2012, p. 74) and, consequently, potentially transform the social environments which enable individuals to learn to "deal with the uncertainties of their changing world" (Goodwin, 2005, p. 615) together.

Kyra also spoke about the adaptability of her learning from the partnership:

> …how it impacted my teaching is just by being able to take ideas…from everybody who shares…being able to implement them in my own way in my own practice, and I love how everybody can interpret different versions of the same activity or the same game, and put their own spin on it just based on…how they teach themselves.

She went on to describe a human anatomy activity that she had learned from another partnership member which she adapted, and then texted the images and adaptations to the teacher who had originally shared the activity. In this way she felt that members of the partnership can "continue sharing ideas" and "continue those relationships past our sessions." Turley and Stevens (2015) concluded that partnerships, albeit extremely beneficial to both institutions, are not common because they are challenging to set up and even more difficult to maintain. However, in the case of this partnership, the fact that members collaborated outside of partnership meetings strengthened the bonds of the members.

Alana, a younger member of the partnership, initially was intimidated by colleagues in the group; however, she soon felt accepted:

> So, being a new teacher, [the partnership] was invaluable to me, I was pretty intimidated, I'd heard all these amazing women's names, and now sitting amongst them and giving my opinions and feedback, like I didn't want to look like the new hotshot on the block, but just the group of people…like I always felt comfortable since day one. And it's so nice to be able to bounce ideas off of each other, see what other people are doing,

> because I think for me, you kind of get stuck in your…world. I see what colleagues are doing…it's just been such an amazing experience to open my eyes to all of these things…so it's been amazing to be a part of it.

For Keisha, learning from her colleagues in the group provided her with the necessary challenge to push herself to try new strategies with her PHE students:

> I think part of it is like hearing what other people are doing on a regular basis, sort of pushes me to do better with what I'm doing at times, because I do find that like I, for the last few years I've been teaching the same courses so it's pretty easy to just kind of fall into doing the same thing that works for me and then I hear somebody else's doing something, 'Oh that's a good idea I should try that too.' So, I think it encourages me to do better practice for sure. And it inspires me to try new things that maybe I wouldn't always have tried.

The findings in the external domain support previous research in showing the critical role peers can play in partnerships. For example, Fullan (2008) argued over a decade ago that collective commitment in an organisation can be fostered "not because people fall in love with the hierarchy but because people fall in love with their peers" (p. 30). The existence of such social connections "affords group solidarity that makes achieving collective goals much more likely" (Bryk et al., 2010, p. 169). The dialogue between participating members in this partnership encouraged them to listen to and listen for each other's needs and priorities, and importantly, sow the seeds of trust, respect and collaboration in their search for a shared purpose and what (Fullan, 2008) calls "the we-we solution" (p. 49). McLaughlin and Black-Hawkins (2004) argue that "in the models which are school-wide, and even more so in those which go across institutions, the nature of the relationships is crucial" (p. 279). Day et al. (2021b) learned

that teacher learning and how it relates to organisational change is best when teachers are willing to participate, collaborate and be centrally involved in the construction and shaping of new meanings and change of practice, which parallels my findings in the external domain.

The Personal Domain: Teacher Knowledge, Beliefs and Attitudes

In Clarke's and Hollingsworth's (2002) model, this domain contains a complex set of attributes: a teacher's knowledge, beliefs and attitudes. Two themes emerged from the data to explain the teachers' changes in their personal beliefs and attitudes regarding NBPA in PHE due to their participation in the partnership: Confidence and Motivation, and Validation.

Confidence and Motivation. A number of the teachers interviewed commented that their learning as part of the partnership provided them with increased confidence and motivation in order to continue implementing NBPA, or to try new NBPAs with their PHE classes. Ava described the partnership like a "security blanket" because, in her words, it "makes [her] more confident that [she] can carry out the things that we've talked about." Ava also stated, "[the partnership] makes me confident that I'm doing something meaningful" and similarly Elise felt, "it's been amazing…It's just really helped me stay excited about teaching, you know, activities with the kids." Elise elaborated by stating, "[The partnership] just gives you…more confidence to think 'yeah I'm doing the right thing, getting the kids outside.' Some of the confidence and motivation to teach NBPA came from learning a more thorough perspective of what NBPA is as Alana explained:

> …money…I think that was a barrier for me…like 'I can't take my kids into nature because we can't afford to rent kayaks and paddleboards, and all these things', but there are so many things you can do that you don't need to get to the ocean for, like hike, go for a walk, teach these little games and go do Manhunt in the forest, go do yoga outside.

> There's just so many options that I never considered or would have never thought about if it wasn't for this group.

Validation. As described previously and in Table 2, the participants in this study have been members of the partnership for a minimum of three years. They were invited to the partnership because they had already shown innovation in their delivery of PHE curriculum, and therefore, were more likely open to further innovation. For the last four years of the partnership, the focus has been on incorporating NBPA in PHE. Therefore, all of them had a lot of time and experience experimenting with NBPA as part of the partnership. All of the participants, to some degree, agreed that the partnership did not necessarily change their beliefs or attitudes on NBPA as they already knew "the benefits of getting kids outside in nature" (Ava). Elise explained, that her beliefs and attitudes did not change necessarily, but instead were "enhanced and encouraged" because "being with like-minded people" her beliefs were "validat[ed] a little bit, because I love being outside; I love sharing that." The partnership validated and strengthened her beliefs in the value of teaching NBPA in PHE:

> …the school that I'm at currently when I got here was more like only sport focused in PE, You know the traditional basketball, football, volleyball, and philosophically that's not who I am and the kids don't always enjoy that. So being a part of this group and always having something tangible to take away and implement has been significant and to share and to be creative.

Previous research has found that the prevailing belief in PHE often stigmatises the 'others' in PHE, those who do not look fit and sporty. Thus, this commonly held belief that PHE is for those who are athletically inclined does not challenge how power and social superiority or inferiority appear in the subject (Brown & Evans, 2004; Camacho & Fernández-Balboa, 2006; Dowling,

2006; Larsson et al., 2018). Contrary to this, Elise appeared to want to challenge the idea of athletic superiority in PHE and create an inclusive environment for all learners, often through the incorporation of NBPA.

Macey felt that being a part of the group "validates why [she] went into to study Phys Ed in University"; she felt:

> …it can be so easy to leave university to be like okay I just got to do it the way everybody else is doing it but then to come back to the core group and go oh no…there are other people who want to teach the way I do and it validates that and so I can come back to my bubble and feel confident to be in line with my values.

Macey also felt her values had not changed, but that the partnership gave her "an opportunity to deepen them." Keisha, who already taught many PHE lessons outdoors, felt that conversations with others in the group made her further appreciate her approach to place-based PHE: "it's always interesting for me to hear about other people's challenges and it kind of puts in perspective how lucky I am to do these things."

Participation in the partnership (External Stimuli) led, through the collective reflective process (Arrow 1), to changes, or validation, in the teachers' Personal Domain (b). This validation can be portrayed as a development in the teachers' *professional vision*, as defined by van Es and Sherin (2008). Professional vision refers to "the ability to notice features of a practice that are valued by a particular social group" (p. 244), in this case, members of the partnership. These changes in the teachers' professional vision (Personal Domain) led to the implementation through *enaction* of professional experimentation (Arrow 2), generating new strategies in their PHE classroom (c), which responded to the new teaching perspectives. The new strategies within the Domain of Practice are discussed next.

The Domain of Practice: Professional Experimentation

Day et al. (2021) stated that the value of schools-university partnerships "lies in their potential to inspire, add momentum, or 'kick start' new ways of thinking, doing and leading teaching and learning in schools" (p. 1). Previous research has found that teachers can attain new instructional skills and/or diversify instructional strategies through professional development (Till et al., 2011) and numerous outcomes were revealed that were situated in the domain of practice. Smedley (2001) argued that "it is the attitudes and dispositions of the individuals within the partnerships that will ultimately dictate the level of success" (p. 201). Day et al. (2021b) added that "unless individuals' attitudes and dispositions are aligned and harnessed by those who lead them so that they become *collective* attitudes, *collective* capacities and *collective* commitments, partnership structures and mechanisms themselves are more likely to falter than succeed" (p. 30). Due to the individual teachers' dedication and motivation, and the collective professional vision of the partnership, the participating teachers reported changing instructional and assessment techniques for inclusion, safety, and the "big picture" of their PHE classes.

Instructional Changes for Inclusion. Alana found inspiration from a recent partnership meeting and planned to implement a new game shared by one of her colleagues entitled 'Marker Tag.'

> …that was one that really stood out to me…where you get kids to hide and give them [markers] and write down a letter, I thought that would be really great too…for the kids who don't like sports, like go out and find your friends in the woods, like what a great idea.

Similarly, Keisha felt her instructional changes in order to incorporate further NBPA "kind of levels the playing field too because there's not a lot of students that have a lot of experience."

She explained that in NBPA activities like forest games, “anyone can excel in different ways.” She provided a specific example:

> …like some of my students here last quarter were very good at hiding…they were engaged in like finding the best spot to hide…whereas I know that when we go into the gym and play badminton they'll stand in the corner and hit a birdie around but it's just not the same.

One instructional change Macey made was to “give [her students] voice” by having them fill out a survey on the first day of class about the activities that they wanted to participate in throughout the PHE course. The students themselves often identified NBPA, when Macey would “get a block where everybody wants to do forest games.”

Alana found that by adapting her assessment techniques during NBPA, she created a more inclusive learning environment:

> …it’s tough to come in day in and day out and play these sports that if you’re not an athlete, if you don’t enjoy sports. So, assessment wise, it’s really great for those kids who don’t enjoy sports to get outside, and for me to give them a little check-in, like hey today was your first 5/5, great job, keep it going for the rest of the week. So, my whole view of assessment has definitely changed around that area.

Kyra felt that the learning environment in general when implementing NBPA provided the time and space for her to “visit and chat with [the students], but also really hear them and see them, enjoying visiting with each other, like I don't think students get an opportunity to do that very often.” She felt the very simplicity of NBPA provided inclusion:

> They're just walking and talking and there's so much value in that… nature-based activities are for everybody. You can find ways to target the competitive students and the

non-competitive students, and provide an environment for everybody to feel comfortable. That's what I've been really enjoying is how inclusive it is.

Instructional Changes for Safety. Some of the instructional changes, and the increased incorporation of NBPA that the teachers made were further motivated by COVID-19. Many found that NBPA fit into their PHE curriculum particularly well as learning outdoors was safer during the pandemic. Kyra found she explored new local areas due to the pandemic: "this year's definitely forced us to…branch out from what we're used to. Right, you know, there's only so many times you can walk to [the local beach] so that's when I just started like changing the route." Elise further explained the impact of the pandemic on her PHE courses:

> And this year, particularly, we really haven't played those conventional [games and sports], we've done more outdoor stuff. Different games, different activities, and the kids are really enjoying it. The feedback has been great from the parents. The nature based physical activity…just encouraging that going outside regardless and tying that into the health concepts of mental health, and the significance it has on our daily lives. So, this group has been the best professional development that I've had or experienced…

The Big Picture. Along with new instructional and assessment strategies reported by teachers, another change in the Domain of Practice was that they claimed to be more aware of the "big picture" of their relevant teaching activities involving planning, executing and/or assessing a lesson. Many of the participants stated that they changed their practice in regards to NBPA implementation by placing nature as the focus. Ava explained:

> So instead of just, you know, going on a field trip to do some disc golf actually turning it into more of a nature-based unit where we don't just play the game as a one off at the end

> of the year but looking at, at skills that can develop it and playing it in and around the school and then going somewhere for the culminating activity. So, making it bigger.

Similarly, Elise felt that the partnership gave her more "structure" to her NBPA lessons: "instead of just …like okay we're going to go for a walk…find connections…recently I had the students spend a week outside…[one] criteria was you just can't be on your phone…" She also changed her assessment for her weeklong NBPA unit: "the assessment piece was finding articles that support nature-based activity and understanding the correlation between what we did [and] the research and the positive aspects and so that helped tie it together."

Kyra began implementing cross-curricular learning in her NBPA PHE lessons. She started having her students create "nature art installations" once they had reached their destination – a beach or top of a mountain – after a hike. These installations also served the function of connecting students to their community because they were to create something for "other passersby to enjoy." She also connected this activity to a community that the students really understand: *Twitter*:

> I take pictures and I post them and they say like, whoever controls the most amount of votes like I'll bring a prize. So, it gets them interacting and gets their friends interacting. And I've had moms who follow that account.

She also hopes to incorporate further interdisciplinary learning like "plant identification" in the future, so that students can make connections to their lifetime activity outside of class: "When they are out walking and doing activity that they can continue to like pinpoint stuff that they've learned and like what's invasive and what's not invasive."

Most of the participants provided specific examples of activities learned in partnership meetings that they then implemented into their practice. Ava stated:

> …whenever we meet then I come back and I try and put things that we've done there into practice here, and even just knowing that I have those to fall back on, it makes it so that I'm way more likely to try them like…oh yeah, I'm going to play Marker Tag.

Elise spoke highly of learning geocaching as it was favourably received by her students:

> The geocaching was amazing and I liked it because…we did it around our school first and then we took them to [a local mountain]…it was great because…They were outside, there was a technology piece that we could incorporate a bit of map reading…so that one was really really good.

The identified changes in the Domain of Practice led to a set of reflective and enactment processes that enhanced teachers' initial changes in the Personal Domain. As Figure 7 shows, teachers reported having engaged in a reflective process after they implemented new strategies with their PHE classes (arrow 3). This process reinforced their initial change in the Personal Domain, hence strengthening their professional vision.

In most Western countries teaching has always been associated with contact time with students in classrooms, leaving teachers themselves with limited time to reflect upon their work systematically (Day et al., 2021b). Many teachers are likely to spend most of their time in rapid, rather than deliberative or contemplative, thought in their classrooms, engaging in reflection-in-action only. Such reflection by its nature only allows time for them to draw upon or re-configure existing practices in order to resolve matters of immediate importance, rather than examine underlying issues of purposes, practices and influences which may help or hinder improvement. However, while teachers are busy, and while teaching itself 'eats' the intellectual and emotional energy of teachers, there are many examples of teachers, including the partnership members in

this study, who willingly participate in the building and sustaining of a formal partnership within and between schools (Harris et al., 2017).

The Domain of Consequence: Salient Outcomes

Most teachers, especially in partnership work with their peers and academic researchers, are likely to be 'insider' researchers of their own practices. Their 'inquiry' is likely to be small-scale, driven by a desire to unlock the puzzles in their worlds of teaching, and with little concern of being constrained by the academic prescriptions of what *systematic research* should entail (Day et al., 2021b). Teachers in this study discovered their inquiries of implementing NBPA resulted in changes in student behaviour. The changes in the Domain of Practice led through an enactive process (arrow 4), perceived by participants as Salient Outcomes (d) in terms of students' participation and engagement in the NBPA lessons. Walsh and Backe (2013) argued, that the primary beneficiaries of schools-university partnerships should always be the students. The participants in this study spoke of two main outcomes they noticed in their students as a result of their changes in practice: a breath of fresh air and a greater appreciation of place.

A Breath of Fresh Air. Ava noticed, when she increased her use of NBPA in PHE, that many of her students "like being outside" and "they really enjoy the idea of being able to do something that doesn't involve competition necessarily; that isn't a team sport." Similarly, Alana found that "it's so interesting to me how just a change in environment just rejuvenates [the students] and gets their energy up a bit." Elise noticed a dramatic change in her students in response to implementing NBPA:

> The kids, they seem happier, they enjoy PHE more, and I've heard that from a number of students, parents (we just had parent-teacher interviews), and it was wonderful to hear from the parents: 'We love that you're doing something different like our son is so happy.

> It's such a good fit. You're a good fit for him because you're doing non-traditional things, spending more time outside.' I remember when I told my grade nines this year kind of the [NBPA] structure of what we were going to do, and I kid you not…they clapped.

She felt, specifically for students who had been disenfranchised in the past in PHE that NBPA built their confidence and it was "a safe place for them with this different type of class structure."

Keisha, who teaches senior elective PHE courses, had the chance to directly compare the participation of students in regular PHE with her NBPA-focused courses:

> I find that the students that may be in a normal PE class wouldn't participate very well. You get them outside playing tag in the forest and they're on and they're playing. I definitely noticed that there are higher levels of engagement when we are outside. They seem to really thrive and some of the students I think would do just fine in a regular PE class also really thrive out there. I definitely see more engagement in the students; when we're outside doing activity that's harder to sit out - if you're playing Foxes and Hounds in the woods someone is going to chase you, there's not really that option to not participate.

A Greater Appreciation of Place. Keisha noticed that her students show "a greater appreciation of where they live" after participating in NBPA. She felt this appreciation would transfer to NBPA outside of PHE as well:

> …[the students] can walk through this [forest] from their own house and see the thing [that we] talked about…they're exposed repeatedly to going outside and doing things and realize it's 'oh this is fun'…this is kind of the purpose…to lead them down that path so they're showing that they value being outside and active.

Similarly, Kyra felt her students had a “general appreciation of being outside” during the NBPA lessons. As the teacher, she worked “really hard to model that appreciation” by stating “it's such a beautiful day today” and “This is such a nice way to spend my afternoon.”

Change in the domain of consequence is firmly tied to the teacher’s existing value system and to the inferences the teacher draws from the practices of the classroom (Clarke & Hollingsworth, 2002). The occurrence of both new practices and outcomes contributed through teacher reflection to another change in the Personal Domain (arrow 5). Teachers reported changes in their attitudes towards their profession and their role as PHE educators. The term ‘reflection’ is used in this study in much the same way that Dewey (1910) used the term, as “active, persistent and careful consideration” (p. 6). Elise reflected on the impact of NBPA on her students, and the meaning it brought to her perspective as an educator:

> …my job is to expose you to so much that you are active for your lifetime, not that you can shoot a layup… I want you to be exposed to something that you're like, oh I actually really like that, I want to continue that when I'm not in a structured PHE class or, you know, and have the confidence to go to these different places, maybe, you know to a mountain…it's like, that's what I want, I want to give them the confidence. I'm going to take you there I'm going to show you, you can do it…now maybe you take your family or after you graduate, you've been there so you understand it. Right, like just exposing them and hoping that they will have this in their back pocket so they continue to be active in some way.

The teachers in the schools-university partnership were able to identify important consequences of their new strategies in their personal domain, as shown in Figure 7. To what extent can we expect these reported changes to endure? Clarke and Hollingsworth (2002)

proposed two types of teacher change that can be represented using their Interconnected Model, and can help answer this question. First, change sequences, where there is evidence that change in one domain causes changes in another in a momentary way, such as the introduction of an innovation due to a course, with no further impact. Growth networks, in turn, are described as a professional development, in light of "explicit evidence of lasting change in practice or in teacher knowledge or beliefs" (p. 958–959). In the current study, complex change sequences were identified and links were suggested between the external, practices and outcome domains, and the personal domain of teachers' attitudes and beliefs. Hence, according to teachers' perceptions, these change sequences could correspond to a growth network. Nonetheless, as Clarke and Hollingsworth (2002) claim the need to find explicit evidence of lasting change, the current analysis should be placed in relation to further evidence of teachers' practices.

Professional Development

Finally, I wanted to hear from the teachers on their views of professional development outside of the partnership. The members of this partnership are clearly teachers who are engaged in professional development, so we wanted to know from them what they felt was needed in order to facilitate other teachers' growth. All of the teachers agreed that one way to impact teachers' practice is "to give them something concrete to use… those kinds of resources are invaluable" (Ava). Alana echoed this by stating:

> …kind of like what you sent out last time, to just have this package where it's like here is the information, here are the games, here [are] some testimonials from people who have tried these things…it's done for me, it's even easier right? And I think the same way for the nature-based stuff. Like, here's a little booklet with all the games they get to choose

> from, and they can read it for themselves and assess as they go, and it's tough to argue or push back against something that is so easy for you to do.

Elise felt that because all of the teachers in the partnership have "taken the university classes", they "don't need like to sit there and hear the philosophical aspect of why we should be doing something". She believed that instead of gaining too much information, just "pick one thing that you're going to add…I'm going to try it this week or this month and if it goes well, great. If not, I tried it and we'll try something else." She felt this aspect was something that the partnership does particularly well: "when I come to our group every November. I am like, I know I will leave there with actual tools that I like."

Another integral part of growth from professional development, Elise thought, was learning from fellow teachers rather than searching for information online:

> …hearing from people in the same profession, and different ideas that they're doing in their classroom that work. We're not just reading about it online that it's actually coming from a fellow teacher, I think that is huge…for teachers.

Keisha similarly felt "there's not a lot of pro-d for PE that I find that I walk away from and I'm like yes I'm going to do that, I'm going to call that person up and schedule it or I'm going to do that activity." However, as a member of the partnership, she stated, "yes I can use this the next day."

Kyra felt that some teachers are "just fine with doing what they've always done because that's what works and they don't want to put the work in to change or they don't know where to begin." She believed for these particular teachers that pro-d was best "presented by an administrator to the department head. That isn't so much like a suggestion, it's like I have set up this opportunity for you and the department to participate in. Where in a way it's not optional."

Macey also had experience with teachers who did not go out of their way to attend professional development. She felt, "…you need to make it part of the school day you need to make it an in-service." Macey also had some success simply sharing her ideas with members of the department in order to inspire professional growth:

> When I first came to the school, yoga was like scoffed at; like 'we don't do yoga.' Then I remember coming in this year, we have these huge long blocks, and one of the other teachers, he would do yoga for the first half hour with his class and I was like, 'yes, you wouldn't see that five years ago.'

Elise too felt it was important to "have stuff that we can bring back to our colleagues" from the partnership, so she could then act as a leader in her own PHE department.

Limitations

As I was once a part of this partnership as a member and now as a leader, I have a degree of affinity with the population under study and this can introduce a question of bias in the study (Mehra, 2015). There is also a potential self-presentational concern of participants wanting to look supportive of the researcher. Given that I am an "insider" investigator, this may have limited my curiosities so that I only discovered what I thought I did not know, rather than opening up my inquiry to encompass also what I did not know I did not know (Chenail, 2011).

Conclusion and Implications

At a time when the politics of educational reform have become increasingly complex and unpredictable, partnerships falter when they fail to respond to the particularities of the contexts in which they are embedded, or to support the operational priorities of the participating

organisations (Day et al., 2021b). However, this does not have to be the case. Lessons from successful partnerships, such as the one described in this study, suggest that while common values provide an integral foundation, and are the bedrock for building success, within these, flexibility, adaptability and strategic relevance are vital attributes if they are to secure and sustain their functionality, performance, and as importantly, their impact on the quality of teaching and learning, and professional growth, in schools for teachers and students (Day et al., 2021b).

While it is important not to overstate the evidence on the effectiveness of schools-university partnerships, it is clear that they are a promising strategy for fostering educational improvement and transformation (Coburn et al., 2021). Day et al. (2021b) wrote that "school-university partnerships have an ongoing evaluation challenge" (p. 32). Similarly, Coburn's and Penuel's (2016) review of available evidence of the outcomes and dynamics of research-practice-partnerships in education and related fields found that although there was evidence of the success of interventions developed within partnerships in other fields (e.g. health), the evidence of impact in education in terms of fostering research use and supporting educational improvement was sparse. They lamented that few studies had even attempted to investigate the value of the partnerships themselves. This study is one step towards evaluating the impact of a schools-university partnership on teachers' professional growth.

Schools-university partnerships appear to be a beneficial way to promote teachers' re-engagement with the core of their practice, which is the promotion of students' learning. Thus, there is evidence that teachers are capable of articulating their ideas and beliefs about both the teaching and learning processes and providing a narrative of the results of their lessons, and, in consequence, finding ways of improving their practice through informed decisions. Additionally, the analysis of the interviews in this study shows that teachers adopted the main theoretical

points of our partnership, namely the research on the benefits of NBPA. I consider that these elements constitute bridges between theory and practice, which is at the core of the development of schools-university partnerships (Baumfield & Butterworth, 2007; Hennessy et al., 2011).

The findings presented here are related to the teachers' perceptions of their own learning experiences and those of their students, therefore it is not possible to claim that they actually changed their practice in the short or long term. However, the findings from the interviews are consistent with other types of evidence collected throughout this schools-university partnership which shows that these teachers became more aware of students' participation, engagement, autonomy and relatedness (Gibbons et al., 2020; Gruno, Gibbons, & Baker, 2018; Gruno, Gibbons, Condie, et al., 2018; Gruno & Gibbons, in review). They are related as well to the increasing quality of the discussions during the meetings between the research team and the practitioners (Gruno & Gibbons, 2021).

The data presented in this study fits with the Interconnected Model of Teacher Professional Growth (Clarke & Hollingsworth, 2002). When the participating teachers described their processes of learning and change, they described interactions between the external domain, the personal domain, the domain of practice and the salient outcomes. By approaching the schools-university partnership with a goal of growth and not from a deficit perspective, the teachers were able to engage as a community of learners and grow professionally in their individual, non-linear ways. The richness of the relationships among these elements stated by the participants represents evidence of coherent and reasoned understanding of their practice in relation to the concepts fostered throughout the partnership. Further studies of individual change patterns, combining interviews with other types of available evidence, are needed. The concept of growth networks, as described by Clarke and Hollingsworth (2002), would enrich our

understanding of the different routes of professional development. As shown in the model and this study, when inspired by perceived improvements in student learning and engagement, teachers were able to grow in their professional vision, become more motivated to teach NBPA and feel validated in the fact that these instructional changes are what is best for their students in PHE.

Chapter 5 – Study 3

Using their (Photo)voice: Student experiences with nature-based physical activities in and beyond Physical and Health Education

Abstract

In this study, I employed a participatory action research methodology, Photovoice, to explore the experiences of adolescent students while learning nature-based physical activity (NBPA) in Physical and Health Education (PHE). In particular, I wanted to know how students related these experiences within PHE with being active in nature outside of school. Students were asked to take photos both within PHE lessons and outside of school as part of a unit entitled *NBPA in Pictures*. Students analyzed their photos and wrote captions summarizing their analyses. Findings indicated that through the *NBPA in Pictures* unit in PHE, students were able to: connect to both place and others within PHE and outside of school; overcome challenges to being active in nature; describe nature's impact on their body and being; and, gain the desire to inspire others to enjoy nature. This study describes a promising instructional approach for eliciting student voice and connecting students to place, themselves, others and their community.

Background

All Canadian youth spend a large proportion of their time in school, therefore, the school domain can play an important role in promoting daily health and physical activity for all children. Physical and Health Education, in particular, stands in an advantageous position for promoting the benefits of leisure and lifetime physical activity as well as healthy behaviours as it addresses young, diverse and captive audiences (van Beurden et al., 2003). Lifetime activities are those that people continue to participate in throughout life and in their leisure time because they can be done individually or with others, require little organization, and minimal equipment

(Fairclough et al., 2002). Many of these activities occur outside and in nature: walking, running, hiking, swimming etc.

Although PHE curriculums across North America state lifelong physical activity as a goal, this goal is not always delivered in an explicit manner to students. Not always are students supported in a way that helps them make the connection between being physically active in PHE and being active in the community where they live. Importantly, through PHE young people can experience a wide variety of physical activities, and it is these experiences that may determine future involvement in physical activity during leisure time and throughout the lifetime (Hagger et al., 2003). However, for many young people, their engagement with physical activity outside of school is antithetical to the physical activity experiences provided to them through their formal PHE curriculum (Macdonald, 2003). Additionally, there is relatively little research outlining how PHE teachers can effectively orient young people toward participation in regular leisure-time physical activity outside of school (Polet et al., 2019).

One way to help students make the connection between PHE and physical activity outside of school is to elicit student voice. Student voice "describes the many ways in which youth actively participate in the school decisions that shape their lives and the lives of their peers" (Mitra, 2007, p. 727). Many researchers within the field of PHE have identified the importance of including student voice in research (Fisette, 2012; Gibbons et al., 2010; Gruno & Gibbons, 2016; Wattchow et al., 2014). Student voice is about more than just listening to students; it is about listening to students with the intent of responding to what we hear (Cook-Sather, 2007; Fielding, 2004). Eliciting student voices in PHE has been identified as particularly important during COVID-19 in order to navigate the gaps in equity that have surfaced during the pandemic. Listening to students enables them to connect emotionally and build skills like

communication, cooperation, teamwork, and responsibility while still following physical distancing guidelines (Davis & Long, 2020). One way to directly involve students in sharing their experiences in PHE is through participatory-action research.

The purpose of this study was to help students in PHE, through participatory visual research, make a connection between nature-based physical activity (NBPA) in PHE and being active in nature outside of school. Nature-based physical activities are those that are done in natural areas, require little specialized equipment, deemphasize competition, are cost-efficient, and can be implemented by teachers on a regular basis (Gruno & Gibbons, 2020, 2021). NBPA can influence the promotion of physical activity by redesigning the PHE curricula to promote out-of-class physical activity, modify the school environment so students have opportunities to be active on campus outside of PHE lessons, and work to develop physical activity linkages in the community (McKenzie & Lounsbery, 2014). Additionally, NBPA can help students realize some of the many benefits of learning outdoors: (1) developing outdoor-living skills, (2) risk and challenge, (3) gaining environmental knowledge, (4) personal growth and leadership skills, (5) sense of community, (6) building connections, (7) having fun in nature, and (8) lasting impacts (Purc-Stephenson et al., 2019).

Using their (Photo)voice: Student experiences with nature-based physical activities in and beyond Physical and Health Education is the final study of this dissertation. Two research questions were addressed: What were the experiences of adolescent students while learning NBPA in PHE? How did they relate these experiences within PHE with being active in nature outside of school? The manuscript based on this chapter will be prepared for submission to either the *Journal of Teaching in Physical Education* or *Educational Action Research*.

Participatory Action Research: Visual Methodology

Participatory action research emphasizes "research for change and the development of communities" (Tandon, 2005, p. 37). Participatory methods are those that facilitate participants in finding their own language to articulate what they know and help them put words to their ideas and share understandings of their worlds, thereby giving participants more control over the research process (Enright & O'Sullivan, 2012). Most often participatory methods are practical activities, which are considered engaging, enjoyable and relevant ways for students to engage in research and generate data (Enright & O'Sullivan, 2012). Participatory methodologies have been widely praised as facilitating the active participation of students in research. Facilitating students in "learning to derive meaning from themselves and the world around them" (Kincheloe, 2007, p. 745) and promoting enjoyment and relevance for students (Barker & Weller, 2003). In participatory-action research, the end goal is to involve participants during the entire research project (Wang, 1999). Within the field of PHE, several studies have previously explored how participatory-action research can support students having their voices heard about their experiences in PHE (Enright & O'Sullivan, 2010; Lamb et al., 2018; Oliver & Hamzeh, 2010; Oliver et al., 2009). One aim in this study was to work with students to disrupt the perceived boundaries of what is possible in PHE, imagine what is possible, and work towards what could be (Oliver et al., 2009).

Increasingly in the literature, we are seeing examples of participants producing their own visual representations as part of the participatory action research project. Participatory visual research is an area of research where there are contributions to be made in order to influence policy. The use of photography in Photovoice, participatory video, digital story-telling and drawing and mapping have all been shown to be effective in engaging community participants,

and especially in altering some of the typical power dynamics related to the researched/researcher, and to ensuring spaces for marginalized populations to both speak about and then speak back through interactive workshop sessions to social conditions. The products – photo exhibitions, video productions (live screenings and postings on YouTube) – are ideally suited to be seen (Mitchell et al., 2018). Student drawings have been used to access students' experiences and perceptions of PHE (Goodwin & Watkinson, 2000) and physical activity in their communities (Sharpe et al., 2004). Oliver et al. (2009) employed student photography as a tool to facilitate students identifying what prevented them from being active. Given my intention to collaboratively investigate students' experiences of NBPA, build a supportive community, and promote positive change for students in PHE, I selected the participatory visual research methodology, Photovoice, for this study.

Methods: Photovoice

Photovoice is a participatory action research methodology that was designed by Wang and Burris (1997) to shed light on various global public-health issues based on the assumption that people are the experts of their own lives. In Photovoice, participants use cameras to document their lived experiences and take a critical view of the world around them in an effort to advocate for social change in their own community at the grassroots level (Wang et al., 2004). Photovoice is an empowerment tool because it gives a voice to those who typically do not have a say in shaping policy, and it emphasizes both individual and community action (Wang, 1999). Photovoice has begun to be used in educational research and is valuable because it is an engaging tool for both teachers and students. Through the use of Photovoice, teachers can learn more about their students' experiences within PHE and their lives outside of school, and students

feel valued because their voice can be heard by their teachers, classmates and policy makers.

Photovoice puts cameras into the participants' hands to help them to document, reflect upon, and communicate issues of concern, while stimulating social change (Wang & Burris, 1997). With the intention to foster social change, Photovoice can enhance community engagement, increase awareness of community resources, and foster self-efficacy of the research partners (Israel et al., 2010). The premise is that visual images are powerful representations of individuals' experiences, sometimes in ways that language is not (Parker et al., 2016). Photovoice participants can and should be involved in all research phases, from planning through data gathering, analysis, and action. Photovoice participants are responsible for the inquiry's direction by: capturing photographs they consider central to their experiences, being given the chance to engage in sense-making with their peers, and being encouraged to be critical. Therefore, the reported effect of Photovoice studies is to empower participants to advocate for their own and their community's well-being (Rivard & Mitchell, 2013). Photovoice can support critical thinking, self-reflection, discovering strengths and social support (Halvorsrud et al., 2019).

Previous studies have outlined the value of Photovoice for students in PHE (e.g. Enright & O'Sullivan, 2012; Treadwell & Taylor, 2017), PHE in-service teachers (e.g. Parker et al., 2016), PHE pre-service teachers (e.g. Langdon et al., 2014; Walker et al., 2017), and PHE teacher educators (e.g. Parker et al., 2016). Some of the benefits reported by these studies include participant "honesty, learning, enjoyment, confidence, ownership, and empowerment" (Enright & O'Sullivan, 2012, p. 49); as well as authentic engagement, discussion, and reflection, and articulation of implicit views (Parker et al., 2016). The favourable experiences of participants in these and other Photovoice studies epitomize the myriad of reasons I felt Photovoice was the

participatory action research method best suited to my research questions. Sharing photographs gave the students something tangible to talk about, helped them get to know each other on a different level, and share experiences they might otherwise have struggled to put into words. Another reason I selected Photovoice is because others have noted that such studies can be fun (Enright & O'Sullivan, 2012), and enjoyment and meaning for my adolescent participants and their teachers was important to me. Additionally, as one benefit of being active in nature is engagement with all of the senses, using a visual means to capture the students' use of sight in nature was powerful.

Wang (2006, pp. 149-152) identified nine steps to implement a Photovoice study: Select and recruit a target audience of policy makers or community leaders; recruit a group of Photovoice participants; introduce participants to the Photovoice methodology and facilitate a discussion on cameras, power, and ethics; obtain informed consent; pose initial theme(s) for taking pictures; distribute cameras to participants and review how to use the camera; provide time for participants to take pictures; meet to discuss photographs and identify themes; and, plan with participants a format to share photographs and stories with policy makers or community leaders. Additionally, Treadwell and Taylor's (2017) methodology served as inspiration for this study. They also described their Photovoice study in a series of steps: Select a topic; take the photos; select and analyze the photos; create a needs assessment; and, advocate for change. The specific methods for this study are outlined below. They align both to Wang's (2006) and Treadwell and Taylor's (2017) steps.

Participants

Participants in this study included two PHE teachers and 34 students. The two teachers involved in this study are members of an ongoing schools-university partnership, a group of 25+

teachers representing six local school districts. A schools-university partnership has recently been defined as "an enterprise that is jointly created, developed and sustained in the midst of complex settings to advance educational practice, knowledge and understanding (Day et al., 2021b, p. 24). Schools-university partnerships offer a locally driven, collaborative approach to educational improvement and transformation, in which researchers and teachers pursue improvement goals they define together, drawing on the expertise of each partner (Coburn et al., 2021).

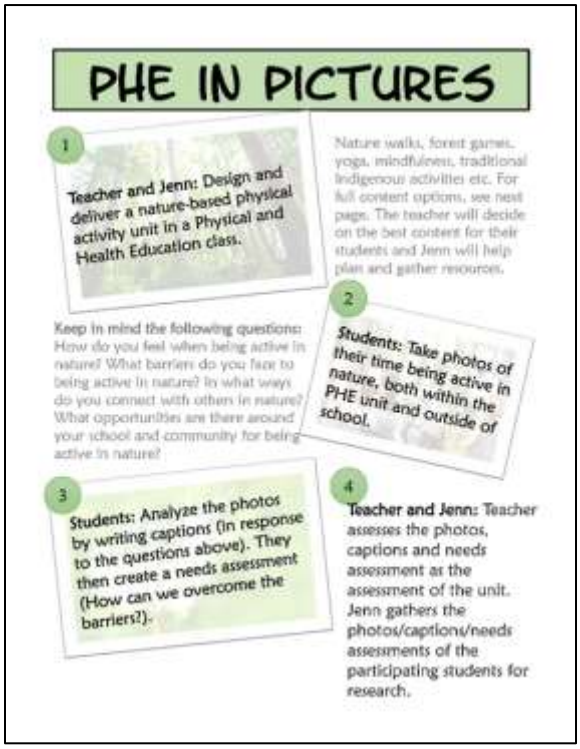
Although teaching PHE can be isolating (Richards et al., 2014), when multiple PHE educators within or across schools come together to create a collaborative environment focused on innovation, they are more likely to survive and thrive in schools (O'Sullivan, 2008). Particularly relevant to the PHE profession, relationships are central to enhancing perceptions of mattering while combating marginalization (Gaudreault et al., 2018; Lux & McCullick, 2011). Relationship building is an important component of any advocacy initiative that seeks to raise the status of PHE programs (Lux & McCullick, 2011). The two participating teachers in this study are members of the partnership who helped to design, implement and assess the Photovoice project with their PHE students.

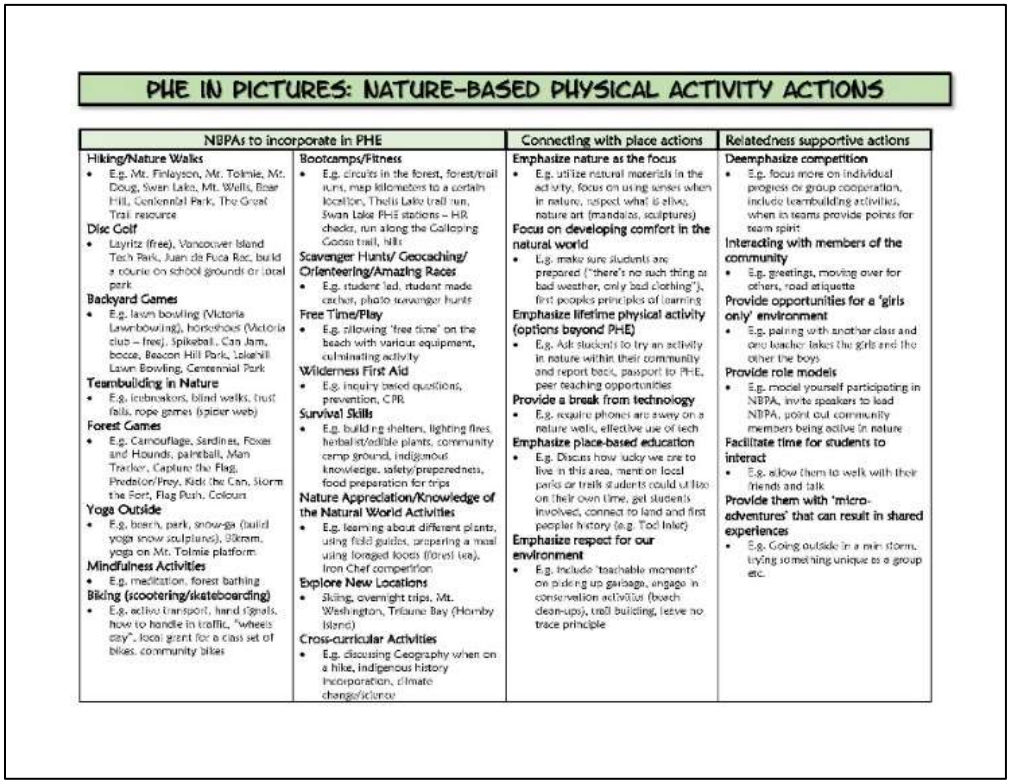
During our schools-university partnership's annual meeting, I briefly described the *NBPA in Pictures* unit to all of the teacher members. I invited all members of the partnership to participate in the project. Many teachers expressed interest in implementing the unit and two chose to participate in this particular study and emailed me their interest: Aria and Emma (pseudonyms). The sampling techniques for this study are a combination of convenience and purposeful (Creswell, 2013). Convenience in that the teacher participants were easily accessible to me, and purposeful in that the teachers were selected from the ongoing schools-university

partnership because they had been involved in previous NBPA research (e.g., Gruno & Gibbons, 2021) and have dedicated their teaching of PHE to focus on the meaningful inclusion of nature. I provided Aria and Emma with a framework (see Figure 8) and explained that the unit will be a collaboration between me, them, and the students. The content within the unit framework was informed from previous studies (Gruno & Gibbons, in review).

Figure 8

The NBPA in Pictures Unit Framework

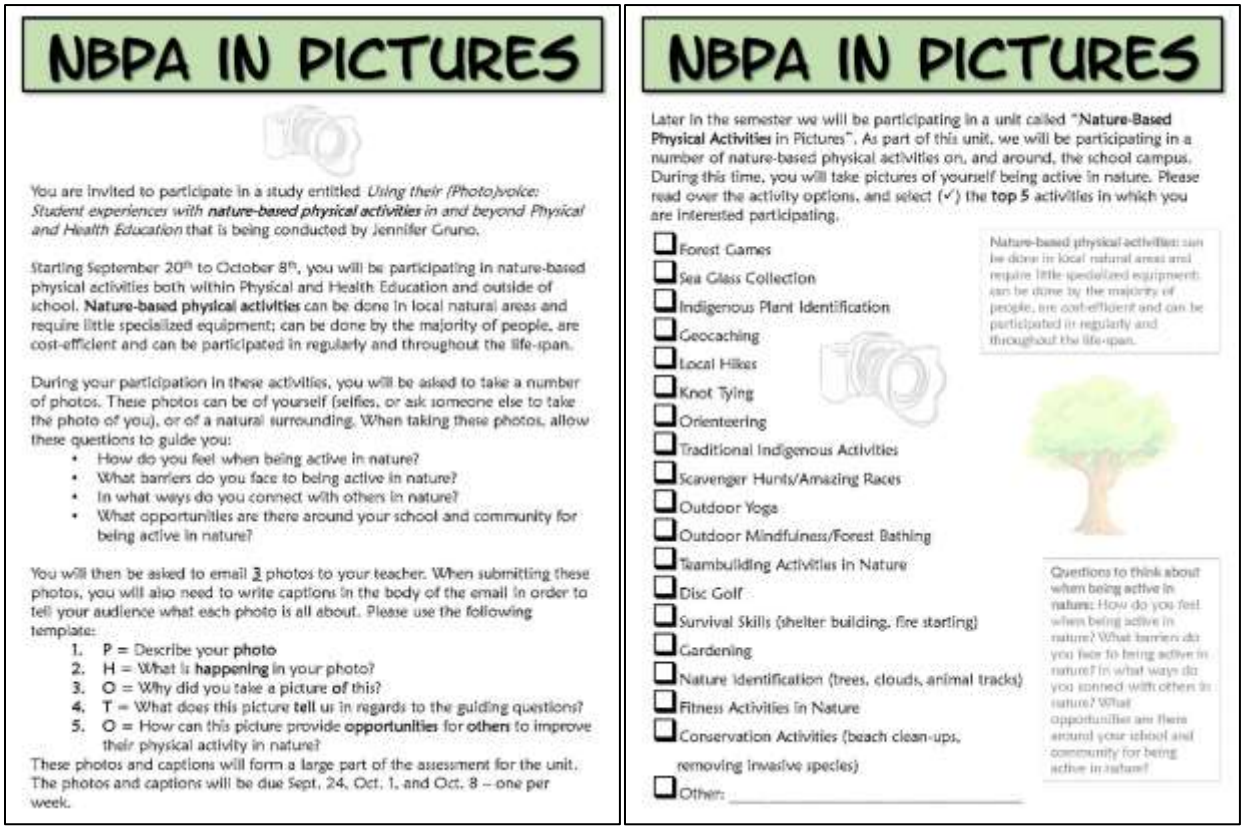




All students in one of Aria's grade 11/12 female identifying only PHE course and two of Emma's grade 10 all gender PHE courses participated in the *NBPA in Pictures* unit as each teacher provided the unit as a part of their overall PHE curriculum. However, I only collected data from the students who consented to be a part of the Photovoice study – 31 of Emma's students and 3 of Aria's students. Aria teaches in a very large public secondary school in a semi-rural area. Emma teaches at a small private school in an urban area. I used pseudonyms for all students and both teachers throughout the study to identify their contributions and to protect their identities. I, the researcher, the students, and the teachers, were all participants in this process; Aria, Emma and I occupied the role of adult allies (Enright & O'Sullivan, 2012), fostering the students' capacities to reflect on their time being active in nature both within and beyond their PHE class. All participants planned the unit together. See Figure 9 for information provided to students prior to the unit and the choice survey that provided the means of gathering student input in the design of the unit. The students collected and helped to analyze the data by taking photos and writing captions.

Figure 9

Unit Information for the Students and Choice Survey



NBPA IN PICTURES

You are invited to participate in a study entitled *Using their (Photo)voice: Student experiences with* ***nature-based physical activities*** *in and beyond Physical and Health Education* that is being conducted by Jennifer Gruno.

Starting September 20th to October 8th, you will be participating in nature-based physical activities both within Physical and Health Education and outside of school. **Nature-based physical activities** can be done in local natural areas and require little specialized equipment; can be done by the majority of people, are cost-efficient and can be participated in regularly and throughout the life-span.

During your participation in these activities, you will be asked to take a number of photos. These photos can be of yourself (selfies, or ask someone else to take the photo of you), or of a natural surrounding. When taking these photos, allow these questions to guide you:

- How do you feel when being active in nature?
- What barriers do you face to being active in nature?
- In what ways do you connect with others in nature?
- What opportunities are there around your school and community for being active in nature?

You will then be asked to email 3 photos to your teacher. When submitting these photos, you will also need to write captions in the body of the email in order to tell your audience what each photo is all about. Please use the following template:

1. P = Describe your **photo**
2. H = What is **happening** in your photo?
3. O = Why did you take a picture **of** this?
4. T = What does this picture **tell** us in regards to the guiding questions?
5. O = How can this picture provide **opportunities** for **others** to improve their physical activity in nature?

These photos and captions will form a large part of the assessment for the unit. The photos and captions will be due Sept. 24, Oct. 1, and Oct. 8 – one per week.

NBPA IN PICTURES

Later in the semester we will be participating in a unit called "**Nature-Based Physical Activities** in Pictures". As part of this unit, we will be participating in a number of nature-based physical activities on, and around, the school campus. During this time, you will take pictures of yourself being active in nature. Please read over the activity options, and select (✓) the **top 5** activities in which you are interested participating.

- ☐ Forest Games
- ☐ Sea Glass Collection
- ☐ Indigenous Plant Identification
- ☐ Geocaching
- ☐ Local Hikes
- ☐ Knot Tying
- ☐ Orienteering
- ☐ Traditional Indigenous Activities
- ☐ Scavenger Hunts/Amazing Races
- ☐ Outdoor Yoga
- ☐ Outdoor Mindfulness/Forest Bathing
- ☐ Teambuilding Activities in Nature
- ☐ Disc Golf
- ☐ Survival Skills (shelter building, fire starting)
- ☐ Gardening
- ☐ Nature Identification (trees, clouds, animal tracks)
- ☐ Fitness Activities in Nature
- ☐ Conservation Activities (beach clean-ups, removing invasive species)
- ☐ Other: _____

Nature-based physical activities can be done in local natural areas and require little specialized equipment; can be done by the majority of people, are cost-efficient and can be participated in regularly and throughout the life-span.

Questions to think about when being active in nature: How do you feel when being active in nature? What barriers do you face to being active in nature? In what ways do you connect with others in nature? What opportunities are there around your school and community for being active in nature?

Data Collection and Analysis: The NBPA in Pictures Unit

The data collection steps in this study closely mirror the first three steps outlined by Treadwell and Taylor's (2017) study that explored PHE students' physical activity in the community; they also relate to Wang's (2006) steps 3-8.

Step 1: Select a Topic. As this study explored learning and teaching NBPA, the specific focus of this chapter was on the students' experiences with NBPA both within PHE class and outside of class time. Weeks before the unit took place, each teacher described the *NBPA in Pictures* unit to the students and gathered their input in designing the unit by asking them to rank the top NBPAs they wanted to learn (Figure 8). Aria's students selected local hikes, outdoor

mindfulness/forest bathing, geocaching, outdoor yoga, forest games, knot tying, survival skills and gardening as their top activities. Emma's students chose local hikes, survival skills, geocaching and forest games as the NBPAs they were most interested in learning.

Aria and Emma both approached the unit differently. Aria, who teaches at a large public school of approximately 1700 students, had a number of vulnerable youth in her all female identifying PHE 10 class. She created a three-week unit, based on the students' interests that centred on NBPAs on or close to school grounds (Figure 10).

Figure 10

Aria's NBPA in Pictures Unit Plan

Monday, September 20th: *Walk in the forest and work out*	Tuesday, September 21st: *Yoga outside*	Wednesday, September 22nd: *Yoga presentations outside*	Thursday, September 23rd: *Gardening – planting daffodils*	Friday, September 24th: *Forest game and forest bathing*
Monday, September 27th: *Scavenger hunt*	Tuesday, September 28th: *Survival skills – knots and fire starting*	Wednesday, September 22nd: *Survival skills – Shelter building*	Thursday, September 23rd NO SCHOOL	Friday, September 24th: *Forest walk and forest bathing*
Monday, September 20th: *Geocaching*	Tuesday, September 21st: *Final yoga session*	Wednesday, September 22nd: Flex day	Thursday, September 23rd: *Nature Bingo*	Friday, September 24th: *Hiking field trip*

Emma, on the other hand, teaches at an independent school of approximately 400 students. She chose to run a two-week unit (Figure 11), with a mixture of on and off campus activities. Since her school has a fulltime bus driver, she was able to explore local natural areas as part of her unit.

Figure 11

Emma's NBPA in Pictures Unit Plan

Monday, Sept. 27th NO SCHOOL	Tuesday, Sept. 28th: *Hike base trails of local mountain*	Wednesday, Sept. 29th: *Geocaching on school campus*	Thursday, Sept. 30th NO SCHOOL	Friday, Oct. 1st: *Lawn games and shelter building at local beach*
Monday, Oct. 4th: *Hike technical & steep routes of local mountain*	Tuesday, Oct. 5th: *Capture the Flag at local lake*	Wednesday, Oct. 6th: *Orienteering on school campus*	Thursday, Oct. 7th: *Geocaching on local mountain*	Friday, Oct. 8th: *Forest games in park adjacent to school grounds*

As Treadwell and Taylor (2017) outlined, the topic of a Photovoice project should center on an issue that impacts the class, the school community, or society. Nature-based physical activity, as described previously, impacts both the class level through a possible PHE pedagogy reform, and the community/society level, as evidenced in this study, students can identify ways to be active in nature as well as environmental issues in their communities. Each teacher made it clear that their students should not alter anything about how they lived their lives for the duration of the unit, as the photos needed to tell the 'real story.' As honesty is of utmost importance for accuracy, the teachers and I were careful to foster a positive and judgment-free learning environment.

Step 2: Taking the Photos. All of the secondary school student participants owned a cell phone with camera capabilities. Therefore, they used their phones to document their experiences with NBPA both within class and outside of school for duration of the unit. Moreover, both teachers went over social responsibility as it related to digital photography prior to starting the *NBPA in Pictures* lessons. All photos were taken within the PHE lessons or outside of the school day so as to not disrupt the learning environment of the school.

Students were provided with questions at the beginning of the unit that guided their photo taking (Figure 9):

1. How do you feel when being active in nature?
2. What barriers do you face to being active in nature?
3. In what ways do you connect with others in nature?
4. What opportunities are there around your school and community for being active in nature?

Step 3: Selecting and Analyzing the Photos. The teachers each instructed students to take a number of photographs over the course of the unit, both within the PHE lessons themselves and outside of school time. Each photograph had to respond to one of the guiding questions. Students then had to select a number of their favourites. Students in Aria's class had to submit at least one photograph per week whereas students in Emma's class had to submit at least three photos at the end of their two-week unit. Alongside each photo, students had to analyze the photo by writing a caption. For this portion of the analysis, students were asked to use an adapted version of Amos, Read, Cobb, and Pabani's (2012), PHOTO, an acronym for a series of questions that the students answered as they wrote their captions:

1. P = Describe your **photo**
2. H = What is **happening** in your photo?
3. O = Why did you take a picture **of** this?
4. T = What does this picture **tell** us in regards to the guiding questions?
5. O = How can this picture provide opportunities for **others** to improve their physical activity in nature?

The teachers encouraged the students to think about each photo on a deeper level with each answered question. The teachers made it clear to students that honesty was important and they were assessing the students' captions based on the thoughtfulness and depth of responses to PHOTO, not on their positive, neutral or negative responses to NBPA. This instructional process not only engaged the students in the content of the lessons, but also enabled students to look critically at the world around them.

The data used in this study included observational notes taken by me during the meetings with the teachers and students, the teachers' preparation materials, the photographs taken by the adolescent students as well as the captions they wrote. The thematic analysis was conducted as proposed by Braun and Clarke (2006). The themes were identified using an inductive approach to thematic analysis in which themes emerged from the data rather than trying to accommodate themes to a framework (Braun & Clarke, 2006). To identify the meaning of patterns, the five phases proposed by Braun and Clarke were followed: (a) familiarizing with data, (b) generating initial codes, (c) searching themes, (d) reviewing themes and (e) defining and naming themes. I re-read the notes and the participants' captions several times to identify patterns. To create initial codes, a table was created that summarized every photo and caption (see Table 3) and this is presented in Table 3 also as a way to honour all of the students' contributions since I could only include a limited number in the discussion. An additional column was then added and then dedicated to identifying and summarizing the most basic meaning of the data (Braun & Clarke, 2006). Subsequently, these initial codes were analysed in order to identify main themes and sub-themes. Finally, themes were refined and names were created that captured the essence of the identified themes (Braun & Clarke, 2006). No software package was used for the data analysis as it was conducted manually as suggested by Braun and Clarke (2006). Credibility was increased

by prolonged engagement with the participants, both with the researcher present at the two school sites as well as the prolonged student engagement in the NBPA units. Additionally, data triangulation was used. Although the study relied heavily on the photos and captions, my observational notes at the meetings as well as on the school sites and the teachers' preparation materials added further credibility to the study.

Table 3

Summary of Participants' Photos and Captions

Student (and Teacher)	**Summary of Photos (Taken During PHE or Outside of Class)**	**Key Quotations**
Parker (Emma)	• Self and friend working on building a beach shelter (during class) • Self from behind standing on a rock overlooking scenery (during class) • Self-climbing up a steep hill using hands as balance (during class)	• "This picture helps others, as its premise is that we are strong together." • "I took the picture because it reminded me of the romantic painting "Wanderer above the sea of fog" by Caspar David Friedrich from 1818, but without the fog. Besides, the view was stunning." • "This picture can help others because they could also try climbing on not so steep and high places where it is safe"
Surinder (Emma)	• A small stream running through a valley in a forest (during class) • Self and a group of friends in front on a tree while geocaching (during class) • A fort made out of driftwood, supported by a large stump (during class)	• "These pictures show that there is a distinct connection to nature when the activity is directly related to the environment, not just a game outdoors." • "These pictures show that Nature-Based Physical Activity is not solely centred around the environment and that there still can be a competitive aspect and a game aspect to the activity" • "This activity was a team-building activity and required a collective effort to lift and assemble the fort."
Leah (Aria)	• Self in yoga pose on school grounds (during class) • Self in beach wood structure on beach (during class) • With family walking forest trails (outside of class)	• "We just walked and admired the woods." • "The sun was like a warm jacket and helped me be calm and mindful." • "This picture shows how much I enjoy sitting in the sun looking out onto the water."
Katie (Emma)	• A small yellow orienteering tag attached to a metal fence post (during class) • A view of tall grasses, a distant lake, and blue sky with puffy white clouds (during class) • A large willow tree with a small playground underneath (during class)	• "It was lots of fun, however they were hard to find at first because of size." • "The view was beautiful and it was nice to go out for a walk without the stress of being in a classroom and doing homework."

		• "It was really fun even though I slipped a couple times."
Jade (Emma)	• A weeping willow by a lake (during class) • A large, tall grassy field with a lake in the background, and blue sky with puffy white clouds (during class) • The view from the top of a large rocky hill, with blue sky and the houses below in the background (during class)	• "I think the pictures can help influence them to do more outdoor activities" • "I hope these pictures help • influence people to go out and enjoy the view" • "We mostly just spent the time enjoying the view, the weather and the view were really beautiful"
Nicole (Emma)	• A large willow tree surrounded with mud, with a small pond beneath it (during class) • A large group of students scattered around a grassy field by a lake (during class) • Yellow orienteering symbols taped onto a goalpost (during class)	• "This was a walk that calmed my mind yet kept my body active" • "I also wanted to show the dynamic of some of my classmates to show how they get along well and had fun outside. These photos can improve future activities in nature by inspiring teachers and students to go outside for physical activity by seeing how fun and effective it can be" • "This was a fun activity as we got to move around while increasing awareness of our surroundings while we looked for the papers"
Remi (Emma)	• A long bridge over a lake; people are seen ahead (during class) • The view overlooking a dry, brown forest from the top of a rocky hill (during class) • Self from behind walking through a grass field with a willow tree in the background (during class)	• "At swan lake on a huge bridge was very fun, and I loved walking on it with my peers" • "The breeze was amazing at the top of the hill." • "Walking with my friends and enjoying the beautiful nature at [the local lake] was so heartwarming."
Henry (Emma)	• A group of students working together to carry a large log on the beach (during class) • Self, turned to the side, smiling, surrounded by thick tree branches and leaves (during class) • A group of students are walking down an open trail lined with bushes (during class)	• "I took a photo of this because it really showcases the communication and teamwork that it would take to carry a log that heavy." • "If you enjoy it, you will go for more, and eventually, going outside will become a daily part of your life, just like how it did to mine. • "Small activities in nature such as walks can help us improve our physical activity in nature because they don't take up too much time and can eventually build up good habits"
Liam (Emma)	• A group of students working on a driftwood structure on the beach (during class) • A tall grass field with a trail running through it (during class) • The view from the top of a rocky hill, with blue sky and the houses/trees below in the background (during class)	• "This photo promotes cooperative activities in nature and shows that if you work together, you can achieve more" • "This photo gives an opportunity to go for a walk and you will find places that are so open and peaceful" • This can provide an opportunity for people to go on hikes because the view from the top is always great"

Elliot (Emma)	• The thick, lush forest around [a local lake] (outside of class) • The view of the ocean between branches, with the forest below (during class) • A group of students standing at the top of a large rocky hill, with blue sky and the houses below in the background (during class)	• "Always love and acknowledge the beauty in nature" • "This photo could inspire people to go out and have a nice time in nature." • "This photo tells me that getting outside with friends and taking photos is very fun, and to never underestimate the fun in nature"
Cora (Emma)	• An a-frame shelter made out of driftwood on a beach (during class) • A group of hikers from behind on a wide dirt trail in a lush green forest (during class) • A large Garry Oak tree surrounded by a field of tall grass, with blue sky and puffy white clouds (during class)	• "Try making a little shelter to have shade and a view of the water." • "These pictures could motivate people to see the view of Mount Doug or experience hiking up a mountain." • "I got stung by a wasp it wasn't nice but that's nature for you."
Stella (Emma)	• Tall cedar trees as viewed from below, looking up (during class) • Self and two friends smiling and giving a thumbs up, surrounded by rain and wet trees (during class) • The view from the top of a rocky hill, showing a lush green forest and farmlands below (during class)	• "Being active in nature can be beautiful" • "Even though it was rainy and muddy, we still managed to have fun" • "Nature based activity can be very rewarding"
Sebastian (Emma)	• A large, tall grass field dotted with trees (during class) • The view of the Pacific Ocean with mountains in the distance, with trees and branches in the foreground (during class) • The view overlooking a dry, brown forest from the top of a rocky hill (during class)	• "Opens people's mind to the beauty of nature" • "Sometimes the view is worth the climb" • "I was feeling calm"
Gemma (Aria)	• Self and her sister smiling and leaning up against a bridge railing in a forest (outside of class). • 10 large elk in a grass field surrounded by a wire and wood fence, from the view of a windshield (Outside of class). • The ocean, showing the horizon line with blue sky, and the last few pebbles of the beach before the waves (Outside of class).	• "We were outside getting fresh air and working really hard and having fun" • "Me and my dad were outside all day shooting and just having fun" • "Go outside on a hike with friends and have fun"
Sarat (Emma)	• A large fort on a beach, made of driftwood and supported by a thick stump (during class) • The view overlooking a dry, brown forest from the top of a rocky hill (during class) • Two large willow trees with a playground on the right, and a lake in the background (during class)	• "My group succeeded in all of our obstacles and made a strong fort. I felt proud and accomplished" • "At the top the view was spectacular and it made the whole experience a lot more memorable." • "I was trying to relax and make sure to not take these opportunities for granted."
Elsa (Emma)	• A group of students on a trail surrounded by tall trees with sunlight peeking through the gaps (during class) • A group of students building a fort out of driftwood on the beach (during class)	• "I felt grateful to have access to nature around me" • "With the help of dedication, teamwork, and fresh air, any task is possible if the right mindset is applied"

	• The view from the top of a rocky hill, showing a lush green forest and farmlands below (during class)	• "This photo demonstrates the importance of nature in our world and how many people rely on it as a 'safe space' to clear their thoughts."
Santo (Emma)	• Tall trees as viewed from below, looking up, with blue sky peeking through the canopy of leaves (during class) • The view from the top of a rocky hill, showing the rows of houses and trees below (during class) • A group of students walking down a residential street, with trees and blue sky with clouds in the background (during class)	• "Nature can be a very bright and happy place at the right time" • "Hard work always pays off, whether it's a school project or a hike up a mountain" • "Being active in nature can just be a calm and slow walk around a lake"
Emily (Emma)	• A group of students hiking along a trail, surrounded by leafy trees and branches (during class) • A student crouched down on the beach beside a small structure made of sticks (during class) • A group of students by a lake surrounded by large willow trees (during class)	• "It is always better in a group- more fun" • "We are feeling accomplished with our finished structures" • "Physical education doesn't have to be in an ugly gym"
Lauro (Emma)	• A group of students hiking along a trail (during class) • Self and two friends outside in the rain (during class) • The legs of two students sitting and enjoying the scenery on the rocky and grassy summit of a hill (during class)	• "I took these pictures to remember how peaceful and adventurous being outside can be for everyone" • "Anything can be achieved through teamwork and communication" • "I took this picture to appreciate the community we live in"
Eoin (Emma)	• The view from the top of a rocky hill, showing the rows of houses and brown trees below (during class) • A leafy tree trunk submerged in mud, with a small pond below it (during class) • The ocean through a space between two trees, with forest below (during class)	• "My friends are running down the hill" • "The spot where the tree is has a very different environmental tone from the rest of the lake" • "Two trees branching over each other looked like a photo frame"
Jack (Emma)	• A weeping willow by a lake, with a picnic table in front (during class) • A group of students working on a log structure on the beach (during class) • The view from the top of a large rocky hill, with blue sky and the houses below in the background (during class)	• "Nature can make you feel calm and peaceful" • "In this photo we were building shelters at [a local] beach, I felt challenged" • "I felt really good after reaching the top"
Grace (Emma)	• A group of three students holding up a small geocache in the pouring rain (during class) • A well-constructed fort made of driftwood on the beach (during class) • A group of students standing at the top of a large rocky hill, with blue sky in the background (during class)	• "No matter the weather conditions, outdoor education is fun" • "This picture can hopefully show people that outdoor education doesn't have to be just running outside on trails." • "Being active in nature is rewarding! I got rewarded with a nice view."
Aubrey (Emma)	• A willow tree in front of a lake, surrounded by green grass and a wide trail (during class)	• "There are tons of ways to be active outside like capture the flag"

	• A small yellow orienteering marker on the bottom of a fence (during class) • Self and two friends holding up a small geocache on a rainy day (during class)	• "You can learn new things while also being active" • "This would hopefully help someone be active in nature because it is as easy as getting an app and going outside on an adventure"
Surjeet (Emma)	• A student walking near a log structure on the beach, with the ocean in the background (during class) • Self from behind, waiting at a crosswalk during a geocaching session (during class) • A group of students hiking along a trail, surrounded by leafy trees and branches (during class)	• "There are great ways to interact with nature" • "It is possible to incorporate modern technology with nature based physical activities" • "There are different levels of difficulty for nature based physical activity, so there is always something for everyone"
Owen (Emma)	• The view of the ocean from the top of a mountain, looking down onto the forest below (during class) • A tall grass field with tall and bushy trees and blue sky (during class) • A small, yellow orienteering marker taped to the bottom of a brick wall (during class)	• "The hiking can be tiring but the reward is the amazing view" • "This picture can encourage people to take a walk along the Swan Lake trail. Great stress reliever" • "People can test out their physical awareness by locating the symbols"
Zara (Emma)	• A student running across a pathway, with a playground in the background (during class) • Two students walking down a path surrounded by low-hanging trees (shot from behind) (during class) • Two students looking out towards the ocean and rows of houses at the top of a hill (during class)	• "There are places outside where you can play fun games like capture the flag, this makes it that much easier for people to spend time outside" • "Many will love to spend their time doing physical activities outside because of how pretty the surroundings are" • "Some people might like a large view, and this motivates them to hike up the hill to get one"
Kylie (Emma)	• Self and two friends standing in a forest while geocaching (during class) • A structure made of driftwood on the beach (during class) • Two weeping willows by a lake, with a path running in front. The sky is gray and cold outside. (during class)	• "This picture captures us participating in a global activity found in nature, and may encourage others to do the same" • "This photo displays the resources in nature and how we can use them sustainably, to be active" • "This photo may provide opportunity by showing that nature based physical activity is still fun in non-ideal environments."
Dorothy (Emma)	• A student standing in front of a tree in a forest (during class) • An orienteering map with locations marked (during class) • The view of a lake from a fenced platform (during class)	• "We were following the path and it was really peaceful and calming" • "It was really fun but some of the cards were hard to find" • "It was really beautiful, and I enjoyed the view"
Khloe (Emma)	• Self from behind, walking along a wooden bridge on a trail (during class) • The beach during low tide (outside of class) • A large tree with leaves falling, overhanging a rocky beach (outside of class)	• "It tells us that physical activity is a nice idea even when it's raining" • "It can inspire people to walk or jog along the beach" • "There could be some places close to your house where you can do some physical activities"

Kalvin (Emma)	• Yellow symbol on a piece of log wood. Beside it, is a metal pole on a block of cement (during class) • A thicket of trees and grasses, taken from a behind a fence (during class) • The view from the top of a rocky hill, with blue sky and the houses/trees below in the background (during class)	• "This can provide opportunities for others to improve their physical activity in nature by being cooperative with your team by helping them" • "This can provide opportunities for others to improve their physical activity in nature by taking this walk slowly and pay attention to your surroundings" • "When I first got up to the top of [the mountain behind the school] after a decent hike, it felt so nice because the view was just so relaxing to look at"
Eloise (Emma)	• Sunlight coming through the trees on a path (outside of class) • A structure made of logs on the beach (during class) • Students conversing under a willow tree next to a lake (during class)	• "This particular walk was a relaxing part of my day, as I enjoyed breathing in the fresh air of nature" • "This activity demonstrated one of the barriers to being active in nature, because you cannot always achieve what you are hoping for" • "This photo shows how people can connect with each other in nature because we can see students having a conversation together"
Lily (Emma)	• Sunlight peeking through the canopy of leaves (during class) • A boardwalk through a marshy forest (during class) • A dry, grassy hillside near the summit of [a local mountain] (during class)	• "Overall, I enjoyed myself and being outside" • "It was a peaceful walk and very enjoyable" • "I really enjoyed getting outside in the middle of my day"
Bella (Aria)	• Self and a friend biking in the pouring rain (outside of class) • Looking down at attempts to start a fire with tinder, fluff, and strikers (during class) • A dog getting handed a treat (during class)	• "I felt really nice tbh [to be honest], it was like free therapy" • "I learned a life skill that could potentially help me one day" • "Maybe it will motivate them to go out and do a scavenger hunt cuz they are fun and low effort"
Katryna (Emma)	• Self and two friends holding up a small geocache in the pouring rain (during class) • A well-constructed structure made of driftwood on the beach (during class) • Students at top of a rocky hill, with blue sky and the houses/trees below in the background (during class)	• "This activity put me in good spirits throughout the day as I felt energised" • "We worked together in a large group to a common goal" • "After a day in a classroom this activity really woke me up and put me in good spirits for the rest of the day"

Findings and Discussion

Throughout the data collection and analysis, the teachers and I learned a great deal about the students' experiences with, and perceptions of, NBPA both within their PHE lessons and outside of school. These findings revealed the interplay between different domains of the

adolescents' lives. The students uncovered important insights about their participation in physical activity outdoors. Five salient themes emerged, with subthemes, and are discussed in detail below. Representative student photos and captions are included within each theme.

Theme 1 - "Physical education doesn't have to be in an ugly gym": Connecting with Place

Many of the participants spoke of the *NBPA in Pictures* unit, and involvement in NBPA more generally, as a conduit for connecting to place. The NBPA unit had students interacting with their local environment and the act of taking photos further engaged their senses. Learning to be comfortable with nature is consistent with Potter and Henderson (2004), who stated that "what needs to be unlearned is a fear of and detachment from nature" (p. 75). As society loses linguistic and cultural diversity, we lose diversity in seeing, thinking, doing, and being; we further weaken our experience of place (Davis, 2009). Current relative uniformity of curriculum and pedagogy reflects this cultural homogenization (Davis, 2009). Furthermore, the shift in focus and superimposed hierarchy of knowledge, from learning through direct experience and observation to learning theoretical knowledge has contributed to the uprooting of education's connection to our environments.

Surinder, one of Emma's students, writes in their caption to Figure 12, "[This photo shows] that there is a distinct connection to nature when the activity is directly related to the environment, not just a game outdoors". Previous research (Gruno & Gibbons, in review) has advocated that NBPAs, in order to be a part of place- or land-based education, are not activities "designed for the gym and simply moved outside."

Figure 12

Surinder's photo of "A small clearing within the vegetation of the forest"

Another student, Parker felt that participating in NBPA not only connected them further to place, but also to art as well: "I took the picture because it reminded me of the romantic painting 'Wanderer Above the Sea of Fog' by Caspar David Friedrich from 1818, but without the fog. Besides, the view was stunning" (Figure 13).

Figure 13

Parker's photo of "me, standing on a rock and a wonderful scenery in the background"

At times, the students insightfully selected nuanced elements of their environment to highlight in their photographs. Eoin wrote in his caption for Figure 14, "I took this picture because the spot where the tree is has a very different environmental tone from the rest of the lake." Similarly, Eloise, in Figure 15, noticed "Flowers sprouting through the first signs of fall. I took a picture of these flowers because the pop of colour caught my attention."

Figure 14

Eoin's "Portrait shot underneath a tree" at a local lake

Figure 15

Eloise's photo of "these flowers are helpful reminders… of how pretty nature really is"

Place- and Land-Based Pedagogy. The *NBPA in Pictures* unit, in some circumstances, acted as an introduction to both place- and land-based learning for students thereby helping them to form connections to place. As part of her unit, Amy asked local Indigenous Elder to translate traditional plants into the local Kwak'wala Indigenous language for use on an Indigenous plant Bingo card. The local words were then learned and used by students within the authentic context of being in the forest. Because Indigenous language is intricately connected to the land (Ormiston, 2014), it is important that the languages are taught where they were traditionally used and generated (Moore, 2003). Land-based learning moves beyond the limited western perspective offered by place-based learning by centring Indigeneity and honouring the relationships that Indigenous peoples have with the land (Styres et al., 2013). As such,

Indigenous-centred land-based learning is a means to promote decolonizing goals through the expressions of active and historical Indigenous resistance to colonial systems (Calderon, 2014; Friedel, 2011). There is a widespread belief that land-based learning must entail being in wilderness. However, important to the context of this study and NBPA in general, land-based learning can occur in both urban and rural spaces because all land on Turtle Island is Indigenous land (Styres et al., 2013; Tuck et al., 2014).

In Lowan-Trudeau's (2014) exploration of the question of how Indigenous ecological perspectives might reshape outdoor learning in Canada, he concludes that "it is already beginning" (p. 361). Later, Lowan-Trudeau (2019) claims that educators "often experience formidable internal and external challenges" (p. 62) when incorporating Indigenous content into their courses. Lowan-Trudeau contends that an "inadequate level of pre-service, curricular, resource, and research support" (p. 62) for teachers contributes to some teachers' reticence to include Indigenous content in their courses. One hope from this study is that *NBPA in Pictures* can provide inspiration for incorporating elements of Indigenous land-based pedagogy.

Theme 2 - "It is always better in a group - more fun": Connecting with Others

Nature connectedness, as discussed in the previous theme, is "a predisposition to take an interest in learning about the environment, feeling concern for it, and acting to conserve it, on the basis of formative experiences [in nature]" (Chawla & Derr, 2012, p. 19). Nature connectedness is a strong predictor for both visit frequency to local green spaces and meeting physical activity guidelines in adults (Flowers et al., 2016).

Relatedness. Many students wrote of how their participation in NBPA, both within PHE lessons and outside of class, created a sense of relatedness. Relatedness is the perception of belonging and feeling connected both to classmates and to educators (Ryan & Deci, 2000).

Relatedness and nature connectedness are similar, as a strong connection to others as well as to the natural world can both result in a number of benefits for young people (Zelenski & Nisbet, 2014). Several studies have shown that engagement with the natural world may not only increase nature connectedness, but also relatedness to others, including prosocial behaviours such as empathy and generosity (Cervinka et al., 2012; Zhang et al., 2014). Nicole in her caption to Figure 16 wrote, "I wanted to show how many people participated in these outdoor activities. I also wanted to show the dynamic of some of my classmates to show how they get along well and had fun outside." Previous research highlights the importance of relatedness in PHE (Gruno & Gibbons, 2020; 2021).

Figure 16

Nicole's photo of "a bunch of my classmates scattered around the field" at a lake

Teambuilding. As part of her *NBPA in Pictures* unit, Emma incorporated teambuilding activities such as shelter building on the beach. Many of her students commented how these types of activities made them feel connected to place as well as their classmates. For example, Lauro wrote in one of their captions, “Anything can be achieved through teamwork and communication.” Similarly, Liam’s caption for Figure 17 read, “This photo promotes cooperative activities in nature and shows that if you work together, you can achieve more.” Teambuilding challenges, when implemented systematically and purposefully in PHE, have been shown to increase perceived social approval (Gibbons et al., 2018), and learning outdoors, more broadly, has been linked to increasing social cohesion (Gray & Pigott, 2018; Mygind, 2009; Prince, 2020; Scott et al., 2011; Sjöblom & Svens, 2019).

Figure 17

Liam’s photo of “myself and a couple others…building a structure out of washed-up beach wood”

This theme supports previous research in that NBPA, or outdoor learning, has been proven to foster communication, reasoning, and interactional abilities (Breunig et al., 2015), while also enhancing 21st century skills such as resilience (Booth & Neill, 2017; Hayhurst et al.,

2015), collaboration (Fägerstam, 2014), conflict resolution and self-regulation (Gray, 2019; Mirrahmi et al., 2011; Sibthorp et al., 2015). Relationships themselves are a common focal point of land-based learning (Bowra et al., 2021). Additionally, Purc-Stephenson et al. (2019) found that *sense of community* was one key learning outcome of outdoor education programs. Their reviewed studies described how learners fostered emotional bonds, improved communication with their peers, and how learning outdoors taught them how to work collectively to complete tasks. Educators guided this process using group exercises and physical challenges, similar to Emma's shelter building activity that fostered students working together. Purc-Stephenson et al. (2019) described that when learning outdoors, friendships develop as learners share stories and give input as they work together. When displaced in the outdoors together, learners develop interdependent relationships with each other, often providing emotional and tangible support.

Fun with Friends. Another thread that stood out within this theme is how much fun students had being active outside with their friends. Elliot wrote in his caption to Figure 18, "This photo tells me that getting outside with friends and taking photos is very fun, and to never underestimate the fun in nature." Similarly, Gemma wrote describing her photos capturing her, her sister and her boyfriend hiking to a local beach outside of class time: "we were outside getting fresh air and working really hard and having fun!"

Figure 18

Elliot's photo of "my peers standing on a rock" on the top of a local mountain and the "dark contrast with the bright clouds looks cool!"

This idea of having fun with peers reflects previous research that highlights environments that students value throughout their PHE experiences; ones in which they feel supported socially, so can relax, have fun and become enthusiastic about the activities without the fear of ridicule (Gruno & Gibbons, 2016). Similar to Purc-Stephenson et al.'s (2019) findings, participants in this study appeared to enjoy the more unstructured format of some of the NBPA experiences, which allowed them the freedom to explore and engage with their surroundings and with others. These types of activities are often not interpreted as "learning" because they are physically engaging, and novel (Purc-Stephenson et al., 2019). The fact that many students reflected having fun while taking pictures of being active with their friends outdoors, supports the choice of Photovoice as the methodology for this study. Fun or enjoyment is often underrated in research, and the success of the method can hinge on the ability to engage students with the process (Enright & O'Sullivan, 2012). Additionally, when looking at NBPA as a form of PHE reform, a unit like NBPA can be seen as a novel activity situated within a supportive environment, and therefore, can act as a catalyst for change in PHE curriculum (Timken & McNamee, 2012).

Theme 3 - "I got stung by a wasp, it wasn't nice but that's nature for you": Overcoming Challenges to Being Active in Nature

In their captions, some of the students commented on overcoming the challenges encountered when being active in nature.

Weather. Eloise, wrote in her post-unit reflection that "Sometimes the weather acts as a barrier to me exercising outside. I have planned to go on a walk before, but it was raining too much." Similarly, Katryna wrote in a caption for one of her photos taken during a field trip to a local lake, "one barrier is the absolute cold; we were not prepared for the extreme weather." Stella wrote of one her experiences in *NBPA in Pictures* during a geocaching lesson in her caption to Figure 19: "even though it was rainy and muddy, we still managed to have fun."

Figure 19

Stella's photo of "of one of the geocaches we found near" the park

Blenkinsop et al. (2016) provided tips to mainstream educators interested in becoming more outdoor, place-based, and experiential in their own teaching practices. They advised that effective teachers in the outdoors need to be able to create a shape and rhythm for learning that works with the needs of the students, maximises the affordances of the place where the class is being conducted and is flexible enough to respond to unknown variables such as weather. Many educators have experienced the disengagement caused by wet, cold students and teachers in previous studies and have noted that students often come to school unsuitably dressed for the weather, making it problematic to take them outside for learning (Oberle et al., 2021). It is important to identify weather as a potential barrier to NBPA as once barriers are identified,

strategies for removing barriers can be developed; once support factors are identified, they can be further enhanced, solidified and systematically incorporated into class planning (Oberle et al., 2021). One such support may be resources to address the lack of appropriate outdoor gear among students such as a clothes lending library (Oberle et al., 2021). Students in Scandinavian schools spend approximately three hours each school day outside – rain, hail, snow or shine – in all four seasons. Despite a climate that would seem to discourage outdoor learning activities (Gray, 2019). Scandinavian educators believe that "there is no such thing as bad weather, only bad clothing" (p. 69).

Building Resiliency. Other students in the *NBPA in Pictures* unit wrote of overcoming physical challenges during some of their nature excursions. Santo wrote in his caption of Figure 20 of the success he felt by pushing his limits to reach the summit: "hard work always pays off, whether it's a school project or a hike up a mountain." Purc-Stephenson et al. (2019) found that this idea of overcoming physical challenges, was deemed necessary to help learners explore their environment in new or novel ways, learn to be comfortable in nature, and understand the capabilities of their bodies. Researchers have repeatedly argued that exposure to challenge activities in nature can enhance participants' psychological resilience (Gray & Martin, 2012; Gray & Pigott, 2018). By employing NBPA as a teaching strategy, elements of risk taking, problem solving and inner-mastery emerge as by-products of engaging with natural environments.

Figure 20

Santo's photo of "a stunning view from the summit"

The Accessibility of NBPA. Teachers in previous studies have identified lack of funding, transportation, and accessibility as barriers to implementing NBPAs in their classes (Gruno & Gibbons, 2021; Hall et al., 2020). In Bentsen et al.'s (2010) study on the use of Udeskole (curriculum-based outdoor learning in Scandinavian schools for seven- to 16-year-olds), the costs associated with this pedagogy were also identified as the main challenge, particularly for training, additional staff, and transport. Whereas many students in this current study highlighted overcoming challenges during their participation in NBPA in Picture unit, many others discussed the accessibility of NBPA. Accessibility in the case of this theme means ease of access for all. Henry, in his caption to Figure 21 wrote:

Small activities in nature such as walks can help us improve our physical activity in nature because they don't take up too much time and can eventually build up good habits…soon enough, short walks will turn into long walks, and you may even try going on a run. Small, baby steps are all it takes to change how active you are in nature.

Figure 21

Henry's photo of "a few of the students walking down the trail" at a lake

As part of another caption for a different photo he explained, "If you enjoy [NBPA], you will go for more, and eventually, going outside will become a daily part of your life, just like how it did to mine." Similarly, Surjeet wrote in their caption for Figure 22, "…this [photo] tells us that there are different levels of difficulty for nature based physical activity, so there is always

something for everyone." The use of local green spaces for educational purposes (rather than visiting distant parks, forests, or beaches) has been identified as a key strategy to address challenges associated with funding and accessibility (Bentsen et al., 2010; Edwards-Jones et al., 2018). Khloe, in one of her captions, further elaborated on this idea of the accessibility of NBPA beyond PHE: "There could be some places close to your house where you can do some physical activities." This accessibility means NBPAs are logistically simple and likely school-based which address the common barriers of limited time and budget, and logistics which have been identified by several researchers as primary constraints of learning outdoors in K-12 education (Hall et al., 2020; Mannion et al., 2013; Shume & Blatt, 2019).

Figure 22

Surjeet's photo of the "less technically challenging trails at [a local mountain]; I took this picture because I thought the way that the sun was shining through the trees was very pretty"

Theme 4 - "This was a walk that calmed my mind yet kept my body active": Nature's Impact on Body and Being

During a class field trip to a local beach as part of the *NBPA in Pictures* unit, Leah took a photo of herself "looking out at the water, under a log hut someone made. It was a very nice day, the sun was shining and the leaves were bright and all different colours." As part of her caption to Figure 23 she wrote, "The sun was like a warm jacket and helped me be calm and mindful."

Figure 23

Leah's photo of a "calm beach with the clouds hovering over the mountains, with a bright blue sky"

Katie felt that the NBPA lessons removed her from the stress associated with the school building. She wrote in her caption to Figure 24, "The view was beautiful and it was nice to go out for a walk without the stress of being in a classroom and doing homework."

Figure 24

Katie's photo of "a walk around [a local lake]"

Sarat viewed the NBPA lessons as a time to be mindful and use all of their senses: "I was trying to relax and make sure to not take these opportunities for granted. I was calm and observant of what was around me." They believed, "being outside helped change my mood." Similarly, Bella wrote of a bike ride a friend and her took outside of school when it was "pouring rain" and she explained that "It felt really nice tbh [to be honest], it was like free therapy."

Figure 25

Sarat's photo of a park at a local lake

Similar to Purc-Stephenson et al.'s (2019) findings, the participants described the NBPA experiences as a time to remove themselves from the stresses of urban living to reconnect with nature. Students of Indigenous land-based learning have long recognized "land as a place of reflection" (Bowra et al., 2021, p. 136). This experience of "self-in-relation" (Styres et al., 2013) allows for reconnection with not only culture and community, but also with self (Schultz et al., 2016). Our natural environments possess a restorative power; literature shows that outdoor settings ameliorate stress, improve mood, enhance coping ability and assist in combating depression (Gray & Pigott, 2018; Nielsen & Hansen, 2007).

Theme 5 - "I hope these pictures help influence people to go out and enjoy the view": Inspiring Others to Enjoy Nature

With the hope to foster social change and community engagement (Amos et al., 2012) as a goal of Photovoice studies, both teachers involved in the study plan to publicly display the

students' photos and captions for future students and community members. The second O in the PHOTO acronym asked students to respond to the prompt, *how can this picture provide opportunities for others to improve their physical activity in nature?* Sebastion, in his response to PHOTO reflected on the impact of nature on both himself ("I liked the way the grass looked in contrast to the sky") as well as the potential impact his photo could have on others as he hopes it "Opens people's mind to the beauty of nature."

Figure 26

Sebastian's photo of a trail around a local lake

Similar to what was discussed in a previous theme, some students also felt that the accessibility of NBPA displayed in their photos could inspire others to participate. Aubrey wrote in her caption to Figure 27 that her photo shows "that there are so many ways to be active in nature…that you can learn new things while also being active." Often, it can be as easy as "getting an app and going outside on an adventure" like in geocaching, one NBPA lesson that Emma offered as part of her *NBPA in Pictures* unit.

Figure 27

Aubrey's photo of "some of the things we had to find during our time orienteering around the school"

Outdoor learning in general in educational settings can benefit the community because it facilitates children and youth's lifelong environmental stewardship (Silverman & Corneau, 2017). Elsa wrote of the imagery in her photo and its ability to convey powerful ideas to others:

> I feel like this photo demonstrates the importance of nature in our world and how many people rely on it as a "safe space" to clear their thoughts. During this photo, I felt happy admiring the view of the land splitting with the clear blue sky.

Figure 28

Elsa's "photo taken from the peak of [a local mountain]…I felt as though it really captured the true beauty of nature"

This study suggests that Photovoice leads to critical thinking and discussion that allows self-reflection, understanding of others and social support. This Photovoice project is consistent with that of prior Photovoice studies with adolescents in that it proved to be a rich research tool. The project allowed adolescents to open up about their experiences with NBPA. In this Photovoice process I aimed to engage the adolescent participants through the following: (a) ask research questions that were relevant to them; (b) provide opportunities to visually capture their reality; (c) provide a safe place to share their experiences with other peers and (d) provide an opportunity to present their photographs and captions directly to their teacher which afforded the teachers with invaluable information about their students' daily lives. Providing opportunities to hear from the adolescents' point of view may begin to allow PHE teachers to learn and incorporate the types of NBPAs that interest and engage their students.

Limitations

There are a number of limitations to this study. Firstly, although there were 34 participants from two schools, the vast majority attended private school. The students attending this school tend to have a much higher socioeconomic status than students attending public school. The students and teacher also had access to a bus and were, therefore, able to participate in lessons in a variety of locations as part of the *NBPA in Pictures* unit. As school sites are situated in varying social, economic, and geographical contexts, the conditions of this study may not be replicable and, therefore, the results cannot be generalized to all school situations. Naturalistic generalizations, however, can be made by individuals depending on the relevance and usefulness of this study in relation to the reader's own circumstance (Allison & Pomeroy, 2000). It is my hope that other teachers and schools will use the results of this study to integrate NBPA experiences into their PHE curricula.

Secondly, *NBPA in Pictures* was a part of the regular PHE curriculum in both schools. As these photos and captions were submitted to the teacher as a form of assessment, students may have felt some pressure to write what the teacher wanted to read. Thirdly, the teacher participants were a part of the schools-university partnership which could be considered an opportunistic sampling strategy. Fourthly, each NBPA unit occurred over a short length of time and at a single point within the school year. It would be interesting to see if similar findings would come from a winter NBPA unit.

Implications and Conclusions

The findings of this study indicate that if provided the space and the voice, adolescents are willing and able to share important insights about how they want to be active outdoors. Their

expertise can inform teachers about how to plan their PHE classes to incorporate students' preferred ways to be active outdoors and local areas for place-based learning. This study did not address Treadwell and Taylor's (2017) Step 4 (Create a Needs Assessment) or Step 5 (Advocate for Change) due to the teacher's time limitations and desires for their NBPA units. Photovoice methodology not only requires gathering images through photography to look critically at a specific aspect of an individual's life, but also calls for the individual to use the photographs to advocate for change in a school or community. Therefore, a future recommendation is to facilitate students in creating a needs assessment including a list of the shortcomings in the school and community, as they relate to being active in nature, and possible solutions. For example, the students in the Treadwell and Taylor's (2017) study identified a lack of sidewalks in the community and suggested that the town build more sidewalks or nature trails that connect neighborhoods and parks, so that youth would not have to share the road with traffic. Another recommendation is to facilitate a photo exhibit as it is the purest form of advocacy in traditional Photovoice projects (Wang, 1999). Teachers could place their students' photos on display around the school or on social media. Wang (1999) indicated that Photovoice, while traditionally viewed as a research methodology, is really a tool that can enable those who typically are not given a voice — the marginalized and the ordinary citizens of society — to become powerful advocates for change. Photovoice presents a powerful opportunity to be used as an educational strategy with adolescents that demands further research.

In regards to the importance of providing youth with outdoor learning experiences, Gray (2019) stated that "clearly our educational challenge is how to create these wide-ranging [outdoor learning] opportunities and how to value these outdoor activities as legitimate experiences for students to learn that are equally worthy of a school and its teachers' investment"

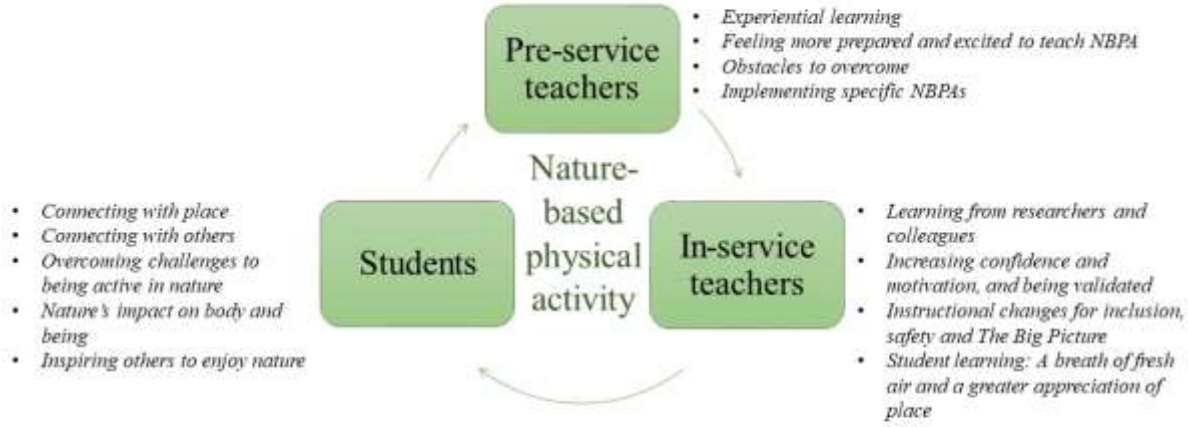
(p. 69). Throughout this study, participants were provided with an opportunity to explore the natural world through their own lens, and draw connections between the natural world and various dimensions of health and wellness. Overall, the photos collected were representative of a student body eager to explore their surroundings and realize the many benefits of NBPA. Photovoice proved an effective method for helping students in PHE make a connection between NBPA in PHE and being active in nature outside of school, and through continued application, may ultimately, encourage a lifelong love of nature and physical activity.

Chapter 6 – General Discussion

The overall aim of this dissertation was to better understand the learning and teaching of NBPA in PHE experiences for teachers and adolescent students. A secondary aim was to better understand the learning and teaching cycle for NBPA reform in PHE. To achieve these aims, I conducted three interrelated studies that explored: (a) how pre-service teachers learn to teach NBPA in PHE, (b) in-service educators' perspectives on learning and teaching NBPA, and (c) adolescent student experiences with NBPAs through their use of Photovoice in and beyond PHE. These three studies explored the learning cycle from pre-service instruction, to in-service professional development, to, finally, the impact on the students' learning. Figure 29 provides a summary of the findings from the three studies and a cycle of implementation for NBPA reform in PHE. In the previous chapters, I have discussed many findings arising from each study, and have observed that there are two prominent themes that span all three studies: (a) NBPA as a conduit for place- and land-based education; and (b) NBPA as an effective form of PHE reform. In this chapter, I will discuss these two key findings in terms of student and teacher experience, contribution to the literature, implications for teachers and teacher-educators, and future research recommendations.

Figure 29

Nature-Based Physical Activity in PHE: A Cycle of Implementation for Reform



NBPA as a Conduit for Place- and Land-Based Education

The findings in this dissertation illustrate NBPA in PHE to be a form of place- and land-based education that can be feasibly implemented in K-12 schools. The importance of place- and land-based education was apparent in all three studies. Specifically, two subthemes representing NBPA as a conduit for place- and land-based pedagogy emerged from the three studies: Greater Appreciation of Place and Nature's Impact on Body and Being. Although these are two themes specifically identified by the teacher and student participants in Chapters 4 and 5, they were significant to the entire body of research.

Greater Appreciation of Place

Participants, both students and teachers, in all three studies discussed the significance of students connecting to place during NBPA activities and lessons. Forming this sense of

connectedness with the place one inhabits has been shown to be important for interdisciplinary learning (Asfeldt et al., 2022), relevance to students' lives and influencing future sustainability efforts (Asfeldt et al., 2020; Braun et al., 2018; Greg Mannion et al., 2013). In 1972, Passmore published the results of a nation-wide examination of outdoor education in Canada and concluded his research by saying:

> Outdoor environmental education is certainly not the answer to all our educational problems. But there is growing recognition that it is a method of teaching that can add that other important "R" to every subject on the curriculum – *relevance in what we teach about the world in which our young people live* (p. 61).

Historically, learning outdoors has often been viewed as a means of educational reform that has pushed back against the institutionalization of schooling (Quay & Seaman, 2013). That is, with the formalization of schooling came specialization of subject matter which often resulted in students struggling to understand the relationship between emerging subjects. This was coupled with education taking place in a specialized setting–the school–which was commonly decoupled from the community and the students' everyday life (Asfeldt et al., 2022). This typically resulted in the focus of schooling being to know the content of specific subjects with little importance placed on integrating subject matters or demonstrating the relevance of that knowledge in the students' everyday life. Further, because this institutional, transactional schooling took place in the specialized setting of schools, it did little to help students' personal development or to assist them in understanding their place in the world or their local community (Asfeldt et al., 2022). The teachers, particularly in Chapter 4, spoke of the power of NBPA to offer cross-curricular learning as well as a connection to the community beyond the school building.

Research investigating the development of environmental consciousness and stewardship in children and youth demonstrates that early experience and learning in natural settings play an important role in influencing future responsible environmental behaviour and knowledge (Braun et al., 2018; Mannion et al., 2013). As Eames et al. (2018) point out, in addition to formative school experiences, family experiences also play an important role as a form of environmental education for sustainability for children and youth. Nature-based physical activity has the potential to provide that link between learning in school and NBPA outside of school as shown particularly in the findings of Chapter Five.

First Peoples Principles of Learning are highlighted in NBPA. Although not a central theme in the three studies, a strong commonality that participants in all three studies remarked upon was NBPA's potential to highlight the First Peoples Principles of Learning for students. Despite all identifying as settler-educators, teacher participants in all three chapters demonstrated that NBPA provided them with the confidence to introduce Indigenous land-based pedagogy to their students. Specific to the BC education context, the pre-service and in-service teachers felt NBPA was aligned with First Peoples Principles of Learning; particularly the principles of "Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors"; and "Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place)" (Chrona, 2014).

Within a traditional Indigenous worldview, the land is central to education; engaging in land-based activities is central to Indigenous students' mental, physical, emotional, and spiritual development (Bell & Brant, 2015; Greenwood & de Leeuw, 2007). When educators and schools provide opportunities to secure students' connection to the land through traditional

land-based activities including traditional teachings, language, and survival skills with mentorship from Indigenous knowledge-keepers, Indigenous students are better able to establish their identity, and value their culture (Bell & Brant, 2015). The studies within this dissertation support NBPA as an instructional strategy for culturally responsive pedagogy: "using the cultural characteristics, experiences, and perspectives of ethnically diverse students as conduits for teaching them more effectively" (Gay, 2002, p. 106). Culturally responsive pedagogy has been particularly associated with increased engagement and interest in school and increased educational achievement of minoritized students (Aronson & Laughter, 2016). Within an Indigenous context, a culturally responsive pedagogy must first address the disparity between Western and Indigenous education, to ensure the educational process is informed by Indigenous principles. Traditionally, Indigenous education centres on the land and is determined by an individual's own unique pace of development; this kind of education is delivered holistically with the view that all aspects of a person's life— mental, physical, emotional, and spiritual—are intrinsically connected and developing together (Bell & Brant, 2015).

Nature's Impact on Body and Being

Many of the teacher participants in Chapters 3 and 4 and the students in Chapter 5 commented on noticing nature's positive impact on students' well-being. The teachers viewed NBPA as a source of self-regulation, mental wellbeing and resiliency. Although not explicitly explored in this study, NBPA has also been found to positively impact levels of physical activity in PHE (McKenzie et al., 2000). Specifically, it has been reported that students take 35% more steps when a PHE class is held outdoors versus indoors (Smith et al., 2009). Within Canada, ParticipACTION (2015) stressed that increasing the time children spend outdoors is one of the most important actions required for enhancing physical activity levels. In 2020, Hall et al. asked,

"in what ways can we increase the amount of time children spend outdoors being physically active?" Based on the findings from the three studies in this dissertation, it appears that NBPA, as a form of PHE reform, is one answer to that question. Additionally, these findings show that incorporating NBPA may enable PHE teachers to meet the holistic nature of evolving PHE curriculum including competencies on mental and social wellbeing.

NBPA as an Effective Form of PHE Reform

There are many reasons for teachers to want to provide students with learning opportunities that occur outdoors such as physical and mental wellbeing, relevancy and lifelong learning (Eigenschenk et al., 2019; James & Williams, 2017). For example, PHE can play a central and significant role, because education that occurs outdoors can be incorporated into any quality PHE program (Cross et al., 2019) in the form of NBPA. When looking at the BC PHE curriculum (*Physical and Health Education BC's New Curriculum*, 2020), NBPA is well situated to meet many, if not all, of the competencies. However, as shown in the literature, PHE is often the "pill not taken" (McKenzie & Lounsbery, 2014) when it comes to outdoor learning, and more generally, when providing students with meaningful and engaging experiences.

In reviewing the three studies in this dissertation, two main themes emerged that support NBPA as a promising area for reform in PHE: Social Interaction, Inclusion and Fun, and Relevance to Life beyond PHE. These themes are consistent with the ones found by Beni et al. (2017) who conducted a review that identified central influences on young people's meaningful experiences in PHE. These themes, as well as how teachers can be prepared to teach NBPA in order for students to realize these benefits, are discussed below.

Social Interaction, Inclusion and Fun

In all three studies, in one form or another, the teacher and student participants discussed how students felt a sense of relatedness and inclusion with their peers as well as engagement, or a feeling of fun, when participating in NBPA. The three studies showed that incorporating more NBPA as part of a PHE program can help level the playing field among students of varying ability levels and address the highly criticized lack of variety that often exists in many sport- or fitness-oriented PHE programs (Chen & Garn, 2018; Solmon, 2018). NBPA can add breadth and variety to PHE programs, and more variety affords students with greater opportunities to obtain enhanced levels of confidence and competence across different physical activities and different environments enhancing their physical literacy (Mandigo et al., 2009; Mandigo, 2010; Whitehead, 2010). NBPA can also "allow physical [and health] educators the opportunity to address the needs of diverse learners, especially those students who might feel disenfranchised by the overemphasis of traditional sports" (McNamee & Timken, 2017, p. 9). Many teacher participants in Chapters 3 and 4 commented on how students typically disengaged by PHE found motivation and engagement in NBPA. Specifically, in Chapter 4, the in-service teachers felt the lack of competition offered by NBPA created further inclusion and engagement in PHE. Previous research shows that students reported appreciating learning new activities. By introducing new activities into PHE, students who had not previously experienced competence had the opportunity to experience mastery (Walseth et al., 2018).

Involving student voice has also been found to increase inclusion and engagement in PHE (Fisette, 2012; Gibbons et al., 2010; Gruno & Gibbons, 2016; Wattchow et al., 2014). This is particularly salient as the participants' voices were included in all three studies within in this dissertation, and explicitly in Chapter 5, the students' (Photo)voices spoke to the social

interaction, inclusion and fun they experienced during NBPA both within PHE and outside of class. Oliver and Kirk (2016) argue that there is now a need for research that focuses on how we can develop PHE so that it enhances the interests and meets the needs of all students. It is my hope that by listening directly to teachers and students about their positive experiences with NBPA in PHE will contribute to this research goal.

Relevance to Life beyond PHE

Participants in all three studies spoke explicitly about NBPA's potential for connecting students to life beyond PHE and to their community and local environment. For example, some parents spoke to the teachers in Chapter 4 about visiting the locations explored during the NBPA unit outside of class as a family. Students in Chapter 5 took pictures of them applying their learning of NBPA to time in nature with friends and family outside of PHE. Central to creating meaningful PHE experiences as outlined above is the transfer of learning from PHE to life beyond school, and into adulthood. One of the main instructional problems found in PHE is that the subject focuses too heavily on competitive team games and sports disenfranchising the students who do not feel engaged, motivated or included in this form of physical activity (Chen & Garn, 2018; Solmon, 2018; Trost, 2006). Not only can NBPA help students realize all of the benefits of being active in nature as discussed above, but it can also help those students disenfranchised by typical PHE programs find engagement in the subject. However, simply moving PHE lessons outside does not fully address the research-supported issue of students feeling disenfranchised in PHE. Participating in flag football on the school field, for example, does not guarantee that students are participating in an activity that has any more potential for fostering lifelong physical activity than would indoor activities. Instead, as advocated in this dissertation, embracing nature in PHE can improve PHE's potential for building toward

enhanced lifelong physical activity, meeting a variety of health and wellness outcomes, while adding breadth and variety to PHE programs.

Currently, outdoor learning, and specifically NBPA, can be seen as a grassroots approach in Canadian public education that is driven by individual educators and advocates (Boileau & Dabaja, 2020). Recent survey findings suggest that there is growing interest among teachers in Canada to implement a nature-based pedagogy more formally as part of their teaching (Boileau & Dabaja, 2020). The findings of Chapters 3 and 4 showed that there is not only interest among pre-service and in-service PHE teachers to incorporate NBPA in PHE, but also that a focused effort on learning NBPA during PHETE and a schools-university partnership can provide an effective form of professional development for teachers to adopt this particular form of PHE reform.

Preparing Our Educators to Teach NBPA

Given the plethora of benefits offered by NBPA discussed above, and in wanting students to realize these benefits, teachers must feel prepared to offer NBPA as part of their PHE curriculum. Any PHE reform must begin with pre-service teacher PHETE programs and in-service teacher professional development. The pre-service and in-service teachers in Chapters Three and Four discussed the importance of hands-on learning experiences and practical resources provided by researchers and/or peers. This supports previous research that PHETE should prepare pre-service teachers for real world situations (Walker et al., 2017). The teacher participants in all three studies received on-going support in their learning of NBPA either through the module in PHETE or through the schools-university partnership.

These experiential and practical experiences and resources and ongoing support increased the pre-service and in-service teachers' and confidence and motivation to implement NBPA with

their classes despite identifying a few barriers to implementing NBPA: student perception of what "gym" is supposed to be, time, and weather. As cost is repeatedly reported as a barrier for outdoor learning, Hall et al. (2020) stated it is important to introduce PHE teachers to cost-effective physical activities to do outside either during PHETE programs or through professional development opportunities. Encouragingly, cost as a barrier to participation in NBPA was not identified by any teachers or students in my studies. This suggests that NBPA may already be a cost-efficient solution to getting students moving outdoors during PHE. Additionally, Hall et al.'s (2020) findings, supported by my Chapter 4 findings, indicated that dedicated professional development regarding physical activity in alternative environments is one of the only teacher characteristics significantly associated with PHE teachers' implementation of outdoor activities in PHE.

Limitations

Many limitations of this body of research were already identified for each study, however, there are some limitations of the overall qualitative paradigm worth mentioning here. All three studies took place within a context where the qualitative research did not claim to be 'scientific' and 'objective,' but rather it sought to engage in sense-making in terms of the meanings, values, beliefs, and experiences of people (Denzin & Lincoln, 2018). This body of research was conducted within the constructivism paradigm that emphasizes the dynamic nature of our world and that individuals' views are directly influenced by their experiences, and it is these individual experiences and views that shape their perspective of reality (Corner et al., 2019). Therefore, under this ontological view that reality and the world we live in are dynamic and socially constructed, concepts such as causality, generalizability, and replicability were not

the goal of this research (Tenny et al., 2021). However, all three studies provided a thick description of both the participants' experiences and context as well as the research process, thereby enabling the reader to assess whether my findings are transferable to their own setting (Korstjens & Moser, 2018).

It is important to note that many of the participants in these studies were teachers motivated enough to join a schools-university partnership and volunteer to participate in a study; as well as participants who were students of those motivated teachers. Other participants were students in university PHETE programs who also volunteered. These participants are not representative of all educators tasked with teaching PHE in schools. Additionally, methodological triangulation, which involves using multiple methods of data collection to increase the likelihood of getting a reliable and accurate result (Tenny et al., 2021), was not fully employed in all three studies. Future research on the learning and teaching of NBPA in PHE would benefit from using a combination of questionnaires, focus groups, interviews, and visual data such as photos and captions. On the other hand, peer examination was used in order to increase rigor throughout this dissertation in that results were reviewed by my supervisor, as well as the members of my committee, to ensure the data was consistent with the findings (Tenny et al., 2021).

Implications and Recommendations

In their recent work, Hall et al. (2020) found that regardless of where a teacher teaches, what grades a teacher teaches, or if a teacher is a specialist in the area of PHE they were equally open to embracing activities beyond the typical areas of gym, weight room, field or track as a part of a PHE program. The findings shared in this dissertation contribute to the literature in that

showing with support and education, PHE teachers have the potential to include NBPA regularly, or more regularly, in their PHE programs.

My research points to a number of important and interesting future research questions. Firstly, it would be worthwhile to explore the amount of exposure to NBPA in PHE that is necessary for students to feel connected to place. Secondly, a question requiring a response is to understand more fully what the Indigenous land-based learning goals are that teachers have identified as central to their NBPA programs and how those goals are achieved. As well, it is important to identify what specific role and contribution NBPA PHE programs in K-12 can play in advancing reconciliation in Canada. Given the hands-on experiential holistic integrated nature of NBPA takes place outside on traditional territories, NBPA seems well placed to play a specific and meaningful role in reconciliation given that NBPA commonly connects people, place, and environment.

After beginning this body of research, the global pandemic, COVID-19 ravaged the world. This pandemic was devastating in so many ways, but also highlighted the importance of this particular line of inquiry. It has been argued that youth, particularly urban youth, have never needed outdoor programs like NBPA more than they do now, as COVID-19 has normalized the use of home-based technologies worldwide, keeping children and youth indoors in front of screens and less physically active outdoors (Moore et al., 2020; ten Velde et al., 2021; Xiang et al., 2020). On the other hand, with safety being increased outdoors, many people have become reacquainted with nature, specifically educators and students within schools. Outdoor learning was recommended as an approach to teaching during the pandemic since being outdoors supports physical distancing and reduces the risk of viral transmission (Thampi et al., 2021). Pre-service and in-service teachers in Chapters 3 and 4 spoke specifically of the relevancy of NBPA during

COVID-19. Therefore, a final future recommendation for connecting to place would be to investigate how K-12 PHE programs have changed and adapted since the pandemic began. It appears many Canadian K-12 schools adapted to COVID-19 restrictions by taking their classes outside; therefore, fully understanding how taking classes outside has impacted the perception of NBPA and if the pandemic might have served as a springboard for increasing NBPA opportunities in K-12 PHE would be valuable. Or conversely, is there a potential for a reversion as the restrictions lift and people are feeling more confident about interacting indoors?

The studies in this dissertation provide a novel contribution to the PHE reform literature in that they show NBPA as an achievable and promising form of reform for PHE. As students and teachers in these studies identified NBPA as particularly relevant to connecting students to physical activity and health benefits beyond PHE, it would be of particular interest to investigate the long-term impact of an NBPA reform in PHE. For example, a long-term study following adolescent students, who had experienced NBPA throughout their secondary school PHE courses to see if they continued being active in nature into adulthood.

Conclusions

The overall aim of this research was to better understand the learning and teaching of NBPA in PHE experiences for teachers and adolescent students. NBPA can be an effective means for PHE teachers to help preparing children and youth for a lifetime of physical activity and health as well as for current and emerging environmental and social challenges. For example, the British Columbia Ministry of Education's stated mission is "to enable learners to develop their individual potential and to acquire knowledge, skills, and attitudes needed to contribute to a healthy society and a prosperous and sustainable economy." To achieve this

mission, British Columbia educators aim to develop the “educated citizen” which they define as a person having intellectual development, human and social development, and career development (*Framework for Enhancing Student Learning*, 2020). Therefore, as PHE teachers continue to develop programs to meet the changing needs of Canadian students for a changing world, NBPA should be considered for its strength as a form of holistic and integrated learning that embraces experiential teaching methods, achieves a range of emotional, social and physical learning goals, and links that learning to students’ everyday lives and local communities. Moreover, the inclusive and engaging nature of NBPA is well suited to prepare children and youth for the challenges of living well in the 21st century.

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