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Playground Improvement Plan

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Capstone Project: A School Improvement Plan

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Abstract

Physical activity is important to the growth and development of children of all ages. The purpose of this paper is to use what we know about physical activity and the connection between social development, cognitive development and overall health to physical activity to improve the current opportunities for physical activity in school age children. Fundamental movement skills (FMS) mastery level of students will be used to implement this improvement plan as well as incorporating more physical activity opportunities in the school day to promote more movement and less sedentary time in the school day on a regular basis and to improve the current playground. The use of the SOPLAY method will be used as an observation tool.

Keywords: Fundamental movement skills (FMS), physical activity, playground, social development, cognitive development, mental health, obesity, moderate to vigorous physical activity (MVPA), preschool, school age, SOPLAY

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Students in preschools require more daily physical activity in school and at home than they are currently getting. (Bergqvist-Norén, 2022) School expectations have moved towards academic time to meet state standards and in turn has caused a push down effect into preschools, creating more sedentary times during the school day. Between parents' work schedules and increase of technology devices available, children participate in more screen time than active time at home. The American Psychological Association recommends one hour or less of quality screen time in children ages 3-5 years old. (Pappas, 2020) However, a study comparing the use of screen time from 1997 to 2014 discovered that as of 2014 "three- to 5-year-olds got 2 hours, 28 minutes a day of screen time" (Chen & Adler, 2019) which is significantly more than the recommended amount. The recommended amount of moderate to vigorous physical activity (MVPA) recommended for preschool age students is 60 minutes daily and the majority of children are not meeting this amount of physical activity. (McKenzie et al., 2010).

Physical activity has a strong relationship with cognitive, social, and self-regulation skills as well as improves the overall mental and physical health of children. The successful habits children create while they are young can continue with them through adulthood when those habits are positively nurtured. Various studies have demonstrated correlations between physical activity (PA), academic achievement and social skills. (Nielsen-Rodriguez et al., 2021). Schools can promote student engagement in MVPA through the addition of a variety of age appropriate playground equipment and materials. Boys and girls both require the same amount of MVPA, however studies have shown that they utilize playground equipment differently and have different needs. This means that there should be open spaces for ball play and running games available, as well as equipment to climb on, houses and building materials, hard and soft

surfaces, and free play areas, as well as structured activities. (Dyment & O'Connell, 2013) The variety of equipment and materials allows students to be creative in their play through the use of cognitive skills, allowing for group and solo play areas for social skills development, and many opportunities to strengthen and explore their muscles and bodies through climbing and running experiences.

The issue that arises is the availability of the equipment and materials to promote physical activity on the playground. Funding and available space are limitations to providing appropriate equipment to promote MVPA in schools. The classroom can only provide so many indoor opportunities for students to climb, run and jump, which are just a few of the fundamental movement skills (FMS) children should learn in their early childhood years. (De Waal, 2019) Preschool safety standards play a role in what equipment and materials are available for purchase. School playground magazines and websites provide the recommended ages for the equipment along with fall zone size and fall surface depth requirements for the equipment. Alternatives to the playground during inclement weather that prevents outdoor time can be the use of a gymnasium, large motor rooms with bicycles, scooters, hula hoops, balance beams, and other materials to promote activity, as well as teacher led games or videos with guided exercises and music to dance too. This does not replace the benefits of outdoor play, but is an alternative when weather prevents outdoor play.

The purpose of this school improvement plan is to increase materials and equipment on a preschool playground to promote MVPA in preschool children. This research will be shared with the school administration to promote the idea of increasing physical activity opportunities outdoors. Through the use of research studies, there is plenty of evidence available for the benefits of playground and physical activity opportunities that go beyond a child's gross motor

abilities. Through play, children build social relationships with each other and build cognitive skills that will transfer over into the classroom with academic skills. This research will address the need for more various play opportunities in preschool aged children.

Articles for the research for this school improvement plan were compiled from the DeWitt Library at Northwestern College. To utilize the most current research the criteria for resources used were within the last 10 years and published in a peer-reviewed journal. Studies regarding the benefits of physical activity, including beyond the preschool years into adolescents and adulthood, socioeconomic factors, parental involvement, and national and state preschool policies are included to support the research and school improvement plan.

Review of the Literature

Introduction

Physical activity is a vital part of child development. (Mas et al., 2018) Research of physical activity in childhood is important for parents and educators to be aware of and how to implement activities and give opportunities to children to develop their motor skills. This literature review consists of twenty-two peer reviewed articles discussing the importance of physical activity in preschool children into adulthood. During the research several themes appeared including the parent's role, teacher's role and school's role in physical activity, connections to other domains of child development, and beyond the early childhood years. The articles are broken down and discussed by the themes they addressed with their findings.

Parental Role in Physical Activity

According to a five year longitudinal study (Bergqvist-Noren et al., 2022) children ages two to six are more active during weekdays than weekends and the opposite is true for their parents. During this study 106 children and their parents measured their physical activity with an accelerometer for seven consecutive days and that data was analyzed. The findings were that children averaged an increase of 11% in physical activity each year regardless of if the children were boys or girls. This study discussed the importance of parent involvement in a child's physical activity and healthy habits. Another study based out of Norway (Valla et al., 2020) looked at the impact of parental involvement of 1,555 infants from ages four to 24 months, finding that when parents understood the milestones and interacted with their child their child made progress towards those milestones. This study used the Ages and Stages Questionnaire (ASQ-II) to assess the children along with periodic well-child visits at 6, 12 and 24 months. The researchers involved found no difference between boys and girls in progress towards milestones

and that after parents received instruction on what to watch for in milestone attainment they were accurate and able to adjust to their child's developing needs. The ASQ-II was also used along with the Denver-II scale in a study in Iran (Amouian et al., 2017) focusing on the connection of the child's body mass index (BMI) to their gross motor development, finding as before that there is no significant difference in the developmental levels of boys and girls in children ages 3-5 years old. This study did find that of the 90 children that participated in the study there was no significant difference between the normal and underweight groups classified by their BMI, but there was significant difference between these two groups and the children with overweight/obese BMI status.

Agard's 2021 study focused on the overall healthy habits of parents and children of 31 families that included preschool age children in Colorado. There were five researchers that interviewed families using a fifteen question probe that was recorded for later analysis. The findings were that most parents did not have their own exercise routine; they based the importance and current knowledge of physical activity and FMS on their own experiences from childhood but did not know how to improve these skills. (Agard et al., 2021)

The findings of the articles all found little difference between boys and girls in their development towards future physical motor skills. They all saw the importance parents play in children's physical activity and healthy habits. However, it was pointed out that a mother's impact and interactions played a more significant role in developing communication and gross motor skills than other adult influences in the child's life. (Valla et al., 2020) Each article highlighted a different skill connected to gross motor development: social and communication (Valla et al., 2020), parent interaction over time (Bergqvist-Noren et al., 2022), BMI and health (Amouian et al., 2017), and overall health and nutrition (Agard et al., 2021). The ASQ-II, which

is an assessment tool that uses a rating scale of: often, sometimes or rarely, for 30 different criteria based on the age of the child at the time of testing across five domains including gross motor, was used in two different studies.

Over the course of reading these studies a repeated statistic was that only 50% of preschool aged children are meeting the daily physical activity recommendations. (Agard et al., 2021) It also was a recurring theme of the importance parents play in their children's physical activity. Parents rely heavily on their past experiences to shape their child's experiences with physical activity. Parents lack an understanding of how to develop and encourage physical activity progression in their children and the developmental milestones for their age. Tools like the Ages and Stages Questionnaire (ASQ-II) and Denver II scale questionnaire component can be used too with parents to find their child's level of current milestones (Amouian et al., 2017) and these widely accepted assessment tools can highlight for parents the activities that their child should be able to complete at their current age to encourage further development of gross motor skills.

Researchers and outside adult support come in for a short amount of time on a weekly to monthly basis resulting in different outcomes from a snapshot visit from a stranger than what their familiar parent sees. (Valla et al., 2020) This makes the role of the researcher more of an educator, teaching parents what to watch for and how important exercise and healthy nutrition is to the development of their child. Through education, parent's knowledge base can be expanded to promote healthy habits in their children, lower obesity levels and encourage new skill development in children. Parents can be provided with a list of FMS for their child's age, along with indicators of successfully completing those skills, and activities to do with their child to promote them to practice the skills.

The importance parents put on physical activity and how much of a model they are for their children plays a part in how much their child participates in physical activity. Educating parents about FMS and the importance of building healthy habits now promote lifelong habits they can carry with them. (Agard et al., 2021) This importance of physical activity in early childhood will help parents see the benefits of having play equipment and materials available for their child at school.

Connections to Other Domains

According to research studies across the world there is a positive correlation between physical activity and cognitive ability that translates into academic progress in the classroom, one study found the correlation was especially in the area of mathematics. (De Waal, 2019) In De Waal's study in South Africa, there were 69 participants 5-6 years old where all participants were tested over two days, and two prior data points were provided by the schools the participants attended. There was a large correlation found between FMS and academic skills through the use of the Kinderkinetics Screening Assessment. (De Waal, 2019) Another study considered the connection of cognitive development and motor skills in Bangladesh. In this study there were 2,260 children that were tested at 64 months old. The research team chose seven milestones to record data on, the research team taught the parents how to record progress of these milestones and the order that the milestones should be met. Researchers came into the home to record the results once a month and to complete their own testing; in this process they found that the parents' assessments were accurate to their own. The results of the correlation data were low but significant, not enough to be a predictor of future IQ ability. (Hamadani et al., 2013) A small study from 2018 in Barcelona (Mas et al., 2018) had 26 participants of the ages 11-12 months old at the start of the study that was completed over a 23 month period of time. The researchers

used the Merrill-Palmer-R test that looks at 5 areas of development. The intervention used was a 45 minute session in a project based learning environment that encouraged free play and movement opportunities throughout the study. The researchers came to the conclusion that without psychomotor activities, those activities that combine cognitive and motor skills, the development of children would be hindered. (Mas et al., 2018) Denmark also had a study in 2017 that looked at the correlation between motor skills, health, cognition, and well-being. (Hestbaek et al., 2017) Children in this study were 3-6 years old at the start of the study; there were 865 total children in the study, 368 were in the intervention group and the researchers followed up with the participants after 2.5 years. Trained staff members were used to measure the target skills of fine motor, balance, coordination, challenges of the vestibular, tactile and kinesthetic senses and relaxation. This study is still currently in progress and the knowledge gained is hypothesized to support similar studies in the importance of physical activity to cognitive development as well as to the development of the whole child across all domains. (Hestbaek et al., 2017)

Research studies that have taken place in the United States (Giles et al., 2017) and in Ireland (Beadleston et al., 2019) discuss the correlation between physical activity and social development, mental health, and a sense of belonging. In Giles' study there were 74 participants from the United States from ages 18-32 years old that completed questionnaires on mood and physical activity as well as a Stroop test to track perceived stress in images while wearing an fNIRS monitor to track brain activity. The study concluded that participants who participated regularly in exercise activities reported less depression, perceived stress, and anxiety. (Giles et al., 2017) Beadleston's research included 3,682 male and 3,843 female thirteen year old adolescents in Ireland with two data sets, the first when the participants were nine years old and second set when they were thirteen. This study compared the number of boys and girls who

participated in group sports, individual sports and other extracurricular areas with their scores on a 40 question timed standardized test called the Drumcondra. A five point scale was also used to assess the participant's level of exercise along with a survey asking about what groups the participants were in, broken down as a four part scale of 0-4. Group sports had a positive correlation to cognition and academic grades, however as girls dropped out of group sports they maintained their academic growth more often than the boys. The new hypothesis from this discovery became that girls could get the social and self-belonging effects of group sports through extracurricular groups in the arts. The trend was not as significant for boys. (Beadleston et al., 2019) Another study in Australia began in 2017 with the purpose of looking at the connections between physical activity in students, social interactions, behavior and the environment of primary age children. The study findings have yet to be reported, they will add to the collection of information of the importance of physical activity in social development. (Cotton et al., 2017)

One extracurricular study looked specifically at music and its connection to the development of movement skills. Sixty-two children ages 5-6 years old were divided into a control group, music only program, and music and movement program; each intervention group had twenty sessions while the control group continued the regular curriculum during that time. The results showed positive correlations between music and motor skills, participants gained coordination, jumping and ball handling skills through the interventions. (Marinsek & Denac, 2020)

The articles discussed different age levels, but came to similar conclusions that showed the positive correlation between physical activity and cognitive skills, social skills, mental health and a sense of belonging. These skills are all important to the development of a healthy child. A

sense of belonging plays an important role in the mental health of a child, especially in adolescents (Beadleston et al., 2019), and those social skills start to develop in the early childhood years through free play opportunities, including physical activity.

The results of these studies show the positive connection across multiple domains of the development of children to physical activity. Physical activity goes beyond gross motor skills and into social skills (Beadleston et al., 2019), mathematics and other cognitive areas. The data translates across countries, gender and age levels; showing that physical activity is important no matter where a person lives and how old they are or the gender of the person. Physical activity should be encouraged on its own and with cognitive skills to successfully meet the needs of the development of young children. (Mas et al., 2018)

Teacher and School Role in Physical Activity

Several research articles have utilized the System for Observing Play and Leisure Activity in Youth (SOPLAY) in their studies. SOPLAY uses a visual scanning method while staying in a fixed location on the playground and recording notes from the observations. A study in Germany (Reimers & Knapp, 2017) used SOPLAY to visually scan ten neighborhood playgrounds for one hour time periods; the researchers approximately observed 3,000 children with ages of the children ranging from 0-17 years old. The trained observers counted the number of boys and girls in different areas of the playground and noted what type of play they were engaged in and what materials they used in their play. The researchers of this study looked for patterns; they found that boys and girls used playgrounds differently. The researchers noticed that more boys chose to play ball games, while more girls chose to utilize the play equipment. (Reimers & Knapp, 2017)

Another research study using SOPLAY occurred in California (McKenzie et al., 2010) over 18 months and included 13 elementary schools; there were a total of 2,349 area visits and 36,995 children observed. This study targeted times to focus their observations, those targeted times were before, lunch and recess; the researchers also categorized the type of activity observed as sedentary, walking or vigorous. The researchers noted that structured activities and some equipment were only available during some of the observed visits and made the hypothesis that if the equipment was more available and supervisors increased structured activities more children would be physically active during these times. The findings of the research noted that more boys than girls participated in MVPA, noting the importance of including activities to encourage more girls to engage in physically active play. The research also noted that more physical activity took place during lunch and recess than before school, the children who utilized these times to participate in MVPA could add an additional 20-22 minutes of physical activity towards the recommended amount of 60 minutes daily. The researchers recommended that during these free play times that physical activity should remain a choice for children, not a requirement. (McKenzie et al., 2010)

A third study utilizing the SOPLAY observation method occurred in Australia (Dyment & O'Connell, 2013) across four preschool centers. This study consisted of 40 scans of each target area over 30 days for a total of 920 scans and a total of 2,361 preschool children observed. The goal of this study was to discover how the design of the playground influences how and where children play. Along with counting the number of boys and girls in each area the researchers also looked at the type of play, they were categorized as functional, constructive, symbolic, self-focused, and talking. The four centers were referred to as Center A, Center B, Center C and Center D when discussing the results of the type of preferred play area at each

facility. All four centers had paved areas, although this area was significantly more popular at Center C, most likely due to the fact that the majority of the ground covering at this facility was paved; children primarily participated in functional play in this area. Soft-fall and grass areas were most popular at Center B and Center D, this area was used by children mostly for functional and self-focused play. Sand areas were also at all four centers allowing for constructive and symbolic play, children at all centers participated in play in this area although there were differences in the use at each center. Three centers had natural areas; this was a popular play area in Center A for functional and constructive play. Only two of the centers had manufactured equipment that was used by a few children for symbolic and functional play. The researchers noted a final conclusion that the playground design and the professionals who are supervising both play a part in how and where children play at the playground. When portable equipment and organized activities are available that may change the children's behaviors and play choices. Another factor could be the temperature, if children have access to sun and shade areas, or the type of ground coverings on the playground. Small changes can make a big difference. (Dyment & O'Connell, 2013)

Researchers in Australia (Cohen et al., 2014) conducted a study in 8 primary schools where 460 total children from grades 3-4 participated to measure MVPA during target areas of the day in low income communities. The parts of the day targeted in this study were lunch, recess and after school. This study utilized Supporting Children's Outcomes using Rewards, Exercise and Skills (SCORES) for baseline data, a 12 month multicomponent physical activity intervention. The targeted FMS were categorized as locomotor, object control, and stability skills. Children were assessed during the intervention using the Test of Gross Motor Development (TGMD) 2; this test consisted of completing each task twice, six tasks from each

FMS category with the assessments videotaped for later review. Children also wore accelerometers for seven consecutive days with the data broken down by time of day, noting target times of recess and lunch, and the intensity of the physical activity. Results of the research found that girls scored higher in locomotor skills, boys scored higher in object-control skills and children who were active during lunch and recess resulted in higher total daily MVPA times. Researchers also found that mastery of FMS is low, especially in children of low socioeconomic backgrounds. (Cohen et al., 2014)

A research study in Zurich (Kakebeeke et al., 2019) assessed 216 children ages 3-6 years old on five motor tasks including fine motor, pure motor adaptive tasks, dynamic balance, static balance, and movement quality. The researchers took a current assessment called ZNA-2 and modified it for preschool age children called ZNA-Q, for a quick overview of developmental status of the motor skills of preschool children. The goal in the modified assessment was to increase speed and quality of assessment of motor skills resulting in an assessment tool that could be administered in less than five minutes, existing assessments assessing preschool age motor skills took significantly longer to administer. The assessment used a scale with a possible score range 0-4, where the assessed tasks were performed in the same order by all participants individually in a separate room and recorded to be reviewed later. Directions were given to participants verbally and modeled by the instructor. Results of the assessment were deemed reliable and effectively administered within a five minute time span. (Kakebeeke et al., 2019)

According to research in Spain (Nielsen-Rodriguez et al., 2021) studying the amount and intensity of exercise in 156 children ages 4-5 years old, it was found that students spent most of their time in sedentary activities including free time. Few children currently meet the recommended physical activity requirements of 60 minutes daily. The researchers chose to use

accelerometers to measure activity levels. The results of the data showed students averaged 80.7% of their day in sedentary activities, 6.7% was moderate activity and 6.8% was vigorous activity. Considering that free time is spent in sedentary activities the researchers recommended that free time may need to include more structured activity opportunities. The researchers also noted that the large amount of time spent at school makes it ideal for implementing recommended amounts of physical activity. (Nielsen-Rodriguez et al., 2021)

The amount of time spent in sedentary activities compared to physically active times at school has been on a decline over the past few years, enough that the World Health Organization recently added recommended daily physical activity for children under the age of 5 to engage in at least 180 minutes of physical activity and that at least 60 minutes should be MVPA. The increase in sedentary time has been attributed to an increase in academic focus. Teachers can help this trend through combining content learning into physically active lessons. This helps children gain cognitive and executive function skills while improving their overall health. (Nielsen-Rodriguez et al., 2021) By educating teachers about the importance of including physical activity in their day on a regular basis and how this benefits children learning content being taught in the classroom, there can be a shift back from the majority of the day in sedentary activities to highly engaging physical active classrooms. The role of the supervisor on the playground must be rethought; many playground supervisors treat their time as a break and instead supervisors need to realize how influential they are in engaging students in physical activity by facilitating play and organizing structured play opportunities. (Dyment & O'Connell, 2013)

Returning themes throughout the research have been that girls and boys utilize playgrounds differently (McKenzie et al., 2010) and socioeconomic status plays a role in

children's physical activity opportunities within their neighborhood environments (Dyment & O'Connell, 2013). All the researchers came to similar conclusions about boys and girls utilizing playgrounds differently and excelling at different skills; they also agreed that the majority of children are not currently meeting the recommended physical activity on a daily basis. Schools create more equal opportunities for physical activity opportunities for all children regardless of their background and outside sports opportunities. This makes schools the best place to promote physical activity in children to maximize opportunities for students to engage in physical activity daily.

Neighborhood and school playgrounds play an important role in physical activity opportunities due to the large number of FMS that require an outdoor area to practice and master the skills. (Reimers & Knapp, 2017) When considering the history and progression of playgrounds over time through Szekely's research, it can be seen that neighborhood playgrounds of the past were seen as eyesores and artists were enlisted in designing playgrounds that were functional and appealing to have in the neighborhood. Adventure playgrounds became popular in Europe, providing used tires, wood scraps and telephone cable spools to build creatively with instead of the ready-made structures, American safety standards are stricter than those in Europe, stopping them from catching on in America. Gardens, natural play areas, and gathering building materials onto the playground are current trends that promote creative thinking in children. (Szekely, 2015) Through little changes, schools and teachers can significantly change the environment of their playground allowing for critical thinking skills, imagination and creativity to occur. Teachers and schools play an important role in the development of playground materials and equipment that are available and how they are used. Teachers can keep

safety in mind while still encouraging creativity and exploration of children's physical abilities. Playgrounds are areas of endless learning opportunities for young children.

Going Beyond Early Childhood

A longitudinal study from Finland (Jaakkola et al., 2019) assessed 336 children from grades 6-7 from six primary and eight lower secondary schools in leaping, throwing-catching, and MVPA during their transition years. Children wore accelerometers to measure their activity level for seven consecutive days and completed a leap test and a throwing-catching test. The findings of the study were that MVPA was higher in boys than girls and sedentary time was higher for girls than boys. Throwing-catching skills have a positive correlation to MVPA levels in boys. There was a negative correlation between sedentary time and leap test results. (Jaakkola et al., 2019)

According to a study in Slovakia (Kopcakova et al., 2018) it was found that excessive screen based activities was more common in small towns than villages. There were 9,743 participants in the study between the ages 11-16 years old. The participants of the study were given surveys on their family background, physical activity, and amount of screen time they engage in on a regular basis. The survey used was the Family Affluence Scale III (FAS III), consisting of six questions. Results of the study found significant positive relationships between physical activity and availability of local areas that promote physical activity including tennis courts and skate parks. The researchers indicated further research into why adolescents in smaller towns had higher screen time than in villages. (Kopcakova et al., 2018)

A study in Ireland (Beadleston et al., 2019) considered the changes in children as they become adolescents in the area of physical activity, cognitive ability and a sense of belonging. There were 3,682 males and 3,843 females that were 13 years old at the time of the first set of

data collection; the second set of data was collected four years later. Participants were asked about their exercise levels and participation levels in group sports. Participants also completed a 40 question timed standardized test called the Drumcondra. The findings of the study were that the group sports had a stronger correlation to a positive sense of belonging and cognitive scores on the standardized test for male participants than for the female participants. Although group sport membership in female participants declined over time, group membership activities still played a role in their sense of belonging and cognitive scores. The decline of participation of girls in sports and exercise opportunities was still an area that the researchers thought needed to be addressed; physical activity is important to a person's overall health no matter their age. (Beadleston et al., 2019)

Research in the United States (Giles et al., 2017) focused on the connection between coping with stress, depression, anxiety and exercise. This research study recruited 74 participants of ages ranging 18-32. These participants were asked to complete a Stroop test which addressed cognitive task switching tasks where the color of a word was written in a color font that did not match the word and emotional tasks. The emotional tasks consisted of looking at images and asked to visualize the circumstances to be improved or maintained while wearing a fNIRS monitor to collect data on brain waves during this process. The findings showed a positive correlation between exercise and cognitive control and lower prefrontal cortex oxygenation responses to emotional information. (Giles et al., 2017)

Commonalities that surfaced through the research show that physical activity is important across ages. The purpose of physical activity changes with age, in the early childhood years the goal is focused on mastery of FMS, exploring their environments, creativity, social skills and exercise. (Cohen et al., 2014) As children move on toward adolescents the focus becomes more

on health, social opportunities, and a sense of belonging. (Beadleston et al., 2019) In adulthood, the focus turns more towards overall health, including mental health, coping with stress and anxiety of life circumstances. (Giles et al., 2017) Physical activity habits formed in childhood, when positively encouraged, will continue through to adulthood, creating happier, healthier adults.

Schools can promote physical activity in the early childhood years through the use of playgrounds that promote creativity and have multiple areas to maximize the opportunities for different types of play. (Szekely, 2015) The use of different types of areas promotes different types of play depending on the ground covering, space, materials and equipment available. It is also important to note that girls and boys utilize these areas differently. (Dyment & O'Connell, 2013) The goals of teachers and staff should be in the facilitating of activities to promote all types of play and work towards the mastery of FMS while instilling healthy habits in children. (Cohen et al., 2014) The research found and discussed in this paper is to promote and improve the current equipment and materials children have access to during the school day, this will in turn promote more physical activity including MVPA and in turn increase cognitive and social development of children.

School Profile

Storm Lake, Iowa is located in Buena Vista County in the northwest region of Iowa. As of 2019 the population of Storm Lake is 10,558 with 5,278 people employed and a 16.4% poverty rate. The main ethnic backgrounds represented in Storm Lake are White (Non-Hispanic) 7.5%, White (Hispanic) 25.4%, Asian 18%, Other Hispanic 10.7%, Black or African American 3.95% and Native Hawaiian & Other Pacific Islander 2.76% . Storm Lake is home to Buena Vista University and Faust Institute of Cosmetology for local continued education opportunities.

The most common occupations in Storm Lake are jobs in production (34%), office and administrative support (9.44%), and education (8.01%). The number of homeowners in Storm Lake is at 51.7% of the population. (Jorgensen, 2021)

St. Mary's Catholic school is located in Storm Lake, Iowa. St. Mary's is a private school, drawing in students from 12 communities surrounding Storm Lake. (St Mary's Catholic School, 2022) Scholarships are available to help families pay the tuition of the school. The total enrollment of St. Mary's is 286 students, 149 boys and 137 girls. The school is racially diverse made up of 142 Caucasian, 91 Hispanic, 31 Multi-race, 16 Asian, 4 Pacific Islanders student backgrounds. (Iowa Department of Education, 2022) The mission of St. Mary's Catholic School seeks to be a Christ-centered family devoted to the development of the spirit, the mind, and the body. (St Mary's Catholic School, 2022) Professional development focus during the 2021-2022 school year was on creating a vision statement and the grade level priority standards and this work will continue into the 2022-2023 school year. Teachers also were working towards a goal related to the technology standards at each grade level.

Progress data showing the beginning and end of year data using the STAR assessment for kindergarten through 12th grade are compiled by both the elementary and high school principals and shared with the school board annually. In the area of reading, kindergarten students increased their scores from 57% in the fall to 71% in the spring on the Early Literacy Assessment tool and in the area of math students went from 33% in the fall to 62% in the spring for number recognition and from 62% in the fall to 76% in the spring for quantity comparison during the 2021-2022 school year. In grades 1st-5th the percent of students meeting or exceeding the expected score range on the STAR Assessment in reading for the 2021-2022 school year was 70% which was an 11% increase from the previous school year and in 83% during the 2021-

2022 school year which was an increase of 8% from the previous school year. In grades 6th-11th the percentage of students meeting or exceeding the expected score range in the 2021-2022 school year was 52% in reading which was an 11.2% increase from the previous school year and 69% in math which was a decrease of 9.7% from the previous school year. St. Mary's has a 100% graduation rate. (Berg & Swanson, 2022)

St. Mary's has several opportunities for parents to be involved in the school. Teachers create newsletters and utilize a communication platform to stay in contact with parents on a regular basis. A popular program is called the Watch D.O.G.S (Dads of Great Students); it is a national program that St. Mary's participates in to promote family and community engagement where dads come in to volunteer in classrooms across grade levels. PTP (Parents and Teachers of Panthers) is a parent and teacher organization that encourages and supports the teachers and staff of St. Mary's to promote the education and social environment of the school. PTP also supports and organizes fundraisers to support the educational needs of the students. Another way parents can be involved is through the S.O.S Thrift Store. It is located a block from St. Mary's School. Parents and families of students are asked to volunteer at least 18 hours at the store, proceeds raised at the store help to fund St. Mary's. As a private school, a large part of the school financial support comes from the annual St. Mary's ball fundraiser where items are auctioned off in person and online, staff, parents and community members are encouraged to attend.

St. Mary's has five goals that include students and staff related to reading, mathematics, technology, safety, and faith. The reading goal for St. Mary's is to have 70% of individual students in grades 1-11 be at or above proficient on the STAR Assessment in the area of reading by the year 2023. By the year 2023, 84% of individual students in grades 1-11 will be at or above proficient on the STAR Assessment in the area of mathematics. The staff goal at St. Mary's is to

have 75% percent of faculty actively participate in annual technology surveys and show growth in the use of the SAMR model and/or ISTE standards. St. Mary's School will successfully educate and train all faculty and staff on the updated Emergency Operations Plan. All full-time St. Mary's faculty will participate in at least six hour's worth of professional development focused on Catholic Identity and Faith-based components. The goal for preschool students is to be 80% proficient in each of the domains addressed using Teaching Strategies GOLD that aligns with the Iowa Early Learning Standards.

Teachers at St. Mary's make individual professional development plans that include a professional and personal goal. Teachers use grade level curriculum and have Professional Learning Community (PLC) meetings that include classroom teams across grade levels. The principal completes learning walks weekly and scheduled observations with a pre and post evaluation meeting. Teams use data from assessments to make new goals for students working with resource teachers to support learning needs of students. All teaching staff are included on a committee including safety, climate and culture, Positive Behavior and Instructional Supports (PBIS), special events, health and wellness, and leadership committees. Some teaching staff are on more than one committee; by everyone having a role on a committee there is a sense of ownership of the whole building.

Students in kindergarten through 5th grade currently have scheduled time in the gym for structured physical education activities twice a week for 30 minutes each session, middle school and high school students have access to the gym for two hours each day. Students in kindergarten through 5th grade also have scheduled recess times for 35 minutes a day, including playground and paved surface areas with play opportunities. Preschool students have gym access

for 20 minutes twice a week and recess times for 60 minutes daily, with access to balls, play houses, building blocks, a tunnel, and bikes on paved, grass and pea gravel surfaces.

Needs Assessment

The area of focus for improvement is School Climate and Culture, specifically maintaining and improving the school environment through improving the playground area to promote more physical activity opportunities and mastery of FMS in children and promoting instruction in the classroom that includes physical activity to meet the recommended 60 minutes a day of physical activity. (Nielsen-Rodriguez et al., 2021) The current data based on the master schedule for the office shows that students at St. Mary's Catholic School in kindergarten through fifth grade are meeting the recommended amount of 60 minutes of physical activity a day twice a week. The rest of the week, the students have the opportunity to complete 35 minutes of physical activity. (Sennert, 2021)

The goal is to improve physical activity for students to complete at least 60 minutes of MVPA a day, through incorporating physical activity into content lessons and providing equipment and materials to promote physical activity on the playground teachers can help students to get closer to this recommended amount during the school day. Current research shows that the majority of the school day has students engaged in sedentary activities. (Dyment & O'Connell, 2013) Through incorporating physical activity into lessons, students' engagement will increase and their cognitive and social skills will grow as well. (Cohen et al., 2014) Including movement in music class or music into a content area with movement has been proven through research to increase students' physical activity and cognitive skills in content areas. (Marinsek & Denac, 2020)

Currently the FMS opportunities for mastery on the playground are limited, especially for the preschool students. Finding equipment, materials and activities to promote all areas of FMS will aid in their development, those areas being running, throwing, catching, kicking, skating, swimming, falling and tumbling, climbing, hopping, jumping, skipping, cycling, dribbling, and striking objects. (Grove, 2013) Some of these skills teachers are not able to work on at school, such as swimming, where there is no access to a swimming pool; however the majority of these skills can be addressed and promoted at school.

Data Analysis

According to the times gathered from the master building schedule at St. Mary's Catholic School, students have opportunity to complete physical activity 35 minutes a day on a regular basis (Sennert, 2021), which is 25 minutes short of the recommended amount by the World Health Organization of at least 60 minutes daily of MVPA. (Nielsen-Rodriguez et al., 2021) Students are grouped together for recess times. Preschool classrooms have their own playground which is used by one classroom at a time. There is a separate playground for the older grades; kindergarten through second grade have a shared recess time and third through fifth grade have a separate shared time.

The type of FMS that is available on a regular basis for the preschool students are throwing, catching, kicking, tumbling, and running, and other opportunities that can be made available are hopping, jumping, cycling skills when a teacher facilitates the activity. Kindergarten through fifth grade students have opportunities for throwing, catching, kicking, climbing, running, jumping, hopping, swinging, and dribbling activities. (Grove, 2013)

The data shows a strength of St. Mary's is the variety of equipment available on a regular basis for the kindergarten through fifth grade students. There are multiple types of equipment

available and over a spread out area for students to interact with others or participate in solo play. The playground is open and allows for easy supervision for all areas of the play area, as shown with an aerial view, using Google Earth; it is attached in the appendix and shows the areas separated by preschool area, paved area and pea gravel areas. (Google Earth, 2022) Another strength is that the preschool program meets the 60 minutes a day of physical activity opportunities on a regular basis.

Weaknesses shown by the data are that there are some types of FMS that students do not have access to on a regular basis or at all to develop those skills to a mastery level, mainly at the preschool level. The preschool playground area is two leveled areas with the upper level paved surface and the lower level with both a grass area and pea gravel area. There are two play houses with one on each level, one storage bin on each level holding toys for digging, stick horses, building blocks, stompers, and balls. On the upper level there is a child size table with four chairs, a mud kitchen, and a water table. On the lower level there is a play kitchen, a caterpillar tunnel, a balance beam, and cones to mark the barrier between the preschool and elementary playgrounds. There is also a large tree in the middle of the lower level separating the pea gravel and the grass area. There are no opportunities for students to climb, also limited opportunities for jumping and hopping without a teacher facilitating an activity. Another weakness is the amount of time that kindergarten through fifth grade students has the opportunity to participate in physical activity. There are two additional days a week that each grade has a physical education class that adds more opportunities for physical activity however this is not on a regular basis. The preschool playground must comply with Iowa Quality Preschool Program Standards (IQPPS) and Department of Human Services (DHS) guidelines due to St. Mary's serving three and four year old preschool students. The checklists and assessment guidelines for both are an

important consideration to be aware of when assessing the physical environment of the playground.

Other assessments or data that could be used to evaluate the students' level of physical activity opportunities could be weekly lesson plans identifying any additional time that students are engaged in movement activities, especially for the music teacher and resource room teachers. Tracking GoNoodle accounts, a website with short videos for exercise and mindfulness techniques, or other brain break activities that are used on a regular basis would also be useful. SOPLAY could also be a useful tool to complete scans of the playground to gain insight on which items are being used the most frequently as well as how often materials are taken out by teachers and supervising staff. All data would help the understanding of the current level of the students' opportunities for physical activity.

Action Plan

Proposed Improvement Plan

The playground observation strategy SOPLAY came up several times in my research. (Reimers & Knapp, 2017) (McKenzie et al., 2010) (Dyment & O'Connell, 2013) This strategy allows for supervisors on the playground to observe the playground through the use of observation notes and tally marks. The target of the observation can be changed for the purpose of the recorder. The purpose for St. Mary's staff when using the SOPLAY method of data collection, is to collect the number of students engaged in each type of activity related to FMS during each scan. Teaching staff would need to complete professional development that includes practice scans that are compared with each other's results to ensure fidelity in observation results. These scans would occur multiple times throughout the year for continued insight and progress monitoring purposes, preferably once each quarter of the school year.

Another strategy to use is imbedding physical activity into the day through connections to content area lessons, brain breaks and transitions. (Nielsen-Rodriguez et al., 2021) This strategy would require teachers to look into what is appropriate for their grade level on their own, along with professional development of why physical activity is important and the role of the supervisor on the playground. (Dyment & O'Connell, 2013) One way that the research showed the imbedding of physical activity in the classroom was through music with successful results in the cognitive ability improvement of students during those learning sessions. (Marinsek & Denac, 2020)

There were different ways that researchers collected data on FMS in their participants. There were different assessments across the different countries used in the articles reviewed; a common theme among them was that the assessment did not fit the preschool skill levels. It will be beneficial to complete an assessment on students' current level of FMS skills, having the same assessment across age levels would make it more accurate when assessing the levels of student performance although this does not yet exist. One research article from Zurich modified a current assessment for infants to fit preschool levels; this could be a solution for future research and development of physical activity levels in school. (Kakebeeke et al., 2019) Expected performance varies from one grade level to the next; each grade level will have different milestones to perform to meet the expected performance.

There are activity ideas to promote FMS on the Nuku Ora website that are listed by age group and skills broken down into two age groups of 0-5 years old and 5-12 years old. The skills in the 0-5 year old age range are categorized as stability and balance (rotation and static balance), manipulative (throwing, catching, kicking, striking with hand, striking with an implement), locomotion (walking, running, hopping, dodging) and movement and body awareness. Skills in

the 5-12 year old range are categorized as stability and balance (rotation), manipulative (throwing, catching, kicking, striking with hand, striking with an implement), and locomotion (walking, running, hopping, dodging). (Nuku Ora, 2022)

After getting approval from administration, the first step is to have a meeting with the staff on the role of the supervisor on the playground and schedule a time with the staff that will implement the SOPLAY observation scans on training and practice observations. A schedule will be set up with the building administrators on when the training and observations will take place.

The data gathered from the SOPLAY observations will be analyzed to find the most popular type of equipment or materials used and what type of FMS is being completed through these activities. Through analyzing the data, trends may arise to find commonalities for boys and girls and preferred activities. This analysis will also help locate which skills students are not engaging in during free play. The questions to ask and answer based on the data are why are students not engaging in these activities? Do students have access to these activities on a regular basis? How can we support and encourage students to participate in developing these FMS skills? Data analysis of these questions will show the gaps in play opportunities and facilitate a conversation with administration on choosing and purchasing equipment and materials to meet these needs.

Teachers will include in their lesson plans physical activity opportunities with the amount of time spent each day on physical activity. Teachers currently share their lesson plans through Google Drive allowing access to view their lesson plans to anyone with access to that folder. A spreadsheet will be made with the teacher’s names and amount of physical activity recorded as an average minutes per day and total minutes per week on this sheet weekly, with the goal being

60 minutes of daily physical activity. (McKenzie et al., 2010) This time will include recess and physical education classes. Teachers can utilize part of their PLC time towards the development of these activities to boost physical activity in the classroom.

Analyzing the results of all data and applying for grants to buy playground materials and equipment would be the final steps in completing this improvement. The research and data collected through the observations and the targeted FMS that show students are lacking opportunities to develop during the school day will be a strong argument for the purchase of new materials and equipment for the playground.

Implementation of School Improvement Plan

Teachers return to work August 17, with scheduled meetings and professional development. Professional development has already been scheduled and topics assigned for this school year by administration. The professional development suggested here will occur during PLC meetings. This will be documented in their agendas by team leaders and have a task to complete, a video to watch or compare data from an observation. There are three videos to watch for training purposes that are linked on Thom McKenzie's website; the videos should be watched before the end of August. (McKenzie, 2016) During the second week of school, practice observations will take place and results will be compared for fidelity by administration. Practice observations will be repeated until the results of the observation are 90% accurate.

There will be four times during the year that the SOPLAY observation tool will be used. (Reimers & Knapp, 2017) September, December, February, and May are the goal months to complete the observations. The building principal will work out scheduled times to make sure there is no overlap with other staff obligations or special events classrooms are participating in that would affect the regular classroom schedule. A master form will be used for formatting

consistency with FMS listed for tallying the numbers of students participating in those types of activities during the scans. Teachers will use the FMS for their grade levels on the forms they are observing, also noting the number of boys and girls participating in each area at the time.

The PLC meetings will also look at the grade level milestones for the students that those teachers work with on a regular basis. Understood.org has developmental milestones for several domains including physical development. (Morin, 2022) Teachers will work with the physical education teacher on the milestones for their grade level for times to assess their current level of meeting those milestones since there is not one currently available for preschool through 5th grade. Initial assessment will occur before the end of October and an end of the year assessment will take place in May. The data will be compared to see if growth occurred at each grade level.

Staff members are required to turn in their lesson plans weekly and those lesson plans should include physical activity opportunities beyond the recess and physical education class. Total time should be recorded daily on physical activity opportunities given to students on each lesson plan. The principal has access to these lesson plans as well as all the staff members who have access to the Google Drive to upload their own lesson plans.

The responsibility of collecting data and analyzing the data would fall on a committee for the ability to collaborate and brainstorm, however all staff would have a role to play in data collection. St. Mary's already has a health and wellness committee, it could fall into their area or create a new committee with the end goal of playground development. After the collection of data and analysis of the FMS and SOPLAY, the committee will look at what FMS are lacking opportunities on the current playground. This data will give the support to the school board to fund new materials and equipment on the playground to meet the needs of all FMS.

Some challenges to the plan are the timeline of completion, time to get the training completed and getting staff on board. This can be viewed as increasing workload to staff and staff will have to be responsible for follow through on the completion of tasks. Creating activities to promote physical activity in the classroom takes time to develop and implement. Also, different activities are needed for different grade levels and subject areas. St. Mary's school has one section for each grade level, making collaboration with teachers of the same age students difficult. The training provided may not be sufficient to provide accurate results in the goal timeline when all professional development days are already allocated to other topics.

Conclusion

Physical activity is important to the development of the whole child. When children exercise their bodies it goes beyond physical development, it also helps their cognitive development, social skills and overall health of the child. (Hestbaek et al., 2017) This development starts at home with parents watching and encouraging the completion of milestones, and reporting concerns to their doctor at regular visits. Teachers can help with this development through facilitating activities and promoting physical activity through multiple opportunities. Research has shown that the habits started in youth carry on into adulthood when those habits are encouraged and nurtured, which helps adults to maintain a healthy life and cope with stress that comes with adult life. (Giles et al., 2017)

The current reality of a majority of schools is the amount of sedentary time compared to active times students are engaged in during a typical school day. The recommended amount of time that children engage in MVPA activities is 60 minutes daily, but the majority of children do not meet this benchmark. (McKenzie et al., 2010) One issue that comes up is the availability of

equipment and materials to promote physical activity especially MVPA and opportunities that promote FMS mastery.

Teachers can have a large impact on physical activity opportunities in their students. Through reevaluating their role during recess teachers, can change their experience from supervisor to facilitator, engaging and encouraging students to be active during those leisure times. (Dyment & O'Connell, 2013) Teachers can aid in the data collection of physical activity opportunities, including those that take place in the classroom, and evaluation of activity that occurs on the playground; one way to do this is through the use of SOPLAY. (Reimers & Knapp, 2017) Through the evaluation of materials and equipment on the playground, how they are used, and the FMS that they help develop a justification can be made to purchase new materials and equipment to fill in gaps in FMS opportunities. In the future, there will be continued evaluation of the playground, physical activity opportunities in and out of the classroom and progress towards FMS mastery.

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Appendix

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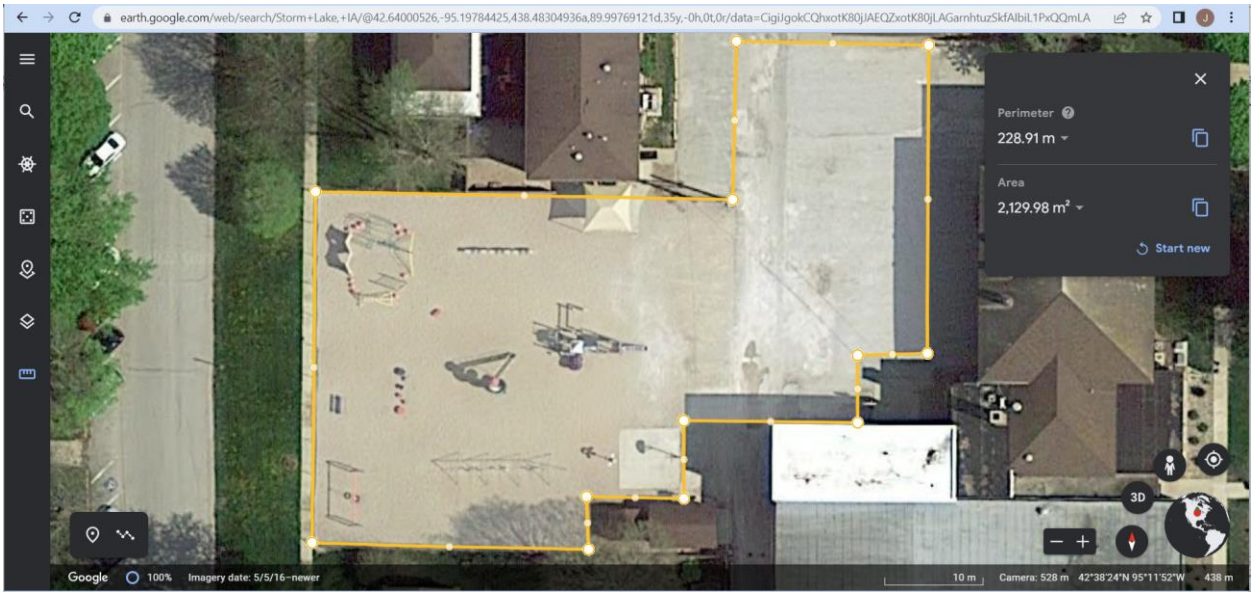

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