

PHYSICAL LITERACY:
A JOURNEY OF UNDERSTANDING AND DEVELOPMENT

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By

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Abstract

Physical education has been identified as one of the most opportune ways to develop physical literacy, and Whitehead (2010) notes the crucial role teachers play in developing and fostering physical literacy. Little is known about the knowledge of teachers with regards to physical literacy, however there has been some literature demonstrating that several teachers of physical education do not fully understand physical literacy. In addition, physical literacy has been explicitly defined and integrated into many provincial physical education curricula. Despite this recognition of the importance of physical literacy in curricula development, little empirical data exists to demonstrate how to develop physical literacy through physical education. Only a handful of studies have conducted physical literacy interventions in physical education.

In this dissertation, I examine teachers' understanding of physical literacy, physical literacy and physical education, and the impact of a physical literacy intervention in physical education on students' physical literacy. Because of the teaching context in the province, both specialists and generalists were sought to participate in this dissertation research. Three studies were designed to explore gaps in the literature regarding physical literacy and physical education. Results suggest further work is required to alleviate confusion surrounding physical literacy so that teachers can effectively develop physical literacy in physical education classes and help children develop physical literacy skills to participate in physical activity throughout their lifespan. Findings also indicate a range of teachers' understanding of physical literacy. More work is needed to help establish best practices for developing students' physical literacy through physical education.

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List of Abbreviations

ANCOVA	Analysis of Covariance
CAPL	Canadian Assessment of Physical Literacy
CS4L	Canadian Sport for Life
IPLA	International Physical Literacy Association
M	Mean
PHE	Physical and Health Education
PLAY	Physical Literacy Assessment for Youth
SHAPE	Society of Health and Physical Educators
SPEA	Saskatchewan Physical Education Association
UNESCO	United Nations Educational, Scientific, and Cultural Organization

List of Definitions

Combined Class- A class with one teacher that teaches students in two different grades. In this study, students in a combined class were in grades four and five.

Display Effect- Unlike other school subjects, in physical education students' performance is visible to others because of the physical nature of tasks. This can cause students to have negative experiences with physical education (Carlson, 1995; Roetert & MacDonald, 2015). By having quality physical education instruction and assessment, teachers aim to diminish this effect as much as possible.

Fundamental Movement Skills (FMS)- Movement patterns involving different parts of the body. These skills are believed to be the building blocks for more complex and specialized skills that children will use in physical activity throughout their lives. Three categories of FMS include: locomotor skills, stability or body management (nonmanipulative) skills, and manipulative skills (Graham, Holt/Hale, & Parker, 2013).

Generalist- A classroom teacher who is responsible for teaching all subjects during the school day for their class. This type of teacher typically has minimal professional preparation to teach the subject of physical education (Mandigo, 2010).

Intact Class- An entire class is assigned to a specific condition. Potential participants can only come from the classes of the teachers who are participating in the study.

Locomotor Skills- Skills that see the body moving (traveling) through space (Saskatchewan Ministry of Education, 2010, p.52). They include skills like walking, running, hopping, and jumping.

Physical Literacy- "Physical literacy is the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life" (ParticipACTION et al., 2015, p. 1).

Physical Literacy Condition- Classes in this condition participated in the intervention program (the curricular-based and assessment-based physical literacy circuit and locomotor activities) during physical education classes.

Specialist- A teacher who has majored or minored in physical education, prior to completing their education degree or concurrently with their education degree (Mandigo, 2010). Unlike a generalist, this type of teacher does not teach all subjects. This teacher may teach physical education to all or most of the students in the school.

Usual Practice Condition- Classes in this condition participated in the same physical education classes they have been participating in all school year. There was no intervention from researchers.

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Chapter 1

Introduction and Review of the Literature

1.1 Introduction

Physical literacy involves the tools necessary for an individual to be physically active over the lifespan. While there are several definitions of physical literacy (Aspen Institute, 2015; Canadian Sport for Life [CS4L], 2014a; Physical and Health Education [PHE] Canada, 2010; Whitehead, 2010), all include similar components of physical competence, motivation and confidence, knowledge and understanding, and behaviour (ParticipACTION et al., 2015). Although there are many definitions of physical literacy, I selected the PHE Canada definition of physical literacy to guide my work because it was created purposefully for physical education. PHE Canada's definition states that "Individuals who are physically literate move with competence and confidence in a wide variety of physical activities in multiple environments that benefit the healthy development of the whole person" (PHE Canada, N.D., A, para. 1).

In the literature, physical literacy has been theorized as an approach to help children become more physically active (ParticipACTION, 2015), as a means to showcase the importance of physical education (Tremblay & Lloyd, 2010), and as a disposition to capitalize on movement potential (Whitehead, 2010). Without developing a physical literacy foundation, children may drop out of physical activity (Higgs, Balyi, & Way, 2008). The concept of physical literacy is not restricted to sport; the importance of physical literacy transcends across the lifespan and various sectors, from activities of daily living to injury prevention to vocation (Kriellaars, 2014b). While many sectors possess the potential to develop children's physical literacy, the education system plays a pivotal role.

Because of the ability of schools to reach all children, the school subject of physical education has been identified as an opportune place for children to develop physical literacy. In Saskatchewan, the provincial physical education curriculum explicitly defines physical literacy and includes a focus on "achieving physical literacy" as one of the characteristics of an "effective physical education program" (Saskatchewan Ministry of Education, 2010). Across Canada, many provincial physical education curricula stress that students should become physically literate as a result of being taught the curriculum (Mandigo, Francis, Lodewyk, & Lopez, 2009). Though the curricula may include physical literacy as a critical piece, there is

some evidence in the literature that physical literacy is not always well understood (ParticipACTION, 2015; Stanec & Murray-Orr, 2011; Tristani & Fraser-Thomas, 2014).

Little empirical data exists to determine best practices for developing and assessing physical literacy in physical education (Lounsbery & McKenzie, 2015; ParticipACTION, 2015; Robinson & Randall, 2017). Most of the research conducted includes unpublished masters or doctorate work (Kiez, 2015; McManes, 2013). With Saskatchewan's provincial elementary physical education curriculum's focus on physical literacy, and the limited data regarding the development of physical literacy in physical education, I chose to focus this body of work on teachers' understanding and implementation of physical literacy in physical education.

The remainder of this section provides a review of the literature and an accompanying rationale for this dissertation research. Along with the rationale, the guiding research questions and hypothesis are included in this section to frame the remainder of the document. Following this introductory chapter, Chapters Two, Three, and Four are three separate, but interrelated manuscripts detailing the research I conducted on physical literacy with teachers of physical education and their students. In between each manuscript chapter is a bridging transition summary that will help the reader connect the manuscripts together and guide the reader in understanding the progressions from the previous manuscript. The last chapter of this document (Chapter Five) will revisit the main findings of the entire body of work, relate the conclusion to the overarching goal of the thesis, and establish recommendations for next steps.

1.2 The Concept of Physical Literacy

Physical literacy is a concept that is not limited to any single sector. Physical literacy can be developed through numerous platforms, from sport to physical education. At its core, physical literacy represents a necessary foundation to help individuals lead healthy, active lifestyles. Despite multiple definitions, physical literacy is often stated to include motivation and confidence, physical competence, knowledge and understanding, and engagement in physical activities for life. Physical literacy has been suggested as the foundation for participation in lifelong activity (CS4L, 2014a). Depending upon the situational context, physical literacy can have different definitions.

1.2.1 Definitions of Physical Literacy

Physical literacy is a concept developed by Margaret Whitehead, however its ideals of a sense of self, universality, embodiment, and the role of propositional knowledge have been in

existence for many years. Whitehead (2010) defines physical literacy, at its most basic form, as the following: “As appropriate to each individual’s endowment, physical literacy can be described as the motivation, confidence, physical competence, knowledge and understanding to maintain physical activity throughout the lifecourse” (p.11-12). The concept of physical literacy, as realized by Whitehead, has its underpinnings in philosophy. Those philosophical beliefs have been previously expressed by various philosophers and writers (Whitehead, 2007). Because she has been at the forefront of development with the concept, there is extensive literature discussing her work (Whitehead, 2001; 2007; 2010).

One characteristic of Whitehead’s definition that drastically sets it apart from other definitions is the heavy philosophical focus on educating holistically and concentrating on the embodied and lived experience (Whitehead, 2010). Whereas Western culture tends to separate the body and mind, in Whitehead’s definition there is a heavy focus on the pedagogical teaching of the whole body (Liedl, 2013; Whitehead, 2007). One way to comprehend this aspect of physical literacy is to reflect on two quotes, “I think, therefore I am” and “I am my body” (Whitehead, 2007). The first quote gives priority to the mind and states nothing about the body (Whitehead, 2007). It separates mind and body into distinct entities; this is duality. The second quote, “I am my body,” is an embodied, lived approach with a monistic view. With this philosophical approach the body and mind cannot be separated, as one cannot exist without the other. In order to achieve this embodied state, an individual must experience interactions within the world. While Whitehead heavily focuses on the embodied and lived experience in her concept of physical literacy, other definitions have varying foci.

Unlike Whitehead’s definition, Canadian Sport for Life has a focus on sport and does not speak to Whitehead’s philosophical emphasis on interaction with the world or embodied experience (McCaffery & Singleton, 2013). It is understandable that this definition would vary from Whitehead’s definition as Canadian Sport for Life advocates physical literacy to keep more Canadians active for life in recreational sport and physical activity (Keegan, Keegan, Daley, Ordway, & Edwards, 2013). Canadian Sport for Life (2014a) identifies physically literate individuals as people who (a) demonstrate a wide variety of movement and sport skills, (b) move with poise, confidence, competence, and creativity in multiple environments, (c) develop motivation and ability to use, understand, and apply different movements, and (d) make healthy active living choices. The organization is working towards improving the quality of sport and

physical activity in Canada. Physical literacy is a key component of the Long-Term Athlete Development (LTAD) model, and the concept is integrated in the first three stages of the LTAD model (Active Start, FUNdamentals, and Learn to Train) (CS4L, 2014a).

There is one particular aspect of movement and physical activity that both Canadian Sport for Life and Whitehead agree on: overspecialization. Canadian Sport for Life states children in the FUNdamental stage (boys 6-9 and girls 6-8) should not specialize in a single sport and that they should participate in other sports and activities at least three to four times per week (Higgs et al., 2008). Whitehead (2010) agrees, stating that overspecialization can be at the expense of physical literacy and that overspecialization may actually close doors to lifelong participation in activity. While coaches and those in the recreation sector may have to deal with issues of overspecialization, the education sector is one that is bound by the curriculum to teach a wide variety of skills.

Physical and Health Education Canada (PHE Canada) is the professional organization for physical and health educators in Canada. The organization includes educators, administrators, and researchers who work together to support schools and communities in implementing Quality Daily Physical Education (PHE Canada, 2014). PHE Canada supports schools through a range of programs, resources, and initiatives. Physical literacy is a primary focus of PHE Canada's latest work, and they describe a physically literate person as someone who "...move[s] with competence and confidence in a wide variety of physical activities in multiple environments that benefit the healthy development of the whole person" (PHE Canada, N.D., A, para. 1). Moving with competence, participation in a wide variety of activities, and the development of the whole person echoes Whitehead's sentiments (PHE Canada, 2010). This organization also has a similar definition to Canadian Sport for Life's (i.e., participation in a range of physical activities, long-term participation), but without a sport lens. Due to the fact that my dissertation research focused on the development of physical literacy through physical education, the PHE Canada definition was the selected definition of physical literacy to guide this dissertation research.

While I chose to use PHE Canada's definition of physical literacy (PHE Canada, 2010) for this dissertation research, another definition of physical literacy was created after this research had been completed. Canada's Physical Literacy Consensus statement was the result of a collaborative process between many stakeholders and organizations, and it is now used by many organizations, such as Sport for Life Society, the organization previously titled Canadian

Sport for Life. This 2015 Consensus Statement identifies physical literacy as “the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life” (ParticipACTION et al., 2015). The Statement identifies four essential and interconnected elements of physical literacy including motivation and confidence (affective), physical competence (physical), knowledge and understanding (cognitive), and engagement in physical activities for life (behavioural) (ParticipACTION et al., 2015).

Due to the multiple sectors in which physical literacy can be developed, and the numerous countries that are attempting to develop physical literacy, confusion surrounding interpretation of the concept is inevitable. Whitehead’s definition has transformed through many renditions, but has always been underpinned by philosophy. Other organizations such as Physical and Health Education Canada and Canadian Sport for Life have evolved the definition to suit their own needs (Robinson & Randall, 2017). The Canadian Physical Literacy Consensus Statement was created to alleviate confusion and provide a consistent definition of physical literacy (ParticipACTION et al., 2015). While each definition may have alternate versions of the concept of physical literacy, ultimately the vision is the same: for all individuals to engage in movement confidently and competently so that each and every person may be active throughout the lifespan.

1.2.2 Controversy Regarding Physical Literacy

The concept of physical literacy has been met with some controversy. This controversy stems both around the term itself, as well as the assessment of physical literacy. Roetert and Jefferies (2014) stated that due to the need to align with other countries and to enhance physical education, physical activity, and sport programs that the United States would be “...wise to embrace the concept of physical literacy as we move into the future” (p. 40). Conversely, American scholars Lounsbery and McKenzie (2015) were critical that the term ‘physical literacy’ replaced the term ‘physically educated’ in the American National Standards for Physical Education. The authors identified their apprehension of the National Standards moving away from ‘doing’ to ‘knowing’ (Lounsbery & McKenzie, 2015). Lounsbery and McKenzie (2015) also noted the lack of consultation from stakeholders in changing the term in the National Standards, along with the lack of empirical data and peer-reviewed physical literacy publications.

In Robinson and Randall's (2017) critique of the assessment tools used to assess physical literacy, they questioned whether physical literacy should be assessed at all. They put forth the idea that by quantifying and labelling physical literacy in physical education, we might be missing the idea of physical literacy. Robinson and Randall (2017) also proposed that physical literacy may be akin to other noble life-course pursuits, such as joy or truth, which do not require measurement. Giblin, Collins, and Button (2014) perceived present physical literacy assessments to be lacking and inaccurate. They suggested that physical literacy assessments should concentrate on demonstrating an individual's ability to show proficiency in complex and combined movements, as that is more imperative to becoming physically literate. Giblin and colleagues (2014) also proposed "exer-gaming" as a possible physical literacy evaluation as they believe the technology allows testing and teaching for all the elements of physical literacy across a range of skill levels.

Despite the controversy surrounding physical literacy, both with the definition of the concept and the philosophy underlying assessment, sectors and stakeholders of several countries have accepted physical literacy and recognized it as a priority (Aspen Institute, 2015; CS4L, 2014a; Keegan et al., 2013; McLennan & Thompson, 2015; PHE Canada, 2010).

1.2.3 Responsibility for Developing Physical Literacy

Whitehead (2010) identified that it is important for physically literate individuals to take responsibility for their own movement, however children may not have the capacity to take responsibility right away. Teachers can play a key role in developing and fostering physical literacy (Whitehead, 2010), but children also have many other pivotal influences in their lives. Parents are one of these pivotal influences. In a recent study investigating parental understanding and attitudes towards the development of physical literacy, Humbert, Chad, and Sulz (2017), identified that 87.7% of parents surveyed believed they had the primary responsibility for helping children develop physical literacy. Developing physical literacy requires a collaborative effort from a range of individuals, from parents to schools to community recreation leaders (Higgs et al., 2008).

Whitehead (2010) deemed physical literacy a disposition and a capability everyone possesses. This notion of a disposition is echoed by Lewis, Lessard, and Schaefer (2014): "Thinking about physical literacy as a disposition as opposed to a set of skills awakens up to the holistic nature of physical literacy" (p. 31). It is also important to note that physical literacy is

not restricted to sport or activities; there are multiple reasons to develop physical literacy, such as health and active participation, performance arts, injury prevention, rehabilitation, and vocation (Kriellaars, 2014b). Anyone, regardless of age, ability, or sex, has the capability to become physically literate (Whitehead, 2010). Elderly people need to participate in purposeful pursuits (e.g., walking, gardening, going up and down stairs), and this has the potential to energize and enrich lives (Whitehead, 2010). While physical literacy can be developed throughout the life course, several authors believe that the optimal time to develop physical literacy is during childhood (Higgs et al., 2008; Mandigo et al., 2009; Whitehead, 2010). One aspect of this dissertation research focuses on how to develop physical literacy in children. As aforementioned, one of the ways to share the responsibility of developing children's physical literacy is to develop physical literacy through physical education.

1.3 Physical Education

The school subject of physical education is a time where children have an opportunity to learn and embody a healthy, active lifestyle (Mandigo, 2010). Quality physical education has been viewed as the foundation for lifelong engagement in physical activity and sport (McLennan & Thompson, 2015). Unlike other school subjects, the subject of physical education is about the union of body and mind. Students in physical education work on developing the three learning domains: psychomotor (the physical), affective (the feeling), and cognitive (the thinking) (Graham, Holt/Hale, Parker, 2013). Quality physical education has the potential to provide students with numerous benefits in the following domains: physical, lifestyle, affective, social, and cognitive (Bailey, 2006). With regards to this literature review and the subject of physical education, there are two sections that are critical: best practices in physical education pedagogy, and the teachers of physical education.

1.3.1 Best Practices in Physical Education Pedagogy

Graham and colleagues (2013) along with Physical and Health Education Canada (PHE Canada, 2014) identify various components that construct best practices of teaching within physical education. While these may not cover all of the best teaching practices in their entirety, they along with the principles of motor learning, provide a concrete foundation for developing physical literacy in the gymnasium. Best practices of teaching are often found in quality physical education programs. While there are pedagogical strategies that can be applied to many subjects, physical education requires specialized methods to ensure a quality physical education program

(PHE Canada, N.D., B). There are a variety of components that make up a quality physical education program. Graham, Holt/Hale, and Parker (2013) identify several facets of a quality physical education program: physical education should be at least 150 minutes per week, class size should be equal to that of a classroom size, has a sequential, developmental curriculum, minimum of 50% moderate to vigorous intensity physical activity during class time, plenty of practice opportunities, high rates of success (70-80% success rate), a positive emotional environment, a teacher competent in physical education (i.e., teacher has a background in the subject and understand/knows the content and pedagogy of physical education), realistic expectations in limited time for class, adequate equipment and facilities, enjoyment is a quality of the class, all three learning domains are addressed, and last but not least, the program should be developmentally and instructionally appropriate.

PHE Canada (2014) also promotes the concept of a quality physical education program. They identify the following characteristics as minimum standards for a Quality Daily Physical Education program: well-planned lessons incorporating a wide range of activities, high level of participation by all students in each class, emphasis on fun, enjoyment, success, fair play, self-fulfillment, and personal health, appropriate activities for the age and stage of each student, activities that enhance fitness, a participation based intramural program, qualified, enthusiastic teachers, and the creative and safe use of facilities and equipment. Contrary to Graham, Holt/Hale, and Parker, PHE Canada (2014) considers daily curricular instruction for all students (K-12) for a minimum of 30 minutes a requirement of quality physical education programs. Quality physical education programs provide one of the best avenues to develop physically literate students (Temertzoglou, 2010). Kriellaars (2014b) identifies high repetition-based learning with knowledge of results as one of the fundamental pieces of physical literacy, and notes that this component is often missing in physical education classes. Knowledge of results and knowledge of performance are critical feedback in the teaching of physical education, and these can also be important to increase motivation and a source of reinforcement for students (Rink, 2014).

1.3.2 Teachers of Physical Education: Specialists and Generalists

In the province of Saskatchewan, school divisions employ a mix of both specialists and generalists to teach physical education at the elementary school level. An exact definition of what characterizes a specialist physical educator is difficult to find. At its most basic level, a

specialist physical educator is identified as someone who has been certified in his or her province to teach physical education (Stanec & Murray-Orr, 2011). Typically, this involves specialized training in physical education, which a generalist (i.e., a classroom teacher) does not have. This situation, having both specialists and generalists teaching physical education, is a common theme across Canada. Nation-wide statistics on the number of current physical education specialists at the primary school level are lacking. The latest annual report on Ontario's publicly funded schools, noted that 42% of elementary schools have a Health and Physical Education teacher, either full or part time (People for Education, 2017). However, this varies widely by region, from a high employment of specialists (73%) in the greater Toronto area to only 15% of elementary schools in Eastern Ontario (People for Education, 2017). At the present time, no numbers are available for the number of specialists employed in Saskatchewan. Particular school divisions may dictate whether a specialist or a generalist will teach physical education. UNESCO's guidelines for policymakers on Quality Physical Education identify that there are not enough specialists at all education levels, leading to physical education being delivered by inadequately prepared teachers (McLennan & Thompson, 2015). In addition, UNESCO has identified that there is currently no requirement for specialists at the primary level and that generalists often receive insufficient training to teach quality physical education (McLennan & Thompson, 2015).

While the majority of schools in Canada may have generalists teaching physical education, much of the literature suggests specialists are critical to ensure that physical education programs are meeting their goals. Children taught by physical education specialists demonstrate significantly higher levels of achievement in most key outcomes than those taught by generalists (Sallis et al., 1997). In addition, physical education specialists also demonstrate higher levels of enjoyment, confidence, and knowledge in teaching physical education than generalists (Decorby, Halas, Dixon, Wintrup, & Janzen, 2005). While a large body of literature suggests that physical education specialists are beneficial, a landmark intervention study has also shown that with effective support, generalists can provide effective instruction in physical education (Sallis et al., 1997). In Canada, teachers regardless of their background and training in physical education, are required to teach the same provincial curriculum. This can be a challenging task, especially for generalists.

1.4 Physical Literacy Development in Schools

Due to the important role that schools play in the development of children and youth, it is vital for teachers to understand physical literacy. Schools, and physical education specifically, are tasked with the responsibility to promote physical activity in children (Sallis et al., 1997). Physical education classes provide one of the best opportunities to develop physical literacy. In fact, the United Nations Educational, Scientific and Cultural Organization (UNESCO) identifies physical literacy as the basis of physical education, and the organization states that the promotion of physical literacy should be a key aspect of any physical education curriculum (McLennan, & Thompson, 2015).

1.4.1 Physical Literacy Development through Physical Education

Whitehead (2010) identifies that physical literacy is an underlying goal of physical education and that there is a close relationship between physical activity, physical education, and physical literacy. Physical activity combined with quality physical education can help children to move forward on their physical literacy journey (Gleddie, 2014). Since many children do not or are not able to participate in sports or activities outside of school, they may be limited in their ability to adequately develop the skills necessary for movement. Physical education is highly valuable because it provides an opportunity for all children to learn the tools to be active (Gleddie, 2014; Whitehead, 2010).

Many provincial physical education curricula in Canada stress that students should become physically literate and the development of physical literacy is stated in curriculum outcomes (i.e., achieving grade specific standards, expectations, or outcomes) (Mandigo et al., 2009). Presently, it is unclear whether children are becoming physically literate as a result of meeting curriculum outcomes as there is a lack of literature on how teachers are developing physical literacy in their physical education classes. It is difficult to discern what a day-to-day physical education class looks like that effectively integrates physical literacy because in the literature there are limited published physical literacy intervention in physical education studies. Additionally, there is a challenge with the current literature because very few interventions provide details regarding the specifics (e.g., dose, duration, lesson plans) of the intervention (Whitehead, 2010). Though current research is lacking in how to develop physical literacy in physical education, there are tenants of physical education that can provide a starting base for

how teachers can develop physical literacy. One such tenant includes the foundation of any school subject: the curriculum.

1.4.2 Physical Literacy and the Saskatchewan Physical Education Curriculum

In Saskatchewan, physical literacy is explicitly defined in the physical education curriculum, and it is considered one of the six characteristics of an effective physical education program (Saskatchewan Ministry of Education, 2010). In this curriculum document, Whitehead's definition is used. It states:

Physical literacy can be described as the ability and motivation to capitalize on our movement potential to make a significant contribution to our quality of life. As humans, we all exhibit this potential; however, its specific expression will be particular to the culture in which we live and the movement capacities with which we are endowed (Whitehead, 2006).

This definition by Whitehead also goes on to discuss five characteristics of a physically literate individual (Saskatchewan Ministry of Education, 2010).

In addition, the four elements of physical literacy (e.g., motivation and confidence, knowledge and understanding, physical competence, and engagement in physical activities for life; ParticipACTION et al., 2015) are aligned with the three goals of the K-12 Saskatchewan physical education curriculum: active living, skillful movement, and relationships (Saskatchewan Ministry of Education, 2010). The Saskatchewan curriculum not only includes physical competence (fundamental movement skills), but also includes the affective and cognitive aspects of physical literacy (skillful play, culture and history, and tactics, strategies, and rules) (Saskatchewan Ministry of Education, 2010). By learning from those teaching the physical education curriculum, it is the hope that students will lead healthy, active lives, therefore developing the behavioural aspect of physical literacy. Though a physical education curriculum exists with the components necessary for the development of physical literacy, the way in which the curriculum is delivered can affect students' physical literacy. For example, avoiding certain skills or activities because a teacher is uncomfortable teaching the content may reduce a child's exposure to a wide variety of activities that was originally intended to be taught as per the curriculum (Randall, Robinson, & Fletcher, 2014). It is not enough to have the curriculum; it needs to be implemented fully.

1.4.3 Physical Literacy and Physical Education Research

With regards to teachers of physical education and understanding the concept of physical literacy, there have been a handful of studies conducted in the past few years. These studies have focused on generalists and early career teachers. Stanec and Murry-Orr (2011) met with five elementary generalist teachers to discuss physical literacy and implementation of physical literacy in the school day. Although all five of the teachers identified themselves as being somewhat physically literate, responses from the teachers suggested that they were not knowledgeable about the concept of physical literacy (Stanec & Murray-Orr, 2011).

Tristani (2014) spoke with ten early career Ontario health and physical education teachers about physical literacy. Participants noted a lack of a definition for physical literacy in the Ontario health and physical education curriculum and a lack of a consistent tool to measure physical literacy (Tristani, 2014). In addition, Tristani (2014) found that these teachers had a poor understanding of physical literacy and they felt they had not received sufficient nor comprehensive training on concepts such as physical literacy during their formal teacher education. While these studies focused on the definition and understanding of physical literacy, there are even fewer studies gathering empirical evidence on how to develop physical literacy through physical education.

Currently a limited number of studies exist that explore the development of physical literacy through physical education classes. Additionally, the majority of these studies are unpublished masters or doctoral theses. Due to the lack of empirical data, best practices for developing physical literacy through physical education have not yet been established. The few intervention studies that have been conducted on the development of physical literacy in physical education classes have investigated a physical literacy circus condition and video playback and verbal feedback. Results of those studies are described below.

Kiez (2015) conducted a physical literacy intervention where schools either offered an experimental circus physical education condition or a usual practice physical education condition. Students in the experimental condition had improved motivation, eagerness, and happiness with physical activity, confidence, and also demonstrated improvement in the cognitive and behavioural elements of physical literacy (Kiez, 2015). Despite fewer hours of physical education instructional time than the usual practice condition, students in the intervention circus condition showed substantial benefits in the area of physical competence, as

well as progress towards decreasing the sex gap between girls' and boys' physical competence (Kiez, 2015).

While McManes (2013) did not focus on developing physical literacy in his study on video playback and verbal feedback, he did use part of a physical literacy assessment tool to determine physical literacy levels. Results demonstrated no statistical difference between children in the verbal feedback and video playback-verbal feedback groups in overall physical literacy results at post-test, however there was a statistically significant overall improvement for physical literacy in both groups (McManes, 2013). Confidence and comprehension were also assessed, and it was determined that only the verbal feedback group had a statistically significant improvement in comprehension (McManes, 2013). McManes (2013) hypothesized that students with a higher physical literacy score would be more active outside of the school day, however results concluded there was no correlation between physical literacy scores and activity in leisure time. Interestingly, in this study physical literacy scores were identified through physical competence, confidence, and comprehension, with little to no assessment of the affective and cognitive elements of physical literacy.

While there has been research on the intricate connection between physical literacy and physical education, the research is limited. Various publications in the literature have acknowledged a lack of physical literacy empirical data and a need for more research in the area of developing physical literacy in physical education (Lounsbery & McKenzie, 2015; ParticipACTION, 2015; Robinson & Randall, 2017).

1.5 Measuring Physical Literacy

Due to the multifaceted nature of physical literacy, measuring the attributes of physical literacy is difficult. Unlike fundamental movement skill tools that measure on a deficiency scale, physical literacy requires tools that go beyond the simple attainment of a skill (Giblin et al., 2014). Since physical literacy is not an end point, but instead a continuous journey that occurs throughout the lifespan, it is critical that the tools measuring physical literacy reflect this. Giblin, Collins, and Button (2014) argued that physical literacy assessments should focus on complex and more sophisticated elements of motor coordination. The authors did not speak to the affective or cognitive aspects of physical literacy, but solely physical competence. Limitations of physical literacy assessments have been identified, and there are currently no tools that assess an individual's ability to combine skills in different environments (Giblin et al., 2014). Robinson

and Randall (2017) suggested that physical literacy may not need to be measured at all and perhaps, that by doing so we are actually moving away from the inherent value of the concept instead of towards it. Despite these limitations, there are three prominent Canadian tools being used to measure physical literacy. At this point in time, all are restricted to land. The Physical Literacy Assessment for Youth (PLAY) tools were selected to measure the impact of the intervention in Chapter Four because of their comprehensive nature. The Physical Literacy Assessment for Youth (PLAY) tools, Canadian Assessment of Physical Literacy (CAPL), and Passport for Life will be briefly discussed below.

1.5.1 Physical Literacy Assessment for Youth (PLAY) Tools

The PLAY tools developed by Kriellaars (2013a) provide a holistic measurement of a child's physical literacy level. These measurements include six tools: (a) PLAY Coach, (b) PLAY Parent, (c) PLAY Self, (d) PLAY Fun, (e) PLAY Basic, and (f) PLAY Inventory (Kriellaars, 2014a). The PLAY tools can be used for anyone in the 7 to 12 year-old age range (Kriellaars, 2013a). The PLAY tools and its instructions can be found on the website (<https://play.physicalliteracy.ca>), and the online form allows individuals to submit completed forms into a database. The PLAY Fun tool is the objective measure of physical literacy (CS4L, 2014b). Unlike other physical literacy or fundamental motor skill tools, this is not an assessment based on deficiencies. Due to the set-up of the assessment, participants have the opportunity to score above an "achieved" level. This tool does not look at what children cannot do; instead it provides a continuum of possible improvement. The tool assesses movements at Initial, Emerging, Competent, and Proficient stages (Kriellaars, 2013b). The PLAY Fun tool takes about 15 to 20 minutes to complete with one to three children at a time. It tests 18 different tasks and compiles an aggregate score (Kozera & Kriellaars, 2011). The higher the aggregate score, the higher the level of physical literacy. The tool also provides information on competence and confidence. The PLAY Self is an indication of the affective and cognitive elements of physical literacy, while the PLAY Inventory can be used to note physical activity behaviour outside of school.

The PLAY tools have several positive features including multiple perceptions of physical literacy and movement vocabulary comprehension. Teachers are not the only ones who influence children's behaviours. Parents value physical education and can be influencers in their children's physical activity levels (Decorby et al., 2005; PHE Canada, 2013a). All people involved in a

child's life (i.e., the child, parents, teachers) can collaborate to ensure that a child can be active for life. The PLAY tools are valuable in that they measure several individuals' perspectives: the teacher's perceptions of the child, the parents' and the child's. These perceptions can be triangulated along with the objective assessment of a child's physical literacy level. The PLAY tools gather an extensive amount of data, yet uses short and simple surveys in order to do so.

The PLAY Fun tool provides an opportunity to gauge the confidence and competence of a child for each task, determining students' progression over time. Students' comprehension of movement vocabulary is also evaluated with the PLAY Fun tool (Kriellaars, 2014b). Students are instructed to perform a movement task without a demonstration. If students require a prompt, mimic, require further instruction, or need a demonstration, this is noted thus establishing the level of movement comprehension. Movement vocabulary comprehension is not tested within any other physical literacy assessment tools.

While the PLAY tools have positive features, the assessment also has some negative ones. The PLAY tools work best for those who are in the 7 to 12 age range. Assessing children at a younger age becomes more difficult with this tool due to attentiveness to the instructions and the reading level necessary for the self-report tools (Kriellaars, 2014b). Although these tools have been found to be valid and reliable (Kiez, 2015; Kriellaars, 2014b), it is difficult for researchers to ascertain these qualities since many studies conducted by Kriellaars have not been published to date. Research confirming the validity and reliability of the PLAY Fun is just beginning to be seen (Wohlers, Stearns, McHugh, Kuzik, & Spence, 2017). Additionally, since movements are conducted in isolation, they may not replicate 'real world' situations (i.e., speed is not a factor to complete any of the 18 tasks). To evaluate the PLAY Fun, Canadian Sport for Life (2014) recommends that an individual trained in movement and motion analysis should be assessing the skills. Having a trained evaluator may not always be possible, especially depending upon the background of the teacher.

1.5.2 Canadian Assessment of Physical Literacy (CAPL) Tool

CAPL is an assessment tool that measures physical literacy in children 8 to 12 years of age. Developed by researchers from HALO (Healthy Active Living and Obesity Research Institute), the CAPL has been tested on over 2000 children (CAPL, 2013). This tool measures four areas: fundamental movement skills through an obstacle course, physical fitness, physical activity behaviour, and a questionnaire to assess knowledge, understanding, and awareness

(Lloyd, 2010; Longmuir et al., 2015). Unlike the PLAY tools, the fundamental movement skills obstacle course is demonstrated and verbal cues are used to show the children what to do. CAPL assesses hopping, dodging, kicking, jumping, catching, and throwing. To determine physical fitness, partial curl-ups, push-ups, a sit and reach test, along with back strength activities are completed. Grip strength and arm flexibility are recorded along with a shuttle run/beep test, and measurements of height, weight, and waist circumference are taken. Physical activity behaviour is assessed through seven days of pedometer data, and a questionnaire is used to determine knowledge, understanding, and awareness.

This assessment combines several skills in the obstacle course to create an applied physical activity/sport situation, which is an advantage to this measurement tool. The tool assesses four areas and uses a variety of data collection methods to do so (pedometers, questionnaires, objective measurements). CAPL has been used to measure children's physical literacy and the data has been published (ParticipACTION, 2015).

Although CAPL provides an applied physical activity/sport situation for evaluation, this results in negative features of the tool. Because the CAPL tool has several areas to measure, evaluators would take more time to assess a child than if only one area was being measured. The assessment of the fundamental movement skills is a particular weakness of CAPL. CAPL (2013) requires two examiners to assess a child through the obstacle course. One examiner uses a stopwatch to determine time length of trial and throws or places the ball during the trial. A second examiner scores the child on a list of qualities, however this all takes place very quickly as a trial lasts less than 30 seconds. Without a video recording, assessing all of the qualities in real time does not appear to be efficient or effective. Furthermore, the instructional video depicts only one child being assessed while the rest of the children are sitting on a bench and watching. These procedures appear to be against best practices in physical education (e.g., not putting children on display). One of the reasons children tend to dislike physical education is because of the display effect (Carlson, 1995).

1.5.3 Passport for Life

Canadian schools have access to Passport for Life, a tool designed by PHE Canada to support the development and advancement of students' physical literacy (PHE Canada, 2013b). As of September 2017, Passport for Life was available for kindergarten through grade twelve (PHE, 2013b). The tool provides a reflection of each student's physical literacy, and is not to be

used as a summative evaluation (e.g., report card mark) or a comprehensive assessment of physical literacy (Keegan et al., 2013; PHE Canada, 2013b). Similar to the other assessment tools, Passport for Life uses a mix of self-report questionnaires and objective assessments to evaluate physical literacy. There are four areas the tool evaluates: active participation, living skills, fitness skills, and movement skills. Living skills and active participation are online questionnaires that ask the students about their physical activity behaviours. The fitness skills evaluated include a four-station circuit, a lateral bound or hexagonal jump, and a plank, while the movement skills include running, throwing and catching, and kicking (PHE Canada, 2013b). Depending upon the skill, students may have multiple trials to perform well on the task. Like the CAPL, instructions and demonstrations are given to the students. Passport for Life is primarily focused on using the results from the physical literacy assessment for goal setting. The recommendation is to administer the assessment twice a year (beginning of school year and end of school year). Passport for Life generates a class passport and an individual student passport. It combines student responses to online questionnaires with student data assessed in class. Students' results are reported within the target areas as Emerging, Developing, Acquired, or Accomplished. Teachers have access to the online platform that gathers all of the information. Similar to CAPL, this tool measures four domains: active participation, living skills, fitness skills, and movement skills (Talsma, 2013).

Passport for Life has many positive aspects. A consultative process with content experts was used to initially develop the tool, and a recent study has conducted a validation analysis that supports the use of the Passport for Life (Lodewyk & Mandigo, 2017). The focus for this resource is on goal setting. It gives students a sense of ownership and can be used from year to year if passed along by teachers. While it is not to be used as a “comprehensive assessment of physical literacy” (PHE Canada, 2013b), it works as a baseline to determine children's physical literacy and how to grow from there. The individual student passports can be a valuable tool for communication with parents. Recent updates to the tool have included accommodations for students with a disability.

While Passport for Life has positive qualities, the assessment tool also has some negative features. Teachers who are curious about the tool cannot view what is required of them and their students with regards to the four areas of measurement until they register and log into the website. Teachers may refrain from using Passport for Life if they need to first go through the

hassle of registering before even understanding what the program is all about. While this resource was created for and piloted with teachers, it is unknown how many teachers are using it in their physical education classes. In addition, it is difficult to discern whether teachers are using it properly as a formative assessment.

The PLAY tools, CAPL, and Passport for Life are the predominant tools being used to measure physical literacy in Canada. Each assessment tool has its own advantages and disadvantages, and one tool may be more applicable than others in a certain context (i.e., program evaluation, research, teaching). All of these tools can be used in a physical education context, however some may be more difficult for teachers to use because of all of the components.

1.6 Research Questions and Hypotheses

With physical education being an opportune school subject during which to develop physical literacy and because physical literacy is explicitly defined and used within the Saskatchewan physical education curriculum (Saskatchewan Ministry of Education, 2010), research in the area of physical literacy and physical education is warranted. The limited research conducted in the development of physical literacy in physical education classes has demonstrated that some teachers of physical education are unaware and unsure about the concept of physical literacy, and there appears to be a critical lack of literature and empirical data regarding best practices of developing physical literacy through physical education.

The aim of this dissertation research was to further explore teachers' understanding of physical literacy, its connection with physical education, and the potential impact of an intervention on students' physical literacy.

The following research questions guided this body of work:

- 1) What do teachers of physical education in a Canadian province know and understand about physical literacy?
- 2) What do teachers of physical education in a Canadian city know and understand about physical literacy and physical education?
- 3) Does a curricular-based physical literacy intervention delivered by teachers (specialist, generalist, generalist combined) in elementary school physical education classes develop students' physical literacy?

Hypothesis: Students participating in the physical literacy intervention should show statistically significant changes in physical literacy than the usual practice students. To answer the research questions, three studies were designed and are discussed in Chapters Two, Three, and Four (Figure 1.1). Although each study is unique, Study Two and Study Three were closely linked and decisions made for Study Three affected the selection of participants for Study Two.

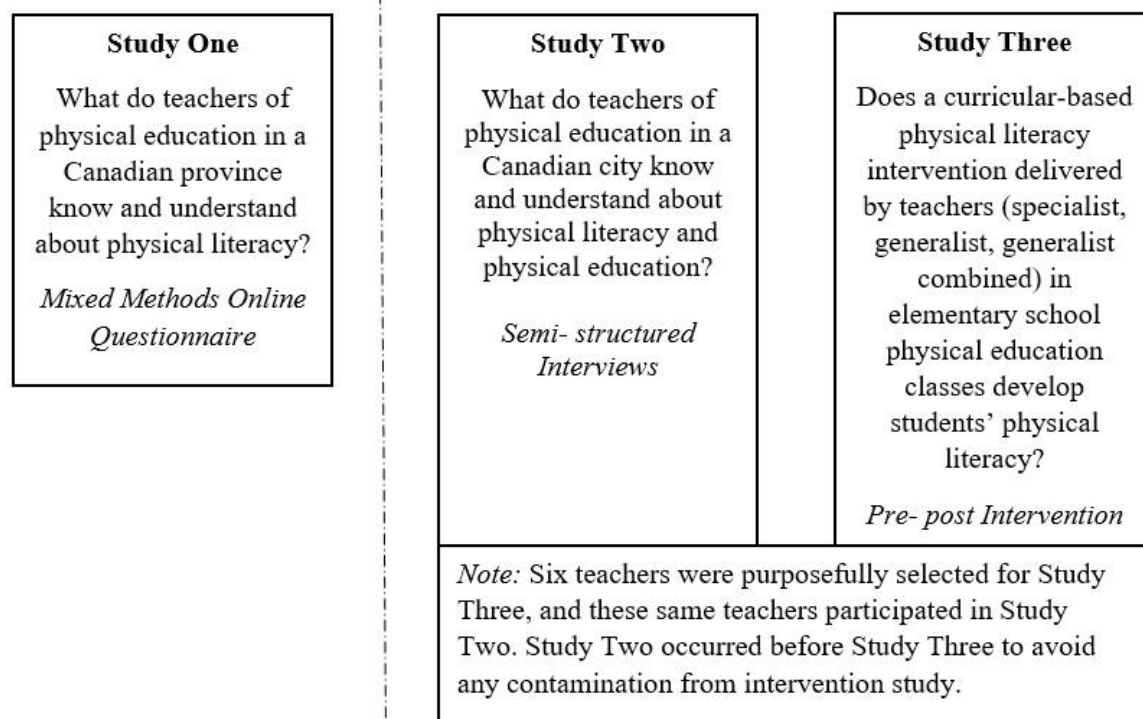


Figure 1.1 Comprehensive research program identified by three separate, but related studies

1.7 References

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Chapter 2

Study One: Physical Literacy is...? What Teachers Really Know

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2.1 Introduction

Due to children's high levels of sedentary behaviour, low levels of physical activity, and low levels of fitness, physical literacy has been identified as a possible approach to help children become more active (ParticipACTION, 2015). At present, little is known about current teachers' understanding of physical literacy. Some literature exists suggesting that those involved with physical activity, especially those teaching physical education, do not fully understand physical literacy (Stanec & Murray-Orr, 2011; Tristani & Fraser-Thomas, 2014). In Stanec and Murray-Orr's (2011) research, classroom teachers considered themselves physically literate, however their explanations of physical literacy suggested that in fact they did not have a thorough comprehension of the concept of physical literacy. In addition, the teachers also struggled integrating physical literacy into the daily routine of the classroom. The intent of this study was to learn about what current teachers in a Canadian province know and understand about the concept of physical literacy.

In Canada, physical literacy is considered the foundation for lifelong participation in physical activity (CS4L, 2014). Physical literacy is about developing the whole person; mind and body as one. While the psychomotor learning domain is a widely recognized element of physical literacy, additional learning domains (affective and cognitive) are also represented in the concept, along with a behavioural element (ParticipACTION et al., 2015). It is clear that physical literacy is much more than physical competency.

The recent Canadian Physical Literacy Consensus Statement that debuted at the International Physical Literacy Conference in Vancouver identified four elements of physical

literacy that are each as valuable as the next: (1) motivation and confidence, (2) physical competence, (3) knowledge and understanding, and (4) engagement in physical activities for life (ParticipACTION et al., 2015). All of these aspects must be considered when developing physical literacy, regardless of the context. Physical literacy encompasses movement vocabulary, movement fluency, and physical proficiency, in addition to interactions with the environment (Kriellaars, 2013).

An individual who has high physical literacy can perform a wide variety of fundamental motor skills allowing them to participate in a range of activities or sports, can interact competently and confidently with a range of environments, and values physical activity (CS4L, 2014; Higgs, Balyi, & Way, 2008; Mandigo, Francis, Lodewyk, & Lopez, 2009; Whitehead, 2001). Physical literacy lays the foundation for being active during the lifespan. If an individual has a broad range of skills in and on water and air, as well as ice, snow, and land, these skills may increase opportunities to be more physically active (CS4L, 2014). While physical literacy is critical for people of all ages, Canadian Sport for Life (2014) identifies childhood as the optimum time to develop physical literacy. If a child is able to run, jump, and manipulate objects, they may be able to participate in a number of activities, regardless of age; conversely, if children are not physically literate, they may drop out of activity (Higgs et al., 2008).

One of the ways schools can support the development of physical literacy is through physical education classes. The United Nations Educational, Scientific and Cultural Organization identifies physical literacy as the foundation of physical education programs (UNESCO, 2015). All elements of physical literacy are incorporated within provincial curricula, and many provincial physical education curricula in Canada emphasize that students should become physically literate as a result of the curriculum being taught effectively (i.e., achieving grade standards, expectations, or outcomes) (Mandigo et al., 2009). Though the curricula state physical literacy is an expected outcome of physical education, this outcome can only be attained if teachers are indeed teaching the curriculum effectively. However, it is unclear whether students are becoming physically literate as there is a lack of literature regarding the impact of physical education classes on the development of physical literacy.

Due to the important role that schools play in the overall development of children, it is vital for teachers of physical education to understand physical literacy. If teachers possess background knowledge in physical literacy, they can maximize opportunities to engage students in diverse

ways. Because physical education programs can reach virtually all children, teachers play a pivotal role in not only developing physical literacy in their students, but also promoting awareness and understanding of the concept with other teachers, administration, and parents. To do so teachers need to be aware of the complexities of physical literacy, as unlike some classroom subjects, physical literacy involves aspects from three learning domains: cognitive, affective, and psychomotor (Graham, Holt/Hale & Parker, 2013).

To fully comprehend physical literacy may be a difficult task as some teachers may not be as well versed in physical education knowledge and material as others. Many studies have investigated the impact of the type of teacher instructing physical education. In Canada, there are two types of teachers who instruct physical education: specialists and generalists. A specialist physical education teacher refers to those who have been certified to teach physical education (Stanec & Murray- Orr, 2011). Conversely, generalist teachers are typically classroom teachers responsible for the instruction of all subjects; previous research has indicated some classroom teachers are not adequately equipped to teach the physical education curriculum, and there may be a disconnect between pre-service training and how well-prepared teachers are to fulfill the curricular outcomes (Decorby, Halas, Dixon, Wintrup, & Janzen, 2005; Fraser-Thomas & Beaudoin, 2002). The lack of generalist knowledge and confidence appears to be a common theme in physical education research (Cothran, Kulinna, & Garn, 2010; Jin, 2013; Morgan & Bourke, 2008). As only 39% of Canadian schools are reported to employ physical education specialists, the fact that generalist teachers may not be well equipped to teach physical education is concerning (PHE Canada, 2015). As both specialists and generalists teach physical education, both types have the potential to affect the physical literacy of their students.

The outcome of physical education is to develop physically literate individuals, and teachers play a key role in developing and fostering physical literacy (Whitehead, 2010). However, much confusion surrounds exactly how teachers should integrate physical literacy within their physical education classes. Thus, it is important to understand what these teachers know and believe about the concept of physical literacy. A key question remains: what do teachers of physical education (both specialist and generalist) understand about physical literacy? This study will provide some insight on teachers' understanding of the concept, how they implement physical literacy in their gymnasiums, and what supports teachers require to progress on their physical literacy journeys.

2.2 Method

2.2.1 Questionnaire

In consultations with colleagues whose research specialization was school-based physical education, I developed a questionnaire using the Fluid Survey platform. The questionnaire was then reviewed by a knowledgeable panel of current physical educators to ensure content validity. After the review, modifications were made to the initial draft to ensure questionnaire questions were clear and additional options to questions were added. Once changes were made the questionnaire was sent back to the panel for review and a pre-testing of the questionnaire design. After discussion and pre-testing the questionnaire in full, the panel came to a consensus of the questionnaire's content validity. Once the panel came to a consensus, the questionnaire was administered to the public.

The questionnaire (Appendix A) was composed of demographic information and both closed and open-ended questions about the concept of physical literacy. The questionnaire's structure was informed by other questionnaires and interview guides in the physical education literature (Morgan & Hansen, 2007; Stanec & Murray-Orr, 2011). Demographic information requested included sex, age, years of teaching, grades currently teaching, educational background, and the teachers' current teaching assignment.

Open-ended questions inquired about the definition of physical literacy, how the participants' instruction develops physical literacy in their physical education classes, how the provincial curriculum addresses physical literacy, whether parents spoke to them about physical literacy, and community initiatives. Closed-ended questions asked about resources and barriers with relation to physical literacy. Participants also had the opportunity to pose questions regarding physical literacy.

After answering the first question "What does physical literacy mean to you?" participants were shown the PHE Canada definition of physical literacy (PHE Canada, N.D.). This was to ensure participants had a comprehensive and accurate definition of physical literacy in order to complete the remainder of the questionnaire.

2.2.2 Procedure

Following institutional ethical approval, the questionnaire was distributed through the membership and networks of the Saskatchewan Physical Education Association (SPEA). SPEA is a provincial non-profit incorporated organization that provides quality leadership, advocacy,

and resources for physical education and wellness professionals (SPEA, 2015). The questionnaire was also promoted through Twitter and other social media to expand reach to teachers who were not SPEA members. The survey was live from November to December 2014.

2.2.3 Participants

The questionnaire was designed for teachers of physical education in the province of Saskatchewan. This included administrators, specialists, generalists, high school teachers, and elementary teachers. The respondents were those who currently taught physical education and those who had previously taught physical education. By allowing a broader participant pool, I anticipated a wider base of knowledge from all of those who could develop or support physical literacy in schools (i.e., principals who may have experience teaching physical education, etc.).

2.2.4 Response Rates

Overall there were 106 valid responses out of 157 total responses. Responses with only consent (i.e., yes to consent and no demographics or questions answered), no to consent, or only demographics answered were excluded from the total responses thus leaving 106 valid survey responses. Of these 106 valid survey responses, 61 were 100% completed. Forty-five of the 106 responses answered some to nearly all questions. These 45 responses were included because they provided responses to the questions, and unanswered questions may have been an indication of a lack of knowledge and comprehension regarding the topic of physical literacy.

2.2.5 Data Analysis

Qualitative and quantitative data were collected in parallel, analyzed separately, and then merged (Creswell & Plano Clark, 2011). Collecting both quantitative and qualitative data brought greater insight into the research question than would be obtained by either type of data separately.

Quantitative data was entered into SPSS Version 23 to be analyzed (Vincent & Weir, 2012). Data analysis determined 1) if a relationship existed between the type of teacher (specialist or generalist) and their understanding of physical literacy, and 2) if a relationship existed between teachers' years of experience and their understanding of physical literacy.

A 2 x 3 chi-square test was performed to analyze the type of teacher (specialist or generalist) and their understanding of physical literacy (full understanding, partial understanding, and no understanding). Any cases with zeroes were removed (i.e., no answer to type of teacher or

no answer to knowledge question). Participants who had a response of a mixed teaching situation (i.e., both specialists and generalists teaching physical education) were removed as the goal of this analysis was to look specifically at the differences between specialist teachers and generalist teachers' understanding of physical literacy. This left 91 valid cases out of the total 106 responses.

A second chi-square analysis was performed to determine if there was a relationship between the years of teaching experience and the understanding of physical literacy. A 2 x 3 chi-square test was performed to analyze years of teaching experience (0 to 15 years and 16 to 30+ years) and their understanding of physical literacy (full understanding, partial understanding, no understanding). Any cases with zeroes were removed (i.e., no answer to knowledge question). This left 104 valid cases out of the total 106 responses. Both chi-square tests met the assumption that no more than 20% of the expected counts were less than five, and all individual counts were greater than one (Weaver, 2017).

Frequency counts were used for closed-ended questions on resources and barriers. Participants were asked about the resources and supports needed to effectively develop physical literacy. In these questions, the participants were given several options, as well as an opportunity to select "Other." The layout was similar in format for all questions about resources and barriers.

Qualitative data was used to explore participants' knowledge of physical literacy and its relationship to physical education. Data from the open-ended questions was transcribed into a Microsoft Word document. Thematic analysis was conducted in an inductive manner with the data aligning into themes instead of trying to fit the data into a pre-existing coding frame (Creswell, 2014, p. 195-200). Individual thematic analyses were completed for each open-ended question. To become familiarized with the data, the first author read every participant's complete questionnaire response before aligning all participants' data into the individual open-ended questions. Once separated into the open-ended questions, initial codes were generated from the data. The initial codes were then used to form lower-ordered categories, which were then categorized into themes. The second author checked responses to ensure they fell into the appropriate themes.

For the open-ended question about the definition of physical literacy, components of the PHE Canada (N.D.) definition were used to help build relationships from lower-ordered

categories into themes. For example, if participants discussed mastering fundamental movement skills or performing movement skills, these initial codes would be used to form the lower ordered category of physical competency.

2.3 Results

Though both qualitative and quantitative data were collected in parallel through the questionnaire, the two types of data were analyzed separately. The participant demographics will be presented first, followed by the quantitative findings and then the qualitative findings.

2.3.1 Participant Demographics

Fifty-one individuals identified as male and 55 individuals identified as female. For years of teaching experience, the largest group of participants (34%) reported teaching for zero to five years, with the next largest group of participants (19%) having taught for 26 or more years. The remaining participants had between eleven to twenty-five years of teaching experience. About 40% of participants taught at an elementary school level, while half of participants taught either at a high school or a combination of elementary and high school levels. For educational background, two thirds of participants had a Bachelor of Education with a Major in Physical Education. Participants could select all degrees that applied to their experience; some selected multiple degrees (e.g., B.Ed. Major in Physical Education and Bachelor of Science in Kinesiology). Participants also identified the physical education context in their school; about half of the participants in this study identified having a full-time specialist in their school.

Table 2.1. *Demographic characteristics of study population*

Characteristic	No. of Individuals	% of Total Respondents
Age		
21- 25	14	13.2
26 - 30	25	23. 6
31- 35	15	14.2
36 - 40	9	8.5
41 - 45	8	7.5
45 - 50	10	9.4
51+	25	23.6
Total	106	100
Sex		
Female	55	51.9
Male	51	48.1
Total	106	100
Years of Teaching Experience		
0 - 5	36	34.0
6 – 10	16	15.1
11 - 15	15	14.2
16 - 20	12	11.3
21- 25	7	6.6
26 – 30	14	13.2
30+	6	5.7
Total	106	100.1
Type of School		
Elementary School	43	41.0
High School	27	25.5
Combination	26	24.5
Other	6	5.7
<i>*Other: retired, substitute, college level, or principal.</i>		
University Degrees		
B.Ed. Major PE	63	
B.Ed. Minor PE	9	
B.Ed. No PE	20	
B.Sc. Kin/ B.PE	37	
B.A.	11	
Masters	18	
Physical Education Teaching Context		
Generalists	22	20.8
Full Time Specialists	51	48.1
Part Time Specialists	12	11.3
Other	20	18.9
External Provider	0	0
<i>*Other: combination of generalists and specialists.</i>		

2.3.2 Quantitative Results

Specialist/generalist and understanding of physical literacy. A chi-square test of independence was performed, and no relationship was found between the type of teacher (specialist/generalist) and their knowledge of physical literacy (full understanding, partial understanding, no understanding). The relationship between these variables was not significant, $X^2(2, N = 91) = .356, p = .837$.

Years of teaching experience and understanding of physical literacy. A chi-square test of independence was performed and a relationship was found between the years of teaching experience and knowledge of physical literacy. The relationship between these variables was significant, $X^2(2, N = 104) = 8.743, p = .013$. The participants with 0 to 15 years of teaching experience had a greater grasp of physical literacy with observed counts greater than expected counts in both full and partial understanding of physical literacy. Those with 16 to 30 years of experience had a lower than expected count of full understanding and a higher observed count in the no understanding category than expected.

Resources and Barriers. When asked about the resources needed to develop physical literacy, approximately 30% of the participants selected an option which included lesson plans, activities, professional development, assessment tools, online resources, and video demonstrations (Table 2.2). Aside from the top selected option already mentioned, only six or less participants selected any of the other combinations of resources, with 10% of participants not answering the question.

Participants were also asked how they accessed physical literacy resources. The following sources were independently listed, however participants could select more than one option: Physical and Health Education (PHE) Canada, the participants' school division, SPEA, and "other" (Appendix A, Question 11). Most participants selected a combination of these sources (Table 2.3). Some participants clarified the "other" option and answers ranged from internet websites such as Growing Young Movers (N.D.), Twitter, YouTube, and SHAPE America, to speaking with colleagues and the Saskatchewan curriculum.

In addition, participants were asked about the barriers they faced in developing physical literacy in their physical education classes (Appendix A, Question 12). Several options were provided, and participants had the ability to select as many barriers as they desired (Table 2.4).

Table 2.2. *Top five selected resource options to effectively develop physical literacy*

Resources	No. of Participants	% of Total Participants
All apart from other (lesson plans, activities, professional development, assessment tools, online resources, video demonstrations)	29	27.4
Lesson plans, activities, assessment tools	6	5.7
All except video demonstrations (no other)	5	4.7
All including other	4	3.8
All except lesson plans	4	3.8

Note. 11 participants did not answer this question.

Table 2.3. *A breakdown of where physical literacy resources were accessed*

Location	No. of Participants	% of Total Participants
PHE Canada, SPEA, and possibly other	17	16.0
All (no other)	16	15.1
School division and SPEA	16	15.1
Other	13	12.3
SPEA and possibly other	9	8.5
All	9	8.5
School division and possibly other	7	6.6
PHE Canada	6	5.7
PHE Canada, school division, and possibly other	2	1.9

Note. 11 participants did not answer this question.

Table 2.4. *A breakdown of barrier options with frequency counts of participants' selections*

Barriers	No. of Participants
Appropriate and sufficient equipment	47
Time to prepare to teach physical education	43
Time for physical education classes	42
School division support for physical education	42
Opportunities for professional development	39
Access to facilities (school and community)	35
Resources (print, web, etc.)	30
Support to attend physical education conferences	25
Other, please specify	19
Concept of physical literacy is unclear	11

2.3.3 Qualitative Results: Themes

This portion of the study refers to the data from the survey's open-ended questions (Appendix A, Questions 8-9, 13-15). The information gained from each question are grouped into themes. For the definition of physical literacy, three subthemes are presented: (a) comprehensive physical literacy knowledge, (b) physical competence, and (c) literacy. For findings surrounding the daily instructional practice and the development of physical literacy in physical education, five subthemes were generated: (a) content, (b) pedagogy, (c) affective domain development, (d) using the curriculum, and (e) skill. For curriculum, three subthemes emerged: (a) concern about the curriculum, (b) basics and a baseline, and (c) yearning for more. This section concludes with thoughts from teachers about parents and community initiatives. Participants are identified by a participant number in order to remain anonymous.

2.3.3.1 What is Physical Literacy?

Participants' responses were organized into three subthemes: (a) comprehensive physical literacy knowledge, (b) physical competence, and (c) literacy. The first subtheme generated from this question was identified as *comprehensive physical literacy knowledge*. Participants provided responses that included several components of physical literacy: movement vocabulary, confidence and competence, valuing activity and/or movement, diversity in activities and/or environment, long term/life span, physical proficiency or competence, motivation, and development of the whole person. These components were part of or related to the PHE Canada (N.D.) definition. Participant 117's response below discusses several components of physical literacy.

Being able to understand and demonstrate the skills and strategies necessary to physically move about our environments, in a confident and safe manner, and be able to apply similar movements in different environments. Being physically literate means you understand how your body moves and how that movement can maintain or improve your overall health.

The above response suggests a thorough understanding of the concept and was typical for responses categorized into this theme. A large difference in understanding physical literacy was observed between responses with multiple components of physical literacy identified compared to responses categorized within the second subtheme.

The second subtheme discussed a focus on *physical competence*. A partial understanding of the concept of physical literacy was evident in a number of participants' responses.

Approximately two thirds of participants only spoke about the physical competence element of physical literacy. For example, participants may have only discussed the importance of fundamental movement skills, without identifying any other components of physical literacy. One participant noted: “Applying fundamental movement skills to all types of movements” (Participant 16).

Less than 10% of participants showed little to no evidence of understanding the concept of physical literacy. These participants’ spoke about a focus on the traditional “*literacy*” aspect of the term physical literacy.

Physical literacy means working on academics, such as Math or Reading, while moving the body by balancing, or moving in various other ways at the same time. A student can walk a balance beam while looking at sight words or letters as he/she is walking and trying to balance at the same time. (Participant 84)

These responses did not match with any definition of physical literacy and responses did not include any components of physical literacy.

2.3.3.2 Developing Physical Literacy in Physical Education Classes

Five subthemes were generated from this open-ended question about instructional practice and physical literacy. These subthemes included: content, pedagogy, affective domain development, using the curriculum, and skill transfer. The first two subthemes accounted for about 70% of participants and will be discussed below. Content refers to what to teach, while pedagogy refers to how one is teaching (Graham et al., 2013).

Fifty-four percent of participant responses fell under the subtheme of *content* as the major tool to help develop physical literacy during physical education. Participants identified the use of movement vocabulary, fundamental movement skills, movement patterns, and active participation. The majority of participants indicated using a wide variety of activities and multiple environments to develop physical literacy in their classes:

Students are exposed to a variety of activities and sports that promote balance, coordination, throwing, kicking, and catching. We do a number of stations and circuits where students each day are able to participate in a number of movements. (Participant 34)

A second subtheme was *pedagogy* in physical education. Responses in this subtheme included the use of specific teaching models, clear concise instructions, and the use of progressions to teach skills. In addition, participants also spoke about using small-sided games,

creating a safe learning environment and using feedback throughout the class. Participants frequently described the teaching strategies they used to develop physical literacy during physical education classes.

Most of my instruction in the gym is based on high repetitions with lots of success and low levels of failure. This way students are able to gain confidence in their actions and self-teach and adjust their motions in order to be most effective.
(Participant 102)

2.3.3.3 *What's Curriculum Got to Do with It?*

Participants were asked if the current provincial physical education curriculum addressed physical literacy. If participants answered yes, they were asked to provide specific examples. About 60% of participants felt the provincial curriculum did address physical literacy. Three subthemes were generated from these responses: (a) concern about the curriculum, (b) basics and a baseline, and (c) yearning for more.

The first subtheme was *concern about the curriculum*. One concern about the curriculum was that the curriculum was unclear and outdated. Participants spoke specifically about some high school physical education courses being outdated. Participant 39 explained “Yes, I believe the Curriculum does support physical literacy. Each grade builds on the previous one. Grade 7-9. Wellness 10 also supports [physical literacy]. However, PE 20 and 30 are outdated.” Teachers, regardless of level (i.e., elementary or high school) also perceived the physical education curriculum as quite vague:

I believe the current Saskatchewan curriculum for physical education does address physical literacy. However, like every curriculum it can be wordy and unclear. It would be great if the curriculum was written in grade appropriate language so that it could be used as a communication tool with students and parents. (Participant 50)

A second subtheme related to the physical education curriculum was that the *curriculum provides basics and a baseline*. Many participants conveyed that all of the aspects of physical literacy were already identified in the curriculum in one form or another. An elementary teacher expressed the curriculum must be taught effectively to develop physical literacy:

Yes the outcomes and indicators would definitely result in physical literacy if they were provided to students effectively and assessed properly. Assessment is a struggle when you have so little time already to get students moving. We have 3-30 minute periods each week. (Participant 42)

Participants expressed that by understanding and following the curriculum, teachers would be well on their way to developing physical literate students. Participant 61 agreed that the curriculum developed physical literacy: “Yes it does. Our current curriculum was created with a PL lens and gives us plenty of opportunities to address PL in our classes.” Participants valued the curriculum as a beneficial base from which to start developing physical literacy.

Lastly, a third subtheme emerged from the thoughts of participants who believed the curriculum did address physical literacy. This third subtheme was *yearning for more*. Participants desired certain things that the current curriculum did not include such as lesson plans. Even those with many years of experience discussed the need for specifics that the curriculum was lacking. An elementary teacher with 26 years of experience mentioned “Yes, I find [the curriculum] matches the movement vocabulary of physical literacy very well. I think it would be helpful to have some lesson plans as exemplars to give more examples and ideas.” Unpacking the curriculum with professional development type of supports was another opportunity that teachers longed for. An elementary teacher with 13 years of experience discussed needing help in learning how to teach the curriculum: “Yes, I believe the current Physical Education curriculum does support physical literacy. However, the curriculum could/should be supported by more available resources/workshops.”

2.3.3.4 Who Else Is Involved?

Participants were also asked about parents and community initiatives. When participants were asked if parents discussed physical literacy with them, 75% reported parents never mentioned physical literacy, while approximately 10% reported parents did discuss physical literacy with them. About 15% of participants did not answer this question. The participants that stated parents did talk to them about the concept gave examples that did not refer to physical literacy, such as: “Physical activities that will help with academics” (Participant 81). Participants were asked if they were aware of any community initiatives that promoted physical literacy. Almost 40% of participants chose not to answer this question. The remaining participants who did respond indicated they were not aware of any community initiatives or that their community did not have any community initiatives in place. Some participants were able to identify community initiatives; about 15% of participants identified Saskatchewan *in motion* as a community initiative that promoted physical literacy. Ten percent spoke about sports promoting

physical literacy. Seventeen participants (16%) either did not mention a particular community initiative in their responses or they did not provide answers applicable to the question.

2.4 Discussion

The purpose of the current study was to explore what teachers of physical education understood about the concept of physical literacy. While many studies exist with regards to the impact of physical literacy in sport and recreation, research is lacking on the relationship between physical literacy and physical education. These findings provide an exploratory snapshot of teachers' understanding of physical literacy.

Research has shown that physical education specialists have higher levels of enjoyment, confidence, and knowledge in teaching physical education (Decorby et al., 2005). However, research has also shown generalists can provide effective instruction in physical education with the right support (Faucette, Nugent, Sallis, & McKenzie, 2002; Sallis et al., 1997). Results from the present study showed there was no significant difference between the type of teacher (i.e., specialists and generalists) and their respective understanding of physical literacy. These findings suggest that more support is needed for all kinds of teachers (i.e., both specialists and generalists) to learn about and integrate physical literacy into their physical education classes.

A significant difference was found between the participants' years of teaching experience and their understanding of the concept of physical literacy. Participants with 0 to 15 years of experience were more likely to have a full or partial understanding of physical literacy than participants with 16 to 30 years of teaching experience. This may indicate: (a) that current physical education teacher education [PETE] programs are adequately preparing teachers regarding the topic of physical literacy, or (b) perhaps teachers with less experience are attending more professional development opportunities where physical literacy education is occurring. An example of PETE would include an initiative at Mount Royal University, where in 2014, a new Bachelor of Health and Physical Education degree specializing in Physical Literacy was launched (Mount Royal, N.D.).

Although teacher preparation programs may be focusing on physical literacy in physical education, continuing professional development for teachers is needed. Some literature has shown that professional development for physical education teachers is lacking; few opportunities exist for physical education specific professional development or the professional development that does exist is poor (Armour & Yelling, 2004; O'Sullivan, 2006; Souza, 2015).

Although we speculated above that teachers might be attending more professional development opportunities, the literature suggests otherwise. Future work is required to understand how teachers are gaining their physical literacy understanding. While teachers with less experience were more likely to have full or partial understanding of physical literacy, overall the majority of teachers who participated in this study had a partial understanding of physical literacy. In this present study and in the literature, opportunities for continuing physical education specific professional development are desired by teachers (Armour & Duncombe, 2004; Stanec & Murray-Orr, 2011). Both teacher preparation and professional development are avenues to potentially provide teachers with support for their teaching practices.

The results from the present study indicated there was a vast range of understanding of the concept of physical literacy. This is consistent with the literature as multiple definitions of physical literacy currently exist (Aspen Institute, 2015; CS4L, 2014; ParticipACTION, 2015; Roetert & Jefferies, 2014; Whitehead, 2010). McCaffery and Singleton (2013) discuss a few of the popular Canadian definitions of physical literacy, as well as the issue of various sectors transitioning the philosophical underpinnings of Whitehead's concept of physical literacy into definitions without the same monist belief. The majority of the teachers in this study did not understand the concept of physical literacy. This may not have been a result of confusion over definitions, but a lack of understanding of the concept.

The creation of Canada's physical literacy consensus statement sought to help clarify discrepancies about the concept of physical literacy and provide a common definition (ParticipACTION et al., 2015). Within this definition, physical literacy is comprised of four essential elements: motivation and confidence, physical competence, knowledge and understanding, and engagement in physical activities for life (ParticipACTION et al., 2015). At the time of this study, the Canadian physical literacy consensus statement had not been created. In this current study, almost 60% of participants focused on the physical competence aspect of physical literacy. To demonstrate a comprehensive understanding of physical literacy, participants were required to identify several components of physical literacy. Only 31% of participants could do so. This demonstrates the need to better support teachers in their understanding of physical literacy in order to impact their students' development. These results also identify the importance for all elements of physical literacy to be equally valued during

instruction. By excluding the other elements of physical literacy, physical literacy narrows to become the development of fundamental motor skills.

There has also been wide debate questioning whether the term “physical literacy” is the appropriate term to be used for this concept in an educational setting (Lounsbery & McKenzie, 2015). Perhaps the term itself contributes to the misunderstanding of some teachers who have been instructed by school divisions to focus on “*literacy*” as solely reading and writing. By promoting the concept of physical literacy, perhaps teachers will begin to expand notions about what “literacy” can include.

Similar to the previous question on the concept of physical literacy, there was a wide range of responses with regard to how instruction in physical education can develop physical literacy. The majority of participants identified the physical education lesson content as the means for developing physical literacy in their classrooms. A wide variety of activities and environments were discussed frequently in these responses. Other teachers had never considered how teaching in physical education could develop physical literacy, while some spoke to different teaching models, breaking down skills, and creating a safe learning environment to build confidence and competence. Five subthemes were generated through participant responses about how instruction in physical education could develop physical literacy. The subthemes generated from this question highlight some of the essential components of physical education: *content, pedagogy, affective domain development, and skill transfer*. All of the learning domains were identified throughout the participants’ responses: cognitive, psychomotor, and affective, which may suggest teachers are integrating all elements of physical literacy, but are unaware of it. While it is favourable that participants discussed these critical components of physical education, it is somewhat concerning that most participants isolated only one component. Examples of this included responses that only spoke to the subtheme of “content,” without including other subthemes. Development of the whole person is a critical aspect of physical literacy (Whitehead, 2010); it is important teachers are aware that to develop physical literacy all of these components of physical education need to be involved.

Many participants identified a need for a variety of physical literacy resources. Participants desired lesson plans, activities, professional development, assessment tools, online resources and video demonstrations. While such resources are available through online resources as Active for Life (2015), PHE Canada, Growing Young Movers (N.D.), and Canadian Sport for Life,

numerous participants seemed to be unaware of these resources. Conversely, when participants were asked about where they accessed physical literacy resources, many individuals identified they used the PHE Canada website, the SPEA (the provincial organization) website, their school division, and other online websites. It would appear that despite resources existing and that participants are in fact accessing the locations where the resources are housed, participants are still at a loss for resources. Similar to the multiple definitions of physical literacy, perhaps this is due to the fact that there is no “gold standard” for physical literacy resources and assessments (Giblin, Collins, & Button, 2014). Despite the existence of resources, it appears as though teachers’ needs for physical literacy resources are not being met.

When asked about barriers to developing physical literacy, participants identified issues that are well known within the subject of physical education and implementation of daily physical activity, such as *time for classes* and *appropriate and sufficient equipment* (Middlemass Strampel et al., 2014; O’Sullivan, 2006). A lack of opportunity for professional development was also high on the list of barriers. This was also discussed in responses noting the need for professional development. Participants selected *the concept of physical literacy being unclear* as the least selected barrier to developing physical literacy. This highlights two issues. The first being that barriers to instructing physical education overall as a subject in school are still prevalent because the majority of choices selected by participants referred to *time for classes* and *appropriate and sufficient equipment*. The second relates back to confusion surrounding physical literacy as a concept. This study’s results demonstrate most participants only have a partial understanding of physical literacy. Herein lies the problem. Teachers believe they have a complete understanding of physical literacy, but they are frequently missing critical elements of the concept. Development of the whole person (e.g., cognitive, affective, psychomotor, and behavioural) will be difficult to address if essential elements of physical literacy are lacking.

Although the Saskatchewan physical education curriculum may not explicitly refer to physical literacy in the outcomes, the curriculum does include Whitehead’s (2006) definition of physical literacy in the introduction along with facts counteracting common myths about the value of physical education (Ministry of Education, 2010, p. 8). The majority of teachers identified that all aspects of physical literacy are evident within the curriculum’s outcomes and indicators. One of the difficulties with transitioning a concept such as physical literacy to the field of physical education is determining how to do so genuinely. The IPLA (2016) suggests

that physical literacy is much more encompassing than the subject of physical education, however it is clear that physical education classes offer a valuable opportunity to increase the physical literacy of children and youth. More discussion is required to truly understand how the concept of physical literacy can be developed in physical education classes.

While many teachers believed the curriculum did address physical literacy, those same participants expressed several negative issues regarding the curriculum. The majority felt that the physical education curriculum was unclear. Many high school teachers spoke about the curriculum being outdated. In addition, other issues were discussed by participants such as disconnection between elementary and high school teachers, too many non-active physical education curricular outcomes, and the curriculum being written for a specialist audience. Although resources were addressed earlier in the survey, several teachers reiterated a need for resources and instruction on how to interpret the curriculum properly.

While teachers are required to teach the provincial curriculum, they are not the only ones responsible to develop physical literacy in children (Saskatchewan *in motion*, N.D.). Parents of students also have a responsibility to help develop physical literacy in their children. A large percent of teachers (75%) expressed that parents do not speak to them about physical literacy. Parents are known to have a significant impact on their children's levels of physical activity (Whitehead, 2010), thus it is essential parents are aware of physical literacy. One participant in this study mentioned "Most parents still don't know the phrase physical literacy and still talk only of physical activity and physical fitness." Because parents play such a prominent role, it is imperative that teachers, coaches, and recreation leaders educate and promote the importance of physical literacy to parents.

Communities also have a responsibility in developing physical literacy. Responses in this study demonstrated a disconnect between schools and the community. Most teachers were not aware of community initiatives focused on the development of physical literacy. This disconnect may be due to the fact that communities do not have programs focusing on physical literacy development or because there is limited collaboration occurring between the community and education sectors. Saskatchewan *in motion* (N.D.) developed a model where responsibility for children's physical activity is shared between the parents, school, and community. This model could be used by schools to help share responsibility for developing physical literacy. Instead of

working in silos, families, schools, and communities need to work together to create authentic and rich physical literacy experiences to help develop children's physical literacy.

For certain questions such as curriculum and community initiatives, there was a substantial lack of participant responses. This, however, was not an indication of failing to complete the survey as many participants completed questions later on in the questionnaire. Instead these blanks may illuminate the study results; purposefully excluding answers may have been an indication of uncertainty or a lack of knowledge about the topic. This only further demonstrates a need for clarification on the topic of physical literacy and for more education and promotion of physical literacy in all sectors.

At the conclusion of the survey, teachers were provided with an opportunity to pose questions about physical literacy. Teachers had a wide variety of questions such as: "How do I teach physical literacy?" "Isn't it just teaching physical education?" and "What does it look like in my gym?" A large number of teachers wanted more information on how to teach physical literacy in the gym and how to assess physical literacy in their physical education classes. The questions further demonstrate the confusion around the concept of physical literacy and may also demonstrate that those who are currently working in schools in the province are not accessing available resources. While these questions may not be the same for all teachers in Canada, they demonstrate that in the province of Saskatchewan teachers have a strong desire to learn about physical literacy and how to develop physical literacy effectively in their students.

2.4.1 Limitations of the Present Study and Future Recommendations

The findings are restricted to the province of Saskatchewan. The questionnaire was designed for Saskatchewan and the questions specifically asked about the Saskatchewan provincial curriculum and how teachers in the province of Saskatchewan teach physical education. Different provinces have different physical education curricula, therefore these findings may not translate to all other provinces. However, results may inform educators in other provinces about the need for education and advocacy surrounding physical literacy.

Additional limitations included the type of educator responding to the survey, as well as the number of valid responses. The majority of the participants identified themselves as specialists, however as aforementioned, generalist teachers instruct a substantial portion of physical education classes. Despite the quantitative evidence indicating no difference between specialist or generalist teachers, having a larger sample of the population may have provided a

more comprehensive review of existing perceptions regarding physical literacy. Because this study was based solely on a questionnaire, it was not possible to discuss responses further with participants. Future work may benefit from the rich data collected in post-questionnaire interviews to supplement these findings.

Furthermore, it is recommended that diverse sectors work together to seamlessly support children in developing physical literacy. The lack of knowledge and possible lack of community programming identifies that more education about physical literacy is necessary on a global scale, beyond the teacher population. Communication between the school, home, and community needs to occur for this to happen. Some additional suggestions for future work include taking a closer look at teacher preparation programs to determine if physical literacy is being addressed effectively and to look at physical education professional development opportunities to determine if these are (a) being effective at educating about physical literacy, and (b) if these opportunities currently exist for teachers to attend.

2.5 Conclusions

Teachers of physical education play a critical role in the development of physical literacy in children and youth. The results of this study demonstrate that further work should be done to ensure current teachers, both preservice and in-service, fully comprehend the concept of physical literacy. Because physical literacy is viewed as the gateway to active participation, teachers must be cognizant of all the facets of physical literacy (Kriellaars, 2014). Efforts are needed to help teachers increase their understanding of physical literacy in order to create rich, authentic physically literate experiences to develop students' physical literacy in order to promote lifelong engagement in physical activity.

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Chapter Three

Study Two: Room to Grow: Teachers' Knowledge and Understanding of Physical Literacy and Physical Education

A version of this manuscript is currently under review.

Co-authorship: This study was created with Dr. Louise Humbert (LH). The manuscript was developed in collaboration with LH. Alexandra Stoddart (AS) had the primary role in the data collection, analysis, and writing of this manuscript. LH provided guidance, suggestions, and editorial input into the creation of this manuscript. This manuscript is currently presented in a format acceptable for the requirements of a graduate dissertation.

3.1 Study One to Study Two Transition Summary

Study one provided a snapshot of teachers' understanding of physical literacy in one province of Canada. An online mixed methods survey was administered and circulated through the provincial physical education association and social media. Approximately 70% of participants identified themselves as specialist physical education teachers. Despite the teachers' specialization, a range of understanding was depicted in the results. About 30% of teachers demonstrated a comprehensive understanding of physical literacy, while the remaining teachers focused on the physical element of physical literacy or the literacy aspect of the term physical literacy. Interestingly, while stakeholders push for the hiring of specialist physical educators (Kaldor & Deutsch, 2013; Mandigo, 2010), the results from study one indicated that no statistically significant differences were found between the type of teacher (specialist/generalist) and the level of physical literacy understanding. Study one contributes to the body of knowledge exploring what teachers understand about physical literacy.

While study one explored what teachers in a Canadian province understood about physical literacy, the aim of study two was to further determine the understanding of teachers in a city regarding physical literacy. With study two, I looked to expand on the results of study one by using semi-structured interviews and speaking with more generalists. Due to the constraints of using a survey in study one, it was not possible to get rich detail from answers. It was the intent of study two to explore what a selected group of teachers understood about physical literacy and particularly the development of physical literacy in physical education classes.

3.2 Framing Study Two and Its Relationship to Study Three

Study one (Chapter Two) involved participants from across the province of Saskatchewan. Conversely, studies two and three involved a group of six teacher participants. These teachers were purposefully selected (Patton, 2002) from four schools in one urban school division in one Canadian province to participate in study three's intervention research. Before study three commenced, these six teachers participated in interviews which provided the data for study two. In study two, these semi-structured interviews were conducted to better understand their knowledge of physical literacy prior to their participation in study three.

3.3 Introduction

Physical literacy is not a new term, but the use of the concept has recently re-emerged in the education, sport, and recreation literature (Aspen Institute, 2015). The concept of physical literacy transcends many sectors, from recreation and sport to injury prevention and vocation, as well as education (Kriellaars, 2013). While physical literacy is viewed as a journey for all people over the lifespan, the most opportune time to develop physical literacy is as a child (Canadian Sport for Life [CS4L] 2014). Due to low physical activity levels and high sedentary rates, physical literacy has been theorized as a possible approach to help children become more active (Aspen Institute, 2015; ParticipACTION, 2015). The re-emergence of the concept of physical literacy is shedding new light on the importance and potential reach of physical education (Lundvall, 2015). In the United Nations Educational, Scientific and Cultural Organization's guidelines for policy-makers, physical education's contribution to lifelong participation in society was noted, "On the one hand, participation in physical education should support the development of physical literacy and, on the other hand, contribute to global citizenship, through the promotion of life skills and values." (McLennan & Thompson, 2015, p. 20). With the focus of physical literacy on motivation and confidence, physical competence, knowledge and understanding, and engaging in physical activity over the lifespan (International Physical Literacy Association [IPLA] 2015), physical literacy and physical education are intertwined (PHE Canada, 2010).

Quality physical education may offer the best opportunity for children to develop their physical literacy (PHE Canada, 2010). Much literature has been written about the links between physical education and physical literacy, with the ultimate conclusion that physical literacy is the foundation for physical education and an outcome of physical education (McLennan &

Thompson, 2015, p. 24). Whitehead (2010) provides a similar outlook in that physical literacy is the underlying goal; physical literacy can be viewed as a disposition of participants while they participate in physical activity and physical education. The Society of Health and Physical Educators (SHAPE) America (N.D.) identifies that Physical education develops the physically literate individual through deliberate practice of well-designed learning tasks that allow for skill acquisition in an instructional climate focused on mastery” (How Does Physical Literacy Connect to PE + PA? section, para. 1).

Physical education may be the only subject with learning outcomes in the three domains of psychomotor, cognitive, and affective learning (Graham, Holt/Hale, & Parker, 2013). By creating a safe and positive learning environment to develop mastery of the three learning domains, teachers can help their students move forward on their physical literacy journey. Unlike other school subjects where students mostly work on cognitive learning through reading comprehension and skill sheets, and affective learning through teaching practices such as groupwork, physical education works to develop students holistically: physically, mentally, and emotionally/socially (Roetert & MacDonald, 2015). The inclusion of three learning domains in physical education align seamlessly with Whitehead’s (2010) definition, as she explains that physical literacy is intent upon developing the whole person. It is not only the physical competence element of physical literacy that educators work to develop through physical education, but the child as a whole.

In North America, both Canada and the United States have integrated physical literacy within their respective curricula and standards. The aim to develop holistic students through physical education is evidenced in many of Canada’s physical education curricula, such as Ontario (curriculum goals: active living, healthy living, and movement competence), Quebec (curriculum competencies: healthy active lifestyle, movement competency, and interacting with others), and Saskatchewan (curriculum goals: active living, relationships, and skillful movement) (Ontario Ministry of Education, 2015; Quebec Ministry of Education, 2001; Saskatchewan Ministry of Education, 2010). In the United States, teaching the “whole” child takes into account the child’s mind and body as one, which works in tandem with the National Standards proposed by SHAPE America (2013). These five National Standards (SHAPE America, 2013) include:

1. The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.

2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.
3. The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health-enhancing level of physical activity and fitness.
4. The physically literate individual exhibits responsible personal and social behavior that respects self and others.
5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction.

Although these National Standards have been modified to focus on physical literacy, there is discussion around whether the “physical” of physical education has been lost due to a lack of “doing” in the current Standards (Lounsbery & McKenzie, 2015). Roetert and Jefferies (2014), speaking on behalf of SHAPE America, stated that embracing the concept of physical literacy would be a wise decision, however Lounsbery and McKenzie (2015) expressed trepidation regarding the shift to physical literacy due to a lack of consultation, a lack of empirical data, and more pressing matters for the subject of physical education. Despite the controversy around the term physical literacy and the National Standards, teachers should be cognizant of physical literacy and how to develop physical literacy through physical education in order to implement these standards.

Many elementary teachers, regardless of preservice training, are often required to teach physical education during their tenure as an educator. In North America, physical education is taught by both physical education specialists and generalists (classroom teachers). Studies suggest specialist physical education teachers are better teachers of physical education as they exhibit the following: higher levels of content knowledge, confidence, and enjoyment among other things (Randall, Robinson, & Fletcher, 2014; Spence et al., 2004). In Sallis and colleagues’ (1997) landmark intervention study, physical education specialists were deemed superior to trained (32 hours of physical education curricula familiarization, class management, and instructional skills) classroom teachers and usual practice classroom teachers. Results demonstrated that specialists spent more time in physical education classes (more classes/week and more minutes spent in physical education class), provided students with more physical activity, and enhanced female students’ fitness (Sallis et al., 1997).

Despite the literature stating that physical education specialists are better at teaching the subject of physical education (PHE Canada, N.D.; Hardman & Marshall, 2000; Spence et al., 2004), physical education is often taught by those with little to no background in physical education. Cameron and colleagues (2003) reported that only 39% of teachers employed in Canada to teach physical education were physical education specialists. A more recent statistic from the People for Education (2016) reported that in Ontario 48% of the elementary schools have a health and physical education teacher, either full or part-time, however not all of these teachers are specialists. Ontario's focus on health can be seen in the increased employment of health and physical education teachers, up from 40% in 2009, however these teachers are not employed evenly across the province (People for Education, 2016). In the United States, Hardman and Marshall (2000) reported that specialists are more common, with 81% of teachers being specialists at the elementary school level, however this varies widely across states. Other findings in the literature discuss how classroom teachers are less confident in their abilities to teach physical education because of the lack of content knowledge (Decorby, Halas, Dixon, Wintrup, & Janzen, 2005). Conversely, some literature has shown that with quality, continuous physical education professional development, generalists can increase their confidence and improve their instruction of physical education (Faucette, Nugent, Sallis, & McKenzie, 2002).

While attention has been paid to the definition of physical literacy, the implications of physical literacy, and the assessment of physical literacy, only a handful of studies (e.g., Stanec & Murray-Orr, 2011; Tristani & Fraser-Thomas, 2014) have examined what teachers understand about physical literacy and their ability to develop physical literacy through physical education classes. An exploratory study by Stoddart and Humbert (2017) found that teachers of physical education have a partial understanding of physical literacy, and many teachers are uncertain about how to develop physical literacy within their physical education classes. This lack of understanding is concerning as developing physically literate students is the outcome of many Canadian physical education curricula (i.e., British Columbia, Saskatchewan, Ontario, Newfoundland and Labrador) (Mandigo et al., 2009). Physical literacy is also the goal of physical education in the United States, as evidenced by SHAPE's revision of its national physical education standards (Roetert & MacDonald, 2015; SHAPE America, N.D.). Whether teachers understand the concept of physical literacy and the implementation of the concept effectively through their teaching is an area in need of research.

The purpose of this study was to explore what teachers understand about physical literacy and how the concept is operationalized in their instruction of physical education. This study will expand on previous research (Stanec & Murray-Orr, 2011; Stoddart & Humbert, 2017; Tristani & Fraser-Thomas, 2014) and examine the knowledge and understanding of physical literacy in depth for both specialists and generalists of physical education.

3.4 Method

3.4.1 Participants

Six teachers from four schools in an urban school division in one Canadian province were purposefully selected (Patton, 2002) to participate in this study due to matching characteristics required for study three (Chapter Four). Six female teachers of fourth and/or fifth grade classes participated (Table 3.1). In that group of teachers, two were specialists, four were generalists and there was a range of teaching experience from three to sixteen years. The class sizes ranged from 20 to 30 students. With the exception of School Four where two classes were combined in the gymnasium for physical education, all schools had one class in the gymnasium for physical education. The majority of the students in all four schools were from middle class families where both parents were employed in some capacity (C. Wilson, personal communication, November 18, 2016).

Table 3.1. *Participants identified by school and teaching characteristics*

Teacher	Type of Teacher	School	Education	Years of Teaching
Ann	Specialist *Member of provincial physical education association	School #1 Approx. 400 students	Bachelor of Science: Physical Education, Bachelor of Education	5 (4 years of physical education)
Courtney	Specialist	School #2 Approx. 440 students	Bachelor of Physical Education, Bachelor of Education	14
Olivia	Generalist	School #3 Approx. 220 students	Bachelor of Education - Major: History - Minor: Biology	3 (at the time of this study, it was her first year teaching physical education)
Marilyn	Generalist	School #3	Bachelor of Education Minors: Reading, Visual Arts, Social Studies (Native Studies), and English	16
Lucy	Generalist	School #4 Approx. 730 students	Bachelor of Education - Major: Science - Minor: Math	3
Noreen	Generalist	School #4	Bachelor of Education - Major: Math - Minor: Science	4

3.4.2 Procedure

Following institutional ethical approval and after giving consent (Appendix B), interviews (individual or in pairs) were conducted and teachers were asked about their physical literacy knowledge and about their experiences teaching physical education. Four interviews were completed in total; generalists from the same school participated in a single interview due to the teachers' scheduling constraints (e.g., Noreen and Lucy, along with Marilyn and Olivia interviewed as pairs, while Ann and Courtney each had an individual interview). All participants

were given a pseudonym to protect their identities. Interviews were audio-recorded ($M = 46.43$; range 36-51 minutes) and were either completed at the teachers' school or at the researchers' university institution. A semi-structured interview guide was used (Appendix C), and the structure of the guide was informed by questionnaires and interview guides in the physical education literature (Morgan & Hansen, 2007; Stanec & Murray-Orr, 2011; Stoddart & Humbert, 2017). Both the Morgan and Hansen (2007) and Stanec and Murray-Orr (2011) studies informed the creation of the current interview guide with what types of demographic information should be collected from participants. Stanec and Murray-Orr's (2011) study also provided examples of previous questions that had been asked regarding physical literacy knowledge (e.g., "Do you see yourself as a physically literate person?"). Stoddart and Humbert (2017) included questions about physical literacy knowledge, and it was an aim of this current study to further explore some of those topics (e.g., definition of physical literacy, physical education curriculum and physical literacy). The interview guide was also developed in consultations with an expert panel constructed of six members of the Saskatchewan Physical Education Association's (SPEA) executive board. The questions were brought forward by the SPEA president and discussed at a SPEA executive meeting. Consensus was reached by the expert panel after revisions were made to the initial draft of the interview guide.

I transcribed the interviews verbatim into Microsoft Word documents, yielding a total of 74 single-spaced pages. Transcribing the interviews permitted me to develop a deeper understanding of the data. After transcribing was completed, transcriptions of the interviews were returned to participants for member-checking. Taking specific actions such as member-checking and using tactics to ensure honesty in participants were used to ensure trustworthiness of the qualitative research study (Shenton, 2004). After reviewing their transcripts, each teacher signed a transcript release form (Appendix D). Aside from one teacher correcting the name of a gymnastics facility, none of the teachers made changes or offered comments about the transcripts.

3.4.3 Role of the Researcher

As a researcher in the field of physical education, specifically in the area of physical literacy, I have a vested interest in the understanding of physical literacy and its connection to physical education. Acknowledging my physical education teacher education as a specialist physical educator and my research background was crucial to understand how my background

and education may have shaped data collection and data analysis. In addition to my education and experiences as a physical education specialist, I have competed at a high level in sport (Division I, NCAA) and this may also have affected my perspective of skill development, physical activity, and physical education. Throughout data collection and data analysis, I attempted to remain open-minded and careful not to let my understandings of physical literacy interfere with the participants' perceptions of physical literacy and physical education.

3.4.4 Data Analysis

Braun and Clarke's (2006) six phase method of thematic analysis was used to analyze the interview data. *Phase one: familiarization with the data* involved the transcriptions being uploaded to NVivo 11.2.0 where the program was used to become familiarized with the data. Interviews were read several times to reflect on their meaning. After getting familiarized with the data, I *generated initial codes in phase two* for each of the transcribed data sets. Participants' data was coded line by line to ensure coding accuracy. An example of phase two follows: a line discussing the curriculum was "if you tell them to dribble do they know what that means?" This may have produced initial codes such as comprehension, understanding the terminology used, and skills. Phase two yielded a total of 1662 individual codes for the complete collection of four transcripts. *Phase three: collation* occurred with individual codes being collated into initial themes. *Phase four required the themes to be reviewed* to determine if the themes matched the coded extracts. The data-driven themes were reviewed, and in *step five the themes were defined and named*. These themes were reviewed by a critical friend who had also read over the transcripts in their entirety before reviewing the themes for correctness (Costa & Kallick, 1993). The critical friend was selected based on: (a) extensive experience with the topics of physical education and physical literacy and, (b) interest and willingness to act as a critical friend. The critical friend surmised that the themes did accurately represent the data. *Phase six involved the production of the report*, which includes this final manuscript.

3.5 Results

Discussions with physical education specialists and generalists allowed the authors a glimpse into the teachers' perspectives about physical literacy, physical literacy and the curriculum, and the purpose of physical education. The teachers' perspectives are presented as three themes: (a) "*Never really used that word [physical literacy] before,*" (b) "*Well, we do have outcomes,*" and (c) "*What do you guys want to play?*"

3.5.1 Theme One: “Never really used that word [physical literacy] before.”

Data emerging from the interviews demonstrated that with the exception of one teacher, all of the teachers involved in this study did not understand the concept of physical literacy. Only one teacher, Ann, a physical education specialist, could discuss the concept of physical literacy clearly and thoroughly. Without being given a definition of physical literacy, Ann summarized the PHE Canada definition, “I guess to put it in my own words, students have a wide range of skills that they are competent in and confident in and that they are able to perform these skills in different environments and I guess that’s basically how I would put it.”

The other five teachers (mix of specialists and generalists) were not able to clearly discuss the concept of physical literacy. Some focused on the “literacy” aspect of the term. For example, these teachers spoke about using language, movement terminology or vocabulary, lacking discussion about confidence, competence, motivation, and being active over the lifespan. Lucy, a generalist, highlighted the use of vocabulary during introductions to new units, “yeah I would just say introductions. And then using that those wordings that you teach them throughout the gym period and throughout the gym unit.” For Lucy, using words like “dribble” and having the students understand those words was important. Noreen, another generalist, likened movement terminology to vocabulary in classroom subjects, “So knowing different terminology and stuff. I relate it to where in any subject you have literacy so you have like math literacy. So physical literacy is just the body.” Noreen also described physical literacy as, “knowledge or using words and sentences to describe physical activity.” Marilyn, a generalist, also believed terminology was a critical part of the definition of physical literacy, “I thought that’s what you meant by literacy is knowing the terminology...” These three generalists were focused on the language used in the physical education setting, whether that included movement terminology or vocabulary used to introduce new physical education units.

The other two teachers appeared to be at a loss for words when it came to the definition of physical literacy. Olivia, a generalist, had never used the term physical literacy until participating in this study. She offered her explanation of physical literacy:

I guess for me physical literacy is being able to participate effectively in physical education, have the motivation to do it, know where your strengths are, know where your weaknesses are, know how to improve, and approaching physical fitness and having a healthy lifestyle with a positive attitude. That’s kind of what I think of it as.

Olivia's discussion about the concept of physical literacy was focused specifically on student participation in physical education. Although her answer did illustrate some of the elements of physical literacy (e.g., motivation), Olivia was unable to clearly articulate the concept. Courtney, a specialist, was aware that a definition of physical literacy existed, but she was unable to recall the definition during the interview. While Olivia and Courtney did not focus on the literacy aspect of the term physically literacy, it also appeared these two teachers were also unable to discuss the concept of physical literacy.

Pertaining to knowledge and understanding of physical literacy, it was evident that regardless of being a specialist or generalist, these teachers generally misunderstood the concept of physical literacy. While one specialist, Ann, efficiently and effectively provided a definition for physical literacy, the other teachers either focused on the "literacy" aspect of the term physical literacy or did not have a comprehensive understanding of the term, with little attention paid to movement.

3.5.2 Theme Two: "Well we do have outcomes."

Despite physical literacy being explicitly defined (Whitehead, 2006) in the provincial Ministry of Education's physical education curriculum document, the majority of teachers in this study demonstrated that they were not aware of the connection between physical literacy and physical education. This was not surprising as the majority of teachers were unable to define physical literacy. Once again Ann, the specialist who defined physical literacy, was the only teacher able to discuss the link between physical literacy and physical education. Ann identified that the foundation of the physical education curriculum was in fact physical literacy:

Well I think that the physical education curriculum is very much based on physical literacy... the curriculum just draws on a wide range of skills that students need to have and that's kind of what physical literacy is. Is that they're competent and confident and able to use a wide variety of skills.

Ann demonstrated her familiarity with the physical education curriculum, "Because that's kind of how our curriculum is. We start at exploration and go to utilization." Ann was the only teacher to describe the curriculum's development of fundamental movement skills through the use of the generic levels of skill proficiency characteristics (Graham et al., 2013).

The other specialist, Courtney struggled to put into words how physical literacy and physical education were connected. When asked about the relationship between physical literacy and the physical education curriculum, Courtney did not identify physical literacy as the focus of

the physical education curriculum. Instead her answer was vague, “[The curriculum] is about trying to develop students to be the best they can be in moving their bodies and learning in all different types of situations so that someday it’s lifelong right. I think that’s what the focus is right.” Unlike Ann, Courtney did not discuss specific tenets of the curriculum (e.g., generic levels of skill proficiency).

The four generalists vaguely discussed the provincial physical education curriculum, and they could not explain the connection between physical literacy and physical education. As with the specialist Courtney, the lack of understanding regarding the relationship between physical literacy and physical education may be directly related to the lack of knowledge about the concept of physical literacy. Instead of clarifying the link between physical literacy and physical education, these generalists spoke about issues the teachers had with the physical education curriculum. Discussions centered on curricular outcomes, but only in terms of “vocabulary words like dribble” that were needed when thinking of outcomes and writing report cards. Some teachers spoke about struggle of implementing the curriculum because of its “open-endedness” and how it was “vague.” While Ann, a specialist, appeared comfortable and knowledgeable about the numerous outcomes of the physical education curriculum, Marilyn and Olivia struggled with the multiple possible indicators to meet an outcome in the current curriculum and wished for previous curricula:

Well we do have outcomes. It does say what they should be able to do and I guess if we use those outcomes and ask them okay we want to see you dodge or evade or something, they should be able to understand what that means I guess. But it is very open ended; you could do a lot of different things to show that skill.

The lack of understanding about physical literacy and its connection to physical education may also be less surprising based upon the experiences shared by the generalists. Some explicitly stated that they did not plan for physical education, they just “have to go with the flow.” Others also noted that planning and teaching physical education was not a priority. Noreen explained, “I think for a lot of teachers with everything else we have going on in the classroom and with the little amount of time that we do get for physical education we kind of put [physical education] on the back burner a little bit for planning.” Her colleague Lucy shared Noreen’s feelings, “[Physical education] is definitely the last subject for planning.” These teachers identified that physical education was low in priority compared to classroom subjects; it

is not surprising then that teachers did not know the physical education curriculum and how it was connected to physical literacy.

By not planning for physical education, generalists may be indirectly sending a message to parents that physical education is not valued. Many teachers spoke about parents and a lack of communication about the subject of physical education. Marilyn noted the disconnect between the value of movement, physical education learning, and family values: “[Parents] don’t see the connection between a healthy body and healthy mind.” Olivia echoed her colleague’s thoughts: “I just don’t think families care as much about, well... they care more about their academic success than any physical success.” Other teachers reiterated that physical education appeared to be a low priority for parents. Teachers concluded that parents did not value physical education as a result of observing parent actions and parents’ lack of presence at parent interviews. Lucy expressed that “maybe [parents] view physical education still as the physical education where you just play games all the time and so I don’t know.” Noreen voiced the same sentiment stating that parents thought of physical education as “play time.” All teachers discussed that the majority of parents were not concerned with physical education. With parents’ perceived lack of value placed on physical education, there is a good possibility that parents are unaware of the potential benefits that physical education and physical literacy can provide.

The connection between physical literacy and physical education remains generally misunderstood by teachers. Only one specialist, Ann, could describe how the physical education curriculum and the concept of physical literacy were intertwined. The remaining teachers (one specialist and four generalists) were unable to discuss the relationship between physical education and physical literacy. Instead, the generalists focused on issues they had encountered with the physical education curriculum. Some generalists also identified that the subject of physical education was one that was low on their priority list. Interestingly, teachers did not make a connection between their perceptions of physical education and parents demonstrating a low value of physical education when it came to their children’s education.

3.5.3 Theme Three: “What do you guys want to play?”

Part of the study was to explore how teachers operationalized physical literacy in the instruction of their physical education classes. Interestingly this prompted teachers to discuss their general thoughts and feelings about physical education as a school subject. It was evident that many teachers held conflicting perspectives about the aim and goals of physical education.

Some generalists spoke about using daily physical activity breaks instead of physical education when they did not have access to the gymnasium in order to meet the curriculum guideline of 150 minutes of physical education per week. Noreen, a generalist, equated physical education with body breaks:

We're required to have 150 minutes a week of physical education. But yeah we have to get creative with our time with body breaks and days that we don't have physical education I'll usually do 'Just Dance' in the classroom.

Noreen appeared to believe that the purpose of physical education was solely to get the children moving and being active. The three goals of the physical education curriculum: active living, skillful movement, and relationships, were not discussed by Noreen or Lucy (Saskatchewan Ministry of Education, 2010, p. 5).

At the opposite end of the spectrum, Olivia, another generalist, spoke about her undergraduate experience and how that had affected her vision of physical education:

I still remember this story of my prof saying oh the classroom teacher wouldn't send down the students they had- for their consequence they would have to miss gym time. And then he would keep the students after for gym time and say well he or she has missed my class, they've missed out on important skills, they need to stay in my class longer. And talking about what physical education should really be. And it should no longer be a body break, it's got to be structured so that when our kids get older that they have the confidence to maybe try out for the basketball team, go and play volleyball in their free time and not shy away from things because they've never experienced it before.

Olivia appeared to have a better understanding of what physical education should entail. Her understanding of the purpose of physical education was undeniably altered by her experience in her undergraduate education. She reiterated that physical education should be equally as valued as classroom subjects, that physical education was not just about being active, but that it was a time for skill development and building important elements such as confidence and motivation to participate in physical activity.

The two specialists involved in this study appeared to have a much clearer idea of the purpose of physical education. Courtney talked about preparing students to be active over the lifespan:

[Physical education] is about trying to develop students to be the best that they can be in moving their bodies and learning in all different types of situations so that someday it's lifelong... That [children] can take these skills someday and say wow I learned this sometime and it'll apply sometime in their lives... You know

we want to develop this whole person and into an adult who eventually can move very efficiently in life.

Courtney's comments directly reflect the aims and goals of the physical education curriculum. She identified curriculum goals including the active living goal and the skill movement goal. Ann had previously identified the aim of the physical education curriculum in her discussion about physical literacy and physical education. In addition, throughout her interview Ann discussed all three curricular goals: active living, skillful movement, and relationships. Both specialists, Ann and Courtney, appeared to have a much clearer idea of the purpose of physical education than the majority of the generalists.

While the specialists demonstrated knowledge regarding the purpose of physical education, the generalists had little knowledge of the purpose of physical education and frequently expressed feelings of inadequacy concerning their ability to teach physical education. Three of the four generalists voiced uncertainty or doubt with teaching physical education. For some generalists, a lack of opportunities to learn about physical education was related to their lack of confidence and comfort with teaching physical education. Lucy yearned for physical education professional development:

I wish there was professional development days like even to teach us new games or to teach us ways to teach. Like I don't know how to teach floor hockey, give me a professional development day so that I can properly learn how to teach them these skills.

Noreen also discussed her lack of knowledge with regards to physical education:

I feel like I wish I had more knowledge and more I don't know I wish I felt a little more comfortable. I love teaching phys ed...I wish I had a little more knowledge about various ways, just even specific sports and things like that and what skills should be taught in what order. And how to teach it in a way that they will understand. I feel like that's always something I struggle with...

It was apparent that both Lucy and Noreen needed much more than the curriculum document to help them teach physical education. These generalists with no background in physical education explained that they required more support and direction in how to effectively teach the subject of physical education.

Olivia's ability to teach physical education was impacted by one physical education course she took in her undergraduate education, however a lack of content specific physical education professional development has contributed to her uncertainty about teaching physical

education, “I don’t know if I’m teaching physical education right because I haven’t taken any physical education professional development or anything like that, I’m just basing my teaching upon what I learned in university.” Olivia’s experience demonstrates the value of physical education classes in undergraduate education for generalists and the need for more support during her current teaching.

Contrary to the aforementioned teachers, Ann, along with Marilyn, talked about how much they learned by attending physical education professional development opportunities such as those offered by the provincial physical education teachers’ association. Ann’s preservice education and her involvement in the provincial physical education teachers’ association greatly impacted her knowledge and understanding of physical literacy. Although Marilyn did not appear to fully understand physical literacy, she may have learned about developing physical literacy in physical education without labelling it as such. Marilyn knew that students needed to initially learn about spatial awareness in a physical education program, and this was reflected in the sequencing of her instruction in physical education:

The beginning of the year the first unit I teach is spatial awareness. That one dodging, evading, how to move in your space without colliding, that’s what I usually teach first. Because even with the little ones like with kindergarten that’s the first thing you need to teach or reiterate every year, how to move in your space without going into somebody else’s space, changing pathways and directions.

While Marilyn had no undergraduate education in physical education, she taught physical education to several grades of children at a previous school. She attended seminars presented by the provincial association and took various clinics on multiple sports. The manner in which Marilyn and Ann spoke about teaching physical education gave some insight into their understanding of the purpose of physical education. Both Marilyn and Ann appeared to believe that skill development was a critical aspect of physical education. These two used teaching strategies to develop skills due to attending physical education content specific professional development opportunities.

The way the teachers in the study spoke about physical education pedagogy and content offered another snapshot of their understanding of the purpose of physical education. Ann, a specialist, spoke about differentiated instruction, adapting lessons for learners’ complex needs, and the fact that skill level was not dictated by grade level: “I have some third graders who might

be more skilled than some of the fifth graders. So you have to try to push them at whatever level they are at” (all concepts discussed in Graham et al., 2013). Olivia and Marilyn, generalists, frequently conveyed that deconstructing skills was a large focus for their teaching strategies. Marilyn shared, “so I try to break it down to different ways of teaching it, I do, we do, you do, and then a game, apply the skills.” Olivia stated that understanding the components of a skill were critical to how she taught: “What are your hands supposed to be doing? Where’s your body weight transfer? What direction should you be facing when you’re done this skill?” Contrary to Ann, Marilyn, and Olivia, Lucy and Noreen centered their discussion on sports and games rather than pedagogical methods of their teaching practice. The specialists in this study had no trouble alluding to the purpose of physical education, however it appeared that there were differences in understanding from the generalists.

3.6 Discussion

Physical literacy is a complex concept. To transform a philosophical and embodied concept into a tangible, measurable outcome has been identified as a difficult task for teachers (Lloyd, 2016). As the development of physical literacy is an expected outcome of many physical education curricula in Canada, it is important for teachers to understand the concept in order to help their students develop physical literacy. In addition, teachers of all backgrounds (specialists and generalists) are required to follow physical education curriculum. The majority of teachers involved in the present study were not familiar with the provincial physical education curriculum. Thus, there is a need to understand or “unpack” the physical education curriculum, as well as a need to “unpack” the concept of physical literacy (Roetert & MacDonald, 2015). In the United States, unpacking the physical education national standards and therefore unpacking physical education is a key aspect in building a quality physical education program (Lund & Tannehill, 2014). Although teachers in Canada, specifically generalists in this study, may have a desire to teach physical education appropriately, they may not be supported to develop physical literacy through their instruction of physical education classes.

Findings from this study demonstrate that regardless of preservice education on the subject of physical education, both generalists and specialists have a lack of knowledge regarding physical literacy. The type of teacher (e.g., specialist or generalist) does not predict knowledge or understanding to develop physical literacy. In the current study, only one out of six teachers demonstrated a comprehensive understanding of physical literacy. This specialist

teacher, who was highly involved in her professional association, was the only teacher able to articulate how physical literacy and physical education were linked. These findings support the results found in previous research. In an exploratory mixed methods study, Stoddart and Humbert (2017) discovered that a large portion of those who taught physical education only had a partial understanding of physical literacy. In this current study, at least half of the participants were focused on the “literacy” portion of the term physical literacy. Physical literacy is much more than learning movement vocabulary. Interestingly, one teacher also noted that “physical literacy is just the body.” This manner of thinking, that physical literacy is limited to physical competence, was also found in the exploratory study by Stoddart and Humbert (2017). Instead of viewing physical literacy as a comprehensive concept focused on developing the whole person, the term is often split into two parts by teachers: physical and literacy. Conversely, Whitehead (2010) envisioned the concept of physical literacy as being monistic and heavily underpinned in embodied philosophy. Findings from the current study support results from Stoddart and Humbert (2017), but also indicate the following: (a) specialists may have an edge in understanding the concept of physical literacy and its relationship to physical education, (b) participation in physical education organizations such as provincial or national associations, and/or attending content specific physical education professional development may lead to a deeper understanding of physical literacy, and (c) generalists have an interest in developing physical literacy in physical education, but they are limited by their understanding of the purpose of physical education and constrained by a lack of physical education content knowledge. These new findings may be critical for both undergraduate teacher education and continuing professional development when teachers are in their careers.

Because an outcome of physical education is to develop students’ physical literacy with the goal of increasing physical activity participation over the lifespan, this purpose needs to be recognized by teachers. There seems to be some confusion amongst teachers as to what constitutes a quality physical education experience for students. Within the Saskatchewan provincial curriculum document, it is stated that an effective physical education program is based upon six characteristics, two of which include a “focus on achieving physical literacy” and that physical education “is planned purposefully based on the curriculum” (Saskatchewan Ministry of Education, p. 7). Teachers were also unable to discuss the relationship between physical literacy and physical education, and most teachers did not address the necessary characteristics required

to provide an “effective physical education program” (Saskatchewan Ministry of Education, p.7). Additionally, the curriculum document also addresses the myth that “as long as children are active, having fun, and behaving, they are engaged in a quality physical education program” (Saskatchewan Ministry of Education, p. 9). In the current study, some teachers seemed to believe providing students opportunities to be physically active was enough to meet curriculum outcomes. If teachers refrain from teaching a wide variety of activities as physical education content and do not follow best practices of pedagogical teaching strategies, their actions may continue to perpetuate the myth of physical education as time to “burn off energy,” a time to relax and socialize, or as “play time” (Jones & Cheetham, 2001; Saskatchewan Ministry of Education, 2010). Teachers’ beliefs surrounding physical education may produce a vicious cycle of misunderstanding the purpose of physical education, as literature also reports students being misinformed about what physical education is all about (Jones & Cheetham, 2001). Learning must be a focus for physical education to truly be physical education.

Corbin (2002) discussed a need to identify the misconceptions surrounding physical education (e.g., participating in physical education should make children fit), to help the public understand the purpose of physical education, and a need for shared responsibility in order to help children become physically active. Shared responsibility among sectors is vital for physical literacy to be developed, however collaboration is difficult when an opportune avenue to develop physical literacy, physical education, is not highly valued. The marginalization of physical education by the public and even teachers is not something new. Hardman and Marshall (2000) reviewed the status of physical education in an international context and found that both teachers and parents perceived physical education as having “low academic esteem.” While these perceptions do not account for all parents and all teachers, teachers in the present study also perceived that parents did not value physical education. It is critical that parents understand and support physical education, as school is only one contributing factor to successfully developing physical literacy.

Future research should focus on how to effectively support all of those teaching physical education. Some generalists expressed that physical education was the last subject they personally thought about and planned. With many school divisions focusing heavily on literacy and numeracy and only so many hours in the day, it is not surprising that physical education may be a low priority for teachers. In one province in Canada, Saskatchewan’s Ministry of

Education's first strategy in its plan for 2013-2014 was for "... improved literacy and numeracy of all learners." Literacy and numeracy continue to be the priority for most schools (Hardman & Marshall, 2000). In that same 2013-2014 Strategic Plan document, there was no mention of any of the following words: physical literacy, physical education, or physically active (Saskatchewan Ministry of Education, 2013). The act of putting physical literacy on an equal platform with that of literacy and numeracy (Kriellaars, 2013) may help teachers and parents realize the importance of movement and physical education.

Findings from this study also demonstrated that the majority of generalists were uncomfortable and uncertain about teaching physical education. Generalists' lack of confidence to teach physical education is a common theme found in the literature (Decorby et al., 2005). In a previous study, Randall et al. (2014) found that the majority of teachers focused on sport and games for the content of their physical education classes, despite the curriculum requiring otherwise. The teachers chose not to teach dance and gymnastics because of their low levels of preparedness, enjoyment, and confidence (Randall et al., 2014). If teachers decide not to teach curricular content, this will undoubtedly hinder the development of physical literacy through physical education. In the present study, while some teachers reported focusing their instruction on specific skill themes and movement concepts, others talked generally about teaching sports and games in physical education. Although sport itself is certainly an avenue for developing physical literacy (CS4L, 2014), in physical education a wide variety of skills and environments need to be experienced by children. As noted in several definitions of physical literacy, developing a wide variety of skills and participation in various physical activities are crucial to develop the element of physical competence (CS4L, 2014; IPLA, 2015; Kriellaars, 2013; PHE Canada, 2010). Perhaps it is not surprising then, that teachers with low levels of confidence and preparedness for teaching the subject of physical education, would choose other subjects as their teaching priorities.

The manner in which teachers discussed pedagogy, the "how" of teaching content, also provided examples of the teachers' understanding of physical education. The way teachers instruct can drastically impact how their students are able to develop physical literacy. Whitehead (2010) states that teachers play a critical role in developing and fostering physical literacy for several reasons. Her rationale includes teachers' access to a wide range of physical activity settings, their major potential influence on student development, their expertise in

working with children, and the opportunity for all children to develop their embodied competence (Whitehead, 2010, p. 160). If the teachers are not using pedagogically sound tactics and strategies for teaching physical education, students may experience negative physical education associations that do not build confidence, motivation, and comprehension, and thus do not develop physical literacy.

Despite having little to no background in physical education and the priorities of the provincial Ministry of Education being on literacy and numeracy, teachers in this study stated they wanted professional development on physical education. Contrary to the some of the findings in Faucette and Patterson's (1989) study (e.g., teachers having overwhelmingly negative attitudes about teaching physical education), the classroom teachers in the present study wanted to know how to teach physical education; they did not express a lack of interest in teaching physical education. These teachers wanted to expand their knowledge and they wanted to feel confident teaching physical education. However, they felt they were not supported to move forward developing physical literacy through physical education. Unfortunately, it is apparent that some things may not have changed in the past 28 years as some generalists in this study also expressed that teaching physical education was the lowest priority of their school day (Faucette & Patterson, 1989). Although there remains a push to hire specialist physical education teachers (Kaldor & Deutsch, 2013; Mandigo, 2010), hiring specialists to teach physical education in schools is often not possible for many school divisions. Many countries continue to employ generalists, especially at the elementary level (Hardman & Marshall, 2000). Students would benefit from better prepared and continuously supported generalists who are required to instruct physical education during their teaching career.

As with any study, this study had its limitations. Due to the field setting, limitations arose with regards to participants and scheduling. Because of the constraints of the school schedule, some of the teachers were interviewed in pairs; alternative ideas may have emerged had all of the teachers interviewed separately. Additionally, only females participated in this study. It may have been beneficial to have a male perspective to determine if similarities and/or differences existed between male and female teachers of physical education with regards to comprehension of physical literacy.

3.7 Conclusions

The majority of teachers in this study did not understand the term and concept of physical literacy, and they did not understand the relationship between physical literacy and physical education. In addition, many teachers also showed a lack of knowledge regarding the purpose of physical education. These findings suggest that work needs to be done if the opportunities physical education presents to develop physical literacy are to be realized. This study also illustrates the importance of being involved in professional development opportunities often offered by a physical education organization. Ann, the only teacher able to discuss physical literacy in a comprehensive manner, was a member of the provincial physical education association. This may suggest that being a member of a physical education association and accessing the opportunities provided by such an association has the potential to positively impact understanding of physical education and physical literacy. With regards to the remaining teachers in the study, findings also suggest that teachers have a desire to learn and room to grow regarding their knowledge of physical education and more specifically, physical literacy.

At its core, developing physical literacy is about giving an individual the tools he or she needs to be active over the lifespan (PHE Canada, 2010). Although physical literacy can be developed through many sectors (e.g., education, recreation, sport), the instruction of physical education in school provides an incredible opportunity to reach all children. Many questions have been raised in the literature concerning the development of physical literacy and how the concept is operationalized in physical education. Since many curricula in Canada stress that students should become physically literate as result of progressing through the K-12 school system, more research is needed to determine effective instructional strategies for developing physical literacy and how to enhance teachers' understanding of physical literacy.

Some future recommendations include professional development sessions focused on the aims and goals of physical education. Teachers must first understand the purpose of physical education before they can understand how to develop physical literacy. Advocacy related to the importance of physical education is necessary to ensure children are receiving quality physical education because that will help with the development of physical literacy. While many school divisions' strategic plans focus exclusively on literacy and numeracy, there should also be a focus on physical literacy. What the school divisions value trickles down through the schools; if physical literacy was included in the strategic plans, teachers would have to be accountable for

developing it. Teaching the physical education curriculum with a physical literacy focus and raising awareness about the connection between physical literacy and physical education would be beneficial during professional development. The purpose of physical education should be promoted and advertised to staff, students, and parents. Lastly, collaboration between specialists who understand physical literacy and generalists would be beneficial for those involved with teaching the subject of physical education.

Teachers, with the right support, have the potential to help their students develop physical literacy through physical education. By developing children's physical literacy, there is potential to enact positive change on a number of platforms (i.e., health, participation in physical activity over the lifespan, injury prevention, etc.), and physical education may be one of the best opportunities to do so. A bit of caution is warranted, however, as findings from this study and others indicate the tendency for both teachers and researchers to focus on a singular element of physical literacy. As all elements of physical literacy are essential and interconnected, teachers and researchers must focus on operationalizing the holistic concept of physical literacy instead of heading down the dangerous path of picking the concept apart. The concept of physical literacy has room to grow, and research will undoubtedly be necessary to build best practices for developing physical literacy through physical education.

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Chapter 4

Study Three: More Than Fundamental Movement Skills: A Physical Literacy Intervention

4.1 Study Two to Study Three Transition Summary

Study two explored what teachers of physical education in a Canadian city know and understand about physical literacy and physical education. Six teachers, who would later participate in study three, discussed their understanding of physical literacy and the connection between physical literacy and physical education in semi-structured interviews. Findings demonstrated that the majority of teachers did not understand physical literacy, they were not aware of the link between physical literacy and the provincial physical education curriculum, and the generalists did not understand the purpose of physical education. The specialist teacher who was a member of the provincial physical education association was the only teacher to demonstrate a comprehensive understanding of physical literacy.

This third and final study is the culmination of my work with the six teachers who participated in study two. These six teachers were purposefully selected to be part of a physical literacy condition or a usual practice condition; this selection occurred before the interviews commenced in study two. While study one and study two looked to explore what teachers of physical education understood about the concept of physical literacy, in study three I aimed to conduct an intervention designed to develop children's physical literacy and gather empirical data that measured the effects of the intervention. In the literature, information is missing on how to best develop physical literacy through physical education and there exists a lack of data from physical literacy assessments (Robinson & Randall, 2017). The purpose of study three was to examine the effect of a curricular-based physical literacy intervention delivered to grade four and five students in elementary school physical education classes. During the interviews in study two, I gained more insight into the teachers' understanding of physical literacy, and I asked the three teachers who would be delivering the intervention about components they would like to see integrated. I was able to incorporate these aspects in study three.

4.2 Introduction

Physical literacy is defined as “the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life” (ParticipACTION et al., 2015). The concept of physical literacy has four

interconnected and essential elements, (a) physical competence, (b) motivation and confidence, (c) knowledge and understanding, and (d) engagement in physical activities for life (ParticipACTION et al., 2015). Although the terms physical literacy, physical activity, and physical education all possess the word “physical” in them, they are different yet related concepts. Physical activity refers to all bodily movement that uses energy (McLennan & Thompson, 2015). Alternatively, physical education is planned progressive learning in school curriculum that involves both learning to move and moving to learn (Association for Physical Education, 2015). In elementary schools in Saskatchewan, physical education is a required area of study that “...provide[s] opportunities for students to develop positive attitudes towards active living, to gain self- confidence as skillful movers, and to promote personal, social, cultural, and environmental growth and appreciation” (Saskatchewan Ministry of Education, 2010b, p. 1). Whitehead (2010) clarifies the connection between the three terms of physical literacy, physical activity, and physical education by stating that physical education is a situation where students can be physically active and that physical literacy is the underlying goal of physical education. Physical literacy is much bigger than sport; physical literacy can impact injury prevention, performance, vocation, recreation, and many more sectors, including the education sector (Kriellaars, 2014a).

Over the past few years, many physical education curricula in Canada have embraced the concept of physical literacy (Mandigo, Francis, Lodewyk, & Lopez, 2009). The transition to a focus on physical literacy is not restricted to Canada. In the United States, the Society of Health and Physical Educators (SHAPE) America recently reviewed and updated their national standards for physical educators to focus on physical literacy (Roetert & Jefferies, 2014). Although some physical education curricula in Canada state students should become physically literate as a result of meeting learning outcomes (Mandigo et al., 2009), the idea of students reaching a “finality” of becoming physically literate is at odds with Whitehead’s (2010) notion that physical literacy is a journey and not a linear process. The process of trying to fit an existential concept into a finite box is a challenging one, and Lloyd (2016) identifies the difficulty of doing so for teachers. Despite some controversy surrounding physical literacy, in many provinces of Canada current teachers of physical education are now expected to develop their students’ physical literacy as evidenced by various provincial curricula explicitly including physical literacy (Ontario Ministry of Education, 2015; Physical and Health Education [PHE]

Canada, 2010; Prince Edward Island Ministry of Education, 2011; Saskatchewan Ministry of Education, 2010a). To determine if students are developing physical literacy through physical education class, research is needed to provide empirical data on development of physical literacy and this can be accomplished through intervention work.

The idea of using schools as a setting for interventions is not unique. Hodges, Hodges-Kulinna, and Kloeppel (2015) identify that schools are commonly used for interventions because the infrastructure already exists to provide physical activity opportunities for children. Unlike interventions that are run in the lab, researchers working in a natural or field setting are restricted by the operation of the setting. In a physical education setting, classes often only receive instruction in physical education a few times a week. In addition, teachers face many barriers when teaching physical education including interruptions in the gymnasium due to assemblies, school holidays, or using physical education time to achieve curricular goals in other subjects (Morgan & Hansen, 2008). Researchers are restricted to delivering interventions during the time available for physical education classes, which may limit the dosage. Because of the strict parameters surrounding physical education based interventions this can impact the duration of those interventions.

Effective interventions in physical education have varied durations. A review on physical education and school sport interventions by Dudley, Okely, Pearson, and Cotton (2011) identified that intervention length ranged in length from six lessons to two and a half years. Approximately 80% of the physical activity studies included were effective in increasing physical activity and the four movement skill studies included were effective at improving movement proficiency; the majority of studies had treatment periods of six months or longer (Dudley et al., 2011). Fundamental movement skill interventions with children have been effective in improving skills, though not all have taken place during physical education classes, and they typically range from 6 to 15 weeks (Logan, Robinson, Wilson, & Lucas, 2011). Generally, school-based physical activity intervention programs reporting statistically significant effects in outcome measures such as duration of physical activity or moderate-to-vigorous physical activity implemented the intervention over a longer period of time compared to those not reporting statistically significant effects (Dobbins, Husson, DeCorby, & LaRocca, 2013). While some interventions have been found to be successful with high dosage and duration, others have not shown the same results. Ultimately effectiveness may depend on how the

intervention is designed and implemented as researchers face unique intervention implementation barriers when conducting research in the education system (Lee & Gortmaker, 2012).

Many interventions have focused on a wide variety of research outcomes in physical education, but only a handful of physical literacy interventions in physical education have been conducted. Furthermore, the majority of this work includes masters and doctoral theses. For example, Kiez (2015) examined the impact of circus arts instruction in physical education on the development of physical literacy of children in grades four and five. Results indicated (a) circus arts improved the motor competence of grade five children; (b) circus arts improved confidence in children in grade four and five, along with improved movement comprehension of females; (c) children in the circus arts intervention stream reported improved perceptions in various domains, from movement terminology to happiness; and (d) schools participating in the circus arts instruction demonstrated a lower sex gap in motor competence and confidence relative to schools in the usual practice physical education stream (Kiez, 2015).

McManes (2013) investigated the impact of video playback and verbal feedback on the acquisition of fundamental movement skills in grade three students. While physical literacy was not the focus of this intervention study, a physical literacy assessment tool (e.g., PLAY) was used to determine if students had improved their physical literacy. Only the PLAY Fun assessment tool was used, which primarily assesses the physical competence element of physical literacy. While comprehension and confidence can be identified using this tool, the complete battery of PLAY tools provide several ways to assess all elements of physical literacy and the Sport for Life Society recommends using as many of the PLAY tools as possible to obtain a complete view of a child's physical literacy (Sport for Life Society, 2017). McManes suggested that there was "no overall difference in physical literacy post-test scores between the [Verbal Feedback] and [Video Playback Verbal Feedback] schools, and yet the majority of participants improved their FMS, and comprehension and decreased their lack of confidence" (McManes, 2013, p.49). While there was no overall difference in physical literacy post-test scores, several elements of physical literacy improved including physical competence, knowledge and understanding, and confidence (McManes, 2013). While Kiez's study offers more insight into developing physical literacy through an intervention in physical education and McManes

demonstrates the use of the PLAY tools, much more research is needed on the best practices of how to develop physical literacy in physical education classes.

Several authors have identified the need for scientific data showcasing the efficacy of physical literacy interventions (Giblin, Collins, Button, 2014; Jurbala, 2015; ParticipACTION, 2015). The need for data to corroborate whether assessments are measuring the development of physical literacy is especially critical as current teachers are encouraged to implement these physical literacy assessments (Robinson & Randall, 2017). As part of provincial curriculum, teachers are also expected to teach an “effective physical education program” so that students can achieve physical literacy (Saskatchewan Ministry of Education, 2010a). Developing and assessing physical literacy may be especially difficult for those teachers who are expected to teach physical education who have little to no background in this area. The lack of data to showcase the efficacy of physical literacy interventions in physical education provides an opportune time for research investigating this important topic. The purpose of this study was to determine if a curricular-based physical literacy intervention delivered by teachers (specialist, generalist, generalist combined) in elementary school physical education classes impacted the students’ physical literacy.

4.3 Methods

4.3.1 Participants and Recruitment

Ethical approval was granted from the participating University’s ethics board and the participating school division. Consent was obtained from the teachers and parents, as well as assent from the children (Appendices B, E, F). Six teachers ($n=2$ specialists, $n=4$ generalists) from an urban school division in a Canadian province were purposely selected to participate in this study (Table 4.1). Teachers were from four elementary schools in the school division. Attempts were made to first match teachers by type of teacher (specialist/generalist) and grade. The physical education consultant for the school division helped to find potential teachers and schools who matched in the above characteristics. All teachers had classes of 20 to 30 students. In the four schools, the majority of students were from middle class families where both parents were in the workforce. 135 students were recruited to participate in this study ($M=9.73$ years, range 9-11; $n=68$ female, $n=67$ male; grades four and five) (Table 4.1). Intact classes (e.g., a class of students that learns together throughout the duration of the school year taught by a teacher as opposed to any students of a school) were part of the study.

The total sample size for the ANCOVA was predicted. For a medium effect size (0.25) with alpha set at .05, and power set at 0.80, a total of 158 participants was required (G*Power 3.1.9.2; Faul, Erdfelder, Lang, & Buchner, 2007). This calculation included the number of groups (3) and the number of covariates (2) included in the analysis. A previous study using the PLAY tools had a total sample size of 211 participants, however the author only stated that the study was powered for the PLAY Fun variables, without including a calculation or a required sample size (Kiez, 2015). Despite efforts to recruit approximately 160 participants, I was only able to recruit 135 students.

Table 4.1. *Breakdown of participants, group, and treatment*

Teacher	Group	Treatment	Total # of Participants	School
Anne	Specialist	Physical literacy condition	46	1
Courtney	Specialist	Usual practice condition	24	2
Lucy	Generalist	Physical literacy condition	23	3
Marilyn	Generalist Combined Class	Physical literacy condition	16	3
Noreen	Generalist	Usual practice condition	14	4
Olivia	Generalist Combined Class	Usual practice condition	12	4

4.3.2 Research Design

A quasi-experimental design was used to determine the impact of a curricular-based intervention on students' development of physical literacy. This type of design is commonly used to assess preintervention and postintervention measurements, as well as nonrandomly selected control groups (Creswell, 2014). In this study, the four participating elementary schools were assigned to one of two intervention conditions: physical literacy or usual practice. Due to the scheduling constraints of working with four different schools, assessments were staggered; the specialist teachers' students had pre-assessments first, followed by the pre-assessments by students in the generalist classes (Figure 4.1). All children participated in physical education classes, regardless of condition, however only those children and their respective parents or guardians that provided assent and consent were measured.

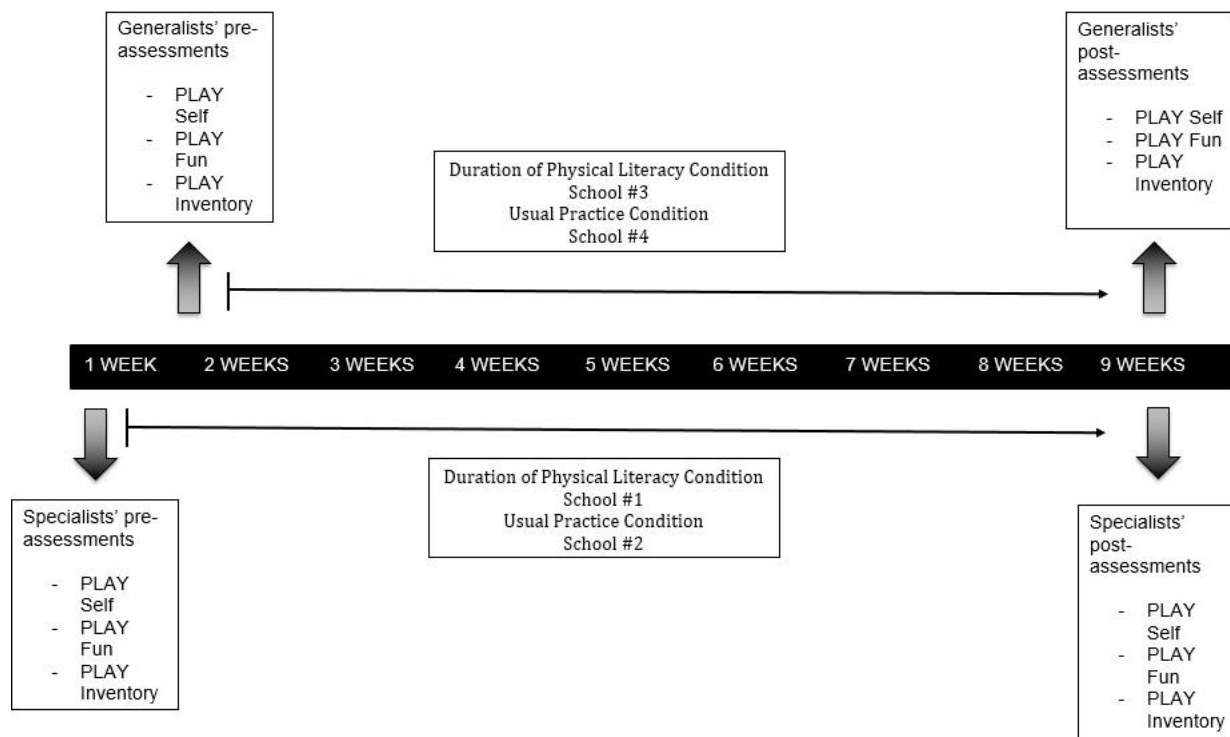


Figure 4.1 Visual representation of the research design and timeline

4.3.3 The Intervention (Physical Literacy Condition) Design and Implementation

The intervention used in this study was developed with input from the physical literacy condition teachers. In addition, a brainstorming session was also held with thirteen members of the participating school division's physical education professional learning community. The members of this learning community were leaders in the school division and were deeply committed to improving their physical education instructional practice. Involving teachers in the development and implementation process has been identified as an important strategy for effective intervention implementation (Sulz & Gibbons, 2016). The participants in the brainstorming session helped to create ideas for intratask variation, practicing the same skill in diverse ways (Graham, Holt/Hale, Parker, 2013), with the intent to keep students engaged and motivated to practice a skill.

The intervention was created to provide a focus on developing physical literacy through the instruction of the elementary physical education curriculum. The foundation of the intervention was the physical education curricular outcomes for grade four and five

(Saskatchewan Ministry of Education, 2010b, 2010c). In addition, the intervention was structured to develop the 18 motor skill tasks assessed by the PLAY Fun tool. A physical literacy circuit resource (Appendix H) that reflected several outcomes of the physical education curriculum and the 18 tasks was then created and implemented in physical education classes. This resource was shared with all usual practice condition teachers after the completion of the study (please see section on Reciprocity for more information).

The physical literacy intervention was designed to run for ten weeks. This time length was selected based on previous movement skill interventions in the literature and interventions using the PLAY tools (Kiez, 2015; Logan et al., 2011; McManes, 2013). Fundamental movement skill interventions have been effective in improving skills, and these types of interventions typically range from 6 to 15 weeks (Logan et al., 2011). While limited literature on physical literacy interventions in physical education exists, there are a handful of studies that have used the PLAY tools assessments within their studies. The time length of these particular interventions ranged from one half of a school year (Kiez, 2015) and from six to ten weeks (McManes, 2013).

The provincial Ministry of Education states that 150 minutes of physical education instruction time should occur per week (Saskatchewan Ministry of Education, 2010b). Most of the physical education within the participants' schools was scheduled in three 50-minute blocks per week. The intervention was created to fit within these scheduling parameters. The physical literacy circuit was built around two principles of learning: repetition of skills and knowledge of results (Adams, 1987; Kriellaars, 2014a). The circuit was designed to facilitate student participation in many repetitions of a variety of skills, with children being able to observe the outcome of those repetitions. The intervention program consisted of the 18 PLAY Fun tasks broken into two sets of circuit stations (sun and hour glass) (Appendix H). A third day incorporating locomotor patterns was used to practice skills that could not be practiced during the physical literacy circuits due to space constraints.

The activities included in the circuits and the locomotor day were designed to be fun and gamified. Throughout the duration of the physical literacy condition, students were given a choice and encouraged to select other objects for an appropriate level of difficulty as they progressed in a task. For example, in the catching with one hand task, all students began catching bean bags, but later they were also able to choose assorted sizes of balls to increase or decrease

difficulty. Laminated posters for each of the 18 PLAY Fun task were created and given to each teacher to use during the intervention. These posters remained on the gymnasium walls for the children to refer to during the physical literacy circuit. Following the circuit, the remainder of the physical education class was spent teaching a specific topic area. Depending upon what the teachers had previously covered in the curriculum, during the second half of class teachers taught content such as dance, flag football, track and field, and other topics. An example of a typical week in the physical literacy condition is shown below (Table 4.2).

Table 4.2. *Weekly intervention format*

MONDAY	TUESDAY	THURSDAY
1 st half of class: Sun stations	1 st half of class: Hour glass stations	1 st half of class: Locomotor activities
2 nd half of class: Curricular content	2 nd half of class: Curricular content	2 nd half of class: Curricular content

Both the physical literacy condition specialist and the physical literacy condition generalists taught this physical literacy circuit. The generalist teachers who were part of the physical literacy condition required extra support to facilitate this program. An embedded professional development model was used where I acted as a mentor teacher in order to (a) initially lead the stations and locomotor activities in the first part of class, and then (b) help support the generalist teacher in the second part of class (whatever was required by the teacher, i.e., taking over instruction, co-teaching, writing lesson plans, etc.). After my initial facilitation of the physical literacy circuit and the locomotor activities, the generalists began to teach the physical literacy circuits on their own (I was present to assist if necessary). This change occurred in approximately the fifth week of the physical literacy condition (A. Stoddart, Research Journal, April 22, 2015). During the physical literacy condition, I also attended the physical literacy condition specialist's physical education classes to ensure the same program was being followed.

4.3.4 Usual Practice Condition

While the three physical literacy condition teachers were participating in the physical literacy focused physical education classes, the three usual practice condition teachers carried on with their own physical education planning and instruction. To understand the topics and skills being

taught in the usual practice condition schools, I sent the usual practice teachers weekly emails to complete regarding what had been covered in physical education classes. All of the usual practice teachers responded to the weekly emails. These emails were completed for the duration of the study and information from those emails are provided in Appendix J. I did not have any control over what the usual practice teachers covered in physical education class.

4.3.5 Data Collection

Data was collected at baseline (March 2015) and post-intervention (May/June 2015). The PLAY tools used in this study included the PLAY Fun, PLAY Self, and PLAY Inventory. Apart from the use of the PLAY tools, interviews were conducted with the intervention teachers post-intervention. Those qualitative analysis and findings are outside the scope of this paper. Only the quantitative results from the PLAY tools will be discussed in this manuscript. In addition, I also kept a research journal noting decisions made in pilot testing, testing procedures, and school information.

4.3.6 Physical Literacy Assessment for Youth (PLAY) Tools

The PLAY tools (Kriellaars, 2014b) were selected as the assessment tool for this study because of their comprehensive nature in assessing physical literacy (Appendix G). The PLAY tools assess the four elements of physical literacy: physical competence, cognitive, affective, and behavioural. In addition, the tools also include a PLAY Coach form where a coach or teacher can fill out a report for each child and a PLAY Parent form where a parent can evaluate his or her child's physical literacy. The PLAY tools have been assessed and determined as reliable and valid (Kiez, 2015; Kriellaars, 2014a). Although Robinson and Randall (2017) state the PLAY tools have self-made claims and a lack of peer-reviewed claims when it comes to trustworthiness, a more recent study by Wohlers, Stearns, McHugh, Kuzik, and Spence (2017) corroborate the reliability and validity findings of the PLAY tools. To answer the research question that guided this study, only data from the PLAY Fun, PLAY Self, and PLAY Inventory was used. Data collection for these PLAY tools occurred during physical education class time. To lessen the display effect (Roetert & MacDonald, 2015) and to cause less of a disruption to the class, students were removed from physical education class to complete the assessments. The PLAY Fun tool took approximately five minutes for one child to complete, while the PLAY Self and PLAY Inventory took about ten to fifteen minutes for each child to complete. The

assessments were completed under the supervision of trained research assistants. Further details about the PLAY Fun, PLAY Self, and PLAY Inventory tools and procedures are below.

4.3.6.1 PLAY Fun

The PLAY Fun tool was used as an objective measure for the physical competence element of physical literacy. Eighteen tasks are objectively assessed with this tool. The tasks cover a range of movements in the following five subsections: running (Task 1: Running a Square, Task 2: Running There and Back, and Task 3: Run, Hop, and Land on Two Feet), locomotor (Task 4: Crossovers, Task 5: Skip, Task 6: Gallop, and Task 7: Hop, Task 8: Jump), object control- upper body (Task 9: Overhand Throw, Task 10: Strike with a Stick, Task 11: One-handed catch, and Task 12: Hand Dribble Stationary and Moving Forward), object control- lower body (Task 13: Kick Ball and Task 14: Foot Dribble Moving Forward), and balance stability and body control (Task 15: Balance Walk (heel-to-toe) Forward, Task 16: Balance Walk (toe-to-heel) Backward, Task 17: Drop to Ground and Back Up, and Task 18: Lift and Lower) (Sport for Life Society, N.D.). We chose to have these tasks video recorded on iPads instead of assessing live to ensure assessors were not biased by knowledge of pre-or post assessment or experimental condition.

Some PLAY Fun task dimensions were modified to fit the practical realities of schools. Space was lacking in every school, thus distances suggested in the original PLAY Fun procedures were modified to fit in school hallways and boot rooms. All changes are explained in Appendix I. These changes were made during pilot testing. The modified measurements were kept consistent throughout all schools and testing.

Two groups of four research assistants with previous experience in motor skill assessments were trained in a half-day training session (one group for the pre-assessment and one for the post-assessment) on how to set up the PLAY Fun tasks and how to video record the tasks properly prior to the baseline assessments. The procedures for the PLAY Fun assessment tool required a verbal script for each particular skill. To ensure the scripts were being used by the research assistants appropriately, a laminated copy of the scripts and the set ups for the tasks (e.g., Task 1: Running a Square, 4 pylons in a 2-metre square) were given to each research assistant to be used during every data collection session. These were used for all pre-and post testing.

Before data collection commenced, the children were assigned a pre-determined code. This code was put on name tags placed on their backs. Small groups of one to three students completed the PLAY Fun tasks one at a time. Students who were waiting their turn, faced away from the student performing the task and/or were instructed to close their eyes to decrease mimicry. Students were randomized for the order of performing tasks. The order in which the tasks were completed stayed the same for all students and for both pre-and post intervention assessments. For example, Task One Running a Square, had an order of Student A, Student B, Student C. For Task Two, Run There and Back, the order was Student B, Student C, Student A. This continued for the remainder of the PLAY Fun tasks. One case did not follow the randomization of the students. For the group including identical twins who wore matching outfits, these students were not randomized and were kept in the same order throughout the PLAY Fun assessment. This was necessary to ensure individuals were correctly assessed later through video.

Two double-blind coders (unaware of both treatment and time) analyzed the PLAY Fun data. Prior to coding, a half day of training occurred to ensure coders were using the same criteria to appropriately code the data. The PLAY Fun workbook was used to help with this process (CS4L, 2014b). Intra-class correlation was used to calculate the interrater reliability of the two coders on a school set of PLAY Fun data. This test is one of the most commonly used tests for assessing interrater reliability; it is suitable for when only a subset of participants is rated by multiple coders and the rest are rated by one coder (Hallgren, 2012).

Each of the 18 PLAY Fun tasks was rated by the double-blind coders on a continuum from one to one hundred with one hundred being the “ideal athlete.” The scale identified the following four categories: initial (0-25), emerging (26-50), competent (51-75), and proficient (76-100) (Kriellaars, 2014b).

Missing Data: Only a few data points were missing from this measure as missing data was the result of a child being injured in some way that they could not complete a certain task (e.g., a student had a sprained ankle and could not hop on that leg). A missing data point was replaced with that child’s mean from the overall scale (Tabachnick & Fidell, 2007). Students who had not completed the pre-or post testing due to drop out or vacations were removed from the data set, resulting in 131 students’ data being analyzed.

4.3.6.2 *PLAY Self*

The PLAY Self tool was used to assess the affective and cognitive elements of physical literacy. This tool is a self-evaluation form to be completed by a child to understand his or her own physical literacy perceptions (CS4L, 2014c). The PLAY Self tool covered four subsections including questions on: the different environments they participated in/on (gym, water, ice, snow, outdoors, and playground), self- description to determine the child's self-efficacy and how it relates to his or her involvement in physical activity (e.g., I worry about trying a new sport or activity, I'm confident when doing physical activities, etc.), relative ranking of literacies (reading and writing, mathematics, and movement importance in school, at home, and with friends), and fitness (e.g., fitness is good enough to let me do all the activities I choose).

I scored all the PLAY Self assessments following the scoring procedures outlined for the tool. For this assessment tool, answers about the environment (Q1-6) were scored as the following: never tried=0, not so good= 25, OK=50, very good=75, and excellent=100. For the physical literacy self-description questions (Q7-19, apart from 13), answers were scored as: not true at all=0, not usually true= 33, true=67, and very true=100. Question 13, "*I worry about trying a new sport or activity,*" had a different scoring system which included not true at all=100, not usually true= 67, true=33, and very true=0 (CS4L, 2014c). For the relative ranking of literacies (Q19-21), answers were scored as: strongly disagree=0, disagree=33, agree= 67, and strongly agree= 100. The fitness subsection data was not included as there was no scoring included for it in the PLAY Self protocol.

Missing Data: Despite research assistants checking self-report data on-site for completion, missing data occurred. As part of the PLAY Self protocol, students were also supposed to use the rule: "if you don't know, don't answer" (CS4L, 2014c). 7020 data points were checked in this measure and missing data points were well under the 10% required to replace missing data points (50 missing data points out of 7020) (Tabachnick & Fidell, 2007). Initially missing data was entered as blanks and highlighted in colour to differentiate from zeros. Following this step, missing data was replaced by the participant's mean from the overall scale. Missing data from students who had not completed the pre-or post testing due to drop out or vacations was removed, this resulted in 130 students' data being analyzed for the PLAY Self tool.

4.3.6.3 PLAY Inventory

This tool was used to assess the behavioural element of physical literacy. Children completed this tool and checked off any activities they had regularly participated in outside of school for the past year. Activities included ranged from physically active ones, such as running or playing tag, to sedentary ones, such as playing video games or homework. Physical activities were tallied and sedentary activities (e.g., homework, watching tv or movies, reading, etc.) were tallied both for pre-and post assessments. If a student specified an activity in other that s/he had already checked off, only one checkmark was included and the double was excluded. For example, if a student had checked off hockey, but then also included hockey in one of the “other” options, only one hockey check would count towards the physical activity tally. Students that checked “other,” but did not specify an activity were not included in the physical activity or sedentary totals.

Missing Data: Students who had not completed the pre-or post testing due to drop out or vacations were removed from the data set. Three outliers were also removed as the students’ data drastically affected the normality of the dataset, resulting in 127 participants’ data being analyzed for the PLAY Inventory.

4.3.7 Statistical Analyses

All variables were assessed for normality and descriptive statistics were generated. In addition to the assumptions of an ANOVA, ANCOVAs also require a parallel linear relationship between the dependent variable and the covariate, and the covariate to be independent of the treatment effects (Vincent & Weir, 2012). Differences in outcome variables between time points (pre/post), treatments (intervention/usual practice) and groups (specialist/ generalist combined class/generalist) were assessed by a repeated measures ANCOVA; covariates included age and gender. SPSS Version 24.0 (Statistical Package for Social Science, Chicago, IL) was used for all analyses. All values are presented as means \pm standard deviation unless otherwise specified. Due to multiple ANCOVAs being conducted, the Bonferroni correction was used to reduce Type I error. This correction has been used previously in the literature for multiple comparisons with types of teachers (Faulkner et al., 2008). For the PLAY Fun and PLAY Self variables $p \leq .003$ (.05/18) was required to achieve statistical significance, and for the PLAY Inventory variables, $p \leq .03$ (.05/2).

4.4 Results

The following section includes sample size analysis, the interrater reliability analysis, and the results of the PLAY tools (PLAY Fun, PLAY Self, and the PLAY Inventory). Results for the latter are organized by the separate measures of the PLAY tools. First, results of the PLAY Fun will be presented, followed by the PLAY Self and lastly, the PLAY Inventory results. For an expanded section on results, please see Appendix K. For the PLAY Fun and PLAY Self means, standard deviations, and effect sizes, please see Appendices L and M.

4.4.1 Interrater Reliability Analysis

Interrater reliability was assessed using a two-way mixed, absolute agreement, single-measures intra-class correlation to assess the degree that coders provided consistency in their ratings of the PLAY Fun tasks across participants (Hallgren, 2012). The intra-class correlation was in the “good” range, $ICC=.831$, indicating that coders had a high degree of agreement. This suggests that the PLAY Fun tasks were rated similarly across coders. Because of the high degree of agreement, coder one’s values were used for all participants. When agreement did not occur between coders, the second coder’s values were eliminated.

4.4.2 PLAY Fun

Overall, eight of the eighteen tasks demonstrated a significant effect of the intervention at $p<.05$, however only three tasks met the Bonferroni corrected alpha of $p\leq.003$. The eighteen tasks are represented below (Table 4.3).

Table 4.3. Summary table of overall significance for PLAY Fun tasks

Tasks	Age	Sex	Treatment	Group	Treatment x Group
Running a Square			F(1,123)=11.534 p=.001 *		
Run There & Back			F(1,123)=10.551 p=.001 *		
Run, Hop, Land 2 Feet	F(1,123)=5.373 p=.022	F(1,123)=4.648 p=.033			F(2,123)=3.441 p=.035
Crossovers			F(1,123)=6.328 p=.013	F(2,123)=3.316 p=.040	
Skip		F(1,123)=19.020 p=.000 *			
Gallop		F(1,123)=5.215 p=.024	F(1,123)=6.450 p=.012		
Hop		F(1,123)=5.361 p=.022	F(1,123)=9.382 p=.003 *	F(2,123)=3.692 p=.028	
Jump					
Overhand Throw		F(1,123)=14.535 p=.000 *			
Strike		F(1,123)=43.143 p=.000 *			
One-handed Catch					
Hand Dribble					
Kick Ball				F(2,123)=3.646 p=.029	
Foot Dribble		F(1,123)=4.676 p=.033			
Balance Forwards		F(1,123)=4.148 p=.044	F(1,123)=7.710 p=.006		
Balance Backward		F(1,123)=4.106 p=.045	F(1,123)=5.712 p=.018		
Drop			F(1,123)=4.600 p=.034		
Lift & Lower		F(1,123)=7.684 p=.006			

Note: * meets alpha of Bonferroni adjusted $p \leq .003$.

Note: Non-significant ANCOVAs ($p < .05$) are represented by a blank cell.

4.4.3 PLAY Self

Overall, one out of the 18 questions demonstrated a significant effect of the intervention, however this question did not meet the Bonferroni corrected alpha of $p \leq .003$. The eighteen questions of the PLAY Self are represented below (Table 4.4).

Table 4.4. *Summary table of overall significance for PLAY Self questions*

Question	Age	Sex	Treatment	Group	Treatment x Group
Gym		F(1,122)=6.321 p=.013			F(2,122)=3.553 p=.032
Water			F(1,122)=7.368 p=.008		
Ice					
Snow					
Outdoors					
Playground				F(2,122)=3.718 p=.027	
Long to learn					
Enough skills	F(1,122)=4.563 p=.035				
Active important					
Active happier					
Take part in activity					
Body allows participation					F(2,122)=3.602 p=.030
Worry about trying new activity/sport	F(1,122)=4.122 p=.045				F(2,122)=3.626 p=.030
Understand words					
Confident					F(2,122)=4.029 p=.020
Can't wait to try new activities/sports					
Best in class	F(1,122)=5.846 p=.017	F(1,122)=15.284 p=.000 *			
Don't need to practice	F(1,122)=5.297 p=.023	F(1,122)=5.335 p=.023			

Note: * meets alpha of Bonferroni adjusted $p \leq .003$.

Note: Non-significant ANCOVAs ($p < .05$) are represented by a blank cell.

4.4.4 PLAY Inventory

There were no significant differences for any activities (physically active or sedentary) regarding sex, age, group, treatment, or group by treatment interaction; Physical Activities: Treatment, $F(1, 119)=0.063$, $p>.05$, and Sedentary Activities: Treatment, $F(1,119)=.411$, $p>.05$.

4.5 Discussion

The concept of physical literacy is complex. The guiding research question for this study revolved around the impact on students' physical literacy due to a physical literacy intervention delivered by teachers in elementary school physical education classes. Although there is extensive literature on the concept of physical literacy, there is little literature discussing how and if participating in physical education has potential to impact students' physical literacy. Of the few physical literacy interventions in physical education that do exist, most of these are unpublished dissertations or theses (Kiez, 2015; McManes, 2013). While the connection between physical education and physical literacy has been acknowledged (McLennan & Thompson, 2015; PHE Canada, 2010), empirical evidence is necessary to further understand how teachers can impact their students' physical literacy development. With the holistic concept of physical literacy, all four elements of physical literacy (affective, physical, cognitive, and behavioural) were assessed to determine if progress had been made in developing physical literacy. Due to the use of multiple comparisons, the Bonferroni correction impacted significance of results. While only a few of the tasks were deemed significant with the new alpha level of .003, I will also briefly discuss some trending towards significant results below. To answer this study's research question, all of the elements of physical literacy are discussed.

Physical Competence Element: From the results of the PLAY Fun assessment tool, it appeared that eight of the eighteen tasks were trending towards significance due to the intervention, however with the Bonferroni corrected alpha levels only three tasks (e.g., running a square, running there and back, and the hop) met the more conservative level of $p\leq.003$. There could be several potential reasons to explain why all eighteen tasks did not show a significant improvement in the intervention stream students. While all of the eighteen tasks were given equal time and importance in the intervention, perhaps better activities could have been used for those tasks that did not show significant differences of treatment over time.

Examining significant sex differences on tasks, three tasks (e.g., skip, overhand throw, and strike) met the Bonferroni adjusted alpha. Sex differences on object control skills are

common in the literature; Barnett, van Beurden, Morgan, Brooks, and Beard (2010) illustrated that significantly more boys could reach a proficient state of performance in the kick, overhand throw, and catch than girls. Busse, Zhang, Thomas, and Weiller-Abels (2012) also found sex differences with boys being significantly better at basketball skills, throwing, and striking skills than girls. Results from this current study did not identify sex differences in the kick or catch, however boys were significantly better than girls at the overhand throw and strike. Despite all students participating in the same physical literacy intervention, sex differences remained.

Contrary to Barnett et al., (2010) who found no significant sex differences in locomotor skill performance, data from this current study identified that girls were better than boys at several locomotor skills (e.g., skip, gallop, hop, and balance). Bunker (1991) noted that prepubescent children should not demonstrate any sex differences in skills, however it is possible for differences to occur should all children not be given adequate experience at practicing skills. Unfortunately, boys and girls do not appear to get the same amount of practice; boys have been shown to have significantly more recess step counts, more out of school step counts, more recess activity time, and more out of school activity time than girls (Beighle, Morgan, Le Masurier, & Pangrazi, 2006). Beighle et al. (2006) also observed that boys were more active during recess playing team sports like soccer or football, while girls spent a lot of time standing in line playing activities like wall ball. Interestingly, in Kiez's (2015) physical literacy study, the circus arts in physical education intervention condition did not amplify the existing sex gap, while the regular physical education condition amplified sex differences (females scoring lower than males) on the aggregate physical literacy competence score from the PLAY Fun tool. More work needs to be completed to understand how developing physical literacy in physical education can potentially address these skill sex gaps. Especially with girls being less active than boys (Canadian Fitness and Lifestyle Research Institute, 2015), it is critical to create a learning environment that allows both girls and boys to succeed.

With respect to the performance of specific skills, the hop was one of the weakest skills of the eighteen skills assessed. These results are similar to Barnett and colleagues (2010) who also found the hop to be one of the most poorly performed skills by all children, regardless of sex. They speculated that the hop itself may be a difficult skill to assess or that assessment of the hop may need further development (Barnett et al., 2010). As opposed to other existing physical literacy assessment tools, the PLAY Fun assessment tool requires the students to hear

instructions for a task once and then theoretically the students are supposed to comprehend those instructions and perform the task (Sport for Life Society, N.D.). It was evident from the data that comprehension of the hopping task was an issue for students both before and after the intervention, despite this being part of the intervention. We speculate that students may not understand the term “hop.” This lack of understanding may be influenced by language used in schools and the community, for example “I hop like a bunny” (Coronach School, 2017, p.1). Confusion may not only be occurring in schools; Active for Life, an organization that promotes physical literacy also describes hopping as using two feet (Active for Life, N.D.). PHE Canada, along with others, clearly indicate the task of hopping involves a one-foot takeoff with same-foot landing (Kriellaars, 2014b; PHE Canada, N.D.). One may ask if students’ performance on the hop may be due to comprehension or the genuine lack of ability to perform the skill.

Affective and Cognitive Elements: The PLAY Self assessment tool was used to evaluate the affective and cognitive elements of physical literacy. From the results, it appeared that the intervention had less of an effect on these elements than on the physical competence element. Interestingly, a trending towards significant effect of treatment was found on the environment question about water, despite there being no focus on participating in water during the intervention. Students in both the physical literacy and usual practice conditions went swimming with their schools. The Saskatchewan curriculum for both grade four and grade five has only one outcome that the activity of swimming could potentially meet (e.g., Outcome 4.1 and Outcome 5.1 Health-related Fitness) (Saskatchewan Ministry of Education, 2010b, 2010c). The reasoning for the difference between the physical literacy and usual practice conditions for water is unknown.

There was less of an impact of sex on the affective and cognitive elements, however one question did provoke a significant effect. *“I’m usually the best in my class at doing an activity”* was the only significant result for the PLAY Self with the adjusted alpha level with boys having a higher mean than girls. Age was more of a factor on the affective and cognitive elements than the physical competence element. Results trended toward significant for several questions including *“I think I have enough skills to participate in all the sports and activities I want, I don’t really need to practice my skills- I’m naturally good, and I worry about trying a new sport or activity.”* While the average participant for each age group indicated that s/he had enough skills, there was a downward trend in age from “true” (*I think I have enough skills to participate in all*

the sports and activities I want) moving towards "not usually true." Results also indicated that as students aged they identified themselves as not being the best in class, and they saw a need to practice skills. Perhaps this may be better understood when we look at literature on children's perceptions. Stipek (1981) identified that young children tend to have a bias towards positive perceptions of their abilities and that as children age they begin to rate themselves more accurately. This theory was corroborated by Harter and Pike (1984) who reported that young children tend to confuse reality and the wish to be competent, while those children at approximately nine years of age begin to use social comparison to judge their own competence. Children in our study ranged from 9 to 11 years old ($M = 9.73$). Reviewing the results from the PLAY Self, we may be seeing the children's perceptions becoming more accurate and the children using social comparison to judge their abilities.

Motivation and confidence represent the affective element of physical literacy (ParticipACTION et al, 2015). It would appear from the data that the intervention was ineffective in increasing confidence levels of students. In fact, a downward trend was seen for all groups, apart from the usual practice generalist class. To develop this affective element through physical education, children need to have successful experiences that will help to build self-esteem and self-confidence (Bunker, 1991; McLennan & Thompson, 2015). Bunker (1991) suggests specific feedback, developmentally appropriate sequenced activities, along with a successful, yet challenging difficulty level to build self-esteem and self-confidence; all of these of which are discussed in Graham, Holt/Hale, and Parker's (2013) text for teaching physical education. Although these characteristics of teaching physical education were built into the intervention, significant differences were not demonstrated with the affective elements of physical literacy.

Behavioural Element: The PLAY Inventory assessment tool was used to evaluate the behavioural element of physical literacy. No statistically significant differences were found with the children's data. The pre-assessment took place in the winter season, while the post-assessment occurred in spring/summer, potentially affecting results. However, being that this particular measure required students to note what activities they had taken part in during the past twelve months, the results would likely not have been affected by the season change. In addition, all students regardless of condition (e.g., physical literacy or usual practice) would have experienced the same change in seasons. The intervention length may have been too short to note significant differences in behaviour outcomes.

Type of Teacher: Who is teaching physical education has been a topic of conversation for many years. While literature exists positioning the physical education specialist as the preferred teacher for physical education (Decorby, Halas, Dixon, Wintrup, & Janzen, 2005; Hardman & Marshall, 2000; Mandigo, 2010; Spence et al., 2004), there is also some research that demonstrates with the right support, generalists can be better equipped to teach physical education (Sallis et al., 1997). Because Saskatchewan school divisions have both specialist and generalists teaching physical education, I believed that it was important to include both types of teachers in this study.

For the most part, there were no statistically significant differences in the results of the assessments for each of the four elements of physical literacy between students of specialists and generalists. The results from the PLAY Fun tool indicated there was a difference between the teachers on the crossovers, hop, and kick ball. Interestingly, the biggest differences were between the generalist combined and generalist classes, despite having students from the same populations/same school. There was only one question on the PLAY Self tool where there was a difference between specialists and generalists. Results from “*How good are you at doing sports and activities on the playground*” indicated that the generalist combined students felt “very good” to “excellent” about their abilities on the playground, while the generalist and the specialist students felt closer to “very good” about their abilities on the playground. This difference may have been because of individual school policy and procedure, as at some schools when students reach a certain grade they are no longer permitted to use the playground. Overall, there were few statistically significant differences between the teachers; this may have been indication that both the specialist and generalist teachers were facilitating the physical literacy resource in a similar fashion.

Implementation and Next Steps: The data from the PLAY Fun, PLAY Self, and PLAY Inventory suggest that the physical literacy condition may not have been sustained long enough to create a statistically significant difference in all tasks and questions. While there is a lack of data on physical literacy interventions, physical activity intervention research may provide the best insight into intervention effectiveness. Kriemler and colleagues’ (2011) updated review regarding the effect of school-based interventions on physical activity found that the majority of studies had significant effects, however studies with a duration less than three months were excluded from the review. Perhaps due to the complexity of physical literacy, longer

interventions are necessary to see change. More work is required to identify effective dose and duration of physical literacy intervention work in physical education.

The physical literacy resource was built to reflect several outcomes of the provincial physical education curriculum (Saskatchewan Ministry of Education, 2010b, 2010c) and the PLAY Fun assessment tool tasks (Sport for Life Society, N.D.). Although the intervention was designed to build success, confidence, and motivation through repetition and knowledge of results, along with student choice, more attention on the affective and cognitive elements of physical literacy may have been beneficial. Perhaps incorporating discussion or critical conversations about these elements of physical literacy with the students may be another layer to add to the intervention. I initially believed that by using pedagogically sound physical education teaching practices and that by having a focus on physical competency, the affective, cognitive, and behavioural elements of physical literacy would develop organically. Longmuir and Tremblay (2016) identify the difficulty of measuring these unobservable elements (affective and cognitive) of physical literacy, and they propose several questions about how to monitor, understand, and enhance physical literacy. Our findings indicate that more of an active focus may be required to develop those other elements of physical literacy.

Regardless of the country and the definition of physical literacy, the research and its respective literature appears to focus on the physical element of physical literacy. While the consensus is that physical literacy is multifaceted, containing more elements than physical competency (ParticipACTION, 2015; Whitehead, 2010), literature is lacking on how to develop the other elements of physical literacy. If the focus is solely on physical competency, how does this differ from research on fundamental movement skills? An analysis of the concept of physical literacy across the international literature by Hyndman and Pill (2017) illustrated that the physical element was the prominent focus, while there was less emphasis on the other elements of physical literacy (cognitive, affective, behavioural). In Edwards and colleagues' (2017) systematic review, confidence and motivation were mentioned in more papers than any one category of physical competence, but the number of papers that spoke about some aspect of physical competence was greater than the affective and cognitive elements overall. That review also discussed that several sport organizations use the terms physical literacy and fundamental movement skills interchangeably, although physical literacy and fundamental movement skills are two distinct, but related entities (Edwards et al., 2017). Much more work needs to be

conducted on the comprehensive concept of physical literacy. Future research should focus on developing all four elements of physical literacy to actualize the true sense of the concept.

One way to develop the holistic concept of physical literacy may be to seek collaboration from various stakeholders. Physical education teachers are not solely responsible for developing physical literacy. All “significant others” can help or hinder the development of physical literacy (Edwards et al., 2017). The idea that physical literacy can be developed by multiple sectors and by multiple people is akin to that of effective and sustainable interventions. Dobbins, Husson, DeCorby, and LaRocca (2013) suggest that effective school-based interventions may require a wider scope than simply the school; the involvement of community and multiple environments that support active living may be necessary (Saskatchewan In Motion, N.D.). Looking forward, a sustainable and effective strategy to develop physical literacy may be to enlist the home, school, and community in a physical literacy intervention. This strategy will only work if these sectors embrace all of the elements of physical literacy.

Reciprocity: All teachers participating in the Usual Practice stream were invited to a half-day session at the University for a workshop on physical literacy. During this workshop, teachers were given all resources created during the study. All teachers who participated in the study were offered continued assistance and support once the study was completed. One of the teachers who participated in the Usual Practice stream was required to teach Kindergarten the year after the study’s completion. Because the original physical literacy resource was no longer beneficial for that grade level, I along with another colleague, created a physical literacy focused lesson plan and we were able to go and teach a Kindergarten class. That lesson plan resource was shared with that teacher.

4.5.1 Limitations

As with any research, this study had limitations. Ultimately, the study was underpowered according to a sample size analysis (e.g., requirement of 158 participants). The sample size was limited by the need to have participants from intact classes, teachers who were willing to participate, and having to acquire both parental consent and student assent. Participating teachers were not surprised by the lack of parental response to consent and student response to assent as they noted that they frequently struggled to get responses back from a simple one or two page note about field trips. Related to the sample size, teachers’ classes were not randomized to the treatment (intervention or usual practice). Because of the complexities of working in schools, it

was critical that the teachers in the physical literacy condition were interested and willing to participate in the intervention and had a school administration that was receptive to housing a collaborative researcher for the duration of the study.

Although the initial study was planned for a ten-week period, respective time lengths in the study were shortened due to conflicts that are typical in a school setting such as school breaks, facilities, and availability of teachers. Interventions in a natural or field setting such as a school may experience a shorter than planned intervention time due to unexpected school events (Azzarito, Simon, & Marttinen, 2016). Although the study was set to begin in January 2015, the need to follow policies and procedures of the school division caused the study to begin in March 2015. Despite receiving email confirmation (February 5, 2015) that the study could begin, we had to wait until we had received a physical copy of the study approval in the mail. With the intervention starting in the middle of the school year, routines and expectations for the students for behaviour and participation in physical education were already in place. It may have been beneficial to start the intervention at the beginning of the school year and continue through to the end of the school year.

Two groups of trained research assistants were used to administer and video record the PLAY tools. This may have increased variance in how the tools were implemented. To reduce potential variance, all research assistants were trained the same way, used the same scripts, and video recorded the PLAY Fun tasks the same way.

No comprehension or confidence flags were reported as the method of evaluation did not permit an accurate assessment of these flags. Because the PLAY Fun tasks were individually video recorded, evaluators were unable to discern accurately whether a student had demonstrated flags of mimicry, needed a description, a demonstration, or a prompt.

The behavioural element of physical literacy was limited by the PLAY Inventory measure. Some students identified activities that a grade four or five child would not typically participate in (e.g., bodybuilding). The Play Inventory was designed to identify the breadth of physical activities that children participated in, as well as sedentary activities in the past year outside of school or work. It would also be helpful for the instructions of the tool to specifically define what “regular” participation in activities means. A different approach to assess the behavioural element of physical literacy may be for students to wear accelerometers to objectively measure physical activity behaviour of children. Having an objective measure of

physical activity behaviour in addition to the self report PLAY Inventory may be more realistic and provide objective data. While using two measures may provide more accurate data, there are challenges with children using accelerometers such as low levels of compliance and issues with putting on or removing accelerometers resulting in lost devices (Kerpan, 2016).

I did not record attendance during physical education classes. This may have been insightful data to collect as students may have been impacted by missing several physical education classes during the duration of the intervention. Some students were instructed to attend other programs (e.g., assistance with reading, English as a Second Language, etc.) instead of attending physical education. This situation could have potentially affected the progress made by these students during the intervention program.

4.5.2 Strengths

Despite the aforementioned limitations, this research also had many strengths. This study is one of the first of its kind to assess the impact of a physical literacy intervention in physical education classes. The research design involved two types of teachers, specialists and generalists. Both types of teachers lead instruction in physical education classes in Canada; therefore, it was pertinent to include both in the research design. The study design also included students in multiple grades, which permitted the comparison of students in one grade to another. Another strength of the research design was the inclusion of both an experimental condition and a usual practice condition. To gain insight into the content being covered by usual practice teachers, weekly emails were sent. These weekly emails were filled out and returned to the researchers so that researchers could have an idea of what topics and skills teachers were covering during the time length of the intervention.

While attenuation is something researchers must consider, only four children dropped out of the study and were not present for post-intervention measurements due to moving to a different school or going on vacation for several weeks during post-testing.

For the physical literacy assessment procedures, students completed the PLAY Fun tasks one at a time. Students who were not presently participating in that task turned around and closed their eyes as to lessen the chances to be influenced by mimicry. Students were also randomized for the order of participating in the task. Research assistants were trained to deliver the tasks to the students, and double-blind coders were later used to assess the video recorded data.

The intervention was developed by a group of experienced physical education teachers who participated in a physical education professional learning community. The strength of collaboration was also a critical aspect of the intervention implementation; a collaborative team of the physical literacy condition teachers and myself permitted an embedded professional development context. The intervention itself was made for both specialist and generalist teachers of physical education and was directly linked to the provincial curriculum.

Because of the physical literacy assessment tools selected, researchers could collect data on the four elements of physical literacy. The PLAY Fun tool provided an objective assessment of the students' physical competence, the PLAY Self a self-report on the cognitive and affective elements, and PLAY Inventory was a self-report regarding the behavioural element of physical literacy.

Dissemination & Knowledge Translation: All teachers who participated in the study were given the physical literacy resource created for the intervention. Once the project's data was analyzed, all teachers were given a summary report of the quantitative results. Following the physical literacy study, I stayed in touch with all the teachers who remained working in the participating school division. I went back and participated in the Terry Fox school walk with one school the following year, and I've been a substitute for some of these teachers and have been able to teach some of the students again. In addition, I have been able to share electronic copies of the physical literacy resource with participating teachers who have taught outside of the school division.

Results and experiences of being a part of the physical literacy condition were shared with other teachers, principals, and school superintendents at the provincial teacher federation conference on research in teaching in November 2015. This resulted in the physical literacy resource (Appendix H) being shared with others (e.g., a principal in a different school division).

4.6 Conclusions

How to develop physical literacy through physical education is just beginning to be understood. This physical literacy intervention was created to reflect the provincial physical education curriculum and the PLAY tools assessment. Both specialists and generalists participated in the study, but for the most part there were no differences due the type of teachers on physical literacy. While children in the physical literacy condition performed significantly better than children in the usual practice condition on several of the physical competence tasks,

the data from the majority of the tasks did not illustrate a difference. Several sex differences occurred with the physical competence, affective, and cognitive elements of physical literacy. Data from the intervention yielded a few significant results from the PLAY Self tool, however the majority of the data from the PLAY Self tool and the PLAY Inventory tool showed a lack of significant results. An insufficient length of the intervention may have contributed to the absence of significant results.

Researchers and educators are embarking on a journey to understand physical literacy and its integration into physical education. To genuinely develop the concept of physical literacy, all four elements need to be considered as each element is equally vital. At this moment in time, there is not enough research to understand how progression in each individual element may contribute to the development of physical literacy. Does growth in one element cause growth in another? Is there an order to the sequence of growth in elements of physical literacy? This study demonstrates the complexities of creating a physical literacy intervention and assessing a physical literacy intervention. While the intervention may not have shown statistically significant differences in developing physical literacy in all four elements, this intervention provides a starting point for critical discussions surrounding physical literacy development and for physical literacy interventions to come.

4.7 References

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Chapter 5: General Discussion and Conclusion

5.1 Summary of Findings

The body of research in this dissertation was designed to explore teachers' understanding of the concept of physical literacy, as well as the impact of a curricular-based physical literacy intervention delivered by teachers (specialist, generalist, generalist combined) on students' physical literacy in elementary school physical education classes. In study one, I examined the understanding of physical literacy of Saskatchewan teachers with a mixed methods online questionnaire. While much information existed in the literature about the definition and concept of physical literacy (Aspen Institute, 2015; CS4L, 2014; PHE Canada, 2010), there was a lack of information on the level of understanding current teachers of physical education had with regards to physical literacy. Results from study one indicated teachers possessed a wide range of comprehension and some confusion about how physical literacy could be incorporated into their physical education classes and in the physical education curriculum. There was no difference between specialists and generalists in their understanding of physical literacy, however, teachers who had fifteen years or less of teaching experience seemed to have a greater grasp of the concept.

The aim of study two was to gain a deeper understanding of how teachers understood the concept of physical literacy and its connection to physical education. Semi-structured interviews were conducted to delve further into concepts that participants introduced in study one that were unable to be explored because of the questionnaire method. Six teachers participated in study two (n = two specialists, n = four generalists) and these teachers were also part of study three. While study one used mixed methods and involved the recruitment of participants from one province, study two used qualitative methods and examined the knowledge of teachers from one particular city and school division located in that province. After conducting the interviews, the data was analyzed using Braun and Clarke's (2006) thematic analysis method. Three themes emerged from the data including: (a) "Never really used that word [physical literacy] before," (b) "Well we do have outcomes," and (c) "What do you guys want to play?" Findings illustrated that only one teacher was able to comprehensively articulate elements of physical literacy, as well as the connection between physical literacy and the provincial elementary school physical education curriculum. The remaining five teachers had a wide range of understanding regarding the concept of physical literacy. In addition to exploring the concept of physical literacy, some

teachers in study two appeared to be confused around the purpose of physical education. As one of the characteristics of an effective physical education program in the Saskatchewan physical education curriculum includes a “focus on achieving physical literacy,” it is important that teachers understand physical education is not simply about being physically active.

The third study in this dissertation research focused on developing students’ physical literacy through a curricular-based physical literacy intervention. This intervention was created by a team of physical educators and delivered by teachers (specialist, generalist, generalist combined) in elementary school physical education classes. The six teachers from study two and their respective grade four and five classes participated in either the usual practice condition (control) or the physical literacy condition (intervention) for approximately eight weeks. The physical literacy condition involved a circuit that was designed to reflect several outcomes from the grade four and five provincial elementary school physical education curriculum and the PLAY Fun assessment tool. Despite a hypothesis that students in the physical literacy condition would show improvements in physical literacy, a statistically significant improvement was not seen in the four elements (e.g., affective, cognitive, physical, and behavioural). This study is one of the first studies to examine the development of physical literacy in physical education through physical education classes. Physical literacy is complicated. Physical literacy is not just about developing fundamental movement skills; it has many intricacies because of the affective, physical, cognitive, and behavioural elements. Although results from some of the tasks and questions from the assessment tools did show significance or trending towards significance, this did not occur for all four elements of physical literacy.

5.2 Limitations and Strengths

While each study has its own limitations, study three’s quasi-experimental design created a limitation that required critical thinking with regards to the implementation of the study. Because study three was occurring in the field (e.g., schools), intact classes were used and this limited the internal validity of the experiment. Intact classes prohibited the randomization of students to treatment conditions. While using intact classes posed a threat to internal validity, I took several precautions in the study’s design and methods to protect against this threat. For the research design, concurrent controls were used. Students in the usual practice condition were matched at the group level (e.g., type of teacher, grade level) to students in the physical literacy condition, and all students received the different treatment conditions (e.g., usual practice or

physical literacy condition) at the same time. In order to ensure that those who were part of the usual practice condition were not affected by participants in the intervention condition, teachers and students from four different elementary schools participated in the study. All of the teachers who participated in the physical literacy condition used the same intervention. I personally witnessed that this was occurring as I attended both the specialist's and the generalists' physical education classes throughout the duration of the intervention. Additional attention was paid to the assessment procedures as I knew these could drastically impact the validity of the study. Research assistants were trained on to how to set up the tasks for the PLAY Fun and use the scripted lines for each of the eighteen tasks. The set up for each task and its respective equipment and measurements were kept consistent throughout the pre- and post-intervention assessments. Instead of assessing the students on the PLAY Fun measure live, the PLAY Fun tasks were video recorded. During the assessment, students who were not participating in a task were asked to either turn away from the activity or instructed to close their eyes so that they could not see the task they were going to perform. Once the study was completed, two double-blind coders assessed the videos of the PLAY Fun tasks. Although myself and the physical literacy condition teachers were not blinded to which students would be participating in the intervention, this was offset by the use of the coders. For the statistical analysis of those assessments, both age and sex were entered in as covariates to try and alleviate any confounding results due to those variables. While it was impossible to avoid intact classes, I did attempt to balance threats to internal validity throughout the study.

5.3 Reflection

The findings from study one and two would appear to indicate that the concept of physical literacy is still in its infancy stages. Despite the Saskatchewan physical education curriculum explicitly defining and using the concept within curriculum documents, the majority of teachers involved in study one and two did not have a comprehensive grasp of physical literacy. There was some evidence from study one that physical literacy is a new concept to teachers as results suggested that teachers with fewer years of experience had a firmer grasp of understanding than teachers with more than fifteen years of experience. Physical literacy has only recently been integrated in several physical education curricula, which may explain why teachers who are currently instructing are unaware or partially unaware of the concept and its elements. As physical literacy continues to evolve, there is potential for the concept to flourish

because of teachers who are impacting students everyday. In conversations with teachers in the physical education professional learning community, when asked about physical literacy they believed that physical literacy was something new and different than what had been done in the past. Physical literacy as a concept seems to be growing ever larger as those in the education, recreation, and sport sectors are integrating it within their organizations and practices. Certainly, more discussion and research centered on physical literacy is needed to gain more insight into what its development would mean for teachers, students, and society.

Throughout this dissertation research, the type of teacher (e.g., specialist and generalist) teaching physical education was a common thread. Since both specialists and generalists teach physical education in schools, it was critical to explore the differences and similarities in their knowledge and the potential impact of an intervention on their students. The results from study one suggested that there was no difference in physical literacy understanding between specialists and generalists, although there was not a representative sample of generalists. In study two, findings indicated that there was a range of understanding of physical literacy between specialist and generalist teachers, and a range of understanding even within one type of teacher. In study three, there were minimal significant differences in the findings between the students of the specialists or generalists. If one were to solely look at these results, they may be persuaded to believe that specialists do not provide a better quality physical education experience to develop physical literacy. Similar to Faulkner et al. (2008), I would implore readers to differentiate between quantity and quality in physical education. Results from these three studies provide some evidence that various specialists and generalists think alike, but the results do not comment on the quality of the specialists' or generalists' teaching practices and long-term ability to develop physical literacy within physical education. A bit of insight regarding quality of experience delivered by teachers may come from Appendix J. Reviewing the weekly content recorded by the generalist usual practice condition teachers compared to the specialist usual practice condition teacher, it is evident that the generalists' physical education content focused mainly on games and play. The usual practice specialist's content appears to be more focused on developing skill, although there were some playground games included. While this situation may not be identical in every school, this data echoes findings in the literature that many generalists play game or large-sided team sports in physical education (Morgan & Hansen, 2008). More

research is necessary to determine how physical literacy is developed within physical education and if there is indeed a difference between specialists' and generalists' ability to do so.

5.4 Recommendations

5.4.1 Recommendation: Area #1 Research

There are few intervention studies in the literature that have investigated how to develop physical literacy in physical education. This has resulted in a paucity of information around the implementation of the concept of physical literacy in physical education. The results from each of my studies have addressed some of the questions regarding the development of physical literacy in physical education, however many questions remain. One question in particular involves determining the appropriate length of a physical literacy intervention. While the original intent was to have study three run for ten weeks, in reality the intervention was limited to approximately eight weeks long. School-based physical activity intervention studies that have shown significant effects are usually implemented over a longer period of time than those that do not report significant effects (Dobbins, Husson, DeCorby, & LaRocca, 2013). Dudley, Okely, Pearson, and Cotton (2011) found that the majority of effective studies had treatment periods of six months or longer, and Logan, Robinson, Wilson, and Lucas (2011) noted that fundamental movement skill interventions have been effective in improving skills with an intervention duration of 6 to 15 weeks. The limited duration of the intervention may have contributed to the lack of significant student physical literacy results. Future intervention studies should use various time lengths in order to help establish recommendations for effective physical literacy interventions in physical education. Because physical education class are often offered only a few times a week, physical literacy interventions may benefit from a time duration longer than eight weeks. In addition, because physical literacy is a concept that permeates many sectors, a research approach that incorporates the school, home, and community (Saskatchewan In Motion, N.D.) may be worth investigating.

5.4.2 Recommendation: Area #2 Policy

Despite extensive research on the benefits of physical education and recommendations for policy and calls to action (Aspen Institute, 2015; Mandigo, 2010; McLennan & Thompson, 2015), physical education continues to be regarded as a lower priority by various school divisions, teachers, and parents (Hardman & Marshall, 2000). Ten years ago, the provinces of Ontario and Alberta instituted a policy on daily physical activity in elementary schools (Alberta

Education, 2005; Ontario Ministry of Education, 2005), however a recent provincial study in Ontario determined that the daily physical activity policy has been implemented inconsistently and incompletely (Allison et al., 2016). In Saskatchewan there is a policy regarding instructional time for physical education per week, but if the daily physical activity policy serves as a precedent, there is a high chance students are not receiving the theorized 150 minutes per week of physical education. While government policies may not create an instant change in behaviour, school divisions' strategic plans may offer an avenue for change. It is recommended that school divisions include a section on physical education in their strategic plans to ensure that the subject is a priority for teachers and for students. When school divisions make physical education a priority as has been done with literacy and numeracy, accountability for physical education and physical literacy may become a reality. Due to several misconceptions about the purpose of physical education, and a lack of a comprehensive understanding of physical literacy among many teachers, parents and children, it may be beneficial to begin every school year with an introduction to the purpose of physical education and the concept of physical literacy.

5.4.3 Recommendation: Area #3 Practice

Changes in practice have the potential to impact many lives, as teachers affect their students daily. A first recommendation is that all students in undergraduate teaching programs are required to take a class on the instruction of physical education. This course should include topics such as the purpose of physical education, its benefits, and important aspects of how to deliver a quality physical education program. Findings from conversations with Olivia, a generalist teacher in study two demonstrated that even one undergraduate class can impact teachers' perception of physical education. A second recommendation is that teachers participate in continuous learning. Teachers could become a part of their respective local or provincial physical education associations. They could also participate in continuing professional development on physical education that may be offered during staff professional development days to continue furthering the knowledge learned in undergraduate class(es). Ann's knowledge around physical literacy and physical education was expanded because of her participation in her provincial physical education association. Ann and Marilyn emphasized the positive impact that professional development can have on teaching practice. Lastly, a third recommendation is for teachers to provide all teachers with an opportunity to discuss the physical education curriculum with other teachers, physical education consultants, and administrators so that they can feel

supported and competent and confident to teach physical education. Many of the generalists in study two felt uncertain and uncomfortable about teaching physical education. By having critical discussions about the goals, content, and pedagogy of physical education in a safe and positive learning environment, teachers can work together to unpack the physical education curriculum and share ideas and challenges. Such opportunities may instill confidence in teachers and help them to provide their students with the best learning environment for physical education.

5.5 Concluding Thoughts

The research program described in this dissertation aimed to understand teachers' knowledge and understanding regarding the concept of physical literacy, its connection to physical education, and how to develop students' physical literacy. In the first study, teachers in the province discussed their understanding of physical literacy in an exploratory mixed-methods study, while purposefully selected teachers in an urban school division then had an opportunity to discuss their knowledge about physical literacy and its development through physical education in semi-structured interviews in study two. During the third study in this research program, I explored the impact of a curricular and assessment based intervention on students' physical literacy during elementary school physical education classes taught by teachers. These studies will add to the limited body of literature on the understanding of physical literacy and how to develop physical literacy in physical education. It is my plan to continue this research trajectory and address the gaps that remain in the literature, especially those in the areas of research, policy, and practice. If teachers are able to develop physical literacy in their students, this may affect many lives. I have been very fortunate to have worked with so many teachers, students, and administrators throughout this research, and I look forward to continuing to build those collaborative relationships in the hope that one day everyone will possess and use the elements of physical literacy to be active over the lifespan.

5.4 References

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APPENDICES

Appendix A: Physical Literacy Survey

1. I have read and understand the description of the research study provided above. I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I agree to participate in the study described above, understanding that I may withdraw my consent prior to the dissemination of the results. Please print this consent form for your records. I consent to participate in the following survey.
2. Gender
3. Age
4. Years of Teaching
5. What grade (s) are you currently teaching?
6. Educational background
 - a. B.Ed. (major in PE)
 - b. B.Ed. (minor in PE)
 - c. B.Ed. (no emphasis in PE)
 - d. B.Sc. Kin or BPE
 - e. PHD
 - f. Other, please specify
7. Please describe your current school PE context by indicating who is responsible for the instruction of PE programs.
 - a. Classroom Teacher
 - b. Full time specialist
 - c. Part-time specialist
 - d. External provider
 - e. Other, please specify
8. KNOWLEDGE: What does physical literacy mean to you?
9. PRACTICE: Keeping PHE Canada's definition of physical literacy in mind, how does your instruction develop physical literacy in the gymnasium during physical education?
10. RESOURCES: What resources or supports do you need to effectively develop physical literacy in your students?
 - a. Lesson Plans
 - b. Activities
 - c. PD Workshops
 - d. Assessment tools
 - e. Online resources
 - f. Video demonstrations
 - g. Other, please specify

11. Where do you get these resources/support?
- PHE Canada Website
 - School division
 - SPEA
 - Other, please specify
12. BARRIERS: What barriers do you face in developing physical literacy in your students?
- The concept of physical literacy is unclear
 - access to facilities (school & community)
 - time for PE classes
 - time to prepare to teach PE
 - opportunities for PD
 - support to attend PE conferences such as SPEA
 - resources (print, web, etc.)
 - appropriate & sufficient equipment
 - school division support for PE
 - other, please specify
13. CURRICULUM: Does the current Physical Education curriculum for Saskatchewan address physical literacy? And if so, how?
14. PARENTS: Do parents discuss physical literacy with you?
- If you answered yes to the above question, what do the parents discuss?
15. COMMUNITY: Are you aware of community initiatives that promote physical literacy?
16. QUESTIONS: What questions do you have regarding physical literacy?

Appendix B: Consent Letter (Educator)



CONSENT LETTER (Educator)

Project Title: Developing Physical Literacy in Children: Teacher Collaborated Physical Literacy Program in Elementary Physical Education to Open the Door to a Lifetime of Physical Activity

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INVITATION

We would like to ask for your assistance with a study that is being carried out by the College of Kinesiology at the University of Saskatchewan. This project is designed to (a) examine whether an integrated physical literacy program into regular physical education classes benefits elementary schoolchildren's physical literacy levels and (b) understand perceptions of physical literacy. We anticipate that this evidence-based information could be used to assist in the development of physical literacy activities that could enhance the physical literacy levels of elementary school children.

Four schools will be involved in this study. You have an equal chance of being selected to be (a) physical literacy program school or (b) a usual practice school. If you are in a physical literacy program school, you will participate in the four phases mentioned below. If you are in the usual practice school, then you will participate in phases one, two and four.

WHAT'S INVOLVED

Study Phase One

To understand more about physical literacy and current knowledge, a survey will be sent out to teachers and administration in schools, asking questions about current knowledge and understanding of physical literacy. This will allow us to gather more insight from people who do not participate in the focus groups in Phase Two. This survey will be a short six-question document to determine current understanding of physical literacy in schools.

Study Phase Two

Before the study begins in the school, you will be asked to sit down with the researcher for a focus group (approximately four participants) about physical literacy (approximately 30-45

minutes). With your permission, this will be audio recorded. You can request that the interview be terminated at any point, refuse to answer a question, and you can also request the audio recording device be shut off at any point. After your interview, and prior to data being included in the final report, you will be given the opportunity to confirm the accuracy of the conversation and to add or clarify any points in the transcript that you wish.

During the first two weeks of the study, the student researcher and two research assistants will be assessing the baseline physical literacy levels of your students. The students will be evaluated once and will have to complete an online survey about their own physical literacy perceptions. As the teacher, you will be asked to complete an online physical literacy perception (PLAYcoach) regarding each of the children in your class.

Study Phase Three

You will be asked to communicate with the student researcher regarding your schedule and any changes to it during the second phase of the study. During the following 14 weeks, a physical literacy program will be integrated into the physical education curriculum you are already conducting. You will be asked to assist the student researcher in selecting physical activities that fit in with the lessons you are delivering during the duration of the program period (14 weeks). The activities will concentrate on a variety of physical literacy skills. The program will be a combination of you and/or the student researcher instructing the physical literacy activities.

Study Phase Four

The last two weeks of the study, the student researcher and the two research assistants will once again conduct physical literacy assessments. These will be conducted to evaluate changes of the children's physical literacy levels. You will also be asked to once again complete the online survey regarding your students' physical literacy levels.

At the end of the study, you will be asked to sit down once again with the researcher for a focus group (approximately four participants) about how the study went (approximately 30-45 minutes). Similar to the initial interview, this will be audio recorded with your permission. You can request that the interview be terminated at any point, refuse to answer a question, and you can also request the audio recording device be shut off at any point. After your interview, and prior to data being included in the final report, you will be given the opportunity review the transcript of your interview, and to add, alter, or delete information from the transcripts as you see fit.

THE TOOLS

You will be using the PLAYcoach tool to assess each student's level of physical literacy. It is a quick and easy assessment that consists of one page with 18 qualities that you will rate on a scale of poor to excellent. It should only take about five minutes to complete per student.

The students' physical literacy levels will be measured using the PLAYfun tool. The student researcher and two research assistants will conduct these evaluations. The physical literacy measure will take about 15 to 20 minutes for about three children. It consists of 18 tasks (i.e. skipping, jumping, overhand throw).

POTENTIAL BENEFITS AND RISKS

There are no known or anticipated risks associated with participation in this study.

The benefits likely to be gained through this research project are:

- Learning how physical literacy can be integrated into physical education curriculum.
- Opportunity for assistance in running a physical literacy program and increased knowledge about the physical literacy assessment PLAY tools that can be used after the research process is complete.
- *Post-study: If the intervention yields increases in physical literacy levels, the usual practice schools will have the opportunity to participate in the program at a time that fits the school's schedule.

PUBLICATION OF RESULTS

The aggregate results from this project will be made available to the researchers, school administrators, parents, and community members. The aggregate results may also appear in printed or published reports such as journal articles and may also be presented at conferences. The final report for this project will be given to you after the study is completed.

CONFIDENTIALITY

The interviews will be recorded and transcribed. Only a study number (no names) will be associated with your interview. All information you provide will be considered confidential. If we chose to use a quote you have provided when we disseminate the results we will use a pseudonym and we will not use quotes that make you easily identifiable. However, because there are only a few teachers involved in this study, and you know each other, it is possible that you may be identifiable to other teachers in the study based on what you have said.

Access to interview data will be restricted to the Principal Researcher, Dr. Louise Humbert, and the student researcher, Alexandra Stoddart. Your name will not appear in any thesis or report resulting from this study. All data will be kept in a locked filing cabinet in the office of Alexandra Stoddart. After analysis of all data, Dr. Louise Humbert, College of Kinesiology, will assume responsibility for data storage for five years upon completion of the study.

In the future, when results of this study are disseminated there may be an opportunity for individual authorship on presentations and journal articles. If this opportunity arises, and you choose to be an author your name will be published.

VOLUNTARY PARTICIPATION

Participation in this study is voluntary. If you wish, you may decline to answer any questions or participate in any component of the study. Further, you may decide to withdraw from this study at any time and may do so without any penalty. If you decide to withdraw, the information you have shared with us will be withdrawn and deleted. Your right to withdraw from the study will apply until the data has been disseminated. After this it is possible that some form of research dissemination will have already occurred and it may not be possible to withdraw your data.

CONTACT INFORMATION AND ETHICS CLEARANCE

If you have any questions about this study or require further information, please contact the principal investigator or the student researcher.

This research project has been approved on ethical grounds by the University of Saskatchewan Research Ethics Board. Any questions regarding your rights as a participant may be addressed to that committee through the Research Ethics Office ethics.office@usask.ca (306) 966-2975. Out of town participants may call toll free (888) 966-2975.

Thank you for your assistance in this project. Please keep a copy of this form for your records.

Consent to Participate

I have read and understand the description of the research study provided above. I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I agree to participate in the study described above, understanding that I may withdraw my consent prior to the dissemination of the results. A copy of this consent form has been given to me for my records.

(Signature of Participant)

(Date)

(Signature of Researcher)

Consent for Visually Recorded Images/Data:

- Photos may be taken of me for: Dissemination* _____
- Videos may be taken of me for: Dissemination* _____

*Even if no names are used, you may be recognizable if visual images are shown as part of the results.

Appendix C: Semi-structured Interview Questions for Teachers

Introduction

We appreciate you participating in this focus group. We will only take a short amount of your time to discuss what your experiences are with physical education and physical literacy.

A few things about what will happen:

- ✓ I have some questions for you; there are not right or wrong answers
- ✓ The tape recorder can be shut off at any time
- ✓ Only a transcriber and a research assistant will listen to the tape
- ✓ You will be given a pseudonym
- ✓ Some questions will seem repetitive, it is just me wanting to make sure I understand what you are saying.
- ✓ Do you have any questions/concerns before we start? Feel free to ask any questions as we go along if something is unclear.

- 1) What is your teaching background?
 - a. Certification
 - b. Years of experience
 - c. Extracurricular
- 2) What does physical literacy mean to you?
- 3) How do you integrate physical literacy into your gym?
- 4) In your eyes, how does physical literacy relate to the physical education curriculum?
- 5) Multiple environments?
- 6) Barriers and supports to developing physical literacy
- 7) What is your background with physical activity?
- 8) What were your experiences like when you were in physical education?
- 9) Differences between multisport and specialized athletes in your class?
- 10) Parents' discussions of physical literacy and physical education?
- 11) Intervention: What would you like to see in an intervention?

Appendix D: Transcript Release Form



TRANSCRIPT RELEASE FORM

Project Title: Developing Physical Literacy in Children: Teacher Collaborated Physical Literacy Program in Elementary Physical Education to Open the Door to a Lifetime of Physical Activity

Principal Investigator:

Dr. Louise Humbert
College of Kinesiology,
University of Saskatchewan

louise.humbert@usask.ca

Student Investigator:

Alexandra Stoddart, PhD Student
College of Kinesiology,
University of Saskatchewan

a.stoddart@usask.ca

I, _____, have reviewed the complete transcript of my personal interview in this study, and have been provided with the opportunity to add, alter, and delete information from the transcript as appropriate. I acknowledge that the transcript accurately reflects what I said in my personal interview with Alexandra Stoddart. I hereby authorize the release of this transcript to Alexandra Stoddart to be used in the manner described in the Consent Form. I have received a copy of this Data/Transcript Release Form for my own records.

Name of Participant

Date

Signature of Participant

Signature of Researcher

Appendix E: Consent Letter (Parent)



UNIVERSITY OF
SASKATCHEWAN

CONSENT LETTER (Parent)

Project Title: Developing Physical Literacy in Children: Teacher Collaborated Physical Literacy Program in Elementary Physical Education to Open the Door to a Lifetime of Physical Activity

Principal Investigator:

Dr. Louise Humbert
College of Kinesiology,
University of Saskatchewan
(306) _____
louise.humbert@usask.ca

Student Investigator:

Alexandra Stoddart, PhD Student
College of Kinesiology,
University of Saskatchewan

a.stoddart@usask.ca

INVITATION

We would like to ask for your assistance with a study that is being carried out by the College of Kinesiology at the University of Saskatchewan. This project is designed to a) examine whether an integrated physical literacy program into regular physical education classes benefits elementary schoolchildren's physical literacy levels and b) understand perceptions of physical literacy. We anticipate that this evidence-based information could be used to assist in the development of physical literacy activities that could enhance the physical literacy levels of elementary school children.

Four schools will be involved in this study. You and your child have a chance of being selected to be in a) physical literacy program school or b) a usual practice school. If you are in a physical literacy program school, your child will participate in phases two to four mentioned below. If you are in the usual practice school, then your child will participate in phases two and four.

WHAT'S INVOLVED

Study Phase One

Teacher physical literacy survey. You will not participate in this phase.

Study Phase Two

Before the study begins, you may be asked to sit down with the researcher for a focus group about physical literacy (approximately 30-45 minutes). This focus group will involve about 8 to 10 participants. With your permission, this will be audio recorded. You can request that the interview be terminated at any point, refuse to answer a question, and you can also request the audio recording device be shut off at any point. After your interview, and prior to data being included in the final report, you will be given the opportunity to review the transcript of your interview, and to add, alter, or delete information from the transcripts as you see fit.

During the first two weeks of the study, the student researcher and two research assistants will be assessing the baseline physical literacy levels of your child. The baseline physical literacy measure will take about 15 to 20 minutes and includes a variety of tasks (i.e. hopping, jumping,

running). Your child will be evaluated once and will have to complete an online survey about his or her own physical literacy perceptions. Both parents/guardians will be asked to complete an online physical literacy perception regarding your child.

Study Phase Three

During the following 14 weeks, a physical literacy program will be integrated into the physical education curriculum in your child's regular physical education class. The activities will concentrate on a variety of physical literacy skills.

Study Phase Four

The last two weeks of the study, the student researcher and the two research assistants will once again conduct physical literacy assessments.

At the end of the study, you may be asked to sit down once again with the researcher for a focus group (approximately 8-10 participants) about how the study went (approximately 30-45 minutes). Similar to the initial interview, this will be audio recorded with your permission. You can request that the interview be terminated at any point, refuse to answer a question, and you can also request the audio recording device be shut off at any point. After your interview, and prior to data being included in the final report, you will be given the opportunity review the transcript of your interview, and to add, alter, or delete information from the transcripts as you see fit.

THE TOOLS

You will be using the PLAYparent tool to assess your child's level of physical literacy. It is a quick and easy assessment that consists of one page with 20 qualities that you will rate on a scale of low to high. It should only take about five minutes to complete.

The students' physical literacy levels will be measured using the PLAYfun tool. The student researcher and two research assistants will conduct these evaluations. The physical literacy measure will take about 15 to 20 minutes for about three children. It consists of 18 tasks (i.e. skipping, jumping, overhand throw).

POTENTIAL BENEFITS AND RISKS

Physical Literacy Levels: There is no risk in having your child's physical literacy level evaluated. The information collected will permit the research team to determine the physical literacy level of your child and will help determine which areas of skills are strengths.

Physical Literacy Surveys: There is no risk in completing the physical literacy surveys for you or your children. The surveys are short and non-invasive; they simply ask about the physical literacy skills your child has.

Physical Literacy Program: There is no risk in participating in the physical literacy program. This program will be designed to fit well within the physical education curriculum your child is already receiving as mandated by the government.

*Post-study: If the program yields increases in physical literacy levels, the usual practice schools

will have the opportunity to participate in the program at a time that fits the school's schedule.

CONFIDENTIALITY

Only a study number (not your child's name) will be associated with their physical literacy data and surveys. All information will be considered confidential and grouped with data from other participants, and thus your child's scores will never be singled out nor will their names be associated with the scores. Access to this data will be restricted to the Principal Investigator, the student researcher, and two research assistants.

During the focus group interview, the student researcher will safeguard the confidentiality of the discussion, but cannot guarantee that other members of the group will do so as well. We will be asking the participants to please respect the confidentiality of the other members of the group by not disclosing the contents of the discussion outside of the meeting.

All data will be kept in a locked filing cabinet in the office of Alexandra Stoddart. After analysis of all data, Dr. Louise Humbert, College of Kinesiology, will assume responsibility for data storage for five years upon completion of the study.

VOLUNTARY PARTICIPATION

Your child's participation in this study is voluntary. Your own participation in this study is voluntary as well. If you wish, you may decline to participate and/or have your child participate in this study. Further, if you do decide to have your child participate in this study you may withdraw your child from this study at any time and may do so without any penalty. If you or your child withdraws, the data will be withdrawn and deleted.

Your right to withdraw your child from the study will apply until the data has been disseminated. After this it is possible that some form of research dissemination will have already occurred and it may not be possible to withdraw your child's data.

PUBLICATION OF RESULTS

The aggregate results from this project will be made available to the researchers, school administrators, parents, and community members. The grouped results may also appear in printed or published reports such as journal articles and may also be presented at conferences.

CONTACT INFORMATION AND ETHICS CLEARANCE

If you have any questions about this study or require further information, please contact the principal investigator or the student researcher using the contact information provided above.

This research project has been approved on ethical grounds by the University of Saskatchewan Research Ethics Board. Any questions regarding your rights or your child's rights as a participant may be addressed to that committee through the Research Ethics Office ethics.office@usask.ca (306) 966-2975. Out of town participants may call toll free (888) 966-2975.

Thank you for your assistance in this project. Please keep a copy of this form for your records.

Consent to Participate

I have read and understand the description of the research study provided above. I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I understand that I may withdraw my consent to have my child participate at any time. A copy of this consent form has been given to me for my records.

I, _____ give permission to allow _____
_____ to participate in the study conducted by the College of Kinesiology.

(Signature of Parent/Guardian)

(Date)

(Parent/Guardian Contact Information)

(Signature of Researcher)

Consent for Visually Recorded Images/Data:

Parent/guardian to provide initials:

- Photos may be taken of my child for: Dissemination* _____
- Videos may be taken of my child for: Dissemination* _____

*Even if no names are used, you [or your child] may be recognizable if visual images are shown as part of the results.

Appendix F: Assent (Student)



Assent for Participants (Students)

Principal Investigator:

Dr. Louise Humbert
College of Kinesiology,
University of Saskatchewan

louise.humbert@usask.ca

Student Investigator:

Alexandra Stoddart, PhD Student
College of Kinesiology,
University of Saskatchewan

a.stoddart@usask.ca

All student participants in this study will be Elementary School Children. Verbal assent will be acquired from each participating student with the use of the following verbal statements below. Prior to seeking verbal assent from the individuals the project will be introduced to the entire class. This will ensure the students hear about the study twice and have time to think about questions they might have.

Assent Script to be verbally presented to each student in the class in which the research is taking place:

Why are we doing this project?

This study is going to help us learn about developing physical literacy in physical education (PE) classes. We want to ask you if you want to participate in the study.

What will happen during the study?

At first you will be doing a bunch of activities that we will evaluate to see what level of physical literacy you are at. These will include things like running and jumping. You don't have to study or do any work to prepare for this. Around the same time you will be filling out a survey about your physical literacy and about physical activities that you participate in.

During this study, you may be in a school where we do activities during your physical education classes about physical literacy. This will all be done in your regular classes for 14 weeks. If not, you will participate in your typical PE classes-just like normal.

After that we will do the same activities that we tested at the beginning of the study one more time. You will fill out the short surveys again.

After the study is over we might ask you to talk with us about what you liked and what you didn't like about having these activities during PE. We would like to talk to you about these things with other students in a group. That way you can all share your thoughts and talk with your friends about the activities we did. When we talk with you in these groups we call them focus groups.

Who will know what I did in the study?

All of the information about what you do in class and what you tell us in the focus group will be a secret. The only people who will see your specific results is my friend helping me in the gym, one person at the University that I go to school at, and myself. No other kids at the school or your teacher will see your information. Your name will never be on any papers that we share with other people. All of the information we get in the study will be kept on a computer with a password that only I know.

All of the results of everyone in your class will be put together and written in a paper. It may also be presented at a conference, but no one will know that it was you who participated.

Do you have to be in the study?

You do not have to be in the study. No one will be mad at you if you don't want to do this. This study doesn't have anything to do with your usual schoolwork and you can still do all of the things you usually do in the class if you aren't in this study. Later on I will ask you by yourself if you want to participate. If you don't want to be in this study, just say no when I ask you. We will also ask your parents if they would like you to be in the study. Even if your parents want you to be in the study you can still say no. Also if you say yes now its ok to change your mind later and not be in the study any more. If that happens we will delete any of your results as long as it's before we publish work. If any new information about the study happens, we will let you know as soon as possible.

What if you have any questions?

You can ask questions any time, now or later. When I ask you later if you want to be in the study I will ask you again if you have questions. Please ask as many questions as you like-questions are a good thing!

Are there good things and bad things about the study?

Good things (benefits): Some researchers like me have found that being physically literate may help you participate in activities for the rest of your life. You will also be able to see which skills you are better at or which you might need help with.

Bad things (harms): There aren't any bad things that will happen in this study.

CONTACT INFORMATION AND ETHICS CLEARANCE

If you have any questions about this study or want more information, please contact the principal investigator or the student researcher using the contact information provided above. This study has been reviewed and received ethics approval on September 17th 2014 through the **Research Ethics Office at the University of Saskatchewan (306-966-2084)**. If you have any comments or concerns about your rights as a research participant, please contact the Research Ethics Office.

Thank you for your assistance in this project. Please keep a copy of this form for your records.

Consent to Participate

I have been verbally presented with the study and understand the description of the research study provided above. I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I agree to participate in the study described above, understanding that I may withdraw my consent prior to the dissemination of the results. A copy of this consent form has been given to me for my records.

(Signature of Participant)

(Date)

(Signature of Researcher)

Appendix G: Physical Literacy Assessment for Youth (PLAY) Tools

PLAYself

Physical Literacy
Assessment
for Youth

Your Name _____

Gender: M F Age: _____

I am most active in (check all that apply): ☐ summer ☐ winter ☐ active in both

How good are you at doing sports and activities?	Never tried	Not so good	OK	Very good	Excellent
1. In the gym?					
2. In and on the water?					
3. On the ice?					
4. On snow?					
5. Outdoors?					
6. On the playground?					
What do you think about doing sports and activities?	Not true at all	Not usually true	True	Very true	
7. It doesn't take me long to learn new skills, sports or activities					
8. I think I have enough skills to participate in all the sports and activities I want					
9. I think being active is important for my health and well-being					
10. I think being active makes me happier					
11. I think I can take part in any sport/physical activity that I choose					
12. My body allows me to participate in any activity I choose					
13. I worry about trying a new sport or activity					
14. I understand the words that coaches and PE teachers use					
15. I'm confident when doing physical activities					
16. I can't wait to try new activities or sports					
17. I'm usually the best in my class at doing an activity					
18. I don't really need to practice my skills, I'm naturally good					
19. Reading and writing are very important	Do you agree or disagree with this statement?				
	Strongly disagree	Disagree	Agree	Strongly agree	
In school					
At home with family					
With friends					
20. Math and numbers are very important	Do you agree or disagree with this statement?				
	Strongly disagree	Disagree	Agree	Strongly agree	
In school					
At home with family					
With friends					
21. Movement, activities and sports are very important	Do you agree or disagree with this statement?				
	Strongly disagree	Disagree	Agree	Strongly agree	
In school					
At home with family					
With friends					
22. My fitness is good enough to let me do all the activities I choose	Disagree	Agree			

canadiansportforlife.ca
physicalliteracy.ca/PLAY



PLAYfun

Physical Literacy Assessment for Youth

PLAYfun is intended for children aged 7 and up.

canadiansportforlife.ca
play.physicalliteracy.ca

Participant's Name _____ Gender: M F Age: _____

Place a mark in the box that best represents the child's ability. Indicate if the child had low confidence, or needed a prompt, mimic, description, or demonstration for each task.

Task	Competence				Confidence		Comprehension		
	Developing		Acquired		Confidence	Prompt	Mimic	Describe	Demo
	Initial	Emerging	Competent	Proficient					
1. Run a square									
2. Run there and back									
3. Run, jump, then land on two feet									
4. Crossovers									
5. Skip									
6. Gallop									
7. Hop									
8. Jump									
9. Overhand throw									
10. Strike with stick									
11. One-handed catch									
12. Hand dribble stationary & moving forward									
13. Kick ball									
14. Foot dribble moving forward									
15. Balance walk (heel-to-toe) forward									
16. Balance walk (toe-to-heel) backward									
17. Drop to ground & back up									
18. Lift and lower									

PLAY*inventory*

Physical Literacy Assessment for Youth

Participant's Name _____ Gender: M F Age: _____

Place a check in the box if you have participated regularly in the activity during your leisure time (not in school or at work) in the past 12 months.

House chores	Triathlon	Zoomba
Farm chores	Cycling	Spin classes
Homework	BMX	Exercise classes
Watching tv or movies	Mountain biking	Yoga
Playing a musical instrument	Dirt biking or motocross	Crossfit
Reading	Duathlon	Bowling
Crafts	Inline skating	DVD/CD or home exercise
Facebook or internet	Dog walking	Rock or wall climbing
Playing "active" video games	Hiking	Fencing
Playing video games	Skipping	Martial arts
Swimming	Cross-country running	Boxing
Swimming lessons	Trail running	Table tennis
Waterskiing	Running	Track and field
Wakeboarding	Jogging	Dance
Surfing	Walking	Gymnastics
Kiteboarding	Geocaching or orienteering	Weight training
Synchronized swimming	Playing tag	Body building
Canoeing	Cheerleading	Baton twirling
Rowing	Scooter	Badminton
Curling	Playground	Tennis
Diving	Equestrian	Hunting
Skating	Mountain climbing	Racquetball
Snowshoeing	Jumping rope	Squash
Snowboarding	Golf	Target shooting
Tobogganing	Fishing	Archery
Downhill skiing	Gardening	Playing catch
Cross-country skiing	Skateboarding	Sailing
Kayaking	Soccer	Football
Basketball	Volleyball	Trampoline
Shoveling Snow	Hockey	Ringette
Figure Skating	Speed Skating	Ultimate
Baseball	Softball	Other:
Other:	Other:	Other:
Other:	Other:	Other:

For more information go to: physicalliteracy.ca/PLAY
or Canadian Sport for Life: canadiansportforlife.ca

physicalliteracy.ca

CS4L
PHYSICAL
LITERACY

Appendix H: Physical Literacy Resource

Moving and Learning Together: Saskatoon Physical Literacy Resource Document

University of Saskatchewan

Alexandra Stoddart

Dr. Louise Humbert

Members of Physical Education Professional Learning Community from School Division

*The creation of this resource was funded by a **McDowell Foundation Teaching and Learning Grant**.*

Questions about this resource can be directed to Alexandra Stoddart at a.stoddart@usask.ca

Physical Literacy Circuit Stations

The stations included in this resource were devised to practice the skills assessed in the PLAY Fun tool created by Dr. Dean Kriellaars. The following stations were used as part of a warm up for Grade Four and Five physical education classes. The 18 PLAY Fun tasks were separated into two sets of stations and a third day was set apart for practicing the locomotor skills.

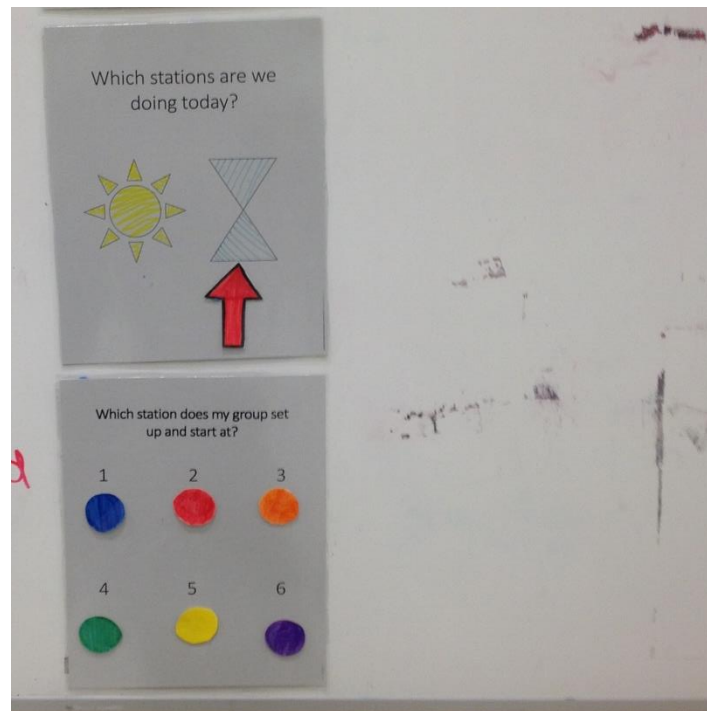
Because physical literacy is so much more than just physical skills, the affective and cognitive learning domains also come into play here. High repetition with knowledge of results and the modification of equipment, as well as having students perform tasks at a student-selected pace allow for the other elements of physical literacy to develop.

How to use this resource

The teacher will have already set up necessary equipment OR once students know the stations, students can help set up the station equipment.

Students should already be organized into small groups (preferably 3 to 4 students, class size permitting). Students should come into the gymnasium and look to a board or wall instructing them of the station they are starting with that day.

When initially teaching the stations, the teacher will go through each station explaining how to properly perform the task. Posters will remain on the wall at each station throughout the entirety of the program in case students forget how to do the task.



[Visual representation of how to organize the board]

Teacher will give feedback throughout the station work and will also determine appropriate time length of stations. Students should only spend a few minutes at each station and then switch to the following station. The direction of switching should have been identified when stations were first taught.

Depending upon the skill and interest level of the students, teachers have the option of switching up different activities for several tasks. For example, overhand throw has several activities to pick from. As students progress, they may need a change of activity and having multiple activities allows the students to practice the same skills, but in a different way.

Weekly Physical Education Schedule (3 x 50-minute classes)

Day 1: Sun Stations

Day 2: Hourglass Stations

Day 3: Locomotor Day

**These days can be switched during the week to best suit student and gymnasium needs.*

***Please note the activities used during the locomotor day are not included in this resource.*

Grade Four Saskatchewan Physical Education Curriculum Links

OVERALL CIRCUIT

Outcome: PE4.1

Make decisions about and apply, with guidance, strategies (including fitness appraisals) and principles related to fitness improvement to determine own level of health-related fitness (cardiovascular endurance, flexibility, muscular endurance, and muscular strength) and to positively affect own level of health-related fitness.

E. Sustain participation in moderate to vigorous movement activities (e.g., walking, running, skipping, cycling, swimming, snowshoeing, dancing) that increase heart rate and respiration rate, for eight consecutive minutes on a consistent basis.

I. Engage in fitness sequences, such as circuits, that include cardiovascular endurance, muscular endurance, and flexibility exercises.

Outcome: PE4.3

Select and apply performance cues to refine and combine locomotor skills into increasingly complex movement skills as applicable to lead-up games and body management activities including dance and educational gymnastics, and others such as yoga, skipping, aerobics, martial arts, and track and field.

A. Use the performance cues language of locomotor movement (e.g., limbs in opposition, align body, transfer weight, absorb impact) while practising the complex skills.

B. Explain why it is beneficial (supports ability to perform the specific skill and this will be used to perform more complex skills) to know the language of locomotor performance and the meaning behind that language (how it is performed and how it is different from the other locomotor skills).

D. Avoid stationary objects and dodge moving classmates, while moving through general space (e.g., obstacle courses, tag games).

E. Combine locomotor skills, with guidance, to develop complex skills for long jump, triple jump, and high jump.

K. Demonstrate the proper footwork and locomotor skill for specific skill movements (e.g., run towards and take-off of one foot to jump into a sand pit, three-step delivery in bowling, sliding sideways to pick up a grounder in softball) and try to use these in lead-up games and fun competitions.

M. Travel quickly and efficiently through obstacle courses that require traveling over, under, through, and around objects while moving forward, backward, and sideways.

Outcome: PE4.10

Apply tactics, strategies, and rules necessary for safe and inclusive involvement in movement activities, including but not limited to co-operative and competitive lead-up games as well as alternate environment activities, when alone and with others.

A. Solve problems cooperatively and respectfully with group members while participating in a variety of indoor and outdoor movement activities (e.g., scavenger hunts, relay races, capture the flag).

B. Work productively and respectfully with others in achieving a common group goal while participating in movement activities.

C. Work towards positive solutions in resolving disagreements that occur while participating in

cooperative and competitive games.

D. Demonstrate correct and respectful application of rules and procedures when participating in a variety of games and alternate environment activities.

E. Express insights into why games have boundaries, time rules, and other restrictions, and how a game might change by varying one or more of these restrictions.

G. Demonstrate inclusiveness while participating in movement activities by ensuring that all classmates have the opportunity to use equipment and to take leadership roles.

H. Propose and implement modifications to strategies and rules used in games and alternate environment activities to enhance the inclusiveness of the activity (e.g., for people in wheelchairs, for people who are hearing impaired).

LOCOMOTOR DAYS

Outcome: PE4.1 Indicator E

Outcome: PE4.3 Indicators A, B, D, J

J. Combine and perform a variety of sequences including five to six locomotor skills (e.g., walking, running, jumping forward, jumping sideways, jumping backward, landing, hopping, skipping, galloping, leaping, sliding, rolling forward, and rolling sideways).

Outcome: PE4.5

Select and apply performance cues to combine and refine non-locomotor skills:

- balancing
- jumping and landing on the spot on feet and hands

into increasingly complex movement skills while participating in body management activities (including dance and educational gymnastics, as well as others such as yoga, skipping, aerobics, martial arts, and track and field).

A. Use the performance cues language of non-locomotor movement (e.g., widen base of support, lower centre of gravity, absorb impact) while practising the complex non-locomotor skills.

F. Practise and perform balance positions associated with a variety of body management activities (e.g., ballet, yoga, educational gymnastics).

M. Balance on different body parts (e.g., one foot, one foot and one hand, knees only) and equipment (e.g., beams, benches, balls), demonstrating control and various body shapes (wide, narrow, round, twisted, angular).

Outcome: PE4.10 Indicators A, B, C, D, E, G, H

Outcome: PE4.12

Create and apply a personal understanding of what it means to be a positive, inclusive team member who makes a commitment towards showing team spirit and the ideals of fair play.

A. Highlight positive aspects of peer and self-performance in both cooperative and competitive group movement activities.

B. Identify and demonstrate the skills needed for effective teamwork (e.g., listening actively, questioning for clarity, paraphrasing, verbalizing own movement and thoughts).

C. Explain how teamwork and decision-making skills gained from participating in movement activities are important life skills.

D. Reflect on own use of courtesy behaviours (e.g., remaining quiet when classmate is delivering

a curling rock), complimentary behaviours (e.g., congratulating an opponent on making a good shot), and inclusive language (e.g., saying “one-on-one” instead of “man-to-man”) when participating in both cooperative and competitive movement activities.

E. Propose and practise personal strategies for enhancing own demonstration of team spirit and fair play.

F. Explain what stereotyping means and the emotional, spiritual, and physical damage and risks associated with sports and fitness stereotypes (e.g., girls are not strong; jocks are not smart; boys do not dance).

G. Demonstrate an appreciation for diversity and a personal responsibility for demonstrating acceptance of everyone while participating in both cooperative and competitive movement activities (e.g., willingness to play and work with all others, acceptance of individual differences, motivation to contribute, dealing with rejection).

H. Represent what team spirit looks like, sounds like, and feels like.

I. Represent an understanding of fair play ideals which include respect for rules, officials, and opponents, self-control, and equitable playing time.

J. Evaluate own level of responsibility and commitment towards playing fairly and showing team spirit.

K. Express insights in response to questions such as “Is it ever appropriate to ‘bend the rules’ when competing in sport?”, and “How can participation in competitive movement activities prepare us for other challenges in life?”

INDIVIDUAL STATIONS SUN CIRCUIT

Station 1: Overhand Throw Target Throwing

Outcome: PE4.7

Station 1: Snow Cones

Outcome: PE4.7

Station 1: Step Back

Outcome: PE4.7 Indicator D

Station 2: Drop to the Ground & Get Back Up, Burpees & Hand Landings

Outcome: PE4.5 Indicator I

Station 2: Drop Down Contest

Outcome: PE4.11 Indicator C

Station 2: Gopher Ball

Outcome: PE4.11 Indicator C

Station 3: Balance Walk Forwards & Backwards

Outcome: PE4.3 Indicator D

Outcome: PE4.5 Indicator I

Outcome: PE4.11 Indicator C

Station 3: Balance Walk Obstacle Course

Outcome: PE4.3 Indicators D & M

Outcome: PE4.5 Indicators A, F, M

Outcome: PE4.11 Indicator C

Station 4: Running a Square Agility Course

Outcome: PE4.11 Indicator C

Station 4: Race Around the Square

Outcome: PE4.11 Indicator C

Station 5: Hand Dribble Stationary & Moving Forward Posters

Outcome: PE4.6 Indicators D, E, F, G

Station 5: Dribble Leader

Outcome: PE4.6 Indicators D, E, F, G

Station 5: Moving Dribble

Outcome: PE4.6 Indicators D, E, F, G

Station 6: Jumping & Hopping Obstacle Course

Outcome: PE4.3 Indicators D & M

Outcome: PE4.11 Indicator C

Station 6: Standing Long Jump & Hopping

Outcome: PE4.11 Indicator C

INDIVIDUAL STATIONS HOURGLASS CIRCUIT

Station 1: Foot Dribble Moving Forward Cone Dribbling

Outcome: PE4.6 Indicator A

Station 1: Dribble Challenge

Outcome: PE4.6 Indicator A

Station 2: Run There & Back, Fluffball Knockdown

Outcome: PE4.11 Indicator C

Station 2: Building Relay

Outcome: PE4.7 Indicator B

Outcome: PE4.11 Indicator C

Station 3: Strike with Stick Hitting off a Tee

Outcome: PE4.6 Indicator L

Outcome: PE4.9 Indicator K

Station 4: One Handed Catch Partner Juggling

Outcome: PE4.7 Indicators A & D

Station 4: Group Juggling

Outcome: PE4.7 Indicators A & D

Station 4: Drop Drop

Outcome: PE4.7 Indicators A & D

Station 5: Kick Ball Partner/Group Pass

Outcome: PE4.7 Indicators F & H

Station 5: Target Kick

Outcome: PE4.7 Indicators F & H

Station 6: Lift & Lower, Over Under with Partner

Outcome: PE4.11 Indicator C

Station 6: Medicine Ball Pass

Outcome: PE4.11 Indicator C

Grade Five Saskatchewan Physical Education Curriculum Links

OVERALL CIRCUIT

Outcome: PE5.1

Create and implement, with guidance, as a class, a health-related fitness plan targeting the health-related fitness component of cardiovascular endurance that includes setting a personal goal for improvement, applies the F.I.T.T. principle (Frequency, Intensity, Type of activity, and Time), and incorporates daily moderate to vigorous movement activity.

B. Sustain participation in moderate to vigorous movement activities (e.g., walking, snowshoeing, running, skipping, hiking, cycling, swimming, dancing, paddling) that increase heart rate and respiration rate, towards nine consecutive minutes on a consistent basis.

C. Sustain participation in lead-up games (e.g., three-on-three soccer, outdoor obstacle course races) that increase heart rate and respiration rates in a progression towards nine consecutive minutes on a consistent basis.

D. Engage willingly in a variety of movement activities at a moderate to vigorous level of effort.

E. Determine the intrinsic (e.g., enjoyment, enhanced health, level of success, increased energy level, reduced stress level, connection to others) and extrinsic (e.g., awards, media, sport heroes, family, peers) factors that motivate participation for fitness development.

Outcome: PE5.3

Demonstrate a progression towards control in complex movement skills that combine locomotor skills with non-locomotor skills to be used in body management activities (including dance and educational gymnastics, and others such as track and field, aquatics, aerobics, skipping, Pilates, yoga) and games.

A. Identify and apply movement concepts and cues (e.g., lower centre of gravity, increase base of support, and align centre of gravity in the middle of the base of support) for controlled movement that challenges balance (e.g., serve reception position in volleyball, defensive movement in basketball, stability for skateboarding, landing from jumps and springs).

C. Demonstrate functional use of combinations of two or more selected movement skills (e.g., combine traveling, rolling, balancing, and weight transfer into smooth flowing sequences) while applying movement variables (e.g., showing contrast in direction, speed, flow).

D. Combine traveling, jumping, and landing skills to practise performing a variety of sport-specific skills such as high jump, long jump, triple jump, and volleyball spike approach.

F. Demonstrate given visual representations of movement patterns (e.g., footwork of a volleyball block, dance steps for a line dance, running pattern for a football play).

G. Apply an understanding of effective body positioning and movement during the flight phase of various jumps.

H. Create and perform, individually or with a partner, a sequence of locomotor and non-locomotor skills that vary in directions, levels, and pathways, and include a landing on hands (e.g., balance, land on the hands by falling forward from a standing position, front support, lower to mat, roll, push up to front support, jump forward to bring feet between hands, stand, leap sideways, balance).

I. Mount and dismount large apparatus (e.g., benches, fitness steps, stacked mats), demonstrating body shapes during flight and landing in control.

Outcome: PE5.6

Apply performance cues, movement variables, tactics (e.g., body fakes, change of speed, change of direction, keeping the body low while moving), and principles of practice (e.g., form, consistency, repetition) in complex movement activities to improve the performance of self and others.

A. Explain how skill competency can lead to enhanced enjoyment of movement and support desire to participate in movement activities.

C. Develop, in cooperation with others, a list of required criteria to use in peer assessment of a skill performance [e.g., long jump - accelerates to the takeoff spot, hits takeoff spot (e.g., paces off, executes), uses proper takeoff (e.g., one or two feet), controls body position during flight phase, lands under control, attains desired distance].

E. Recognize the carry-over (transfer) of general movement skills (e.g., sliding) that can be applied to specific skills or activities (e.g., dances, individual basketball defensive movement, yoga, volleyball blocking movement).

F. Communicate using the vocabulary of tactics, movement variables, and performance cues both when practising the performance skills and when supporting the performance of others.

G. Distinguish between variations required in the application of specific performance cues and movement variables in order to vary a movement skill (e.g., foot placement when kicking a stationary ball, a ball moving away, and a ball moving towards; dance step while moving forward and moving backward).

H. Teach an activity or skill to a classmate using performance cues language, movement variables language, and practice principles.

I. Apply movement concepts related to accuracy, force, and follow-through when sending (e.g., throwing, kicking, striking, volleying, punting) objects.

LOCOMOTOR DAYS

Outcome: PE5.1 Indicators B, C, D, E

Outcome: PE5.3 Indicators A, C, D, F, G, H

Outcome: PE5.6 Indicators A, E, F, G, H, I

Outcome: PE5.7

Outcome: PE5.8

Demonstrate an understanding of and willingness to accept the rules of teacher-selected games, including lead-up games, and invented games by officiating and participating in classmate officiated competitions.

B. Accept willingly the “official’s” decision regarding personal rule infraction, and those of others, without displaying negative reactions toward others.

C. Contribute to a class decision-making process on the creation or adaptation of rules to be used in class activities and games.

D. Examine the agreed-upon rules for games, including lead-up games and invented games, to demonstrate a clear understanding of how the rules affect the play of the game and the actions of individuals.

E. Discuss and propose alternative behaviours for examples that demonstrate inappropriate behaviours related to officiating and abiding by the rules (e.g., yelling at the referee, calling a badminton bird out when it is in).

INDIVIDUAL STATIONS SUN CIRCUIT

Station 1: Overhand Throw Target Throwing

Outcome: PE5.5 Indicators A, B, H

Station 1: Snow Cones

Outcome: PE5.5 Indicators A, B, H

Station 1: Step Back

Outcome: PE5.5 Indicators A, B, H

Station 2: Drop to the Ground & Get Back Up Burpees & Hand Landings

Station 2: Drop Down Contest

Station 2: Gopher Ball

Outcome: PE5.5

Station 3: Balance Walk Forwards & Backwards

Station 3: Balance Walk Obstacle Course

Station 4: Running a Square Agility Course

Station 4: Race Around the Square

Station 5: Hand Dribble Stationary & Moving Forward Posters

Outcome: PE5.5 Indicator J

Station 5: Dribble Leader

Outcome: PE5.5 Indicator J

Station 5: Moving Dribble

Outcome: PE5.5 Indicator J

Station 6: Jumping & Hopping Obstacle Course

Station 6: Standing Long Jump & Hopping

INDIVIDUAL STATIONS HOURGLASS CIRCUIT

Station 1: Foot Dribble Moving Forward Cone Dribbling

Outcome: PE5.5 Indicators I & J

Station 1: Dribble Challenge

Outcome: PE5.5 Indicators I & J

Station 2: Run There & Back Fluffball Knockdown

Station 2: Building Relay

Station 3: Strike with Stick Hitting off a Tee

Outcome: PE5.4 Indicator H

Station 4: One Handed Catch Partner Juggling

Outcome: PE5.5

Station 4: Group Juggling

Outcome: PE5.5 Indicator O

Station 4: Drop Drop

Outcome: PE5.5

Station 5: Kick Ball Partner/Group Pass

Outcome: PE5.5 Indicator K

Station 5: Target Kick

Outcome: PE5.5 Indicator G

Station 6: Lift & Lower Over Under with Partner

Outcome: PE5.2 Indicators C, E, F

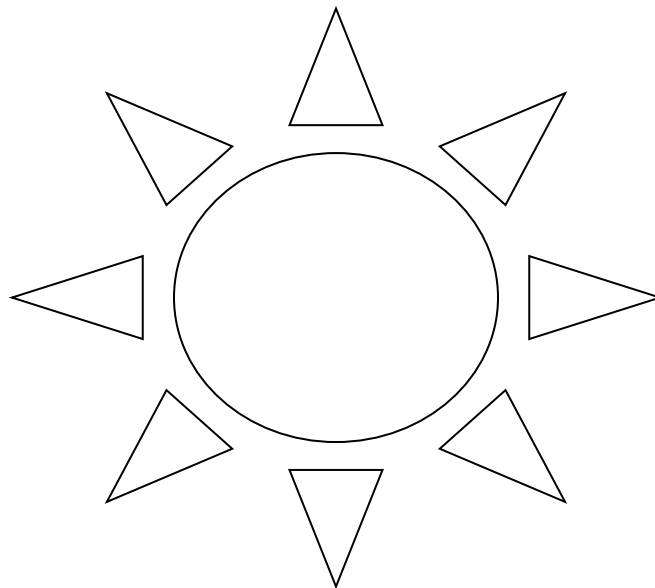
Station 6: Medicine Ball Pass

Outcome: PE5.2 Indicators C, E, F

Stations Set 1: Sun

Tasks Included

- overhand throw
- drop to the ground and get back up
- balance walk forwards
- balance walk backwards
- running a square
- hand dribble stationary and moving forward
- jump
- hop



Station 1: Overhand Throw



Target Throwing

1. Choose a ball.
2. Choose a line to stand behind facing the target on the wall.
3. Complete 10 overhand throws at the target.
4. Complete 10 overhand throws at the target with your non-dominant hand.
5. Choose a new ball and throw from a different distance 10 times using a hand of your choice.
6. Challenge a partner to a contest. Take turns throwing at the target. You get 3 points for hitting the blue and 1 point for hitting the yellow or red. See who can get more points in 10 throws.

STATION 1: Snow Cones



1. Choose a ball and stand behind a line.
2. Throw your ball at one of the upside-down cones and try to knock the ball off the “snow cone”.
3. How many times can you knock the ball off the cone in ten throws?
4. Try throwing from further away or try a new ball. Are you able to beat your record?

STATION 1: Step Back



1. Find a partner and choose a ball you would like to play catch with.
2. Throw the ball back and forth. Each time you catch a ball- you can take one step back. Every time you drop the ball- take a step closer.
3. Try playing this game with your non-dominant hand. Try catching with only one hand. Try using different kinds of balls.

STATION 2: Drop to the Ground & Get Back Up



Task 1 - Burpees

Do 5 burpees as quick as you can using proper form.

Task 2 – Landing on Hands

Practice a hand landing from whatever position you are comfortable- kneeling, squatting or standing.

Complete 10 hand landings as best you can.

STATION 2: Drop Down Contest



1. Challenge someone in your group to a “drop down” contest.
2. Have one of your group members say “on your marks, get set, go”.
3. When they say “go” both you and your partner need to lay down on your belly and put your nose on the ground and stand up as quick as you can. See who can get up the fastest.
4. Challenge different people in your group. You can also use a watch to time each other to see how fast you can lay down and get back up.

STATION 2: Gopher Ball



1. Have all the members of your group lay on your stomachs beside each other except for one person.
2. Number yourselves.
3. The person who is the leader will stand about a meter in front of everyone.
4. The leader will call a number and bounce the ball. The number that is called must stand up and get the ball before it bounces a second time.
5. Once everyone has had a turn to get the ball, switch who the leader is.

STATION 3: Balance Walk Forwards and Balance Walk Backwards



Task 1- Walk forward on the balance beam moving heel to toe. Do a motorcycle landing at the end of the beam. Walk backwards on the balance beam moving toe to heel. Do a motorcycle landing at the end of the beam.

Task 2- Walk from one end of the gym to the other on a line moving heel to toe. See how many steps it takes you to make it from one wall to the other.

Task 3- Challenge someone to a race walking heel to toe. Walk forwards heel to toe to the middle line and on the way back walk backwards toe to heel.

STATION 3: Balance Walk



Obstacle Course

1. Follow the obstacle course by walking only on the equipment set out.
2. Try your best to walk heel to toe the entire way and not fall off any of the equipment.
3. Stop at each spot marker to do the designated balance for 15 seconds and then continue on the course.
4. When you have walked the course forward heel to toe, try completing the course going backwards toe to heel.

Station 4: Running a Square

Agility Course

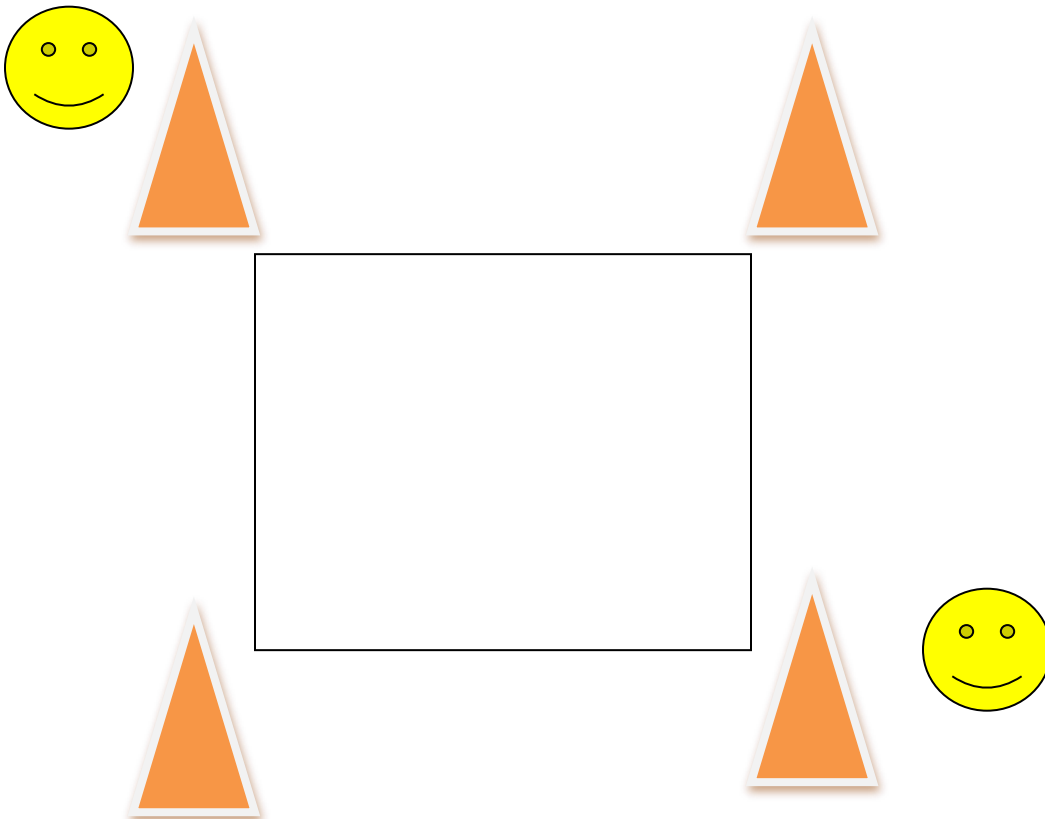


Complete the agility course as fast as you can. Have a partner time you and see if you can beat your time. If someone else is completing the course, wait until they are about halfway done before you start.

STATION 4: Race around the Square



1. Start at an opposite corner of the square from someone in your group.
2. Run around the square and see if you can catch your partner.
3. If you make it 10 laps around the square and have not caught each other, challenge someone new.



Station 5: Hand Dribble Stationary and Moving Forward



Dribble Posters

1. Get a basketball and move around to each dribble poster.
2. Complete each of the stationary dribbling skills 20 times.
3. Complete the moving dribbling skills once for each poster.
4. If you complete the tasks at each poster then complete the stations again.

STATION 5: Dribble Leader



1. Pick someone in your group to be a leader.
2. Follow the dribbling tasks that the leader has you do (from the posters).
3. Switch the leader so that other people have a chance to complete the task.

STATION 5: Moving Dribble



How many times can you dribble to the wall and back? You must use your right hand on the way there and your left hand on the way back.

Station 6: Jump and Hop



Obstacle Course

1. Complete the hurdles **jumping** over them with **two feet**.
2. Hop from spot marker to spot marker.
3. Jump over onto each pool noodle and from each pool noodle.
4. Hop through the hula hoops switching **which foot** you are **hopping** on for each hoop.
5. Complete frog jumps back to the beginning.

STATION 6: Standing Long Jump and Hopping



1. Start on the end line and jump as far as you can.
2. Mark your jump with a beanbag.
3. Have a partner complete the same task.
4. Now hop from where your beanbag is and mark where you land.
5. See how many jumps and hops it takes you to get from one end of the gym to the other.

HOPPING

JUMPING

1 FOOT

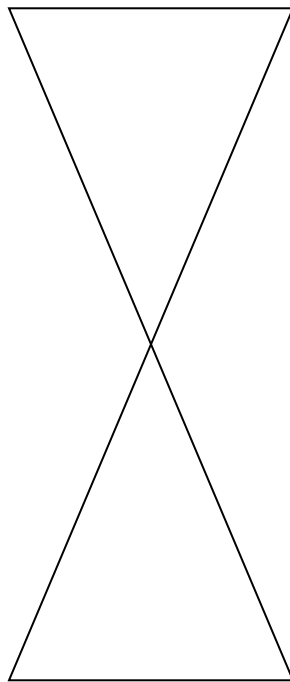
TWO FEET

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Stations Set 2: Hourglass

Tasks Included

- foot dribble moving forward
- run there and back
- strike with stick
- one handed catch
- soccer kick
- lift and lower



Station 1: Foot Dribble Moving Forward



Cone Dribbling

Task 1- Dribble your ball around the cones using both feet to the wall and then dribble back along the line beside the cones.

Task 2- Dribble your ball around the cones using only your right foot and then dribble back along the line beside the cones.

Task 3- Dribble your ball around the cones using only your left foot and then dribble back along the line beside the cones.

Continue these three tasks until it is time to rotate.

STATION 1: Dribble Challenge



See how many times you can dribble your ball to the stage and back. You can use both feet on the way there and one foot to control it on the way back. You must be no more than two steps away from your ball while dribbling it, and you must trap it on each end line.

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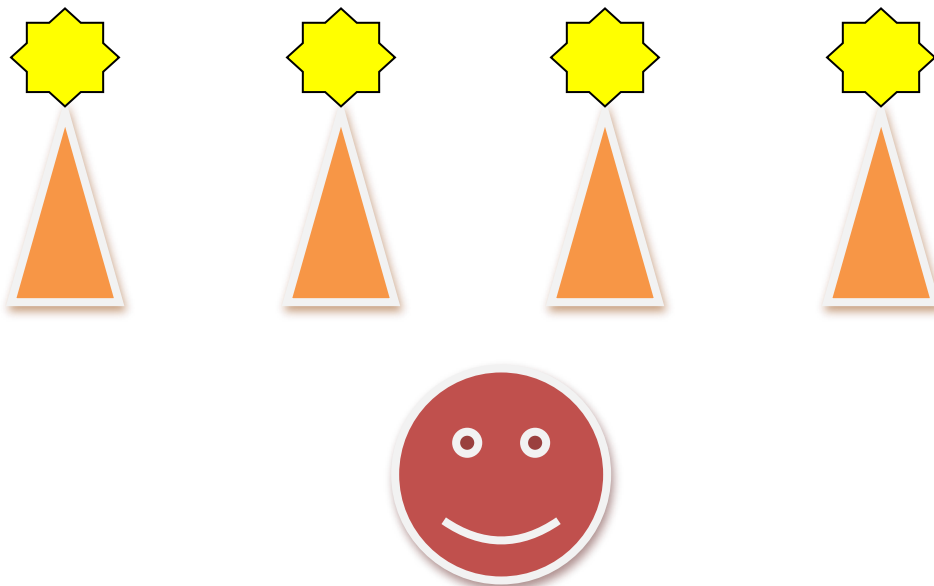
Station 2: Run There and Back



Fluffball Knockdown

1. Run from the end line to one of the cones and knock the fluff ball off the cone.
2. Run back to the end line and touch it.
3. Continue running there and back until all of the fluff balls have been knocked down.

Have a partner time you to see how fast you can knock them off.



STATION 2: Building Relay ⏳

1. Run to the end line and create a pyramid with the cups and take it down.
2. See which team can set the pyramid up and take it down a total of 10 times.

Station 3: Strike with Stick Hitting off a Tee

1. Set the ball up on the tee.
 2. Use your bat to hit the ball into the blue mat.
 3. If there are not enough available tees, practice swinging your bat on the side.
 4. Give someone who is waiting your tee after you have hit the ball 5 times.
- *Be careful hitting and retrieving ball!



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Station 3: Strike with Stick

[Advanced]



*Discuss with your teacher if you are ready for this level.

- If you have successfully completed the beginner version of this skill and are ready for a challenge, practice tossing the ball in the air and try to strike it.
- After you have gone through this 5 times, switch with your partner.
- Be careful hitting and retrieving ball!

Station 4: One Handed Catch

Partner Juggling



1. Have one partner sit cross-legged and the other partner stand behind them.
2. One partner will drop the beanbag into the right hand of the person who is sitting while the other partner will toss a beanbag up with their left hand.
3. Try to get a sequence going between the two beanbags.

*If your group has an odd number of people. Have 1 person practice tossing the beanbag above their head and catching it with the opposite hand. They can add in a 2nd beanbag when they feel ready.

STATION 4: Group Juggling



1. Make a group of 2 or more people.
2. Have each person in your group grab a beanbag.
3. Stand no further than 2 meters apart.
4. Create a juggling sequence only catching the beanbags with one hand.

STATION 4: Drop Drop



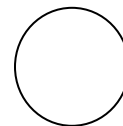
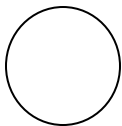
1. Underhand toss a beanbag back and forth in a pair or group of three.
2. You can only catch the beanbag with one hand. Decide as a group if you will catch with your dominant or non-dominant hand.
3. If you miss a toss you must go down on one knee.
4. Each time you miss a toss you will add a level of difficulty in the following order: one knee on the ground, two knees on the ground, one elbow on the ground, two elbows on the ground and chin on the ground. If you have all of these body parts on the ground the game will start over.

Station 5: Kick Ball



Partner/Group Pass

1. Form a pair or group of three.
2. Pass the soccer ball back and forth making sure to trap the ball before you pass it again.
3. Alternate passing with your left and right foot.
4. How many passes and traps can your group make before it is time to rotate?



STATION 5: Target Kick



1. Set up an upside cone on the end line.
2. Choose a line that you and your partner or group of 3 will kick from behind.
3. Take turns kicking the ball at the cone.
4. Each time you knock the cone down you get a point. You have to kick a step further back on the next kick if the cone is knocked down.
5. How many points can you and your partner get as a team?

STATION 6: Lift and Lower



Over Under with Partner

1. Stand in a line facing the same direction.
2. Pass the ball over and under along the line.
3. After you pass the ball, run to the front of the line and continue to pass it over and under until you reach the wall.
4. How many times can your group make it there and back?

STATION 6: Medicine Ball Pass



1. Stand back to back with a partner.
2. Pass the ball over your head to your partner.
3. Receive the ball between your legs from your partner.
4. After 10 passes, switch the direction of your passes.

PHE Canada's Educating for Physical Literacy Checklist modified by Stoddart & Humbert (2015)

Pre-checklist

Do I understand the concept of physical literacy and its components?

A. Planning (Organizing for Student Learning)

1. ☐ Am I articulating clear and appropriate outcomes?
2. ☐ Is there a wide range of activities occurring in my gymnasium?
3. ☐ Am I teaching in a variety of environments (i.e. land, air, water, snow/ice)?
4. ☐ Am I applying relevant concepts to the lesson content?
5. ☐ Am I connecting learning to the past, present, and future (skill transferability)?
6. ☐ Am I using a variety of appropriate teaching methods and models (i.e. Teaching Games for Understanding)?
7. ☐ Am I appropriately distributing practice (i.e. distributed vs. massed practice)?
8. ☐ Are my lessons developmentally appropriate?
9. ☐ Am I implementing suitable progressions?
10. ☐ Have I designed the lesson for maximum participation and maximum activity time?
11. ☐ Am I using a variety of valid and reliable assessment and evaluation strategies that enhance student learning?

B. Environment (Creating an Environment for Student Learning)

1. ☐ Am I creating a fair, respectful, and holistically safe climate?
2. ☐ Am I exhibiting rapport and a caring disposition?
3. ☐ Am I appropriately enthusiastic, participatory, and energetic?
4. ☐ Am I fostering authentic and optimally challenging learning experiences?
5. ☐ Am I maintaining consistent standards of classroom behaviour?

C. Instruction (Teaching Strategies and Skills for Student Learning)

1. ☐ Am I fostering students' motivation to participate in physical activity in or out of school?
2. ☐ Am I managing equipment, space, transitions, and groups?
3. ☐ Am I maintaining optimal pace and making necessary adaptations?
4. ☐ Am I utilizing technology and non-verbal aids?
5. ☐ Am I providing appropriate and timely feedback?
6. ☐ Am I including high repetitions of skills with knowledge of results?
7. ☐ Am I considering retention of skills?
8. ☐ Am I considering individual differences in terms of skill level?
9. ☐ Am I achieving provincial curriculum learning outcomes?
10. ☐ Am I giving opportunities for student leadership development?
11. ☐ Am I minimizing public comparisons?

D. Educator Development (Personal Qualities for Motivation and Instruction)

1. ☐ Do I engage in professional growth and development?
2. ☐ Do I self-reflect after class and identify strengths and weaknesses of my instruction?

Additional Resources

Active for Life	www.activeforlife.com
Canadian Sport for Life Physical Literacy	www.physicalliteracy.ca
Growing Young Movers	www.growingyoungmovers.com
Huddle Connect Webinars	http://new.thompsonbooks.com/kto12/h/huddle/huddle-connect-webinars/
International Physical Literacy Association	https://www.physical-literacy.org.uk
Physical and Health Education Canada	www.phecanada.ca
Saskatchewan <i>in motion</i>	www.saskatchewaninmotion.ca
Saskatchewan Physical Education Association	www.speaonline.ca

Appendix I: Changes to PLAY Fun Dimensions

Task	Original Dimensions	Revised Dimensions for Field Setting
Run a Square	4 pylons 5 metres apart	4 pylons 2 metres apart
Run There and Back	1 pylon and line of tape 5 metres apart	1 pylon and line of tape 3 metres apart
Run, Hop, and Land on Two Feet	2 pylons 5 metres apart	2 pylons 3 metres apart
Crossovers	2 pylons 5 metres apart	2 pylons 3 metres apart
Skip	2 pylons 5 metres apart	2 pylons 3 metres apart
Gallop	2 pylons 5 metres apart	2 pylons 3 metres apart
Hop	2 pylons 5 metres apart	2 pylons 3 metres apart
Jump	2 pylons 5 metres apart	2 pylons 3 metres apart
Balance Walk (heel-to-toe) Forward	2 pylons 2 metres apart	No change
Balance Walk (toe-to-heel) Backward	2 pylons 2 metres apart	No change
Overhand Throw	2 pylons 2 metres away from wall	No change
Strike with Stick	N/A	N/A
One-handed Catch	2 pylons 3 metres apart	No change
Hand Dribble	2 pylons 4 metres apart	No change
Kick Ball	1 pylon 4 metres from wall	1 pylon 2 metres from wall
Foot Dribble	2 pylons 5 metres apart	No change
Drop to the Ground and Get Back Up	N/A	N/A
Lift and Lower	N/A	N/A

Appendix J: Usual Practice Physical Education Topics

Week #	Specialist	Generalists
1 (March 16-20)	M: Dancing to African rhythms T: Skipping-> short & long rope W: Gymnastics-> landings & rolls F: No school	*Staggered start
2 (March 23-27)	<i>*Missing data*</i>	<i>*Missing data*</i>
3 (March 30 - April 2)	M: African dance T: Skipping-> singles/doubles, short/long rope W: Stations-> overhand throw, landings, skipping R: Step aerobics (GoodLife instructor)	M: Cooperative games R: Cooperative games F: No school
4 (April 13-17)	M: Bollywood dance T: Playground games- tetherball, high jump W: Playground games-> 4 square, skipping R: Survivor games-> team strategies & cooperation tasks F: Playground games- circuits, track-> running (endurance/speed)	M: Cooperative games (octopus, treasure hunt) W: Intro to track and field (outside), running drills & technique R: Cooperative games, track: shot put practice with bean bags F: No phys ed b/c of assembly, free time outside
5 (April 20-24)	M: High jump T: Playground games, outside-> "snow games" W: Relays R: Sprints and long jump, F: Circuit training-> muscular strength, flexibility, agility	M: Four corners, leap frog, octopus T: Cooperative games W: Shot put R: Sprinting F: Yoga
6 (April 27-May 1)	M: High jump, ball throw T: playground games, high jump, ball throw W: Fitness-> endurance run, agility R: Survivor games-> cooperation F: Soccer (TGfU), sprints, ball throw, long jump	M: Cooperative games (octopus, steal the gold, pirate ship) W: High jump, centers (basketball, scooters, skipping, etc.) for those who felt uncomfortable w/ high jump R: Tag games, relays F: Badminton basics (equipment, controlling birdie, serving), outdoor walk
7 (May 4-8)	M: Long jump T: Soccer (TGfU), high jump W: Cricket skills R: Guest teacher- soccer skills F: Soccer skills, ball throw/long jump	M: Cooperative games W: No gym outside due to bad weather R: No gym due to band concert F: Cooperative games, 30 min walk to bowl, learn to bowl program, 30 minute walk back
8 (May 11-14)	M: Long jump T: Fitness: endurance & flexibility, high jump & ball throw W: "Survivor" games, RRC-> games for respect, responsibility, & cooperation R: Track meet	M: Cooperative games: octopus, dodgeball T: Swimming at [Rec Centre] W: Long jump outside R: High jump with students who qualify to participate in track day next week. All other students work on badminton in pairs.
9 (May 19-22)	T: Endurance run/ batting & fielding skills: cricket, movement game W: Batting & bowling skills: cricket R: Survivor strategy/cooperative & team games F: Batting & fielding skills: cricket, mini games (TGfU): cricket	T: Just Dance W: Walking around [Farm] R: Gym closed. Played outside. F: Gym closed. Played outside. Track day for students 10 & older

Appendix K: Study Three Results Expanded

Time: Pre, Post

Group: Specialist, Generalist Combined, Generalist

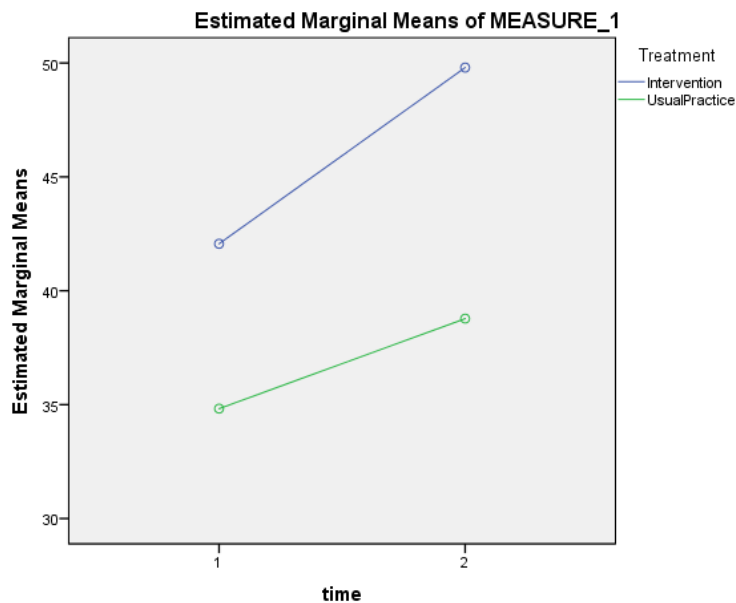
Treatment: Intervention, Usual Practice Condition

Covariates: Age, Sex

**Note: In order to be significant in the study, Bonferroni corrected alpha, $p \leq .003$.*

PLAY Fun

It was found that there was a significant effect of treatment on Task 1: Running a Square, after controlling for age and sex, $F(1, 123) = 11.534$, $p < .01$ (Figure K1)



Covariates appearing in the model are evaluated at the following values: Gender = .50, Age = 9.72

Figure K1. Estimated Marginal Means for Task 1: Running a Square (Treatment & Time)

There was a significant effect of treatment over time for Task 2: Running There and Back, after controlling for age and sex, $F(1, 123) = 10.551$, $p < .01$, (Figure K2).

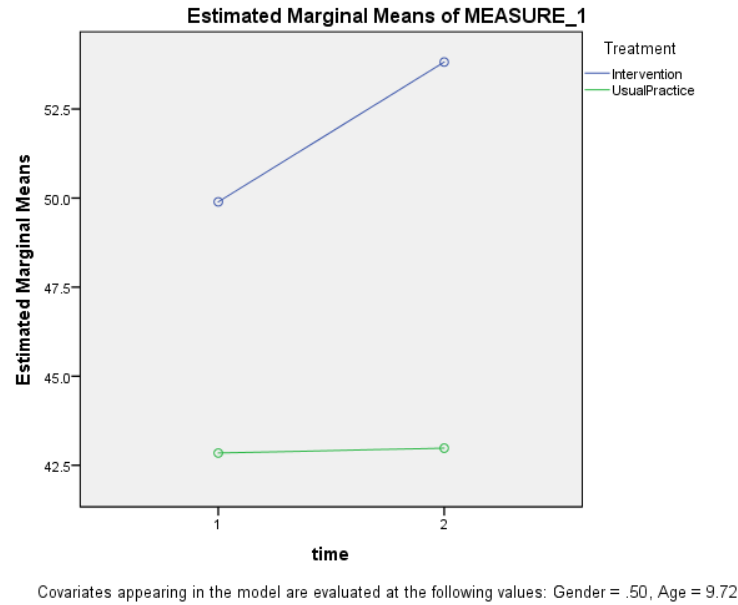


Figure K2. Estimated Marginal Means for Task 2: Running There & Back (Treatment & Time)

There was a significant effect of sex on Task 3: Run, Hop, and Land on Two Feet, $F(1, 123)=4.648$, $p<.05$ (Figure K3), and a significant effect of age, $F(1, 123)=5.373$, $p<.05$ (Figure K4). In addition, there was an interaction effect of treatment and group, $F(2, 123)=3.441$, $p<.05$, but there was no significant treatment effect ($p>.05$) over time (Figure K5).

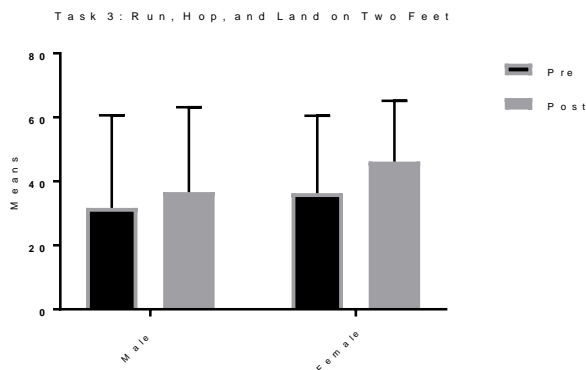


Figure K3. Task 3: Run, Hop, Land Two Feet, Sex, (Means & SD, Pre & Post Intervention)

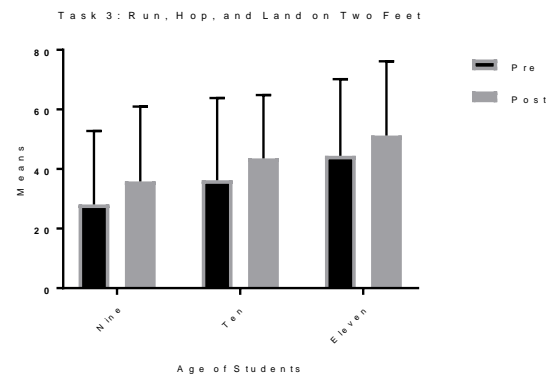
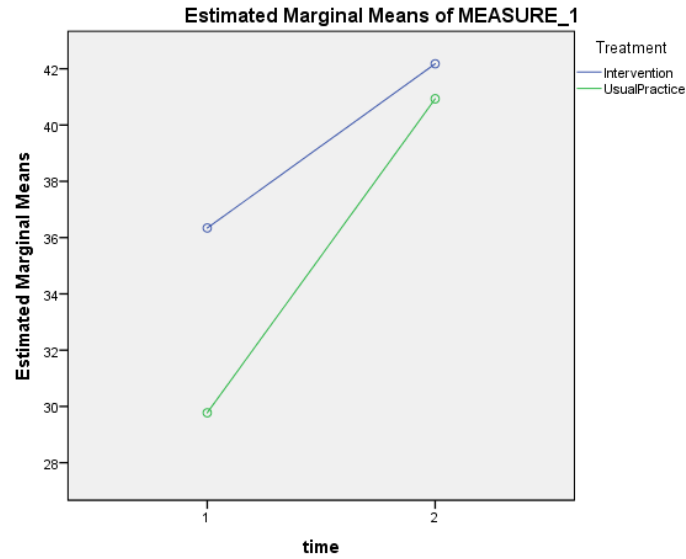


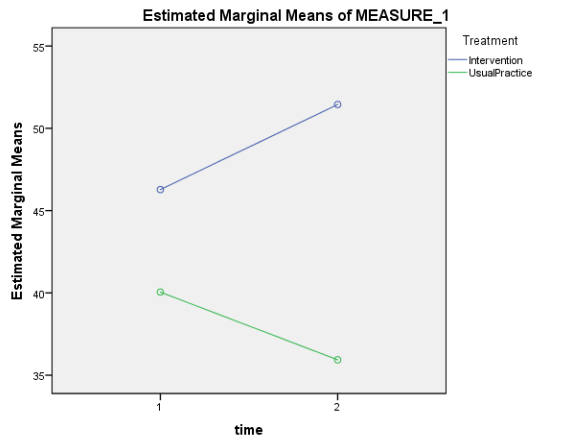
Figure K4. Task 3: Run, Ho, Land Two Feet, Age, (Means & SD, Pre & Post Intervention)



Covariates appearing in the model are evaluated at the following values: Gender = .50, Age = 9.72

Figure K5. Estimated Marginal Means for Task 3: Run, Hop, Land Two Feet (Treatment & Time)

There was a significant effect of treatment over time on Task 4: Crossovers, $F(1, 123) = 6.328$, $p < .05$ (Figure K6), and a significant effect of group, $F(2, 123) = 3.316$, $p < .05$ (Figure K7).



Covariates appearing in the model are evaluated at the following values: Gender = .50, Age = 9.72

Figure K6. Estimated Marginal Means for Task 4: Crossovers (Treatment & Time)

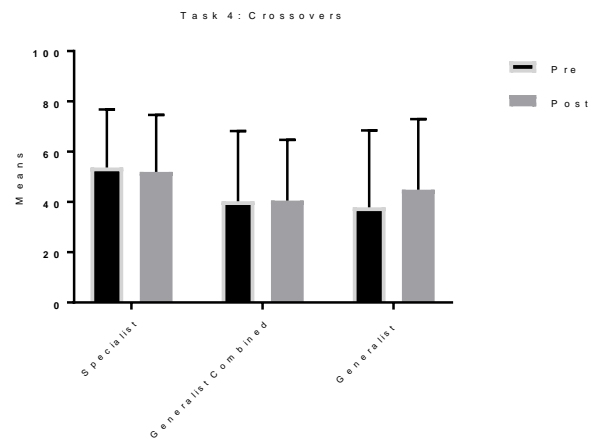


Figure K7. Task 4: Crossovers, Group (Means & SD, Pre & Post Intervention)

There was a significant effect of sex on Task 5: Skip, $F(1, 123)= 190.020$, $p< .001$ (Figure K8).

There was no significant treatment effect ($p> .05$) over time (Figure K9).

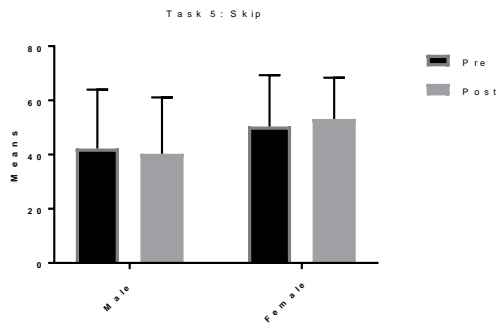


Figure K8. Task 5: Skip, Sex (Means & SD, Pre & Post Intervention)

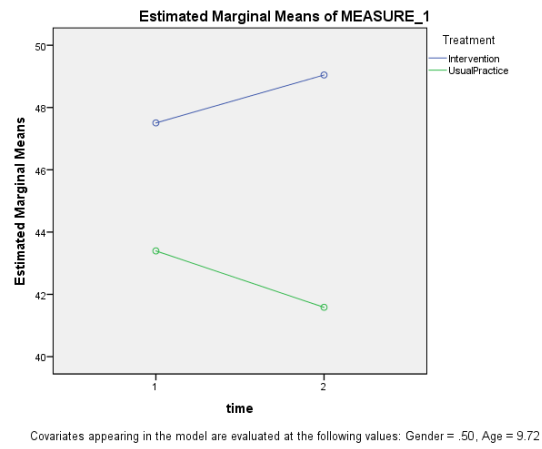


Figure K9. Estimated Marginal Means for Task 5: Skip (Treatment & Time)

There was a significant effect of sex on Task 6: Gallop, $F(1, 123)=5.215$, $p<.05$ (Figure K10) and a significant effect of treatment, $F(1, 123)= 6.450$, $p<.05$, over time (Figure K11).

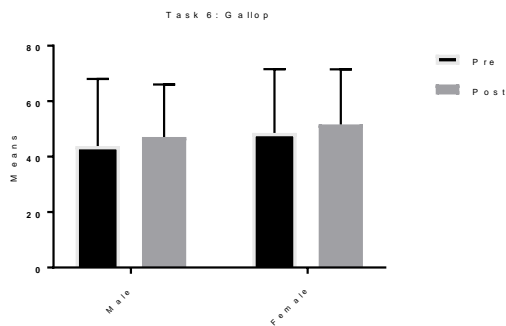


Figure K10. Task 6: Gallop, Sex, (Means & SD, Pre & Post)

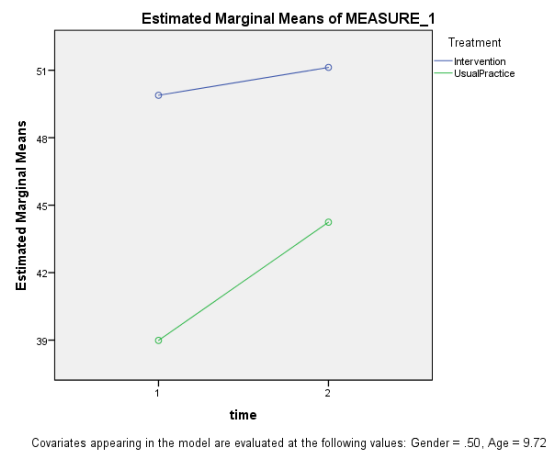


Figure K11. Estimated Marginal Means for Task 6: Gallop (Treatment & Time)

There was a significant effect of sex on Task 7: Hop, $F(1, 123)=5.361$, $p<.05$ (Figure K12), a significant effect of treatment over time, $F(1, 123)= 9.382$, $p<.01$ (Figure K13) and a significant effect of group, $F(2, 123)= 3.692$, $p<.05$ (Figure K14).

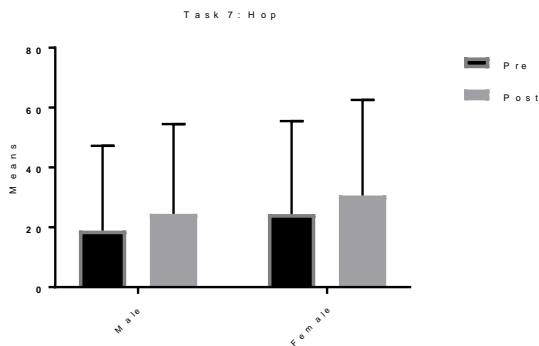


Figure K12. Task 7: Hop, Sex (Means & SD, Pre & Post Intervention)

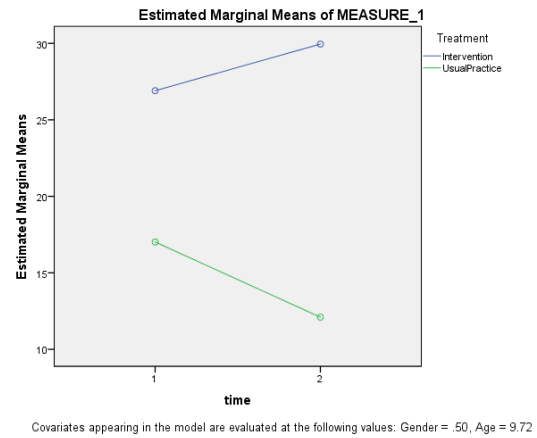


Figure K13. Estimated Marginal Means for Task 7: Hop (Treatment & Time)

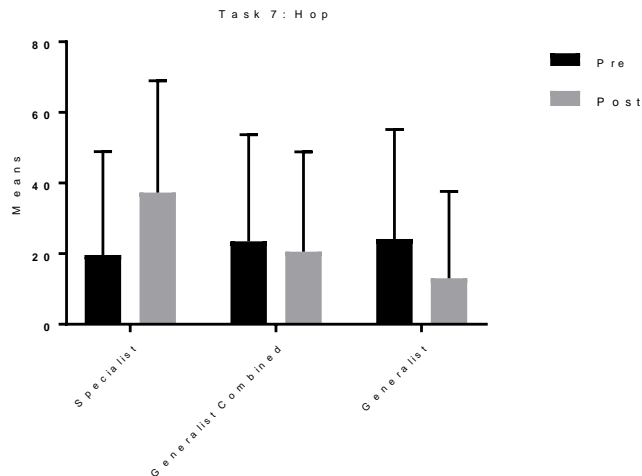


Figure K14. Task 7: Hop, Group (Means & SD, Pre & Post Intervention)

There was a significant effect of sex on Task 9: Overhand Throw, $F(1, 123)=14.535$, $p< .001$, (Figure K15). There was no significant treatment effect ($p> .05$) over time (Figure K16).

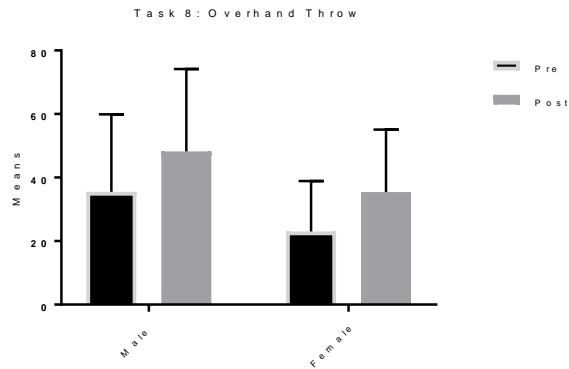


Figure K15. Task 9: Overhand Throw, Sex (Means & SD, Pre & Post Intervention)

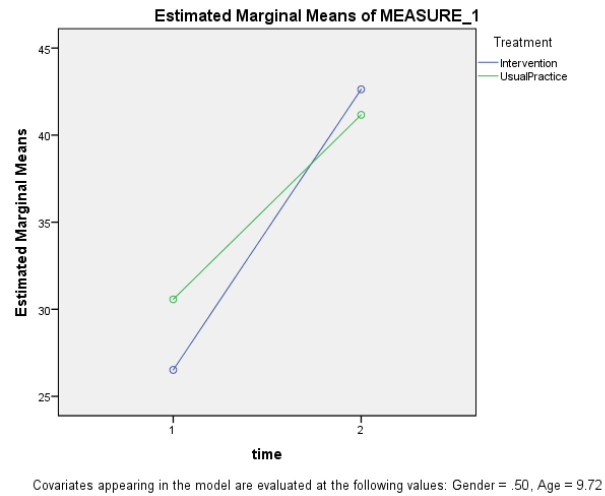


Figure K16. Estimated Marginal Means for Task 9: Overhand Throw (Treatment & Time)

There was a significant effect of sex on Task: 10 Strike, $F(1, 123)=43.143$, $p< .001$ (Figure K17). There was no significant treatment effect over time ($p> .05$) (Figure K18).

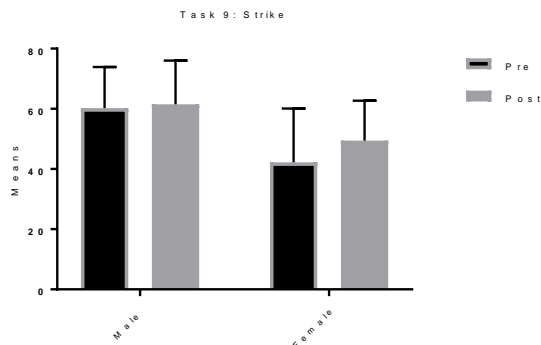


Figure K17. Task 10: Strike, Sex (Means & SD, Pre & Post Intervention)

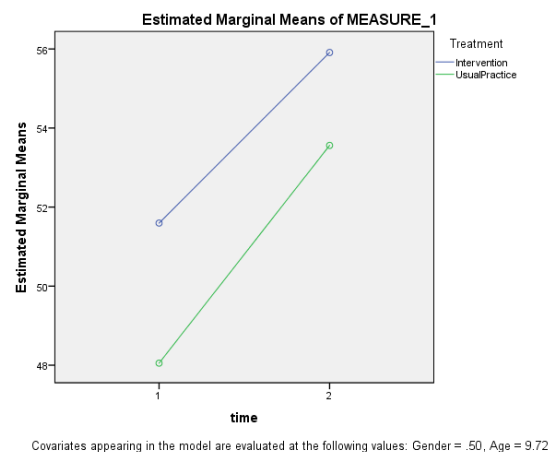


Figure K18. Estimated Marginal Means for Task 10: Strike (Treatment & Time)

There was a significant effect of group on Task 13: Kick, $F(2, 123)=3.646$, $p< .05$ (Figure K19).

There was no significant treatment effect ($p> .05$) over time (Figure K20).

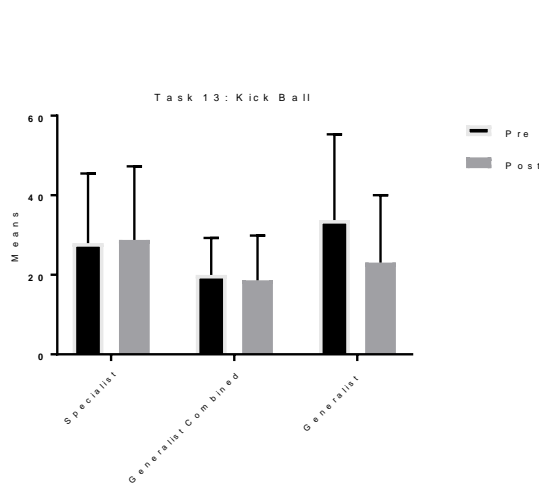


Figure K19. Task 13: Kick, Group (Means & SD, Pre & Post Intervention)

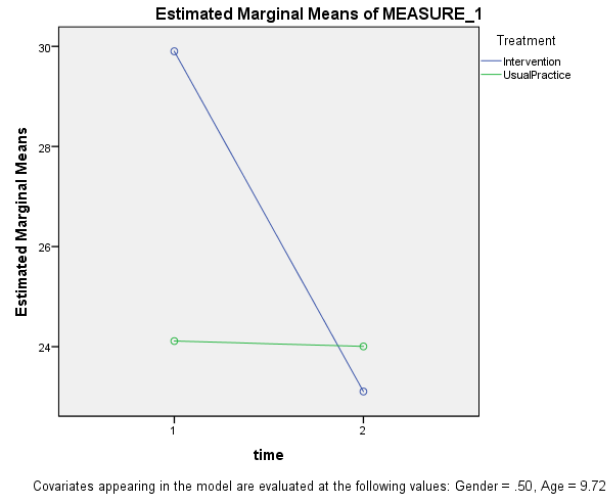


Figure K20. Estimated Marginal Means for Task 13: Kick (Treatment & Time)

There was a significant effect of sex on Task 14: Foot Dribble, $F(1, 123)=4.676$, $p< .05$ (Figure K21). There was no significant treatment effect ($p> .05$) over time (Figure K22).

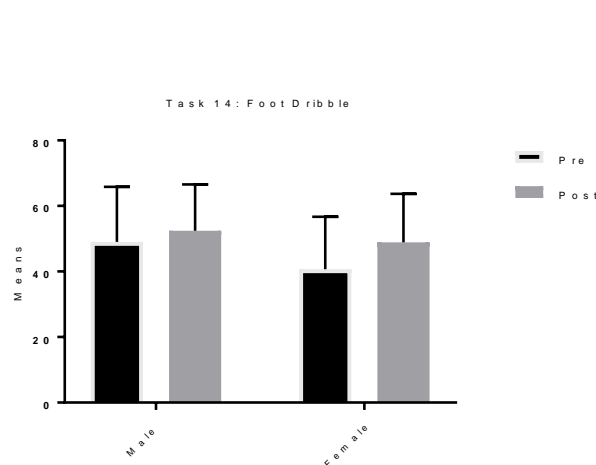


Figure K21. Task 14: Foot Dribble, Sex (Means & SD, Pre & Post Intervention)

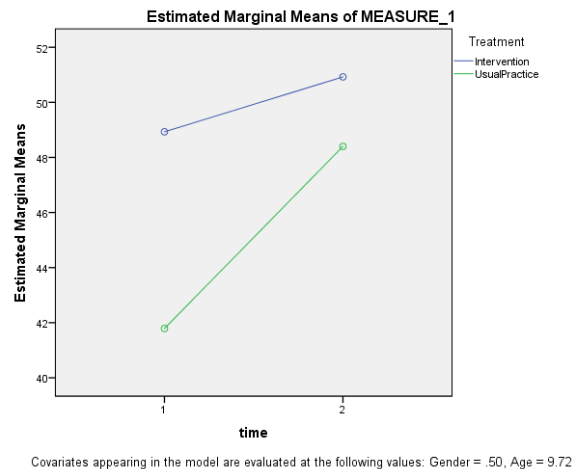


Figure K22. Estimated Marginal Means for Task 14: Foot Dribble (Treatment & Time)

There was a significant effect of sex on Task 15: Balance Forwards, $F(1, 123)=4.148, p< .05$ (Figure K23), and a significant main effect of treatment over time, $F(1, 123)= 7.710, p< .01$ (Figure K24).

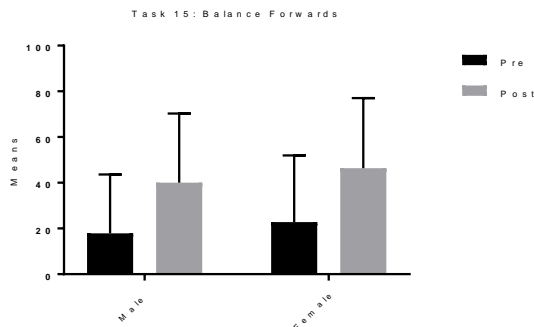


Figure K23. Task 15: Balance Forwards Sex, (Means & SD, Pre & Post Intervention)

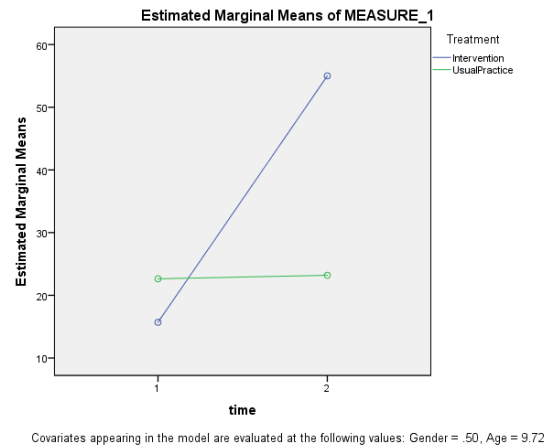


Figure K24. Estimated Marginal Means for Task 15: Balance Forwards (Treatment & Time)

There was a significant effect of sex on Task 16: Balance Backwards, $F(1, 123)=4.106, p< .05$ (Figure K25), and a significant main effect of treatment over time, $F(1, 123)= 5.712, p< .05$ (Figure K26).

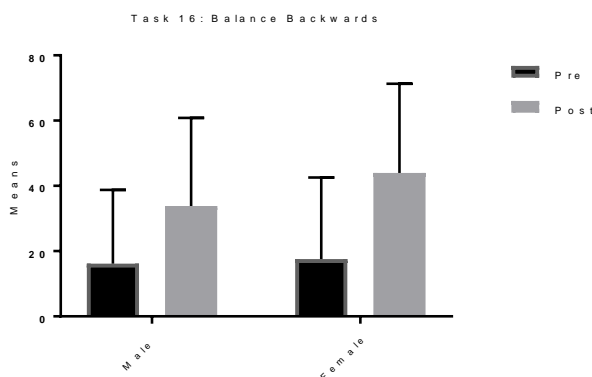


Figure K25. Task 16: Balance Backwards Sex, (Means & SD, Pre & Post Intervention)

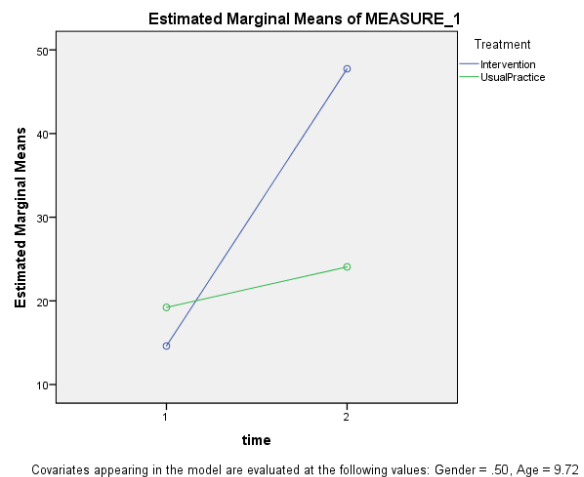


Figure K26. Estimated Marginal Means for Task 16: Balance Backwards (Treatment & Time)

There was a significant effect of treatment over time on Task: 17 Drop to the Ground and Get Back Up, $F(1, 123)=4.600$, $p< .05$ (Figure K27).

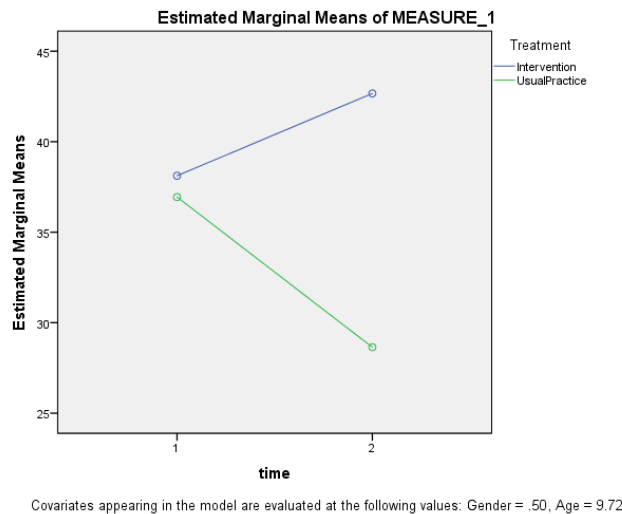


Figure K27. Estimated Marginal Means for Task 17: Drop (Treatment & Time)

There was a significant effect of sex on Task 18: Lift and Lower, $F(1, 123)=7.684$, $p< .01$ (Figure K28). There was no significant treatment effect ($p> .05$) over time (Figure K29).

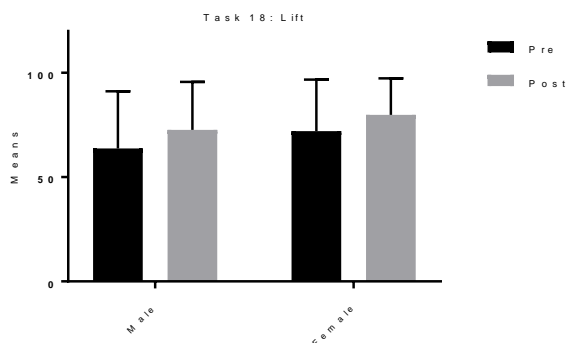


Figure K28. Task 18: Lift, Sex (Means & SD, Pre & Post Intervention)

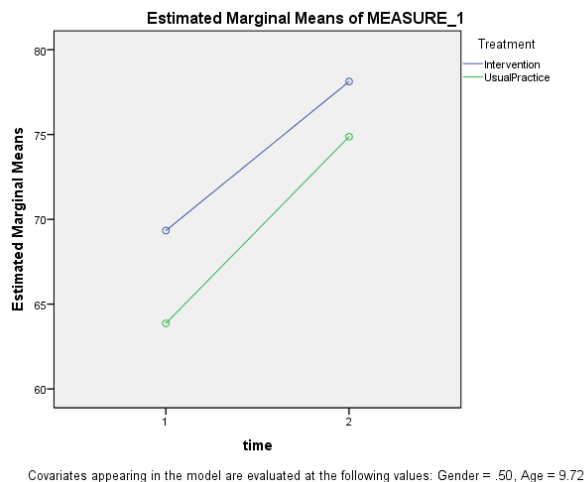


Figure K29. Estimated Marginal Means for Task 18: Lift (Treatment & Time)

PLAY Self

There was a significant effect of sex on “How good are you at doing sports and activities in the gym?” $F(1, 122)=6.321, p< .05$ (Figure K30), and a significant interaction effect of treatment and group, $F(2, 122)= 3.553, p< .05$ (Figure K31).

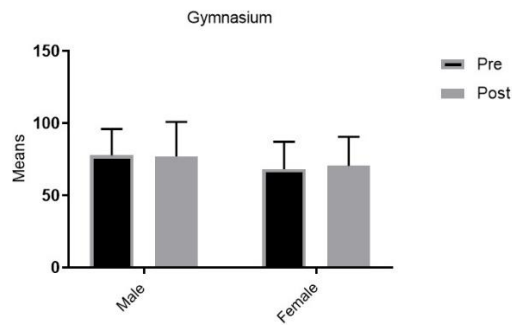


Figure K30. Gym, Sex (Means & SD, Pre & Post Intervention)

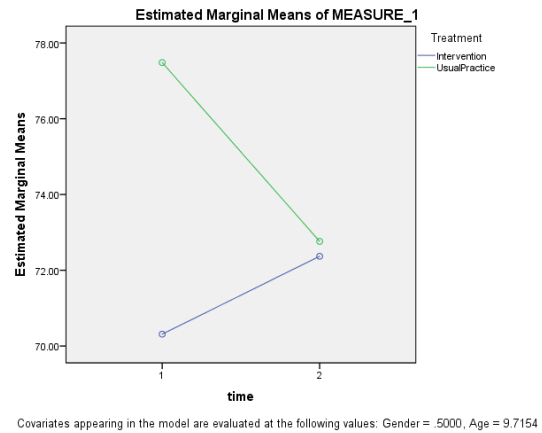


Figure K31. Estimated Marginal Means for Gym (Treatment & Time)

There was a significant effect of treatment on “How good are you at doing sports and activities in and on the water?” over time, $F(1, 122)=7.368, p< .01$ (Figure K32).

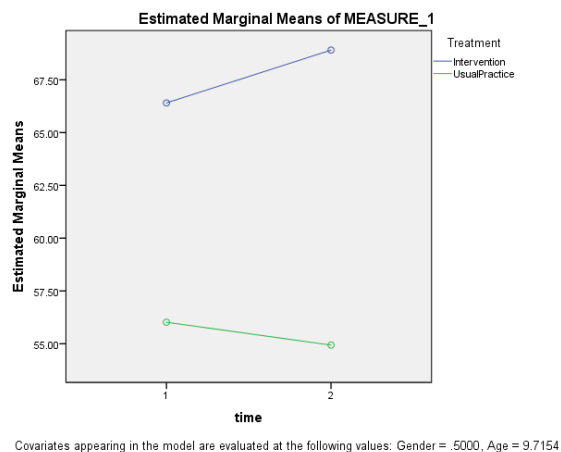


Figure K32. Estimated Marginal Means for Water (Treatment & Time)

There was a significant effect of group on “How good are you at doing sports and activities on the playground?” $F(2, 121)=3.702, p< .05$ (Figure K33). There was no significant effect of treatment over time, $p> .05$ (Figure K34).

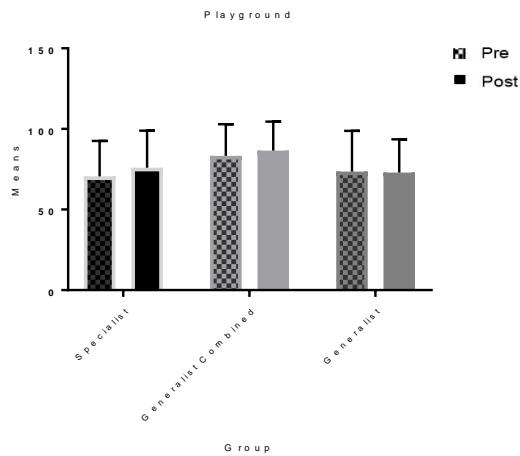


Figure K33. Playground
(Means & SD, Pre & Post Intervention)

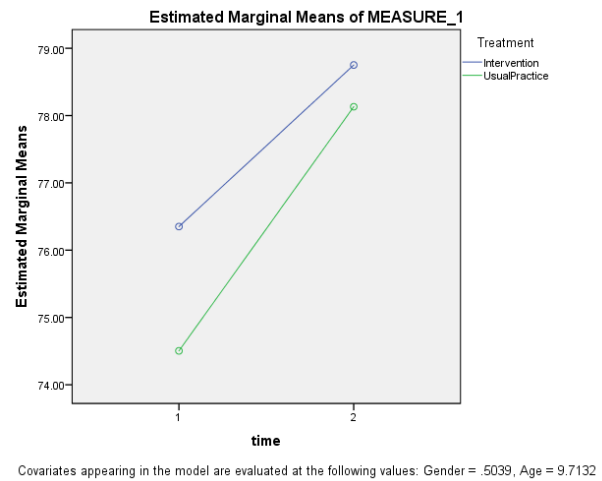


Figure K34. Estimated Marginal Means
for Playground (Treatment & Time)

There was a significant effect of age on “I think I have enough skills to participate in all the sports and activities I want,” $F(1, 122)=4.563, p< .05$ (Figure K35). There was no significant effect of treatment over time, $p> .05$ (Figure K36).

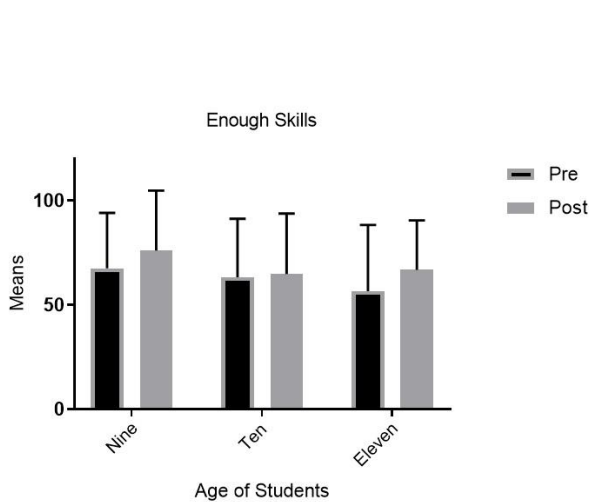


Figure K35. Enough Skills
(Means & SD, Pre & Post Intervention)

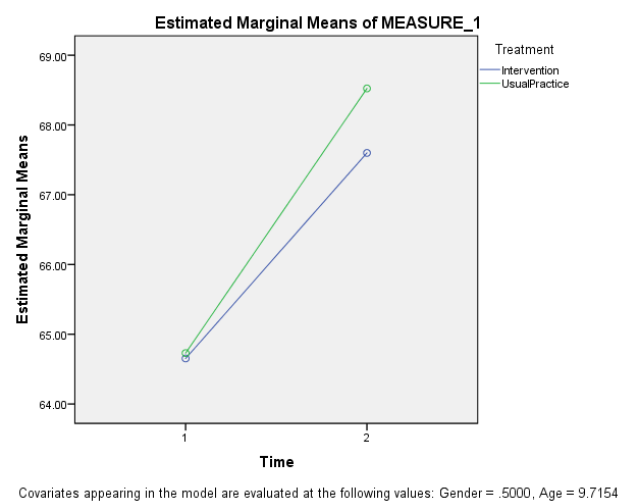
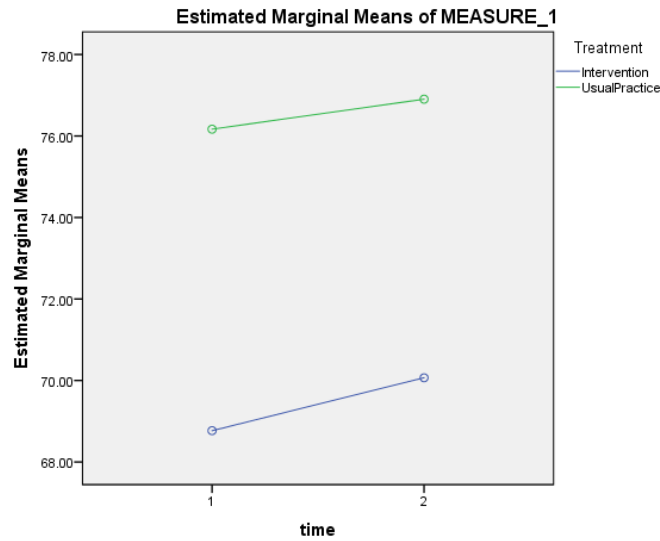


Figure K36. Estimated Marginal Means
for Enough Skills (Treatment & Time)

There was a significant interaction effect of treatment and group on “*My body allows me to participate in any activity I choose,*” $F(2, 122)=3.602, p< .05$ (Figure K37).



Covariates appearing in the model are evaluated at the following values: Gender = .5000, Age = 9.7154

Figure K37. Estimated Marginal Means for Body Allows (Treatment & Time)

There was a significant effect of age on “*I worry about trying a new sport or activity,*” $F(1, 122)=4.122, p< .05$ (Figure K38), and a significant interaction effect of treatment and group, $F(2, 122)= 3.626, p< .05$ (Figure K39).

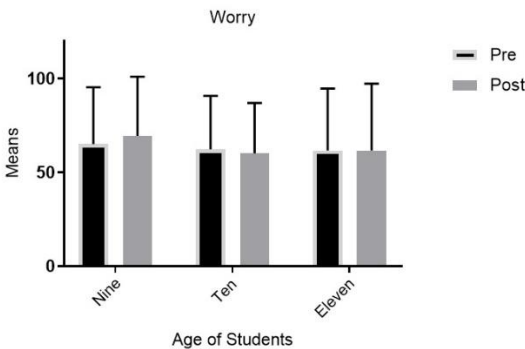
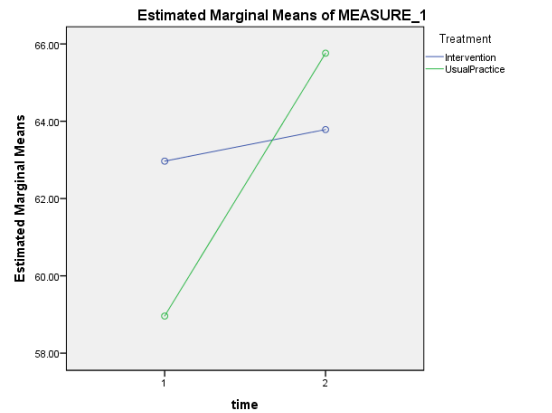


Figure K38. Worry, Age (Means & SD, Pre & Post Intervention)



Covariates appearing in the model are evaluated at the following values: Gender = .5000, Age = 9.7154

Figure K39. Estimated Marginal Means for Worry (Treatment & Time)

There was a significant interaction effect of treatment and group on “*I’m confident when doing physical activities,*” $F(2, 122)=40.028, p< .05$ (Figure K40).

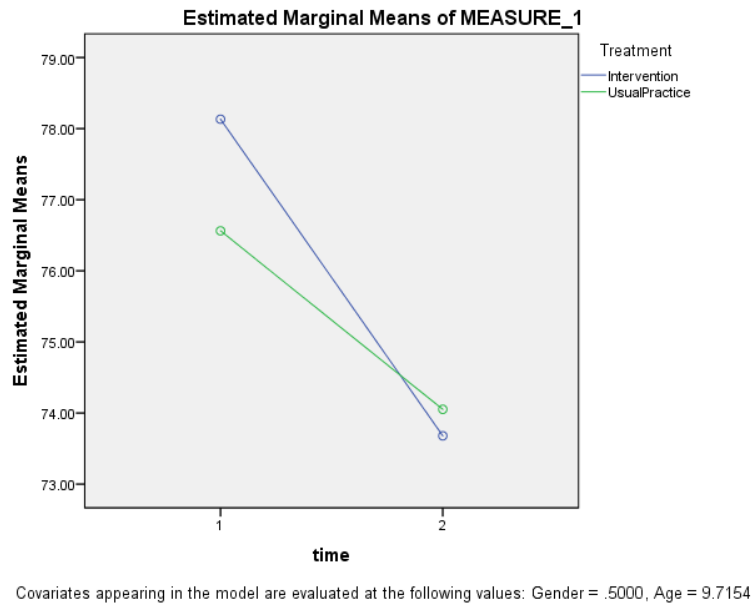


Figure K40. Estimated Marginal Means for Confident (Treatment & Time)

There was a significant effect of age on “*I’m usually the best in my class at doing an activity,*” $F(1, 121)=5.714, p< .05$ (Figure K41), and a significant effect of sex, $F(1, 121)= 14.826, p< .001$ (Figure K42).

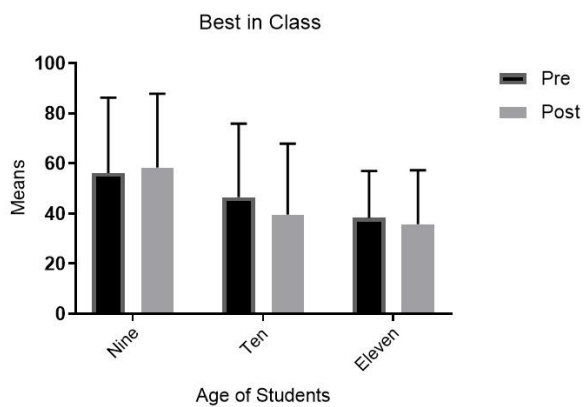


Figure K41. Best in Class, Age (Means & SD, Pre & Post Intervention)

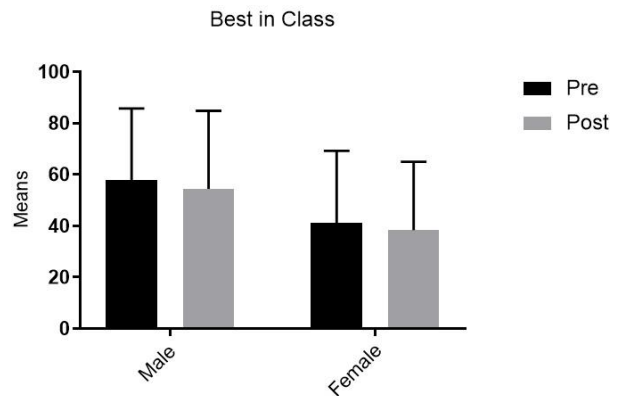


Figure K42. Best in Class, Sex (Means & SD, Pre & Post Intervention)

There was a significant effect of age on “*I don’t really need to practice my skills, I’m naturally good,*” $F(1, 121)=5.714, p< .05$ (Figure K43), and a significant effect of sex, $F(1, 121)= 14.826, p< .001$ (Figure K44).

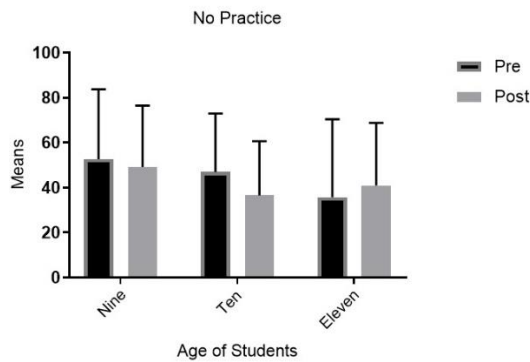


Figure K43. No Practice, Age (Means & SD, Pre & Post Intervention)

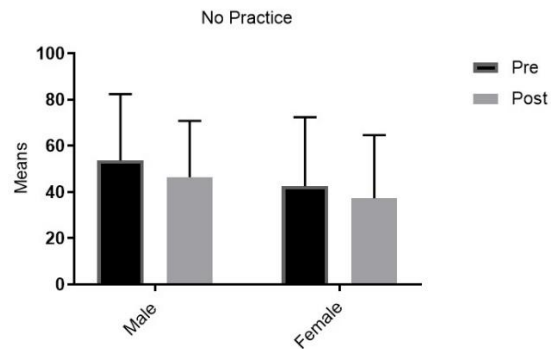


Figure K44. No Practice, Sex (Means & SD, Pre & Post Intervention)

There was a significant effect of sex on “*Movement, activities, and sports are very important at school,*” $F(1, 122)=4.784, p< .05$ (Figure K45), a significant effect of treatment over time, $F(1, 122)= 6.379, p< .05$ (Figure K46), and a significant interaction effect of treatment and group, $F(2, 122)= 3.706, p< .05$.

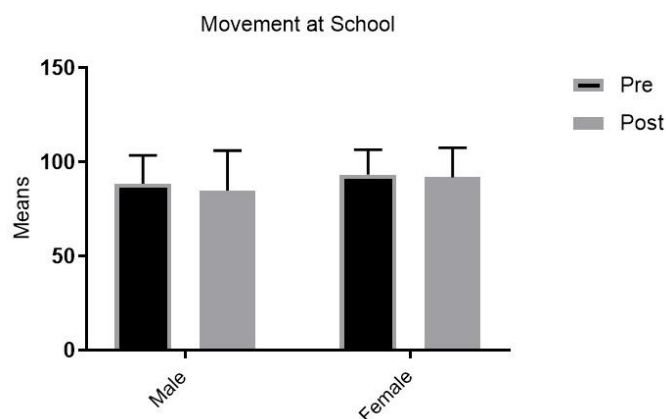


Figure K45. Movement at School, Sex (Means & SD, Pre & Post Intervention)

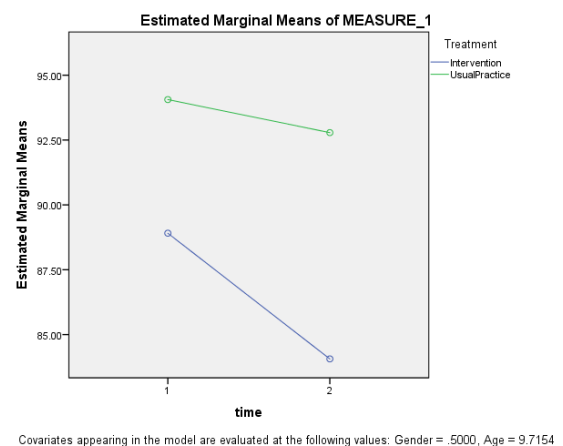


Figure K46. Estimated Marginal Means for Movement at School (Treatment & Time)

There was a significant interaction effect of treatment by group for “*Movement, activities, and sports are very important with friends,*” $F(2,122)= 3.928, p< .05$ (Figure K47).

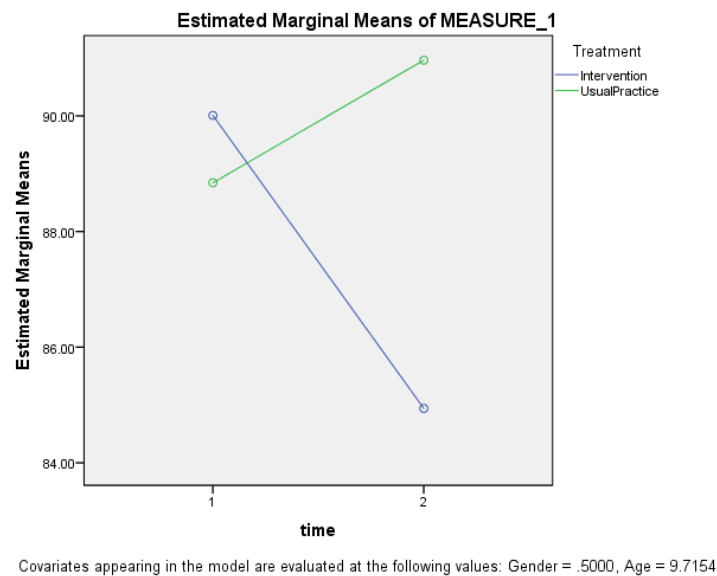


Figure K47. Estimated Marginal Means for Movement with Friends (Treatment and Time)

PLAY Inventory

There was no significant differences for any activities (physically active or sedentary) regarding sex, age, group, treatment, or group by treatment interaction; Physical Activities: Treatment, $F(1, 119)=0.063, p> .05$, and Sedentary Activities: Treatment, $F(1,119)=.411, p> .05$ (Figure K48).

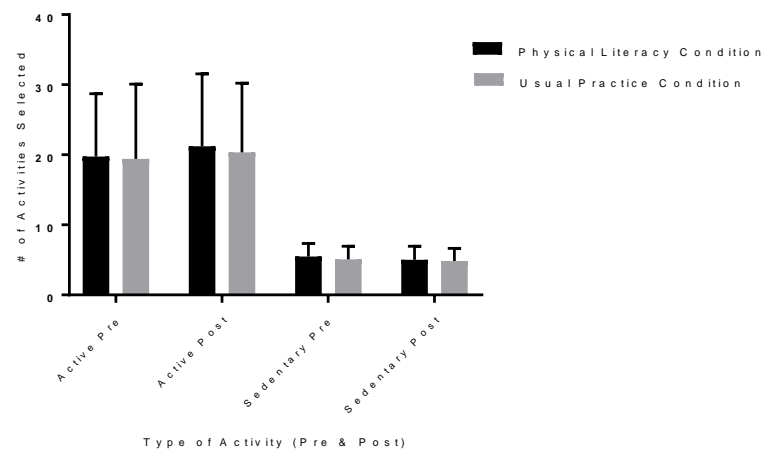


Figure K48. PLAY Inventory Unadjusted Means for Physically Active and Sedentary Activities

Appendix L: PLAY Fun Means, Standard Deviations, and Effect Sizes

Variable	Effect Size	Intervention Specialist	Usual Practice Specialist	Intervention Generalist Combined	Usual Practice Generalist Combined	Intervention Generalist	Usual Practice Generalist
1 Running a Square	Treatment: 0.086	1. 43.91 (16.58) 2. 51.59 (12.44)	1. 38.58 (16.65) 2. 45.38 (10.14)	1. 36.60 (14.90) 2. 49.13 (13.76)	1. 30.67 (20.47) 2. 38.08 (18.34)	1. 45.32 (15.09) 2. 47.95 (15.52)	1. 36.25 (17.98) 2. 34.67 (19.59)
2 Run There and Back	Treatment: 0.079	1. 54.20 (15.16) 2. 58.76 (16.33)	1. 46.50 (14.09) 2. 45.25 (12.01)	1. 46.33 (18.54) 2. 50.87 (12.28)	1. 37.58 (17.02) 2. 43.17 (18.50)	1. 49.00 (20.60) 2. 50.91 (17.08)	1. 44.83 (15.00) 2. 42.42 (19.53)
3 Run, Hop, Land 2 Feet	Age: 0.042 Sex: 0.036 Treatment x Group: 0.053	1. 34.20 (27.92) 2. 35.89 (27.38)	1. 41.67 (24.83) 2. 47.71 (13.74)	1. 39.40 (23.84) 2. 41.80 (20.07)	1. 28.17 (22.42) 2. 41.42 (26.80)	1. 36.55 (29.10) 2. 49.05 (20.54)	1. 18.33 (23.07) 2. 35.00 (25.80)
4 Crossovers	Treatment: 0.049 Group: 0.051	1. 58.78 (19.50) 2. 59.26 (18.69)	1. 43.92 (26.66) 2. 37.88 (23.32)	1. 40.73 (30.76) 2. 47.27 (19.31)	1. 37.25 (24.94) 2. 32.08 (27.70)	1. 40.27 (30.49) 2. 48.14 (27.02)	1. 37.92 (32.64) 2. 38.83 (30.21)
5 Skip	Sex: 0.134	1. 49.17 (16.56) 2. 47.85 (19.53)	1. 45.29 (21.48) 2. 43.71 (21.24)	1. 36.80 (24.53) 2. 47.80 (19.03)	1. 49.42 (19.34) 2. 39.67 (22.35)	1. 54.64 (17.91) 2. 48.91 (15.49)	1. 41.58 (23.47) 2. 49.58 (19.52)
6 Gallop	Sex: 0.041 Treatment: 0.05	1. 46.87 (24.08) 2. 53.67 (16.56)	1. 40.96 (28.05) 2. 43.46 (25.72)	1. 43.60 (27.57) 2. 48.07 (19.10)	1. 40.08 (20.06) 2. 44.67 (21.75)	1. 58.23 (15.35) 2. 49.64 (19.26)	1. 39.33 (21.87) 2. 50.08 (12.28)
7 Hop	Sex: 0.042 Treatment: 0.071	1. 13.28 (24.85)	1. 31.88 (33.48)	1. 31.80 (33.60)	1. 11.58 (22.83)	1. 35.59 (34.24)	1. 8.75 (15.80)

	Group: 0.057	2. 44.52 (30.98)	2. 23.38 (28.72)	2. 27.27 (30.35)	2. 12.17 (24.12)	2. 16.32 (27.60)	2. 7.00 (17.32)
8 Jump		1. 35.20 (24.76) 2. 49.67 (24.13)	1. 30.92 (27.72) 2. 29.42 (24.97)	1. 33.53 (24.77) 2. 31.07 (25.08)	1. 21.25 (20.81) 2. 29.67 (31.21)	1. 36.91 (28.11) 2. 23.59 (27.76)	1. 20.25 (13.98) 2. 32.17 (30.16)
9 Overhand Throw	Sex: 0.106	1. 34.70 (22.00) 2. 46.30 (21.80)	1. 25.79 (23.03) 2. 33.71 (20.98)	1. 20.33 (11.68) 2. 40.73 (24.07)	1. 33.25 (21.39) 2. 34.17 (23.07)	1. 26.05 (21.50) 2. 44.32 (28.51)	1. 27.33 (18.66) 2. 46.00 (26.52)
10 Strike	Sex: 0.260	1. 54.89 (16.25) 2. 60.63 (14.31)	1. 51.25 (20.94) 2. 48.38 (10.74)	1. 45.53 (18.45) 2. 49.80 (14.25)	1. 44.00 (16.60) 2. 51.67 (15.76)	1. 56.91 (16.77) 2. 59.32 (11.18)	1. 40.17 (19.95) 2. 54.33 (23.73)
11 Catch		1. 61.07 (24.62) 2. 62.00 (20.18)	1. 59.63 (28.63) 2. 49.63 (22.79)	1. 45.87 (27.13) 2. 48.33 (22.54)	1. 38.83 (26.92) 2. 58.67 (22.77)	1. 62.64 (20.73) 2. 66.73 (18.67)	1. 35.50 (29.23) 2. 49.58 (20.03)
12 Hand Dribble		1. 58.83 (16.48) 2. 57.22 (20.53)	1. 50.96 (24.23) 2. 54.63 (15.98)	1. 57.13 (20.63) 2. 46.20 (22.49)	1. 43.08 (28.92) 2. 50.25 (26.15)	1. 59.32 (19.30) 2. 59.86 (20.13)	1. 55.50 (18.64) 2. 53.17 (20.18)
13 Kick	Group: 0.056	1. 31.26 (18.83) 2. 32.33 (20.62)	1. 21.67 (12.77) 2. 21.92 (10.94)	1. 19.93 (8.23) 2. 16.73 (4.06)	1. 20.50 (11.12) 2. 21.00 (16.34)	1. 38.00 (20.95) 2. 21.50 (16.63)	1. 30.33 (23.36) 2. 25.92 (17.92)
14 Foot dribble	Sex: 0.037	1. 46.50 (13.43) 2. 56.83 (10.49)	1. 37.96 (15.95) 2. 43.13 (17.16)	1. 50.33 (20.57) 2. 48.53 (8.64)	1. 40.67 (16.89) 2. 50.33 (20.34)	1. 52.82 (17.08) 2. 47.91 (12.07)	1. 41.42 (21.56) 2. 50.33 (18.20)
15 Balance Backwards	Sex: 0.033 Treatment: 0.059	1. 20.33 (28.55)	1. 30.71 (32.42)	1. 9.00 (18.54)	1. 16.42 (24.15)	1. 19.86 (27.62)	1. 17.17 (22.17)

		2. 51.28 (28.90)	2. 31.92 (28.70)	2. 66.13 (14.60)	2. 27.33 (26.22)	2. 44.55 (30.56)	2. 19.17 (30.97)
16 Balance Backwards	Sex: 0.032 Treatment: 0.044	1. 14.50 (20.58) 2. 42.41 (26.64)	1. 22.79 (29.67) 2. 34.04 (28.33)	1. 11.47 (22.33) 2. 57.00 (16.64)	1. 16.58 (22.42) 2. 29.17 (27.27)	1. 20.00 (27.06) 2. 39.64 (27.87)	1. 13.75 (19.04) 2. 20.50 (27.88)
17 Drop	Treatment: 0.036	1. 48.70 (19.59) 2. 38.83 (22.53)	1. 38.63 (24.97) 2. 26.33 (18.59)	1. 29.07 (26.35) 2. 38.80 (21.59)	1. 32.58 (21.46) 2. 24.25 (23.60)	1. 39.18 (26.65) 2. 50.45 (17.75)	1. 33.33 (17.55) 2. 25.42 (23.74)
18 Lift & Lower	Sex: 0.059	1. 70.22 (26.03) 2. 78.59 (16.56)	1. 71.58 (19.02) 2. 63.71 (28.66)	1. 68.47 (22.91) 2. 76.13 (20.47)	1. 55.17 (33.60) 2. 83.50 (7.08)	1. 67.00 (27.79) 2. 79.68 (17.89)	1. 71.50 (29.53) 2. 78.92 (23.89)

Note: ()= Standard Deviation, Effect Size= partial eta squared, 1= Pre test, 2= post test

Note: All skills were assessed on a 0-100 scale.

Appendix M: PLAY Self Means, Standard Deviations, and Effect Sizes

Variable	Effect Size	Intervention Specialist	Usual Practice Specialist	Intervention Generalist Combined	Usual Practice Generalist Combined	Intervention Generalist	Usual Practice Generalist
1 Gym	Sex: 0.049 Treatment x Group: 0.055	1. 74.44 (18.34) 2. 81.67 (19.51)	1. 70.83 (20.41) 2. 66.67 (28.23)	1. 70.00 (14.02) 2. 70.00 (23.53)	1. 83.33 (22.19) 2. 72.92 (19.82)	1. 68.18 (19.18) 2. 64.77 (18.35)	1. 72.92 (19.82) 2. 79.17 (17.94)
2 Water	Treatment: 0.057	1. 67.78 (23.61) 2. 71.67 (22.99)	1. 54.17 (27.25) 2. 62.50 (23.31)	1. 65.00 (22.76) 2. 66.67 (29.38)	1. 61.46 (29.89) 2. 56.25 (30.39)	1. 65.91 (19.74) 2. 67.05 (22.34)	1. 54.17 (33.43) 2. 50.00 (23.84)
3 Ice		1. 62.22 (27.50) 2. 60.09 (24.95)	1. 50.17 (29.65) 2. 44.79 (28.53)	1. 49.50 (31.82) 2. 46.67 (39.94)	1. 44.33 (23.04) 2. 52.08 (29.11)	1. 53.41 (29.17) 2. 53.86 (29.19)	1. 58.33 (24.62) 2. 52.08 (24.91)
4 Snow		1. 64.44 (22.92) 2. 65.27 (23.37)	1. 57.71 (23.77) 2. 50.00 (22.12)	1. 60.00 (36.35) 2. 64.70 (27.33)	1. 68.75 (18.84) 2. 64.58 (19.82)	1. 64.77 (25.19) 2. 65.91 (19.74)	1. 64.58 (29.11) 2. 50.00 (28.20)
5 Outdoors		1. 86.00 (17.41) 2. 87.22 (16.53)	1. 79.17 (25.18) 2. 73.96 (26.04)	1. 74.80 (23.43) 2. 89.27 (16.78)	1. 89.58 (24.91) 2. 85.42 (16.71)	1. 82.95 (22.34) 2. 78.41 (15.99)	1. 81.25 (15.54) 2. 89.58 (12.87)
6 Playground	Group: 0.058	1. 70.58 (22.80) 2. 76.36 (22.63)	1. 70.83 (20.41) 2. 75.00 (24.45)	1. 83.33 (18.09) 2. 87.50 (17.03)	1. 83.33 (22.19) 2. 85.42 (19.82)	1. 73.86 (23.75) 2. 70.68 (19.66)	1. 72.92 (29.11) 2. 77.08 (22.51)
7 Long to Learn		1. 67.94 (19.68)	1. 62.63 (24.82)	1. 72.43 (17.43)	1. 86.25 (16.99)	1. 72.91 (19.61)	1. 66.75 (24.74)

		2. 69.73 (23.46)	2. 66.83 (19.76)	2. 66.73 (25.32)	2. 75.17 (20.70)	2. 60.82 (24.52)	2. 58.50 (24.43)
8 Skills	Age: 0.036	1. 61.58 (29.36) 2. 72.67 (26.92)	1. 65.33 (28.73) 2. 69.58 (25.89)	1. 62.27 (24.94) 2. 62.27 (30.63)	1. 66.67 (28.57) 2. 80.58 (26.49)	1. 69.77 (25.10) 2. 65.23 (28.23)	1. 61.17 (31.36) 2. 61.08 (39.85)
9 Active		1. 94.13 (12.76) 2. 91.20 (14.76)	1. 88.96 (18.76) 2. 88.46 (23.94)	1. 87.80 (22.26) 2. 91.13 (19.80)	1. 81.42 (31.08) 2. 97.25 (9.53)	1. 86.45 (19.61) 2. 86.41 (22.21)	1. 89.00 (16.25) 2. 88.92 (21.73)
10 Happier		1. 83.07 (20.82) 2. 86.02 (19.38)	1. 76.54 (24.98) 2. 71.67 (21.73)	1. 87.87 (18.22) 2. 82.27 (30.52)	1. 88.92 (21.73) 2. 88.92 (21.73)	1. 78.91 (26.28) 2. 72.82 (31.95)	1. 72.42 (27.79) 2. 89.00 (16.25)
11 Take Part		1. 68.20 (29.35) 2. 76.40 (25.26)	1. 69.58 (25.89) 2. 71.71 (21.59)	1. 66.80 (21.93) 2. 75.60 (32.08)	1. 91.75 (14.92) 2. 89.67 (15.41)	1. 72.95 (16.65) 2. 65.32 (24.15)	1. 69.67 (26.41) 2. 66.83 (28.46)
12 Body Allows	Treatment x Group: 0.056	1. 75.73 (22.04) 2. 74.60 (24.54)	1. 74.88 (24.72) 2. 68.96 (34.13)	1. 58.67 (24.26) 2. 69.33 (23.55)	1. 81.33 (16.59) 2. 86.92 (16.31)	1. 71.45 (15.55) 2. 65.27 (26.27)	1. 72.42 (19.24) 2. 77.92 (21.68)
13 Worry	Age: 0.033 Treatment x Group: 0.056	1. 64.53 (28.87) 2. 57.87 (34.45)	1. 68.17 (30.31) 2. 70.42 (24.98)	1. 53.47 (27.76) 2. 62.33 (27.90)	1. 58.33 (38.02) 2. 72.33 (31.26)	1. 68.32 (26.23) 2. 69.91 (22.79)	1. 56.83 (29.00) 2. 55.75 (29.70)
14 Understand		1. 75.27 (24.38) 2. 83.09 (27.92)	1. 59.79 (29.57) 2. 63.54 (19.68)	1. 72.33 (23.33) 2. 71.27 (27.80)	1. 69.42 (36.21) 2. 72.33 (23.98)	1. 69.86 (25.03) 2. 68.27 (28.20)	1. 68.13 (28.92) 2. 72.42 (19.24)
15 Confident	Treatment x Group: 0.062	1. 84.24 (19.91)	1. 79.25 (23.71)	1. 73.47 (28.72)	1. 89.00 (16.25)	1. 77.41 (21.52)	1. 59.83 (28.04)

		2. 83.82 (19.54)	2. 68.67 (20.98)	2. 64.47 (36.73)	2. 78.00 (16.25)	2. 71.32 (27.82)	2. 77.92 (21.68)
16 Try new activities		1. 72.72 (21.69) 2. 73.42 (24.26)	1. 83.25 (24.16) 2. 65.29 (30.38)	1. 74.47 (27.44) 2. 73.40 (25.89)	1. 81.25 (21.96) 2. 78.58 (29.35)	1. 72.82 (31.95) 2. 74.32 (29.01)	1. 72.83 (27.74) 2. 77.83 (26.00)
17 Best	Age: 0.045 Sex: 0.109	1. 51.87 (25.37) 2. 52.69 (27.07)	1. 43.00 (31.93) 2. 45.81 (27.63)	1. 53.10 (29.60) 2. 46.53 (37.45)	1. 57.17 (33.40) 2. 55.42 (29.77)	1. 43.86 (31.63) 2. 27.18 (24.49)	1. 52.75 (30.17) 2. 49.92 (30.30)
18 No Practice	Age: 0.042 Sex: 0.042	1. 46.67 (27.14) 2. 43.24 (25.38)	1. 50.00 (32.72) 2. 44.17 (25.40)	1. 47.80 (32.76) 2. 42.20 (34.53)	1. 66.75 (31.85) 2. 41.58 (29.00)	1. 46.91 (30.41) 2. 38.09 (24.32)	1. 33.17 (20.20) 2. 38.83 (24.11)

Note: ()= Standard Deviation, Effect Size= partial eta squared, 1= Pre test, 2= post test