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Students Reactions To The Pacer Fitness Test After Stretching Interventions

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STUDENTS REACTIONS TO THE PACER FITNESS TEST AFTER
STRETCHING INTERVENTIONS

by

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A capstone submitted in partial fulfillment of the
requirements for the degree of Master of Arts in Education.

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“Education is not the filling of a vessel but a lighting of a flame.”
-Anonymous

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Special thanks to my 8th grade students for allowing me to use their survey data and allowing them to try something new with their classes. My mantra holds true to them—we are always learning, kids and grown-ups alike!

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CHAPTER ONE

Introduction

My Background

I have always been an athletically gifted and competitive person. I ran track and field throughout middle school and high school and was awarded All-State. I started water skiing when I was six years old. I sang in high school choir and achieved “Superior” rankings for my solos. I started club swimming when I was seven years old and won countless state championships that eventually led to a full ride college swimming scholarship at Purdue University. I simply cannot remember a time when I was not competitive or trying my best to win. I love winning, the thrill of knowing that I am the best at something, the praise from family and friends and the knowledge that I have done my absolute best and succeeded. As a Middle School Physical Education (PE) teacher, I want my students to experience success at their highest level. It is in this spirit of wanting my students to be successful at their highest level, that I have developed my Capstone question - How do students describe their reaction to the PACER Fitness Test after a stretching intervention?

This chapter starts by explaining how my capstone research exploring students reactions to the PACER fitness test after stretching interventions is tied to my experience as an elementary student with a fitness test I was required to complete. I then reflect on my college career as a Division I swimmer and my relationship with stretching. The chapter then examines my current practices as a PE teacher and the role of stretching.

This chapter ends with a description of the potential significance of this capstone research.

My Elementary School Experience

As an Elementary Physical Education student in the 1990s, our school participated in the Presidential Physical Fitness program. Newbell (2011) describes how “The President's Challenge is best known for the physical fitness test that has been administered in schools for more than 40 years. The test consists of curl-ups, shuttle run, one-mile run, flexibility test (sit and reach) and pull-ups” (p. 52). In the Spring of each year, as an Elementary School student, I would participate in the Shuttle Run, Pull-ups, Sit ups, Mile run and, the V-sit.

As a hyper competitive individual, I scored at nearly the 100% ranking on all of the fitness tests, except the V-sit. Knudson (1999) points out that “Flexibility can be defined as the intrinsic property of body tissues which determines the range of motion achievable without injury at a joint or group of joints” (p. 24). For the V-sit test all Elementary School students had to sit on the ground, legs outstretched, spaced shoulder width across. Students are instructed to put one hand on top of the other, keep your knees from not bending, exhale outwards and reach out as far as you could on a piece of tape affixed to the floor. That piece of tape marked how many inches you were able to stretch. Your flexibility is based on National norms from boys or girls around your age.

For years, I tried my best to earn the coveted Presidential Physical Fitness test award patch, but sadly, I always failed. I was not flexible. I would cry huge crocodile tears and felt like there was nothing I could do to excel at this test. I was unable to be

flexible enough for the V-sit. No matter how fast I ran or how many push-ups I could do, I simply was an inflexible person.

My Physical Education teacher would try to console me, but I was always upset by my failure. I was just naturally a very muscularly inflexible individual. My brother, who was also athletically gifted got the Presidential Physical Fitness Award every year in Elementary school because the National norms for the boys' V-sit was far less than the girls.' I was jealous and sad that he was so successful, and that I continued to fail. Although I had not achieved the Presidential Physical Fitness Award and had zero stretching ability, I was a highly successful athlete that eventually earned a college swimming scholarship.

Competing in College

Fast forward to my Senior year of college in 2006 at Purdue. After 14 years of competitive swimming, I was looking to finish my career on a high note at the Big Ten Conference Championship meet. My strength training coach gave me a challenge that year in the Fall of 2005. She hypothesized that I could swim my fastest if I was more flexible. She frequently observed my in-flexibility during weight lifting workouts and wondered if I stretched for a mere five minutes each night before I went to bed, if my flexibility would improve and I would swim faster. "Start small," she said.

From that point on, I faithfully turned on relaxing music, turned down the lights in my room and stretched every night before going to bed. After many nights of stretching, I was touching my nose to my knees while sitting, something that I was never able to do. Not surprisingly, my final swimming meet was the best meet of my life. Personal best

times qualified me for the Division 1 NCAA swim meet. During the meet I felt limber, relaxed, confident and ready like I had never been for competition. The stretching regime had worked and I experienced the physical and psychological benefits of daily stretching. After my stretching success in college, I wondered if Physical Education students could benefit from stretching during class time.

The Practice of Teaching Physical Education

In physical education (PE) classes of old, students met in squads for attendance, stretched after attendance, went for a warm-up jog and began their regularly prescribed sport of the unit. My physical education experience highly mimicked this equation. There was not much relaxation time, reflection time, or student input in lessons. The PE teacher was the leader of class. Students learned new skills, played games and went to their next class.

As of 2017, I am in my tenth year of teaching PE in a suburban Middle School near a large metropolitan area in the upper midwest. I see my students approximately every other day for 35-minutes of instruction time. The amount of classroom activity time in my PE classes is minimal and valuable. However, the amount of activity time in my PE class is not unusual and it is important that I make the best use of what is available. According to Bott and Mitchell (2015) “the lack of time available in physical education is a valid concern” (p. 26) and is linked to negative outcomes related to students being less active.

For example, Prusak et al. (2011) links the lack of time for PE to health risks for students. In the following quote the author describes how alarmingly,

the childhood obesity epidemic has dramatic implications for the current and future health of children and adolescents. Type 2 diabetes in adolescents has increased more than 10-fold in the past two decades, and previously unrecognized conditions such as fatty liver in younger persons occurs in nearly one-third of overweight children today. (p. 40)

To combat our nation's battle against obesity and diabetes, my students participate in a fitness testing program called the Fitnessgram (The Cooper Institute, 2014) which is very similar to the Presidential Physical Fitness Test (Newbell, 2011). The difference between these two testing modules is that the Fitnessgram (The Cooper Institute, 2014) is personal-goal-based, while the Presidential Physical Fitness Test is a norm-based series of tests.

For the Fitnessgram, the students participate in the shuttle run, Progressive, Aerobic Cardiovascular Endurance Run, also known as the "PACER" (The Cooper Institute, 2014), push-ups, sit ups, mile run and the sit and reach. The sit and reach is very similar to the V-sit, and both the V-sit and reach allow students to use an elevated box to measure their flexibility if available. The 20-meter PACER test is fitness test designed to assess aerobic capacity and endurance. The test is done with a musical soundtrack that can be played online or with adequately loudspeakers.

To start the PACER, students all start at one line and they wait for the song to beep. After the beep, students run to the next line, which is 20 meters away from them and wait for the next beep. The beeps get faster and faster, requiring the students to run quicker to get to the line before the next beep. If a student misses the line before the beep,

their test is over. The more cardiovascular endurance one has, the farther they can go in the PACER test and the more aerobic capacity they have. The PACER test is a very public test. Students who enjoy competing against others like the challenge of the PACER test, while in my experience more introverted students struggle with the testing format.

When having my students complete the Fitnessgram (The Cooper Institute, 2014) it is clear that some of my students may not do well competing in front of other students. To create a safer testing environment that avoids the use of the whole class watching each other, my students are watched by their partner helper. It has been my experience as a PE teacher that the students feel safer in small testing environments and our Fitnessgram (The Cooper Institute, 2014) results have improved using the smaller size of testing groups.

At my school, students are tested on the Fitnessgram (The Cooper Institute, 2014) at the same time for the first round of testing. If a child missed a test, or would like to re-try their test after it has been completed, students are allowed to. Students can then test in a small testing environment and the teacher records their best score.

It has been my experience that some students do perform much better on their retry than they do in front of the large group and some students do worse. Giving the students options helps them to achieve the highest level of scores for their Fitnessgram tests. My goal is always to make each child as comfortable as possible with the testing experience, while providing them with opportunities to be competitive in a safe

environment. The dual goals of comfort and an opportunity to be competitive make the PACER fitness test an excellent choice in which to explore my capstone question.

Because students are familiar with the Fitnessgram (The Cooper Institute, 2014) testing protocol and are already being expected to participate in the PACER four times during the school year, this test is a comforting choice for my students. Students get to practice the PACER before we test in the fall. In fact, if they are a seventh grader that has been at our school before, they are very familiar with the process. The familiarity is helpful when trying to extract data about flexibility and the potential impact of stretching.

Thoughts on Stretching

Throughout the years that I have administered the Fitnessgram fitness tests (The Cooper Institute, 2014), the following questions have interested me:

- What are possible effects of daily stretching on fitness test performance?
- Can daily stretching before physical activity be beneficial?
- With more mental preparation before the PACER test would my students be more relaxed and self-confident?
- As each of us are individual people, how can I as a PE teacher find that “sweet spot” of stretching time to best fit the needs of my learners?
- With some students being more naturally flexible and more receptive to the relaxation of stretching, how can I find balance between them and less eager students?
- Myself, as a non-flexible person who despises stretching in all forms, how can I make my stretching routine palatable to “non-stretchers”? On the other hand,

how can I tailor my lessons to fit the needs of my students that are already flexible and willing to stretch more?

- If five-minutes of daily stretching helped me in college achieve my athletic swimming goals, could stretching during Physical Education class affect my student's PACER scores?
- Would students be more confident about their abilities and be more relaxed and focused to improve on the test? Would my students be more relaxed before other academic endeavors such as standardized testing?

My curiosity about flexibility, stretching and athletic performance has helped me discover my research question. How do students describe their reaction to the PACER Fitness Test after a stretching intervention?

My research investigated what others have said about stretching and the physical and psychological benefits from stretching. There are many studies, (Behm and Chaouachi, 2011; Knudson, 1999; Samson, Button Chaouachi and Behm, 2012) that discuss the differences between stretching before activity versus after activity. With respect to classroom instruction time, I personally have my students stretch before physical activity. The end of class time is usually devoted to classroom reflection and lesson closure and announcements, leaving little room for more physical activity time. Whenever stretching activities are done during class time, I am still curious about how stretching could affect my students and if it is truly a worthwhile endeavor during PE class with my students.

Significance of this Research for Students and PE Teachers

My capstone research could be significant for students in PE class and PE teachers. If the participants in this capstone describe a connection between self relaxation after stretching it could create positive attitudes about the PACER fitness test and potentially their PACER fitness test scores resulting in students having a higher level of personal fitness. Another benefit of the students describing a connection between self relaxation after stretching is that it might transfer to other academic areas of school. For example, if students have learned ways of relaxing that could be used to reduce stress associated with academic testing that could positively impact academic achievement.

This research project has value for me as a professional because of my experiences as a child growing up in the Presidential Physical Fitness testing world. A primary goal for me as a PE teacher is for my students to know success and to know how to calm themselves down in stressful situations using healthy, appropriate calming methods. As a teacher, I want to explore how my students experience stretching during PE class. Through this capstone it will be possible for me to explore if my students see stretching as a tool that can contribute to them being successful young adults and, eventually, adults.

This research aims to examine the effects of a stretching routine on student attitudes around the PACER fitness test. Students will explore how stretching could affect student's attitudes about the PACER fitness test. Students will also experience the calming factors related to a relaxation stretching routine. This research could empower young adults to be competitive, and confident in their abilities to do well in other

standardized tests such as the Fitnessgram PACER test. Additionally, this research aims to incentivize or entice young adults to see the value of fitness in their adult years and to see how staying physically active and staying flexible can impact their overall health and quality of life. Having touched on the reasoning of stretching research, a brief synopsis of the subsequent chapters will be given.

Overview of Chapters Two, Three, and Four

In this chapter, I identified my research around students reactions to the PACER fitness test after stretching interventions. Chapter Two will be examining what the current literature says about stretching, performance and how it relates to the students that I currently teach. I will discuss the benefits of stretching, the different types of stretching, the role of fitness testing and the potential link of physical fitness to academic performance. Chapter Three describes the research design used in this of the study as it relates to my research question. Chapter Four will share results of the study. Chapter Five will feature the conclusion to my research.

CHAPTER TWO

Review of Literature

Given the short amount of time I spend with my students as a Physical Education (PE) teacher, I want to see my kids active and moving throughout class. I also want to make instruction time as meaningful as possible for my students. It is in this spirit, that I have developed my research question - How do students describe their reaction to the PACER Fitness Test after a stretching intervention? In addition to making the best use of my instructional time this capstone is also motivated by Prusak's et al. (2011) description of negative impact of my students of not being active.

Prusak's et al. (2011) description of the long term negative impact from my students of not being active motivates me to support my students in developing an appreciation of physical well-being and the joy of a healthy life. I want to build their healthy habits from a young age and potentially teach them how to help their families become healthier. Physically active students may help students be more productive in classes, but knowing ways to relax and focus may also be beneficial to students during their school day.

Stretching during class time has the potential to be a relaxing time for students during the hustle and bustle of their school day. As my students travel from class to class throughout their day, they frequently tell me that there is little "down time" for them to reflect quietly. My students are always on the go and rarely have time to relax. As I wonder about ways to improve my students' attitudes about fitness testing, my research

around students reactions to the PACER fitness test after stretching interventions was developed.

In this chapter, the reader will be informed about stretching and the history of fitness testing. Different ways to stretch and why people may choose to stretch will be discussed. A brief overview of fitness testing and students will be investigated as well as new approaches to fitness testing. Potential links between physical fitness and academic performance will be highlighted. Finally, the decline of PE in schools will be addressed and investigated.

Different Types of Stretching

Three different types of stretching are most prevalent in Physical Education warm up routines. One method of stretching is Static Stretching. According to Behm (2016) “Static stretching (SS) involves lengthening a muscle until either a stretch sensation or the point of discomfort is reached and then holding the muscle in a lengthened position for a prescribed period of time” (p. 2). The authors continues that “Static stretching usually involves moving a limb to the end of its range of motion (ROM) and holding the stretched position for 15–60 s” (Behm, Blazevich, Kay and McHugh, 2011, p. 2633). In a PE classroom, Behm et al. (2016) notes how SS is performed twice in a bout of exercise with an emphasis of going farther on the second bout of stretching to fully increase range-of-motion. SS is the most popular Physical Education warm up as it allows all students to stretch in the same manner for the same prescribed amount of time. During SS students are encouraged to breathe through each stretch and mentally picture themselves becoming more flexible as they stretch with their classmates. Given the

different formats of PE classrooms the prescribed SS time varies from teacher to teacher. Another form of stretching is Dynamic Stretching (DS) that “involves controlled movement through the active range of motion for a joint” (Behm and Chaouachi, 2011, p. 4).

Behm and Chaouachi also goes on to mention that, “dynamic stretching is preferable to static stretching as part of a warm-up designed to prepare for physical activity due to the close similarity to movements that occur during subsequent exercises” (p. 2645). During DS, students mimic certain sport movements to warm up their muscles in a sport-specific way as to stretch the muscles in an active way. Students may stand during activities and move around the exercise area. Students generally are not sitting for bouts of DS. Methods of DS vary from teacher to teacher and from activity to activity. Proprioceptive Neuromuscular Facilitation (PNF) is another form of stretching and according to Behm et al (2016) “PNF stretching incorporates SS and isometric contractions in a cyclical pattern to enhance joint ROM with two common techniques being contract relax (CR) and contract relax agonist contract” (p. 5).

Of the three types of stretching, as a PE teacher, I learned that DS is appealing because it gets students moving and active. Students are not sitting down while stretching, rather, Dynamic Stretching is stretching while moving. A good example of DS is to hold onto the wall and swing your leg through its full range-of-motion for 10 repetitions. Another example of DS is running with high knees or cherry-picker skipping.

For this study, I will use SS and DS. PNF methods of stretching are not used in my classroom for two reasons. One, PNF requires the usage of a machine that uses electrical impulses to muscle groups. I do not have those machines at my disposal, nor do I want to have my students try out this method of stretching. Two, PNF can be somewhat dangerous if not performed by trained individuals and creating safe PE environment where my students do not experience unnecessary harm is extremely important to me. Given PNF is not used in this study this form of stretching will not be included in the review of the literature for this capstone.

While all three of the different types of stretching have benefits to certain athletic endeavors this review of the research literature examines only Dynamic Stretching and Static Stretching. As a member of many sports teams, SS is something I directly experience and am aware of its benefits for myself and my teammates. For example, I remember sitting in a circle, or with my team and counting down from ten as we all performed each stretch.

If you were the designated leader for the stretching that day, you were in charge of the stretches and the duration. As the stretching leader, you felt like you had an opportunity to lead and let your voice be heard. As the leader, you also had the choice of which stretches the team would perform. The leader encouraged teammates to count out their stretches loudly as a team building activity. The coach could also work on other important team items such as competition lineups, optimization of relay teams or daily coaching minutia.

Our coaches loved this leadership opportunity. There was a definite comfort about teammates counting together and creating this coveted routine. We all knew the static stretches: legs together, hurdler stretch, butterfly stretch, bridge stretch, quad stretch, the list continues. We knew all routine and knew how to lead the stretches. Our coaches could work on other things while we were leading stretches and it was a nice way to start practice, connect with friends and do something as a team, together! Another popular method of stretching is Dynamic Stretching.

As stated earlier, Behm et al. (2016) explains that “Dynamic Stretching involves the performance of a controlled movement through the Range of Motion of the active joint(s)” (p. 4). A few popular Dynamic Stretches for athletes are high-toe walking, cherry picker skipping and the leg swinging hurdler’s stretch. Leon, Oh and Rana (2012) stated that “Dynamic stretching improves flexibility, while simultaneously increasing body heat and blood flow” (p. 16). The addition of the movement during stretching has the potential to increase performance and ROM as the more that your body warms up, the more flexible you become and the more warmed-up you become creating less risk for injury during game play or competition. However, a question remains about how much time is needed to adequately see desired results from stretching.

Kokkonen, Nelson, Eldredge, and Winchester (2007) addresses the question of how much time is needed for SS in a 2007 study. According to that study “40 minutes of static stretching three times per week for 10 weeks increases flexibility, strength, endurance and power” (p. 1829). Given how my PE class is structured I could have the students perform up to ten minutes of stretching per week. I recognize that this is far

less than Kokkonen et al. (2007) suggests but it is a good chunk of my available class time. The review of the research literature will also guide how I use the ten minutes allocated to stretching in my PE classes.

For example, according to Behm and Chaouachi (2011) “the traditional warm-up was a three-step process involving an aerobic warm-up, static stretching followed by dynamic skill rehearsal activities” (p. 2644). Leon and Rana (2012) adds that “A properly structured dynamic stretching warm-up should be of adequate length to create benefits, but not cause fatigue prior to an event or workout” (p. 17). For my study, I am aiming to engage the students in a stretching routine that lasts approximately five minutes as I do not want to turn off my students to flexibility and stretching in the future. Five minutes seems like a fair amount of time given our current academic schedule and its limitations.

For my students, a five-minute in-class stretching routine will provide enough time to effectively take attendance. A five-minute in-class stretching routine will also provide my students enough time to stretch in a meaningful way. By that I mean my students will have time to relax, but not enough time for my students to get bored and space out. In my next section, I will discuss the effects of stretching with athletic activities.

Effects of Stretching

Another question explored in this review of the research is what are the benefits of stretching? According to Kokkonen et al. (2006) some studies have indicated that stretching may prevent injury. Other studies have indicated that stretching to prevent

injury has been only minimally beneficial. In some cases, “pre-event stretching also increases the chances for lowered maximal performance” (Kokkonen et al., 2007, p. 1825), in other words stretching may help or hinder athletic performance.

Parrott and Zhu, in 2013 stated that “stretching before activity has been a customary part of most Physical Education classes, with static stretching typically the preferred method due to its ease of implementation” (p. 395). Parrott and Zhu went on to explain that “Numerous espoused reasons exist for the pervasive role of static stretching in PE, including decreasing the risk of injury, improving athletic performance and improving flexibility” (2013, p. 397). Parrott and Zhu stated that “based upon the current research evidence, static stretching clearly does not significantly contribute to strength and performance” (2013, p. 399). Based on the work of Parrott (2013) it appears that the benefits of static stretching may not exist. Interestingly, Parrott (2013) also found that “increases in flexibility through static stretching can lead to undesirable effects. Muscles that are overstretched can lead to hypermobility or laxity at the joints” (p. 402). Overstretched muscles can be detrimental to fitness and performance.

In addition to Parrott and Zhu (2013) other researchers (Chatzopoulos, Yiannakos, Kotzamanidou and Bassa, 2015; Knudson; 1999) have also reported not finding desirable results with stretching implementation. In 2015, Chatzopoulos et al. found that “according to their results, prior static or dynamic stretching may not be required for best performance in typical activities of a physical education lesson” (p. 7). Supporting the work Chatzopoulos et al. (2015) is Knudson (1999) who also found that sadly, “there is lack of scientific evidence supporting the injury-preventing or performance benefits of

stretching during warm up for most activities” (p. 26). While there may not be the evidence to support stretching and injury-prevention or performance benefits according to “A British Journal of Sports Medicine study concluded that stretching produced an 8% reduction in the risk of muscle soreness during exercise” (Benefits of Stretching are Limited, 2009, p. 7). Contradicting the results of these researchers (Parrott and Zhu, 2013; Chatzopoulos et al., 2015; Knudson, 1999) is Samson, Button, Chaouachi and Behm (2012).

Samson et al. (2012) research did find that stretching had benefits. Samson found that “static stretching has superior results for improving static sit and reach Range of Motion (ROM)” (2012, p. 283). Warm ups that focus on static stretching, will improve static stretching fitness test performance. Even, Knudson (1999) who did not find scientific evidence supporting injury-prevention or performance benefits of stretching noted that performing a light dynamic warm up caused blood temperatures to rise and that the temperature increase led to less injury. Knudson also went on to mention that “stretching for most physical activities should be scheduled during the cool-down phase of a workout” (1999, p. 26). While the research on the benefits of stretching is mixed it is still a common practice.

Therefore stretching either before working out or after working out seems like it could be beneficial to some, but perhaps not all students. However, with so much conflicting information about the benefits of stretching, my question still lingers, “how do students describe their reaction to the PACER Fitness Test after a stretching

intervention?” My research will focus on the need to incorporate both static and dynamic stretching into my students’ daily warm up routine to achieve results.

In the next section, I will discuss the PACER fitness test (The Cooper Institute, 2014) and its role in determining cardiorespiratory endurance of the students. I will discuss fitness testing and how it relates to the students that I teach. I will point out how the FITNESSGRAM Fitness Tests differ from the Presidential Physical Fitness Tests. I will explore how the PACER (The Cooper Institute, 2014) it is implemented, students’ attitudes towards fitness testing and the effectiveness of the PACER as a valid, National fitness test.

Fitness Testing and Students

Like statewide performance tests in reading, math or science, the PACER fitness test (The Cooper Institute, 2014) is a dipstick to measure the cardiorespiratory endurance and fitness of each student. There are many reasons for Physical Education teachers to continue fitness testing while also making it a meaningful endeavor for students to engage in. Mercier, Phillips, and Silverman (2016) stated that “Fitness testing is a component of most high school physical education programs, and has been for more than 100 years” (p. 179). Fitness testing data has been maintained and scrutinized for many years. Mercier et al. (2016) goes on to mention that, Fitness test results are compared to normative data (national averages) as opposed to criterion standards that indicate an appropriate level for health benefits (p. 180). However, a question does remain, even with fitness testing being in place for over one hundred years should the practice remain unchanged. In next section, background information about fitness testing

and specifically, the PACER fitness test (The Cooper Institute, 2014) is described including how the test came about, how it is administered and the general ideas about the Fitnessgram PACER.

Fitness testing during the adolescent years is important to help students build fitness habits that will remain with them for a lifetime and because, according to Kane et al. (2010) “physical activity decreases during adolescence” (p. 1013). However, it is important that fitness testing does not create a negative attitude because as Stewart, Elliot, Boyce and Block (2005) points out that “negative attitudes (with fitness testing) often promote lifestyle choices that support participation in at-risk behaviors and ultimately lead to health problems” (p. 21) which is not the intended outcome. Given the long term benefits of engaging in physical activity from my perspective, fitness testing needs to be taught with excited positivity to give students reason to continue engaging in it after school and later on in their lives.

While I recognize that post high school aged students are probably not going to be fitness testing on a yearly basis as they did in their middle and high school years. However, it is possible that due to fitness testing, students will be more apt to participate in physical activity in their adult years and challenge themselves to be active and remain active throughout their adult lives.

If PE teachers can shape the students’ ideas about fitness during these developmental years, the rates of obesity and poor health effects could decline. Because “fitness indicators are closely related to health indicators, the goals of identifying fitness levels of children are still important” (Graser, Sampson, Pennington and Prusak, 2011, p.

175). Graser et al. (2011) also points out that “fitness testing in Physical Education classes still has value” (p. 175) and “Schools, teachers and students are in an era of outcomes-based education” (p. 175). As a PE teacher I see it as my responsibility to support my students in developing a positive attitude toward an active lifestyle.

Interestingly, Mercier et al. (2016) reports that, “teachers attitudes have the ability to affect students attitudes toward fitness testing and toward physical activity ultimately affecting the goal of lifelong physical activity” (p. 181). For me Mercier et al. (2016) research means that I can help to inspire my students to be physically active later in their lives and this is another reason why I support the idea of fitness testing as a valuable experience for my students. To promote a positive attitude toward fitness testing in my school we use The Fitnessgram PACER test (The Cooper Institute, 2014) that uses a different approach to fitness testing.

New Approach to Fitness Testing

The Fitnessgram PACER test (The Cooper Institute, 2014) is very different than the Presidential Physical Fitness Test, now the Presidential Youth Fitness Program. The Fitnessgram PACER test uses an approach where students are encouraged to log their fitness progress and try to get into their Healthy Fitness Zone. As part of the Fitnessgram PACER approach after their initial assessment, students are to come up with goals for fitness that are SMART goals. The goals are to be created together with families and teachers. With the Fitnessgram PACER test students are totally involved in the process and keep track of their progress.

Fitnessgram also recognizes that all students are different and therefore one “catch-all” national norm for fitness testing is not appropriate. Fitnessgram aims to help students realize their individual fitness goals and help them to reach their goals. Lifelong physical fitness is also one of their goals. As Graser et al. (2011) explained, “the primary purpose of the FITNESSGRAM is that students become self-sufficient with respect to personal fitness, able to test and then interpret their own results” (p. 176). In the Fitnessgram approach the teacher is there to help students investigate their results, but no penalty will be given for students who earn low achieving scores. Rather, if a student improves, this would be the optimal outcome for students that are taking the Fitnessgram. Students should not be graded on their fitness testing outcomes as well.

Teachers are encouraged with the Fitnessgram to have students pair up to conduct each of the tests. The aim with this practice (Ayers, 2010) is that students will feel more comfortable with a friend testing them and be able to focus more on the testing, rather than comparing themselves to peers around them. Ayers (2010) explained that, “teachers should minimize situations that involve large groups and limited privacy in which students must perform (compete) and be evaluated in front of peers and instead foster more opportunities for peer support and encouragement” (p. 8). The components of the PACER Fitness test also use a different approach in that it gets more difficult as it continues.

Specifically, Butterfield, Mason, Tu, Lehnhard and Schaper (2015) describes how in the PACER Fitness test, “Participants are cued to run 20-m laps at the sound of the beep. As the participants advanced through each level, they attempted to run faster to

keep pace with the beeps” (Butterfield, p. 632). This results in the PACER fitness test (The Cooper Institute, 2014) being one that progressively gets more difficult as it continues. If a student were to complete the whole test, it would take 21 minutes. As a Physical Education teacher, I have not seen this happen, but have had students that have ran for approximately 17 minutes. In my experience students enjoy this fitness test because it is a huge challenge that can be completed inside of a gym. As a teacher I love it, because it is easy to keep track of students’ progress and also help cheer them on in a small environment. Other students also get into the spirit and cheer on classmates as they finish. My observation is that as students make it to the end of the testing session they are truly proud of their accomplishments.

As a Physical Education teacher, my students run the PACER (The Cooper Institute, 2014) four times during the school year. The fall serves as their baseline PACER fitness score for the rest of the year. Depending on how they did in previous years at our school, after their fall PACER, they would make a new goal for the subsequent two PACER check ins. The final PACER fitness test would be conducted in the Spring with an emphasis on improvement from the Fall. As a teacher, I will sometimes run with my students to show them that even “old” people can stay fit. Some students are impressed with this effort.

Stewart (2005) supports my participation in the PACER test by saying that “being a good fitness role model is important because it will go a long way with students” (p. 22). For me, “going a long way with students” (Stewart et al., 2005, p. 22) may mean “walking the walk and talking the talk.” Growing up, some of my most memorable PE

teachers were those playing with my classes and able to participate to the fullest abilities at their ages. They were excellent role models. I find that students get a kick out of me as I try to do my best (on that day) when I am testing with my students. It is a humbling experience and shows the kids that I, as an adult, can still be physically fit and enjoy a healthy challenge. As a Physical Educator, it is my duty to “look the part” and to be a healthy role model to others. In the next section, I will discuss the possible link between physical fitness and academic success in school and how that affects the students of today and the adults of tomorrow.

Fitness and Academic Success

Physical activity and Physical Education have historically been present in our school systems. Chen, Kim and Gao (2014) described how “The national recommendation for engaging in moderate-to-vigorous physical activity (MVPA) during PE clarified that a minimum 50% of PE class time should be devoted to MVPA, but this recommendation has rarely been achieved in numerous PE programs” (p. 2). However, given that PE teachers responsibilities also including locker room supervision and the challenge of decreasing gym space for classes, time for MVPA has been decreased.

Given fluctuating factors such as inclement weather, band concerts, schoolwide testing, school assemblies and student photographs, MVPA can seem like a priority that has been placed on the back burner. Physical Education teachers must juggle poor weather conditions and other party’s desires to use our gymnasium space.

As student’s MVPA has been decreased, Rhea (2009) notes how it is an astonishingly sad fact that, “as children mature, they typically grow increasingly larger

(% body fat) and less physically active” (p. 3). The author continues that frighteningly, “the Centers for Disease Control and Prevention reports that being unfit as a youth highly correlates with being unfit as an adult” (p. 3). In other words the work of Rhea (2009) supports the idea that less activity time for children means larger children that lead to larger adults. In addition to the connections between fitness and a person’s health Hernandez (2014) describes links to between PE and students’ academic success.

Hernandez (2014) mentions that “Studies have shown that there is a direct relationship between school health and physical education and students’ academic success within and outside of school” (p. 8). Additionally, Punnoose (2012) explained that “regular participation in physical activity is linked to enhancement of brain function and cognition, thereby positively influencing academic performance” (p. 49). The evidence from these two studies does support the idea that students who regularly participate in physical activity also performed better on academic tests. Interestingly, Hernandez, (2014) describes how physical activity and healthy eating not only improve academic achievement and well-being, they also lead to decreased risks for obesity, chronic conditions (e.g.,osteoarthritis), and chronic diseases. While the research of Hernandez, (2014) and others does support the value of PE for overall health and academic achievement addressing the achievement gap in core academic classes has reduce time allocated for PE.

Rhea (2009) describes how due to the widening of the Achievement gap, greater need was placed on “core academic” classes in our schools. In fact according to Rhea (2009) the focus on core academic class has taken class time away from the Arts, Home

Economics classes, Industrial Technology classes and Physical Education classes to help students solely focus on core academics. One reason for this according to Rhea (2009) is “Why spend so much money on employing PE teachers when they could better spend the money to employ teachers in other disciplines so that ‘state test scores’ will increase” (p. 4). The decline in time for PE has been significant while the achievement gap is still present if not widening and researchers such as Efrat (2011) provide support that PE classes can support academic performance.

According Efrat (2011) “Evidence indicates that aerobic fitness is related to better working memory capacity in children” (p. 442). Working memory capacity can be correlated to a brain being better able to remember things. Efrat (2011) goes onto highlight, “Children with better working memory capacity, compared to their peers with poorer working memory capacity, are better able to process information, temporarily store information, shift attention and recall information” (p. 442). The work of researchers like Efrat (2011) does support that a link between physical activity and brain function is real and valid, i. e. active students can remember things better than stationary students.

The main cause of the increased memory ability thanks to physical activity has to do with potential cognitive and neurological mechanisms from increased blood flow to the brain and thus, neural activity. Quite simply, a body that is moving and active will have increased blood flow. The child will be less prone to falling asleep and more attentive during academic lessons. They will also be more likely to remember the information that had been presented to them.

The majority of the studies that I encountered while doing this research focused on the PACER fitness test (The Cooper Institute, 2014) and the academic success of the students. Srikanth, Petrie, Greenleaf and Martin (2015) found that “the number of PACER laps children ran, but not other measures of fitness (e.g number of sit-ups), was related to higher scores on state reading and math exams” (p. 368). Basically, the more PACER laps that a student ran, the better their scores on state reading and math exams.

This is exciting news for teachers, students and families to learn. By just engaging in physical activity, students’ academic scores increased, that is fantastic news for our educational system in the United States of America. The research of Bass, Brown, Laurson and Coleman (2013) also supports a link between exercise and academic achievement. Bass found that “aerobic capacity has the strongest relationship to academic achievement” (p. 835). Bass et al. (2013) research also focused on the added benefits of regular physical activity unrelated to academic achievement such as feelings of happiness, contentment and mental health.

Bass (2013) found that “regular exercise can lower stress, anxiety and depression, all of which can influence academic success” (p. 836). If, by participating in daily Physical Education stretching routines, students are more mentally ready for academic testing, that will be a side benefit to my study. My number one interest is bettering my student’s attitudes about the PACER (The Cooper Institute, 2014) in addition to preparing students for other academic testing opportunities. I am wondering if a student is more relaxed due to stretching activities, will perform better on the PACER fitness test and on other academic tests in his/her academic future.

The Decline of Physical Education

Between the years from 1991 and 2003, the National Association for Sport and Physical Education found that the portion of students attending PE daily dropped from 42% to 28%. According to Van Dusen, Kelder, Kohl, Ranjit and Perry (2011) sadly, “schools’ incentives are oriented to the results of standardized academic testing, due in part to the requirements of the No Child Left Behind Act” (p. 733). Now, more than ever, students are having to take statewide standardized tests throughout their school years. Time that was previously allotted to Physical Education class has fallen to the side of extra doses of math, science and reading in an effort to boost student scores on academic tests even though Srikanth et al. (2015) describes how “Being physically active and physically fit have been associated with improved academic performances in classroom grades and standardized achievement test scores” (p. 354). Bass et al. (2013) notes how “recommendations continue for reduction or elimination of PE” (p. 832). While fewer students participate in daily PE Wittberg, Northrup and Cottrel (2009) describes another astonishing fact - that “since 1980, the percentage of children who are overweight has more than doubled, while rates among adolescents have more than tripled” (p. 30). Minority children are more outwardly prone to the obesity epidemic.

Fattening, cheaper food sources are less nutritious and easily accessible and as Efrat (2011) notes “Obesity is particularly prevalent and is disproportionately higher among minority children” (p. 441). The fact is that children who eat calorie-laden, cheap, pre-packaged, pre-cooked food are more likely to become obese. They do not

have time with their families to engage in healthy physical fitness activities and do not see the benefit in participating in fitness activities.

Summary

In this chapter, background knowledge about stretching was analyzed. My question around students reactions to the PACER fitness test (The Cooper Institute, 2014) after stretching interventions guided my research. Different types of stretching were discussed with a focus on static and dynamic stretching exercises specifically. I explored the effects of stretching on the human body and if it helps or hinders athletic performance. The history of fitness testing in the United States of America was discussed and the new approaches to fitness testing was explored. Potential links between fitness and academic success were brought up. Finally, the decline of Physical Education in schools was also discussed. In the upcoming chapter, I will delve into the methodology of my research question of students reactions to the PACER fitness test after stretching interventions.

CHAPTER THREE

Methodology

Introduction

My professional goal to increase student's fitness levels and also help them relax throughout the school day is something that truly appeals to me as an educator. The need to increase students' fitness and physical activity levels throughout the day led me to my research question - How do students describe their reaction to the PACER Fitness Test after a stretching intervention?. As stretching has been a long standing pillar of "best practices" in Physical Education lessons, I have wondered if there is a connection between stretching and fitness test success. In this chapter, I will discuss the research design of my study, the who, what, when, why and how I chose to do this study with my Middle School students. I will delve into my research paradigm, human subjects committee requirements, setting and participants, procedures, baseline, post-intervention, data collection and summary of my findings.

Research Paradigm

One of the goals of my research is to discover how my students describe their reaction to the PACER fitness test (The Cooper Institute, 2014) after a stretching intervention. For this reason, my research design for this project uses a qualitative approach. I am choosing to use qualitative methods for two reasons. One, qualitative research design allows for no random sample data collection and is valid even if my sample size is small.

A second reason for using a qualitative approach is because my goal is to hear my students' own ideas about the PACER fitness test (The Cooper Institute, 2014) and how the experience could be impacted with the use of a stretching intervention. I also am choosing this method of data collection because I am curious about my student's preferences when it comes to fitness testing. Students will be able to truthfully speak about their experiences in PE class and have their voices be heard.

My qualitative approach will use a researcher created pre- and post- survey to explore my students' perceived confidence levels about taking the PACER fitness test (The Cooper Institute, 2014). Through the use of an electronic pre- and post- surveys, students will share their own feelings about the stretching intervention and if they believe that the stretching intervention had any effect on their PACER fitness test (The Cooper Institute, 2014) performance. I will examine the possible connection between stretching, pre-test confidence and fitness test performance. I hope to gain insights about how my students perceive fitness testing and if they felt like the stretching intervention was a worthwhile endeavor.

Procedures

Two surveys will be used in this research design, a pre-fitness test survey, and a post-fitness test survey. Both of the surveys were created by the researcher. Both pre-fitness test and post-fitness test surveys were not pilot tested. The pre-fitness test survey was used to collect baseline data regarding the participants perceived confidence levels. The post-fitness test survey will be used to explore the effects of the daily stretching routine on PACER fitness test (The Cooper Institute, 2014) performance and to

explore if students' perceived confidence levels about the test had changed after the stretching interventions.

Pre-fitness test survey: Students participating in the study will take a five question pre-fitness test survey that I created to gauge their perceived confidence levels. The survey will ask students questions about the PACER fitness test and their feelings around the fitness test. The survey uses the following 1-5 scale.

- 1 = Poor
- 2 = Fair
- 3 = Average
- 4 = Good
- 5 = Excellent

Questions that were on the survey include,

1. On a scale of 1-5, how familiar are you with the PACER fitness test?
2. On a scale of 1-5, how prepared do you feel like you are for the PACER test today?
3. On a scale of 1-5, how do you think that you will do today on the PACER?
4. On a scale of 1-5, how physically fit do you think you are?
5. On a scale of 1-5, how mentally prepared for the PACER do you think you are?

Students will be encouraged to be truthful with their answers and that the only person that would be seeing these surveys would be myself, their PE teacher. Students will complete this paper and pencil survey during PE class time using an iPad. It will take the students approximately five minutes to complete.

Post-fitness test survey. Students participating in the study will also complete a ten question pro-fitness test survey that I created. Five of the ten questions remained the same from the pre-test. Four additional 1-5 scaled questions were added as well as one opened question. The survey will ask students questions to determine how they described the value of our daily stretching routines and if they believed that the relaxation part of stretching could have benefits in other avenues of their educational experience. I also will ask them if they liked the attendance/stretching routine and if they would like to see it continued in the following years. Questions that were on the post- survey include:

1. On a scale of 1-5, how familiar are you with the PACER fitness test?
2. On a scale of 1-5, how prepared do you feel like you are for the PACER test today?
3. On a scale of 1-5, how do you think that you will do today on the PACER?
4. On a scale of 1-5, how physically fit do you think you are?
5. On a scale of 1-5, how mentally prepared for the PACER do you think you are?
6. On a scale of 1-5, did you find value in our daily stretching routines?
7. On a scale of 1-5, do you believe that the relaxation part of stretching could have benefits in other parts of your educational experience?
8. On a scale of 1-5, did you like the attendance/stretching routine?
9. On a scale of 1-5, would like to see the attendance/stretching routine continued in PE class?
10. Any other thoughts, suggestions or remarks about stretching during attendance time or the PACER fitness test?

PACER fitness test. Students participated in the PACER fitness test (The Cooper Institute, 2014) and scores were recorded in a spreadsheet (Excel or Google Sheets). Students will be assigned a “testing partner” that kept track of their friend’s progress on the PACER and their final score on the PACER. This practice was meant to minimize risk and scary feelings toward fitness testing. As students finish the test, my PE teaching colleagues assisted in helping students exit the testing area by stopping by their teacher’s desk to record their scores. The teacher would encourage students to do their best and keep to the PACER test protocol. Students will verbally tell their scores to their teacher, record their scores on their own fitness tracker card and go back to the sidelines of the gyms to cool down and/or get a drink of water to recover from the test.

After the fall fitness testing season, students participating in my study will begin learning and doing a variety of static and dynamic stretches each day that they have PE class. Students will practice these stretches before doing them in their routine order. Music will also be played during daily stretching time. Students will be encouraged to take off their shoes to get more comfortable. The whole routine will take less than three minutes of PE class time.

After two weeks of the teacher leading the stretching routine, student volunteers will lead the stretching routine during attendance taking time. In accordance with the Developmental Designs protocol that our Middle School follows, this stretching routine will empower students to take hold of their own learning and provide an opportunity to lead a group of students as they work on their own flexibility.

During the end of the year PACER (The Cooper Institute, 2014) check in, students will again take their perceived confidence level survey and PACER fitness test scores will be recorded in the spreadsheet. Students will continue stretching after the end-of-the-year PACER fitness test.

Data Analyses

Data analyses for the entire sample included investigating the mean, median, and mode for the entire sample for both the pre- and post student surveys and quantitative PACER fitness test data. Growth between the baseline pre-tests and surveys as well as the post-intervention tests and surveys was calculated.

A post-survey open-ended question aimed to gain insights from my students about their attitudes around this intervention. The question was posed to get students thinking about the effectiveness of this intervention. The question read as follows:

“Any other thoughts, suggestions or remarks about stretching during attendance time or the PACER fitness test?”

To collect data around this open-ended question on the post survey, a spreadsheet of student answers was created. If students saw value in stretching and relaxation, or if they did not, their answers were recorded.

Human Subjects Committee Requirements

In accordance with Human Subjects Committee Requirements, I obtained written permission from my Principal and Department Head for my research study. In March 2018 my Human Subject application was approved by the Hamline University Institutional Review Board (IRB). Following IRB approval a paper student and parental

consent letter detailing the extent of my study was sent home, allowing any of my students to opt out if they wished. To ensure data privacy and confidentiality of my students, only my student ID numbers were used to identify them in my study and also did not include their full names anywhere in my spreadsheets.

When students check their PACER fitness test (The Cooper Institute, 2014) scores, they also viewed their scores with their student ID number to again be cautious about their anonymity. During the reporting of PACER scores students could see other student's ID numbers and their scores, but not their names.

As with any type of physical activity, risks of injury are omnipresent. To reduce the risk of injury during PE safety was talked about daily in my classes. Safely taking the PACER fitness test was also discussed. Students were encouraged to run in a straight line and run as long as possible, without feeling like they are going to be sick or pass out. If students felt this way, they were encouraged to stop testing and ask for assistance from others. Students also have discussions about safety and being able to play safely in defined area.

Proper stretching techniques were also discussed. For example, if you stretch too far, there is a risk of hyperextension. Students were instructed to only stretch until they feel discomfort and to not go farther than that discomfort. Students were taught not to stretch to discomfort because doing so had the potential to cause them bodily injury.

Potential benefits of this study included increased Range of Motion (ROM), increased PACER fitness test performance and increased confidence in test taking abilities. One of my long term goals was that by teaching the students stretching as

relaxation, this practice could help them in other avenues of their education (in other classes) although no data was collected to determine if this goal was met.

As a Physical Educator, this study has the potential to impact historical daily stretching warm up activities like stretching. If there is a link between stretching and performance, Physical Educators will have incentives to keep or add stretching to their classroom daily warm up routines. If there is not a benefit, teachers will know that stretching during class time does not have performance benefits and other activities may be a better use of precious activity time.

Setting and Participants

This study utilizes the school that I am currently working at. The school is a suburban/urban mix school in the upper midwest. Students are mostly from the community of the school, but some students are bussed in from neighboring urban school districts. Some students have open enrolled, but most are from our district.

Because of this mix of students, the racial makeup of our school is quite diverse. In the classes involved in my study, approximately 45% of students are Black, 30% are White, 10% are Hispanic and 5% are Asian/Pacific Islander/Native American. Thirty percent of our students qualify for free and reduced lunches. Our school is also working to increase our racial equity and understanding of other cultures. Students frequently talk about their race and how that impacts their learning at school.

A total pool of 215 students could have participated in this study. However, only 47 students had parents/guardians return the informed consent form. From the pool of 47

only 45 students did the Pre- Survey and only 37 students completed the Post- Survey. Students of all academic abilities are enrolled in regular Physical Education classes.

I also had students that qualified for Special Education classes mainstreamed into my regular PE class. The Special Education students may also be enrolled in Developmentally Appropriate Physical Education class with our DAPE PE specialist. With respect to the genders of my students, there are approximately 50% boys and 50% girls enrolled in my classes.

The PE classes meet two times per week for a total of 135 minutes. The school uses a modified block schedule. Mondays, Tuesdays and Fridays are regular seven period days while Wednesdays and Thursdays are four period block days. Each week is either an "A" week or "B" week. It is interesting to note that with this schedule, if I see a class on Wednesday block day, I will not see them again until the following Tuesday. Due to students changing in the PE locker room, total instruction time for my students is only 105 minutes per week.

Data Collection

Both Pre- and Post- Surveys were available to students on Google Forms. A link to the surveys was added to each course page on Schoology which students accessed with iPads. Schoology is a web-based class homework/information platform website that the students have access to and know how to use. Students simply filled out the surveys and analysis was able to begin. Baseline data was assessed for calculated averages for pre- and post- intervention student surveys. Mean, Median, Mode and Frequencies were calculated.

Limitations of the Research Design

There are limitations with any research design. I had 47 students for my study. Due to various reasons with scheduling, illness or technology, 45 students did the Pre-Survey and only 37 students completed the Post- Survey.

At the last minute, I decided to delete my first initial question asking students on the Pre- Survey about their names. Due to this snafu, I did not collect the student's names for the Pre-intervention Survey. This was a mistake. I corrected the error on the Post- intervention survey, due to not having names for the Pre-Intervention, this made data analysis a bit of a challenge. As a teacher researcher, I realize that this was a mistake in my research methodology. When I do research in the future, I will be sure to include students' names.

Other qualitative research design limitations include students that are not equally articulate and perceptive when it comes to writing or sharing their thoughts and ideas in a survey. Some students may not have understood questions in the surveys. They may have been too embarrassed to ask for help.

Some students may also have hastily completed their surveys because they wanted to go play outside or participate in other Physical Education activities that we had planned for the day. Although I encouraged my students to be thorough in their responses, sometimes students just want to be done!

Summary

I work in a suburban school with a student population from urban areas. Student fitness test scores have been stagnant or slightly improving from fall to spring data. The

need is to increase PACER test (The Cooper Institute, 2014) scores and also increase student confidence in their abilities to fitness test as well as test academically.

Some students are also frustrated that their fitness testing scores were not improving and frustrated with the current testing procedure. Qualitative data from the Pre- and Post- intervention surveys and fitness test was collected and analyzed. A stretching intervention routine was implemented and performed daily by Physical Education students. The intervention will be performed for three minutes each class period. Post-intervention surveys was analyzed and compared to Pre- intervention survey data.

In Chapter Four, the outcomes of my study will be shared and explained. The results will be related back to the research and literature that initially guided my research and then applied to how the findings might affect future teaching practices in the Physical Education field.

CHAPTER FOUR

Results

Introduction

The focus of this capstone was students reactions to the PACER fitness (The Cooper Institute, 2014) test after stretching interventions. The capstone question: what are students reactions to the PACER fitness test after stretching interventions was explored. In this chapter, results of the research will be delved into and investigated.

The chapter will begin with the Pre- intervention survey results, then move into the Post- intervention survey results. Links to the literature around stretching and fitness testing will be explored. Finally, big takeaways for Physical Education teachers will be shared.

Pre-Intervention Survey Results

In spring 2018 as students began to return their parental consent letters to me for this study, I could see that their personal interest was piqued. I fielded many questions about how one obtains a Masters' in Education and what specifically was a Capstone. Interestingly, there were many students that were surprised that a Physical Education teacher would choose to get their Masters' in the first place. Perhaps students need more information and education around the options of higher education.

Either way, my students were interested in the study and why I chose to specify stretching and fitness testing as the pillars of my research. I told them about my personal experiences around flexibility and how I wondered if stretching could affect PACER fitness test (The Cooper Institute, 2014) outcomes. We also discussed as a class that due

to various school assemblies, concerts or school parties, some classes would receive less time to do their interventions. We discussed that the results, no matter if they advocated for more stretching or no stretching at all, the results would speak their truth.

For the Pre-intervention, a total of 45 participants were able to take the online survey. The survey took each student approximately five minutes to complete. Students reported that they were familiar with how to complete a Google Form survey and were easily able to navigate the survey. The Pre-intervention survey focused on gathering background information regarding my student's beliefs and their own knowledge of the PACER fitness tests (The Cooper Institute, 2014), how physically fit they believed themselves to be and how they predicted that they would do on the PACER fitness test. There was also a question about mental preparedness around the PACER fitness test.

The analyses of the pre-intervention survey documented my students also reported that on a scale of three (neutral) to five (high agreement) that an astonishing 95% of students were familiar with the PACER (The Cooper Institute, 2014) with students scoring themselves a three, four, or five on the survey. Interestingly, only 88% of students reported that they felt prepared for the PACER with students scoring themselves a three, four, or five on the survey. This data suggests that students understand what the PACER is more than they feel prepared to take the test.

On the pre-intervention survey my students also reported that on a scale of three to five (with five being extremely physically fit), 80% of students believe that they are physically fit. Even though students may have different ideas around what it means to be

physically fit, they chose to self-select either a three, four, or a five for their survey question.

When it came to students predicting how they would do on the PACER fitness test (The Cooper Institute, 2014), students that scored a three, four, or five reported at 86%. Students also reported about their mental preparedness. Again, students that scored a three, four, or five reported slightly lower at 82%. The pre-intervention survey results are summarized in Table 1.

Table 1. Pre-intervention survey analyses (45 participants)

Pre- Intervention Questions:	1 & 2 Low Agreement	3 Neutral Agreement	4 & 5 High Agreement	Number of 3, 4 & 5s	Percent of 3, 4 & 5s
1. Familiar with PACER?	2	0	43	43/45	95%
2. Prepared for PACER?	5	12	28	40/45	88%
3. Physically fit?	7	11	25	36/45	80%
4. How you will do?	6	14	25	39/45	86%
5. Mentally prepared?	8	12	25	37/45	82%

Analyses of the Pre-intervention data indicate that students' mental preparedness for participating in the PACER test (The Cooper Institute, 2014) was reported at the lowest percentages of all survey questions. Even though students are always warned about an upcoming PACER fitness test, my assumption is that some students naturally forget it and are surprised by having to participate in fitness testing.

The analyses of the survey data also supports that my students feel more confident and positive about their own personal physical fitness and how they will do on the PACER fitness test (The Cooper Institute, 2014) than on their own mental preparedness. This suggests to me there is room for improvement on the mental preparedness side of the PACER fitness test. Even though students believe that they are physically ready to run the PACER, mentally, they are not as confident in their abilities.

After the Pre-intervention survey was completed, the students participated in the daily stretching intervention each time that they had Physical Education class. For approximately three minutes during attendance, students would relax and stretch. Students participated in this intervention for approximately six weeks (April - June 2018). Following the sixth week of the intervention, it was time for the students to take the Post-intervention survey and to run the PACER fitness test (The Cooper Institute, 2014) for the final time of the year.

Post-Intervention Survey Results

During the time between the Pre-intervention to the Post-intervention, my students were participating in the daily stretching intervention warm up routine as attendance was being taken. The daily stretching intervention invited students to participate in various static and dynamic stretches at the beginning of class for approximately three to five minutes as attendance was being taken. Some students embraced the stretching, while others grumbled and whined.

When students would enter the gymnasium for attendance, I would announce that we need to do our stretching before class can begin. Some students would perk up, smile

and physically clap their hands with excitement. Other students, upon hearing the announcement, would roll their eyes and vocally groan as we stretched together. The vastness of the response to stretching was somewhat amusing to observe. As students stretched, I encouraged them to focus on their breathing, stay quiet and think positive thoughts about their day. I instructed them that this was to be a quiet part of their day where they could let go and take three minutes for themselves. The focus was on personal relaxation and working on their flexibility.

At the beginning of the intervention, students were more eager to participate in it. The Spring of 2018 in the state where the school is located was a particularly cruel one. An April 14 blizzard dumped seventeen inches of snow on the ground. Physical Education classes were held indoors until practically the first week of May. As the first week of May, and the spring season finally came, the students were less eager to do the intervention and would have preferred to get to the meat of our lesson together. Two factors could have influence students interest in the intervention.

One was given the late arrival of spring my students were just eager to get outside to participate in our lesson. A second factor could be that during this time students are also engaged in mandatory state exams required by No Child Left Behind (NCLB) legislation. It is possible that the require testing period in late spring causes the student's to be burned out. Taken together these two factors could have also affected their willingness to participate in the intervention. The implementation of the intervention could also have influenced the results.

For example, if I forgot to do the daily intervention, students were instructed to remind me, and some of them did. I would guess that the students who reminded me about the intervention were one, either students that enjoyed doing the stretching and two, students who wanted to please their teachers. It is also meaningful to point out that due to various school assemblies, concerts or school parties, some classes received less time to do their interventions. Those interventions could not be made up, but their information was still included in the study.

Results from this Post-intervention survey tell many stories. When I compared the Pre-intervention survey to the Post-intervention survey, some trends emerge. Thirty-seven students completed the Post-intervention survey. Fewer students completed the post-intervention survey because of absences and field trips.

Beginning with the familiarity that students have with the PACER fitness test (The Cooper Institute, 2014) , the Post-Intervention survey indicated that 100% of the students who completed it are familiar with the PACER. This is an increase of five percent (95%) from the Pre- intervention survey results. Interestingly, on the Post-intervention survey only 83% of students felt prepared for the PACER fitness test as compared to 88% from the pre-survey. As an educator, I hypothesise that the decrease observed in student preparedness for the PACER test was related to the end of the school year. At the end of the school year many of my students may have been bogged down with other summative assessments and had forgotten about the PACER fitness test date. While reminders were posted on Schoology, the learning management system used at my

school, and verbally communicated with students some students actually forgot about the upcoming testing.

My students beliefs about their own physical fitness showed increases from the Pre-intervention survey. In the Post-intervention survey, 89% of respondents scored themselves a three, four, or five for being physically fit as compared to 80% from the pre-survey This change could be due to the amount of time spent participating in Physical Education activities outdoors in the springtime. In the Spring, the gym classes I teach are able to have more space to run and participate in longer warm up activities that involve running. This may have added to the additional surge in physical fitness of students.

When students were asked to predict how they would do on the PACER (The Cooper Institute, 2014) on the Post-intervention survey, 89% of students predicted that they would score themselves a three, four, or five. This is an increase of three percentage points (86% pre to 89% post) when compared with the number of students scoring themselves as a three, four or five on Pre- intervention survey results of 86%. On the other hand, mental preparedness of students did decrease from the Pre- to the Post-intervention by 1% with only 81% of respondents scored themselves a three, four, or five on the post survey. Table 2 summarizes the Post-Intervention Survey Analyses.

Table 2. Post-Intervention Survey Analyses (37 participants)

Post- Intervention Questions:	1 & 2 Low Agreement	3 Neutral Agreement	4 & 5 High Agreement	Number of 3, 4 & 5s	Percent of 3, 4 & 5s
1. Familiar with PACER?	0	0	37	37/37	100%
2. Prepared for	6	9	22	31/37	83%

PACER?					
3. Physically fit?	4	11	22	33/37	89%
4. How you will do?	4	13	20	33/37	89%
5. Mentally prepared?	6	13	17	30/37	81%
6. Value in stretching?	7	14	16	30/37	81%
7. Benefits of stretching?	4	10	23	33/37	89%
8. Did you like stretching?	7	16	13	29/37	78%
9. Stretching continued in PE?	8	14	15	29/37	78%

The final four questions on the Post- intervention survey were questions about the value of stretching, the benefits of stretching, if the student liked stretching and if they would recommend that stretching be continued in other PE classes. With all four questions, students responded positively. Highest of all questions was about the benefits of stretching.

Eighty-nine percent of students scored themselves a three, four, or five on the question about benefits of stretching. When students were asked if this stretching intervention should continue in PE class, seventy-eight percent of respondents scored themselves a three, four, or five. My interpretation of the post-survey results is that the students from this sample believe that stretching during PE class was valuable and a good use of time. Based on the pre- and post-survey and the percentage of students that took the surveys, twenty percent of my 215 students, I conclude that the students that participated in this study and completed the surveys view stretching as a positive activity.

The other eighty percent of my students that did participate in the daily stretching intervention willingly participated with the class and did not voice any overly hesitant or hateful views about the intervention.

As the technical aspects of doing this research could be helpful to Physical Education teachers, students had lots of suggestions from Question 10 on the Post-intervention survey. Question 10 asked students to share any other thoughts, ideas or suggestions about daily stretching or the PACER fitness test.

Suggestions from Students

One of the differences from the Pre-intervention survey and the Post-intervention survey was that the last question on the Post-intervention survey asked the students for their thoughts, suggestions, and ideas about daily stretching or the PACER fitness test (The Cooper Institute, 2014)? The purpose of including an open-response question on the post-survey was to invite my students to voice their opinions about stretching. Fifteen out of the thirty-seven students that completed the Post-intervention survey wrote insightful and useful feedback for me as a teacher. Some students simply wrote, “nope” as their response for Question 10, but others produced delightful suggestions. For me as an educator, this last question yielded the most valuable information.

Clearly, some students did not take the question seriously and were sarcastic in their response. An example of a student’s response that was sarcastic was, “Never do the PACER again. Who thought this would ever be a good idea?” Another student wrote in Question 10, “Nope Ms. Hagen leads a decent class not terrible but not amazing.” Some students simply wrote, “no” or “nope” to Question 10. Others, though, had a lot to say

about the PACER (The Cooper Institute, 2014) and about stretching in general and this was awesome feedback to receive as a teacher. Some of the most helpful feedback will be highlighted below.

I enjoyed the students' frankness and ability to communicate their side of the story. They had a chance to speak their truth and their words were beautiful. One student stated that, "Stretching is good. I think it helps while running the pacer and afterwards too." Another student stated that,

I like stretching and relaxation, but the way we did it in gym class this year was stupid, in my opinion. We stretched before class and we should have stretched after class. Before class, our muscles are cold. It's dangerous and not as effective to stretch with cold muscles. Plus, Ms. Hagen didn't enforce the stretching very much, so a lot of people were just sitting around, not stretching, and they didn't get redirected.

As a teacher, it was interesting to see how some students embraced the stretching, while others clearly did not want anything to do with it. Student motivation in Physical Education can be difficult at times, and it was interesting to see this student's opinion.

One student remarked that, "I think it (the stretching) helped us relax." As a researcher, I was interested to hear if students believed that the stretching helped relax them. For this student, he or she seemed to have been more relaxed after stretching.

Every student that submitted the Post-intervention survey had the opportunity to speak their truth. Students that wanted to voice their opinions did, others simply wrote, "no" to the question. With open-ended response questions, it was a challenge to get the

my students to write more. As a researcher and teacher it is clear that getting students to write thoughtful and wordier responses would have been helpful to improve my practice.

With the physical data collected and student's voices heard with their suggestions, it is important to link the results of the research to other works of literature. Does what I observed jive with previously written works of literature?

Links to the Literature

As there are challenges with every research study, one of the biggest hurdles of my study was the amount of time given for students to stretch on a daily basis.

Kokkonen, Nelson, Eldredge and Winchester (2007) would agree and states, "40 minutes of static stretching three times per week for 10 weeks increases flexibility, strength, endurance and power" (p. 1829). It is important to point out that my study did not allow students to stretch for 40 minutes three times per week. My students did stretch for five minutes, two times per week. That is much lower than the prescribed amounts of Kokkonen et al. (2007).

Another way to increase the amount of stretch time during class would be to stretch before and after class as was suggested by some of my students on their Post-intervention surveys. The students suggesting stretching before and after class predicted that it could have improved their PACER fitness test scores (The Cooper Institute, 2014). Interestingly, Parrott and Zhu (2013) stated that "stretching before activity has been a customary part of most Physical Education classes, with static stretching typically the preferred method due to its ease of implementation" (p. 395). Static stretching did prove to be easier to implement than Dynamic stretching simply because students were able to

stay in our area together and stay more focused on stretching. Having other students lead stretching also allowed me to take attendance in a quicker fashion.

When the PACER fitness test (The Cooper Institute, 2014) was performed, the test was done by just our class alone. By asking my classes informally, they told me that they would prefer to do the PACER fitness test with our class alone. In years past, multiple Physical Education classes would do the PACER at the same time. Ayers (2010) agrees that, “teachers should minimize situations that involve large groups and limited privacy in which students must perform (compete) and be evaluated in front of peers and instead foster more opportunities for peer support and encouragement” (p. 8). Students in my class had ample opportunities to cheer on other students as they participated in the fitness test. As a teacher, my attention could fully be on them as they tested as well.

One thing that would be hard to gauge would be if stretching daily could produce positive academic outcomes in other classes. Punnoose (2012) explained that “regular participation in physical activity is linked to enhancement of brain function and cognition, thereby positively influencing academic performance” (p. 49). During the time of implementation of this research study, the study participants were completing their state-wide comprehension tests. It is hard to say if the stretching interventions aided or hindered their academic performance. Due to my students limited two times of Physical Education class each week, I ponder if there could be any progress seen in the areas of stretching and academic performance.

From this study, one of my goals was to provide information to fellow Physical Education teachers about the potential value of stretching during Physical Education

class. What can be gleaned from this study and what are the big “ah ha” moments. In the next section, I will explain some of the big takeaways from this research.

Recommendations for Physical Education Teachers Interested in Conducting Classroom Based Research

Through this Capstone research process, I have learned many things that will be beneficial to me in the future when I do further research with my students. One thing that I have learned is that a bigger sample size needed for this kind of research. Of the 45 students that originally signed up for my survey, only 37 were able to complete both Pre- and Post- intervention surveys.

Another important point it to make sure that you include student names in your surveys. My Pre-intervention survey did not have a question where students put in their names. This oopsie caused me to not be able to do the in-depth research comparisons that I was hoping to do. On the Post- intervention survey, I did correct the problem, but the damage was already done. I could not glean the information that I wanted to from the data that I collected. It was too late.

Another thing to keep in mind is that students do not mind stretching for short amounts of time, but need more time to do a proper intervention. Many of my students encouraged other classmates to participate and keep stretching. If we could stretch before and after each class, a routine would also be built. In my experience working with middle school students, if students know what is coming and it is predictable for them, they will be more likely to participate in the intervention. Maybe with more background information, students would have participated more willingly and heartily. Interestingly,

many of my students are vocal about preferring to have PE class more than two times per week. If more time was allocated for my PE classes that would increase the time available for stretching and potentially bringing about more tangible results. The results would be more valid and accurate.

Something that is not surprising to me is that my students have mixed views about the PACER fitness test (The Cooper Institute, 2014). Some students really enjoy the challenge of the PACER while others loathe its existence. Some students do respond better to the test when they are encouraged to challenge themselves on the PACER fitness test rather than have a set number that they must reach. The freedom from saying, “you must make 50 PACERs to get an A” really liberates some students and gives them the permission to try their best on a very difficult test. Not every child is capable of getting 50 PACERs, and that is okay. If every child is challenged to do their best, hopefully they will be gaining good feelings about physical activity and exercise as they move into their adult years.

Finally, the last big takeaway that I would like to explore is that students like to share their ideas and suggestions about teaching practices. When the Post- intervention question number 10 was added to the survey, I was hopeful that I would get a few good responses. Question 10 stated, “Any other thoughts, ideas or suggestions about daily stretching or the PACER fitness test?” The fact was that some of my students wanted to make their voice heard and I provided them an excellent platform to voice their opinion. One way that teachers could get more responses to open-ended questions may be to

interview students rather than force them to type up their responses. Students that may not be the best writers may be embarrassed and not write what they want to say.

In the Chapter Five, I will conclude my thoughts around students reactions to the PACER fitness test after stretching interventions. I will provide background for my writing and share about how the Capstone process went for me as a whole. I will revisit my Literature Review as well as discuss implementation limitations to my study.

CHAPTER FIVE

Conclusion

Introduction

In this final chapter, I will conclude about my research around students reactions to the PACER fitness test after stretching interventions and my capstone question, what are students reactions to the PACER fitness test after stretching interventions? I will delve into my biggest learning of the research results, discuss the potential significance of the research results for Physical Education teachers, consider limitations to my research design, give recommendations for future research and provide a self reflection of the researcher.

Biggest Learning of Research Results

As a Physical Education teacher, I am always looking for ways to maximize the effectiveness of my lessons and help those students who struggle to see the value of physical activity in any form. In my experience there are always some middle school students who do not know how physical activity can benefit them in other ways than by the game that we are playing on that day. Structuring my PE classes to make explicit to my students the link between physical activity and academic learning is a powerful tool to have in my toolbox. My research results around students attitudes around the PACER fitness test after a stretching intervention gave me many things to ponder.

After conducting my research, a few vital pieces of information came to the forefront of my thoughts. When comparing the Pre- to the Post-Intervention survey data,

my students felt like they would do better on the PACER test after participating in the stretching interventions. Although the data went from eighty-six percent in the Pre-intervention survey, to eighty-nine percent in the Post-Intervention survey, this data was significant to me as an educator. My interpretation of this increase was that my students felt like the stretching interventions would help them do better on the PACER fitness test.

Interestingly, students reported less favorable results around being mentally prepared for the PACER after doing the stretching interventions. The pre-intervention data came in at eighty-two percent, and the post-intervention data came in at just eighty-one percent for this question. The students results to this question came as a surprise to me, as I thought that the students may feel more mentally prepared for the PACER perhaps due to some mental relaxation or confidence that they gained from doing the stretching intervention.

Another big learning point for me as a teacher were the questions about the students seeing value in stretching and potentially seeing stretching continued in other Physical Education classes in the future. The post-intervention data concluded that eighty-one percent of students see value in stretching and that seventy-eight percent would like to see stretching continued. The students that participated in the surveys felt like they saw value in stretching and would like to see it continued.

The biggest “ah ha” moment that I experienced were the students answers to question 10 in the Post-intervention. Question 10 asked students for any other thoughts, ideas or suggestions about daily stretching or the PACER fitness test. Students certainly

had lots of other ideas around the PACER fitness test, stretching, and Physical Education class in general. To be able to quickly have a way to gather the information thanks to a handy Google Form was also greatly appreciated. Data collection truly was made much easier thanks to Google Form. Most importantly, Question 10 allowed students to speak their truth and to let their voices be heard. I appreciated the thoughtfulness of their responses and of their honesty when answering the open-ended question.

Because stretching during Physical Education class does take up a small chunk of valuable class time, it is important to point out how this research may be significant to other PE teachers and to their students.

Potential Significance of the Research Results for Physical Education Teachers

Sometimes, the benefits of physical activity are not immediately seen, but felt. Getting that “runner’s high” after completing a fun jog around the school or participating in relaxing stretches before class could help students somewhere down their road of life in the future.

Other PE teachers may still question if stretching during class time is worth the extra time and bother. They may say that not enough research exists to warrant the use of stretching on a daily basis. My data suggests that stretching could help some students be ready for the PACER fitness test. This research also indicates that students like to be able to voice their own opinions about testing and class activities. Students want to know why they are doing fitness testing and why they are learning certain skills in Physical Education class. Having students take the pre- and post-intervention surveys allowed

students the time to let their feelings be known and it made them feel like they had a say-so in their Physical Education class.

I believe that infusing more formative surveys into class time would be a positive thing for students in any Physical Education class. With the ease of technology guiding our way, educators can quickly create a meaningful survey that communicates what still needs to be taught in our classrooms. Students would have many opportunities to reflect meaningfully about their experiences and have a platform to voice their oppositions to activities.

Organizationally, as a PE teacher, I love that Google Form surveys are paperless. I have 215 students that I see two times each week. To keep track of their formative assessment and summative assessment papers can be quite a challenge. Being paperless, these forms of surveys have their positive aspects with teachers on the go, like Physical Education teachers are.

The first time that you create a proper intervention and survey for students, there are bound to be some hiccups. My capstone research was the first time that I created Google Form surveys and the first time that I attempted to do an intervention with all of my students. I learned many things from this research process.

Limitations to the Research Design

I believe that we are constantly learning from our experiences that we encounter throughout our lives. After completing my research, I found myself reflecting on the positives and the negatives about my journey. If I would do more research around

stretching in Physical Education classes, I would address the following issues with my research design.

The first concern with my research would be the number of students that were participating in my research. I had forty-five students out of two-hundred-fifteen take the pre-intervention survey and only thirty-seven students out of two-hundred-fifteen take the post-intervention survey. Because my parental consent forms were mailed out to families, some students stated to me that they never received my letter. The family may have moved and not changed their address. I did give those students new copies of the letter of consent, but very few of those students brought their signed paperwork back to me. Students also had to remember to bring in their signed paperwork to school and give it to me. This was a challenge for some students. Even with reminders posted on Schoology and during class time, students simply forgot to turn in the paperwork.

A second limitation to my research design may be the amount of time that was actually used for the intervention. Being that I only see my students two times per week, I question if six weeks was enough time to properly allocate to stretching before PE class. If my students would have had more time to stretch, would their PACER fitness test scores be different? Would they feel like they were more prepared or mentally ready for the test?

A third limitation to my research design would be not allowing more students to lead the intervention stretches. Some classes had some students lead the stretching, but most were led by me. It was my hope to hand off the leading stretches part of the intervention to other students, but not many students volunteered to be lead stretchers.

A final limitation to my research design was that my repertoire of stretches for the intervention was pretty predictable, and some students might even say that it was boring. If there was more variety in stretches or maybe we learned three new stretches each class period, students would not feel as bored. Perhaps I would have more student buy-in if they were more challenged with the stretching.

Knowing the limitations to my research leads me to my final thoughts about recommendations for future research and how would I do things differently in the future.

Recommendations for Future Research

Further investigations around stretching interventions could be helpful in determining its validity and worthwhileness in Physical Education class. The following recommendations and information may prove to be helpful if you are doing this kind of research in the future.

Involve many students in your research as possible. To help your research numbers increase, perhaps introduce your research to your parents and students early in the year. Inform them early about what you plan on trying via email or Schoology. Providing parental consent paperwork during parent/student/teacher conferences in the Fall may also increase the amount of students participating in your study. If you meet with a parent, you will have the opportunity to talk about your research with them and they might be more apt to sign off on your research.

Another recommendation of mine would be to increase the intervention time. Six weeks may be enough time if you see your students every day, but with classes that only

meet twice per week, I question if that is an adequate amount of time for a proper research study.

Along with increasing the intervention time, perhaps allow more students to lead stretches and provide a sign-up sheet for them. By creating this sign-up sheet, students will know when they will be leading and can mentally prepare for the opportunity. Also, posting this sign-up sheet on Schoology could also be a wonderful opportunity to inform parents of your research. Maybe parents could also help remind students of their upcoming leadership time?

My research around students reactions to the PACER fitness test after stretching interventions may have been different if I would have had my students stretch before class and after class. My research intervention had students stretching before class only. Several students remarked that perhaps we should be stretching before and after activity. That might be another intervention to investigate.

Most importantly, I believe that formative surveys have great value in education. I do believe that numeric surveys, like my pre- and post-intervention surveys that mainly focus on answering questions by numbers one through five may not be as helpful to teachers as open-ended survey questions. These open-ended questions allow students to voice their opinions and share their feelings more clearly and precisely than with numbers. Teachers can gain more information from authentic student responses rather than numbers. When I do more surveys in the future, I will ask more open-ended questions of my students to increase their thinking and level of reflections.

As a teacher-researcher, during the research Capstone process, I learned not only about how to navigate the realms of academic research, but I also learned how to cultivate new ideas about myself and the ways in which I learn best.

Self Reflection of Researcher

When I started taking Masters classes at Hamline University in 2010, many things were different in my life than they are today. In the eight years that I have been pursuing my Masters, I have gained a husband, lost a father, taught at two schools, purchased a house and gotten a dog and a cat. Gone are the days of dancing until 3AM and changing apartments every nine months just because I feel like it. My life is much more stable and grounded in 2018 than it was in 2010.

Through this eight year process, I have learned some things about myself as a learner. I discovered that I very much enjoy taking graduate level classes. I like interacting with humans face-to-face rather than online. I learned that going at your own pace with your higher education is a must and that deadlines need to be set. I also have learned to not be as hard on myself for not meeting deadlines. I have learned that I am my harshest critic.

Specifically about my research, I learned that you should not switch survey questions at the last minute, even if you think that it may be a good idea. My pre-intervention survey did not include student's names because of this mistake. I learned that I should have asked another department member or Capstone committee member about the pre-intervention. It was a last minute decision that did not help my

Capstone. My big takeaway: talk with others before making big decisions about your surveys.

Professionally, as a Physical Education teacher, I also learned that I need to formatively evaluate my students more frequently. I want to know more about their thoughts and ideas about PE class, what's working for them and what's not working for them. I need to be more proactive about inquiring about my students' learning. I also learned how easy it is to create and administer a Google Form survey. The ease of this modality makes me very excited about our technological future in education. So many things are possible.

Conclusion

Finding out what works best for my Physical Education students keeps me on the hunt for exciting class units and worthwhile, valuable class activities. Discovering what students reactions to the PACER fitness test after stretching interventions has been influential in the way that I will conduct my Physical Education class in the upcoming years. Daily stretching during PE class may be a positive thing for my students. It may help them stay more relaxed in the future and be more productive in the classroom. Some students may never love stretching or love the routine of stretching, but that is life. There is no one activity that is going to help our students succeed academically or physically.

Additionally, surveying students and asking for their opinions gives students the power and voice to be empowered by their own learning. Student voice is important for teachers to hear. Changing the ways that teachers teach, to better fit the needs of the

learner must be happening from one class to another. If students are open-minded to trying new class activities and thinking about positive change, change will happen!

References

- Ayers, S. F. (2010). Motivation profiles and adolescents' PACER performance. *Journal of Physical Education, Recreation & Dance, 81*(9), 8-8.
doi:10.1080/07303084.2010.10598535
- Bass, R. W., Brown, D. D., Laurson, K. R., & Coleman, M. M. (2013). Physical fitness and academic performance in middle school students. *Acta Paediatrica, 102*(8), 832-837. doi:10.1111/apa.12278
- Behm, D. G., Blazevich, A. J., Kay, A. D., & McHugh, M. (2016). Acute effects of muscle stretching on physical performance, range of motion, and injury incidence in healthy active individuals: A systematic review. *Applied Physiology, Nutrition & Metabolism, 41*(1), 1-11. doi:10.1139/apnm-2015-0235
- Behm, D. G., & Chaouachi, A. (2011). A review of the acute effects of static and dynamic stretching on performance. *European Journal of Applied Physiology, 111*(11), 2633-2651. doi:10.1007/s00421-011-1879-2
- Benefits of stretching are limited. (2009). *Australasian Science, 30*(7), 7. Retrieved from Education Full Text (EBSCO)
- Bott, T. S., & Mitchell, M. (2015). Battling obesity with quality elementary physical education: From exposure to competence. *Journal of Physical Education, Recreation & Dance, 86*(6), 24-28. doi:10.1080/07303084.2015.1053637

- Butterfield, S. A., Mason, C. A., Tu, S., Lehnhard, R. A., & Schaper, M. (2015). Performance by middle school children with and without asthma on the PACER. *Perceptual and Motor Skills, 120*(2), 628-641. doi:10.2466/15.PMS.120v10x9
- Chatzopoulos, D. E., Yiannakos, A., Kotzamanidou, M., & Bassa, E. (2015). Warm-up protocols for high school students. *Perceptual and Motor Skills, 121*(1), 1-13. doi:10.2466/30.PMS.121c11x3
- Chen, S., Kim, Y., & Gao, Z. (2014). The contributing role of physical education in youth's daily physical activity and sedentary behavior.(report). *BMC Public Health, 14*(1), 1-16. doi:10.1186/1471-2458-14-110
- Efrat, M. (2011). The relationship between low-income and minority children's physical activity and academic-related outcomes: A review of the literature. *Health Education & Behavior, 38*(5), 441. doi:10.1177/1090198110375025
- Graser, S. V., Sampson, B. B., Pennington, T. R., & Prusak, K. A. (2011). Children's perceptions of fitness self-testing, the purpose of fitness testing, and personal health. *Physical Educator, 68*(4), 175. Retrieved from Education Full Text (EBSCO)
- Hernandez, B. L. M. (2014). Health, physical activity, and academic achievement: The role of teachers, schools, and communities. *Journal of Physical Education, Recreation and Dance, 85*(3), 8-10. doi:10.1080/07303084.2014.876868
- Kane, I., Robertson, R. J., Fertman, C. I., McConnaha, W. R., Nagle, E. F., Rabin, B. S., et al. (2010). Predicted and actual exercise discomfort in middle school

children. *Medicine and Science in Sports and Exercise*, 42(5), 1013-1021.

doi:10.1249/MSS.0b013e3181c3aa62

Knudson, D. (1999). Stretching during warm-up: Do we have enough evidence?

JOPERD--the Journal of Physical Education, Recreation & Dance, 70(7), 24.

Retrieved from Taylor and Francis online Hamline database.

Kokkonen, J., Nelson, A. G., Eldredge, C., & Winchester, J. B. (2007). Chronic

static stretching improves exercise performance. *Medicine and Science in Sports and Exercise*, 39(10), 1825-1831. doi:10.1249/mss.0b013e3181238a2b

Leon, C., Oh, H., & Rana, S. (2012). A purposeful dynamic stretching routine.

Strategies: A Journal for Physical and Sport Educators, 25(5), 16-19.

doi:10.1080/08924562.2012.10592167

Mercier, K., Phillips, S., & Silverman, S. (2016). High school physical education

teachers' attitudes and use of fitness tests. *High School Journal*, 99(2), 179-190.

doi:10.1353/hsj.2016.0001

Newbell, T. (2011). Fitness gets presidential. *American Fitness*, 29(3), 52. Retrieved

from Education Full Text (EBSCO)

Parrott, J., & Zhu, X. (2013). A critical view of static stretching and its relevance in

physical education. *The Physical Educator*, 70, 395+. Retrieved from Gale

Virtual Reference Library Hamline database.

President's council on fitness, sports and nutrition. (May 19, 2017). Retrieved 12/14,

2017, from

<https://www.hhs.gov/fitness/programs-and-awards/presidents-challenge/index.html>

- Prusak, K., Graser, S. V., Pennington, T., Zanandrea, M., Wilkinson, C., & Hager, R. (2011). A critical look at physical education and what must be done to address obesity issues. *Journal of Physical Education, Recreation & Dance*, 82(4), 39-46. doi:10.1080/07303084.2011.10598613
- Punnoose, A. (2012). Physical activity and performance at school: A systematic review of the literature including a methodological quality assessment. *Jama*, 307(11), 1120.
- Rhea, D. J. (2009). The physical education deficit in the high schools. *Journal of Physical Education, Recreation & Dance*, 80(5), 3-9. doi:10.1080/07303084.2009.10598314
- Samson, M., Button, D. C., Chaouachi, A., & Behm, D. G. (2012). Effects of dynamic and static stretching within general and activity specific warm-up protocols. *Journal of Sports Science & Medicine*, 11(2), 279-285. Retrieved from Education Full Text (EBSCO)
- Srikanth, S., Petrie, T. A., Greenleaf, C., & Martin, S. B. (2015). The relationship of physical fitness, self-beliefs, and social support to the academic performance of middle school boys and girls. *The Journal of Early Adolescence*, 35(3), 353-377. doi:10.1177/0272431614530807

Stewart, A., Elliot, S., Boyce, B. A., & Block, M. E. (2005). Effective teaching practices during physical fitness testing. *Journal of Physical Education, Recreation & Dance (JOPERD)*, 76(1), 21-24.

doi:10.1080/07303084.2005.10607314

The Cooper Institute Fitnessgram. (2014). Retrieved 12/14, 2017, from

<http://www.cooperinstitute.org/fitnessgram>

Van Dusen, D. P., Kelder, S. H., Kohl, H. W., Ranjit, N., & Perry, C. L. (2011).

Associations of physical fitness and academic performance among schoolchildren. *Journal of School Health*, 81(12), 733-740.

doi:10.1111/j.1746-1561.2011.00652.x

Wittberg, R. A., Northrup, K. L., & Cottrel, L. (2009). Children's physical fitness and academic performance. *American Journal of Health Education*, 40(1), 30-36. Retrieved from Taylor and Francis online Hamline database.

Appendix A Pre- and Post-Intervention Survey**Pre-Fitness Survey****Name:** _____ **Hour:** _____**1= Poor 2=Fair 3=Average 4=Good 5=Excellent**

1. Select the number that best describes how familiar you are with the PACER fitness test.

1 2 3 4 5

2. Select the number that best describes how prepared you feel you are for the PACER test today.

1 2 3 4 5

3. Select the number that best describes how you think you will do today on the PACER.

1 2 3 4 5

4. Select the number that best describes how physically fit you think you are.

1 2 3 4 5

5. Select the number that best describes how mentally prepared for the PACER you think you are.

1 2 3 4 5

Post-Intervention Data Survey

Name: _____ Hour: _____

1= Poor 2=Fair 3=Average 4=Good 5=Excellent

1. Select the number that best describes how familiar are you with the PACER fitness test.

1 2 3 4 5

2. Select the number that best describes how prepared do you feel like you are for the PACER test today.

1 2 3 4 5

3. Select the number that best describes how do you think that you will do today on the PACER.

1 2 3 4 5

4. Select the number that best describes how physically fit do you think you are.

1 2 3 4 5

5. Select the number that best describes how mentally prepared for the PACER do you think you are.

1 2 3 4 5

6. Select the number that best describes did you find value in our daily stretching routines

1 2 3 4 5

7. Select the number that best describes your belief that the relaxation part of stretching could have benefits in other parts of your educational experience.

1 2 3 4 5

8. Select the number that best describes if you liked the attendance/stretching routine.

1 2 3 4 5

9. Select the number that best describes if you would like to see the attendance/stretching routine continued in PE class.

1 2 3 4 5

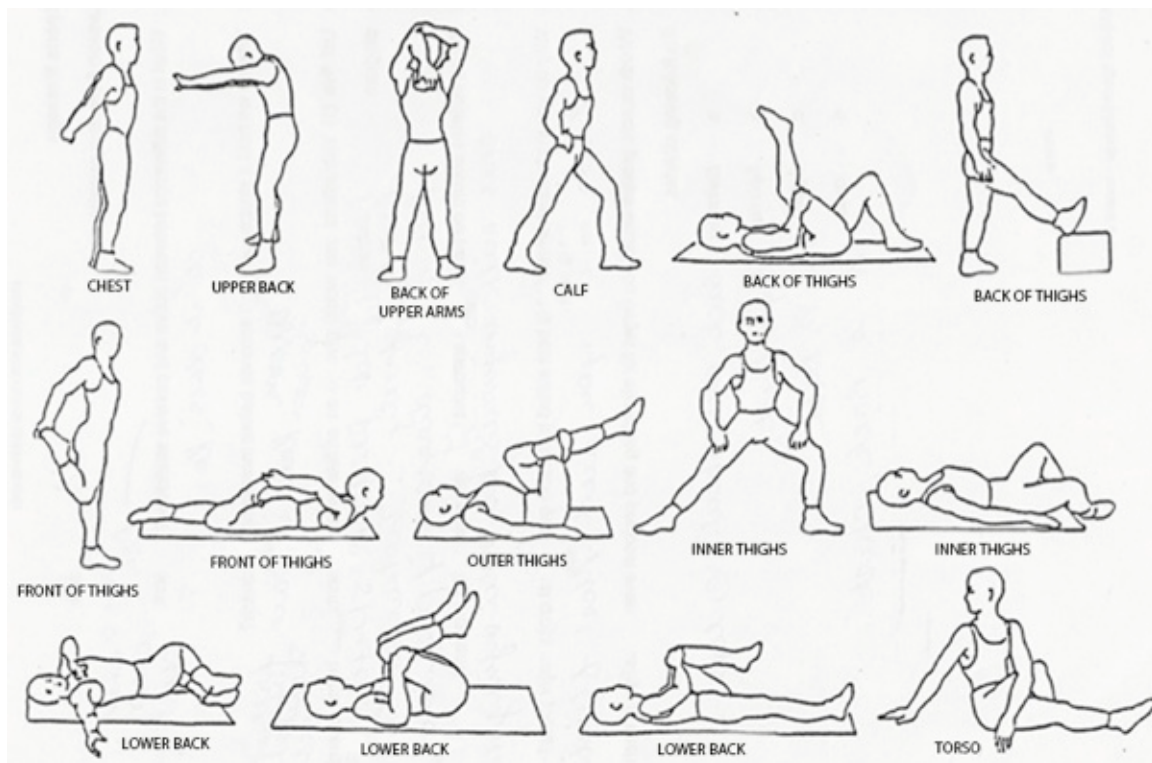
10. Any other thoughts, suggestions or remarks about stretching during attendance time or the PACER fitness test?

Appendix B Stretching Exercises

Stretching Exercises



<http://www.sportsscience.co/flexibility/whole-body-stretching-routine/>



<https://www.washington.edu/wholeu/2015/02/09/week-five-dare-to-do/>