2013

A Systematic Review of the Best Practices for Playground Inclusion

Megan Mejeur
Grand Valley State University

Graceann Schmitt
Grand Valley State University

Hannah Wolcott
Grand Valley State University

A Systematic Review of the Best Practices for Playground Inclusion

Megan Mejeur, Graceann Schmitt & Hannah Wolcott
Masters of Occupational Therapy
Grand Valley State University
2013

A SYSTEMATIC REVIEW OF THE BEST PRACTICE FOR PLAYGROUND INCLUSION

By:

Megan Mejeur
Graceann Schmitt
Hannah Wolcott

A MASTER OF SCIENCE RESEARCH PROJECT

Submitted to the Department of Occupational Therapy
Grand Valley State University
Grand Rapids, Michigan
in partial fulfillment of the requirements
for the degree of

MASTERS OF SCIENCE

2013

RESEARCH COMMITTEE APPROVAL

Chair: Denise Meier, M.A., OTR Date

Lidia Hayhurst, OTR/L 12/4/12

Member: Lidia Hayhurst B.S., OTR Date

Colleen Halloran-Vander Wier, MSPT BS 12/9/12

Member: Colleen Halloran-Vander Wier, MSPT, B.S. Date

Member: Claudia Leiras-Laubach, Ph.D., M.S., B.S. Date

Abstract

Occupational therapy considers the person, occupation, and environment when providing treatment services. In schools, the person is the student, the occupations include education and play, and the environment is the classroom and the playground. In Muskegon, Michigan, the public school system is undergoing a consolidation of elementary schools and trying to determine what to do with the current playground environment. The researchers conducted a systematic review of the existing research regarding best practice, accessible, and inclusive playground designs for the elementary schools that will promote physical activity and enhance classroom performance. Scholarly databases and gray literature were searched using predetermined key words and inclusion and exclusion criteria. A total of 21 research articles were analyzed for content and summarized in a table (see Appendix B). The research findings provide recommendations to design a more inclusive and accessible playground that promotes physical activity. The results also suggest that physical activity on the playground enhances classroom performance. Further research should evaluate the effects of specific playground equipment for various students and how the playground can be utilized for occupational therapy treatment intervention

Table of Contents

List of Tables

List of Appendices

Chapter One: Introduction

Play, characterized as engagement in activity for enjoyment and recreation, is necessary for a child's optimal development. School playgrounds, which are natural environments for children, offer copious opportunities to increase physical, cognitive, and social skills, while simultaneously developing personal creativity, curiosity, imagination, and the ability to communicate. Children developing typically and children with disabilities have the same desire to climb, slide, socialize, pretend, and have fun. By playing together, children with and without disabilities learn to appreciate each other's similarities and abilities. Inclusive playgrounds benefit the development of all children, regardless of their developmental status or abilities (Playgrounds, n.d.).

Background

The budget cutbacks in Michigan have impacted public school systems statewide. One district, Muskegon Public Schools, is unable to sustain the financial burden of operating nine elementary schools and will have to consolidate to six schools to better use available resources. Part of the consolidation process involves evaluating the quality and usability of the current playgrounds at each school. An important statistic is that of the elementary school student population at MPS, 22% have an individualized education plan (IEP) (Lidia Hayhurst, personal communication, Dec. 2011). Thus, school administrators were interested in developing inclusive environments for students with developmental disabilities and typically developing students alike.

The related service providers affiliated with the school district, which consist of physical, occupational, and speech therapy, play a vital role in the success of all students by utilizing the Multi-Tier System of Supports (MTSS). The Multi-Tier System of Supports (MTSS) is used by

occupational therapists as a way to enable every child to be successful. This is accomplished by being prevention oriented and implementing evidence-based interventions for all students in the school system (KSDE, 2008).

The role of the occupational therapist in school-based practice is to work with children to increase functional independence and support the ability to succeed in occupations required at school. Occupational therapists facilitate students' social interactions, self-help skills, play activities, and sensory motor functioning to enhance performance in the classroom (AOTA, n.d.). Thus, in the school setting, occupational therapists are also concerned with readiness to learn for all children. Readiness to learn is the state or condition of an individual that makes it possible for him or her to perform classroom activities to the best of his or her ability. A child's performance in the classroom can be influenced by the time allotted for physical activity and the number and length of breaks from cognitive tasks (Pellegrini & Bjorklund, 1997). OTs possess the knowledge to address physical activity and cognition.

Physical activity has numerous physical and mental health benefits and should be encouraged in the school setting, particularly on the playground, which is a natural environment for children (Taylor, Farmer, Cameron, Meredith-Jones, Williams, & Mann, 2011). According to the World Health Organization (2011), children between the ages of five and seventeen are recommended to exercise 60 minutes a day at moderate to vigorous intensity. Muskegon Public Schools requires students to have a recess period daily, but the time allowed rarely meets the recommended 60 minutes of physical activity for health standards (Lidia Hayhurst, personal communication, Dec. 2011). However, physical activity promoted throughout the school day elicits a readiness to learn when children are in the classroom. If children engage in increased physical activity, they may have increased academic success.

Problem Statement

The existing playgrounds at the Muskegon Public Elementary Schools do not provide adequate opportunities for physical activity, therapeutic interventions, or an inclusive environment for children with and without disabilities. The school district needs to develop playgrounds that are safe, inclusive, and provide opportunity for the best therapeutic interventions. In addition, the equipment must promote readiness to learn through physical activity and play.

Purpose

The study was a systematic review of pertinent literature for best practice regarding playgrounds for full inclusion. This study was guided by the Person-Environment-Occupation (PEO) Model, a theoretical framework used in occupational therapy. The PEO Model guides therapists by applying a client-centered approach while interpreting how the environmental influences the occupations of individuals (Law, Cooper, Strong, Stewart, Rigby & Letts, 1996). A child's primary occupation is to play, which can occur in the environment of school playgrounds. This study provided research regarding the three components of the model to identify a best practice, inclusive playground for the elementary schools that are going to be consolidated at Muskegon Public Schools.

Significance of Problem

With a decrease in time allotted for physical activity during the school day and a large percentage of children having IEPs, the need for an inclusive environment to promote physical activity for all children is becoming increasingly pertinent. The playground is a natural environment that allows children to expend energy and be better focused in the classroom. The systematic review of the literature surrounding best practice playgrounds will establish

guidelines to be used in Muskegon Public Schools when designing inclusive playgrounds.

Children's primary occupations are play and participation in formal education. Occupational therapists who work in the schools evaluate children's capabilities in their natural environments of the classroom and playground. Therapists' interventions help children increase play exploration, social participation, and increase their ability to function in the classroom environment. An inclusive playground provides an environment for children of all abilities to develop and utilize these skills (Mulligan, 2012).

Research Questions

This study used past literature to examine the following inquiries: (a) What are evidence-based best practices for use of playground equipment to foster inclusion for both children with disabilities and typically developing children? (b) How do occupational therapists use playgrounds to facilitate interventions for children?

Key Concepts

Many key concepts were addressed throughout the research.

I. **Inclusion of children with disabilities.** This means that all children, regardless of ability level should be given equal opportunities to participate in activities. Inclusion on the playground refers to creating an environment where all children have equal access and opportunity to engage in play.

II. **Best practice for playground design to meet needs of diverse pediatric populations.** Every playground is structured according to a specific plan to attain the greatest number of options for students across the developmental and disability spectrum, while keeping safety and accessibility in mind. A state of the art playground includes a design that maximizes play safety, accessibility, and learning (ADA Accessibility Guidelines for Play Areas, 2000).

III. **Disabilities addressed in the Individualized Education Programs (IEP).** An IEP refers to an Individualized Education Plan that is provided for students who meet the qualifications to receive special education services in the schools. Children with a wide range of physical, emotional, or cognitive disabilities may have an IEP. Children in the Muskegon Public School district who have an IEP may have a limited playground experience based on their disability. Since 22% of students in Muskegon Public Schools have an IEP, it would be beneficial to incorporate playground designs that utilize equipment for therapeutic intervention (Lidia Hayhurst, personal communication, Dec. 2011).

IV. **Occupational Therapists treat children to improve the use of motor skills, social play, praxis, and sensory integration.** Play is the primary occupation of children. Therefore, the goal of occupational therapy intervention is to help the child develop skills that can be generalized to the playground environment.

V. Playground environment includes the physical and social aspects that comprise the playground dynamic. The physical environment includes playground structures, surfaces and materials used, and the natural surroundings. The social environment includes a venue to foster social engagement through interaction with other children (Edmondson, Fetro, Drolet, & Ritzel, 2007).

VI. Multi-Tier System of Supports (MTSS). The Multi-Tier System of Supports (MTSS) is a system wide model used by all school personnel including the related service providers in educational settings to enable every child to be successful. This is accomplished by being prevention oriented and implementing evidence-based interventions for all students in the school system (KSDE, 2008).

VII. Readiness to Learn. Readiness to learn is the state or condition of an individual that makes

it possible for him or her to perform classroom activities to the best of his or her ability. A child's performance in the classroom can be influenced by the time allotted for physical activity and the number and length of breaks from cognitive tasks (Pellegrini & Bjorklund, 1997).

VIII. Stakeholders. Stakeholders are those with a vested interest in the project or issue being addressed. Primary stakeholders include those staffing and funding the program, while secondary stakeholders are the consumers directly and indirectly impacted by the program. In Muskegon Public Schools, the stakeholders would include the school administration, staff, related service providers, the students and their families, and those financially vested in the project.

Summary

A clear need exists for this study as indicated by the administration and related service providers at Muskegon Public Schools. The first step in designing an inclusive playground for Muskegon Public Schools is to review the current literature to determine the best practice for playground equipment. The researchers will then investigate designs that foster inclusion of all elementary school children and better prepare them to for classroom performance. Through a systematic review, this study provides evidence of best practices for playground inclusion. This information will enable the administrators and key stakeholders in the Muskegon Public School District to make judicious decisions that offer the best therapeutic playground options designed to benefit all students.

Chapter Two: Methods

Research Protocol

A systematic review was completed in order to provide Muskegon Public Schools with the evidence based best practice design for inclusive playgrounds. The systematic review evaluated and synthesized all current literature and provided a summary to answer the research questions: (a) What are evidence-based best practices for use of playground equipment to foster inclusion for both children with disabilities and typically developing children? (b) How do occupational therapists use playgrounds to facilitate interventions for children?

To complete the systematic review, researchers utilized numerous databases: Education Resources Information Center (ERIC), CINAHL Plus (EBSCO), OT Seeker, PsychINFO, and PubMed. To supplement the articles retrieved from the databases, the researchers accessed gray literature resources to further identify related unpublished articles. The sources the researchers gained access to included mednar.com, scirus.com, worldwidescience.org, and greynet.org. A complete description of the search strategy is provided in Appendix A.

Key words and phrases were identified to efficiently search the selected databases for article retrieval. The multi-database search was conducted using these key words and phrases: “inclusion,” “playground activities,” “playground equipment,” “children, disabilities,” “exceptional child,” “recess break,” “motor skills,” “recreation therapy,” “mainstreaming,” “occupational therapy and playgrounds,” “occupational therapy,” “play and children,” “play and disabilities,” “play and elementary child and development,” “child development and play,” “universal design for playgrounds,” “daily living skills,” “slide,” “swing,” “sandbox,” “readiness to learn,” “learning readiness,” “academic achievement,” “physical activity,” “play in children,”

and “elementary students.” After an extensive search of the databases, the articles were sorted based on whether they met eligibility criteria.

Using these keywords and phrases, the researchers performed a preliminary search of the selected databases. Findings from this search were then evaluated for common themes. These results led to the development of inclusion and exclusion criteria as well as categories to guide further research. The categories included: playground design for inclusion, playground play for various populations, and readiness to learn. The categories were developed and grouped based on the Person-Environment-Occupation (PEO) model used in occupational therapy practice. Each category related to the specific criteria of the model: person (playground play for various populations), environment (playground design for inclusion), and occupation (readiness to learn).

An exhaustive search of the databases was then performed using the identified eligibility criteria focusing on the specified categories. The following is a list of inclusion and exclusion criteria for the research articles. Articles chosen for inclusion focused on research regarding playground design, the role of the playground for different populations, and the benefits of play on the playground for children. The major factor for exclusion for this study was the absence of use of the playground in the study protocol. Other exclusion criteria include: articles published before 1992, and populations outside of children aged preschool through eighth grade.

Table 1: Inclusion and Exclusion Criteria

Inclusion	**Exclusion**
Type of materials on playground	Development from play
Adult influence on the playground	How children with and without disabilities interact during play
Benefits of recess/play on playgrounds for readiness to learn	Play preferences of children with and without disabilities
Children’s preference of playground equipment	Play therapy
Playground design that fosters inclusion	Parent’s perception of children’s play
Playground play for various populations	

Chapter Three: Results

The search of the databases yielded 21 articles written by authors or researchers from around the world that met the inclusion criteria. The research represented many fields, including occupational therapy, physical therapy, education, sports and exercise psychology, physical education, developmental and physical disability, center for accessibility, health sciences, children's geographies, and school psychology. Similar articles were grouped based on the categories determined from the preliminary search.

Eight articles written about playground design for inclusion, eight articles describing playground play for various populations, and five articles that focused on readiness to learn were included in the study. Thirteen articles were qualitative, four were quantitative, and four were mixed methods. The articles were written between the years of 1997 and 2012. Within each of the three categories, various themes were evident.

Playground Design for Inclusion

The articles discussing playground design for inclusion contained research concerning playground equipment and how it affects the types of play that occurs. Two types of playground equipment were addressed in research: fixed equipment and loose equipment.

Fixed equipment is the playground structure that remains stationary on the grounds of the school. It may include items such as swings, slides, ladders, or monkey bars. Two articles, Menear, Smith, and Lanier (2006) and Willenburg et al. (2008), mentioned that fixed equipment established play options for children. Menear et al. (2006), a research article discussing the needs of children with autism, described a circular shaped playground to encourage increased play experiences for this population. The circular shape was created by building fixed play equipment in a circle, leaving an area in the middle for cooperative play. The playground also

afforded children a balance of challenge and success as they maneuvered through the equipment. In the article by Willenburg et al. (2008), 3,006 children from 23 primary schools in low socioeconomic areas of Melbourne, Australia saw fixed equipment as inviting, with a greater impact on moderate activity levels.

In 2006, Yuill, Strieth, Roake, Aspden, &Todd investigated the use of a circuit style structure for fixed equipment, which was designed to encourage children to fluidly navigate the playground and maintain continuous activity. The population in this study included eight children, between the ages of five and eleven, who had been diagnosed with autism spectrum disorders (ASD). The findings suggested that the circuit design increased both group and social play for the children with ASD. In addition, the playground had high spatial density, which brought more children into closer contact and increased social interaction (Yuill et al., 2006).

Two other studies addressed the best practice surfaces for playgrounds (Skulski & York, 2011 and Willenburg et al., 2008). Using five different surfaces, researchers found that no playground surface lasted during a 12 month time period without needing repairs. However, it was determined that the most accessible surface for playgrounds was use of one, consistent material because it required less force for mobility (Skulski & York, 2011). Willenburg et al. (2008) investigated the use of bitumen, marked and unmarked, and grass as possible surfaces for playgrounds. Children in the study engaged in moderate physical activity on bitumen surfaces with court markings and goals. The children showed no differences in levels of moderate or vigorous physical activity were detected between grass and bitumen (Willenburg et al., 2008).

The second type of material was loose equipment, which is comprised of materials that can be brought to the play area and used for less-structured, cost-effective play. Materials were readily available and included balls, jump ropes, hay bales, cardboard boxes, tubing, or crates.

The use of loose equipment on the playground was found to increase creative, social, and active play. Social and creative play were addressed in three articles: Bundy et al., (2008); Bundy et al., (2009); and Nabors, Willoughby, Leff, & McMenamin, (2001). Participants in Bundy et al. (2008) and Bundy et al. (2009) included children in a mainstream school with a range of social and physical abilities between five and seven years of age. Teachers supervising playground duty indicated that children were highly motivated to engage in play with loose materials because they could be creative and make up new games including rule-based games and competitive games (Bundy et al., 2008). Nabors et al. (2001) moved toys that facilitated inclusive play in the classroom to the playground, including small blocks, soft balls, buckets, shovels, trucks, small action figures, and cars. These toys promoted pretend play and social interactions between children with and without disabilities. Bundy et al. (2009) found that when given the loose materials, children who usually did not play together, were more likely to do so. Additionally, teachers noted decreased aggression on the playground and more co-operative play.

Four research studies suggested that loose equipment increased physical activity (Bundy et al., 2008; Bundy et al., 2009; Huberty et al., 2010; Willenburg et al., 2008). Huberty et al. (2010), a study including 93 mainstream children in third, fourth, and fifth grade, implemented zones for play with 15 pieces of equipment in each zone. The researchers found that time spent in both moderate and vigorous activity increased significantly after the loose equipment was introduced into each of the zones.

Although loose equipment had numerous benefits, it also elicited considerations about levels of supervision. Some teachers expressed concern about the safety of children and heightened supervision of play, even though the injury rates did not increase during research

(Bundy et al., 2009). Willenburg et al. (2008) also observed an increase in vigorous activity when the availability of loose equipment was linked with higher levels of supervision.

Playground Play for Various Populations

The articles in this category focused on the types of play that children with and without disabilities engage in on the playground, barriers that exist on the playground for children with disabilities, and children's perception about the playground. The results demonstrated all children, regardless of ability level, viewed the playground as a familiar place they enjoyed. However, for children with disabilities, the playground posed many barriers and was a place they often played in isolation. (Bray & Cooper, 2007; Burke, 2009; Prellwitz, 2007; Taub & Greer, 2000; Wooley, Armitage, Bishop, Curtis & Ginsborg, 2006).

The idea that the playground is a place all children can identify with was discussed in the study by Prellwitz (2007), addressing the accessibility and usability of the playground for children with disabilities. The population of this study was 20 children between the ages of seven and twelve. The participants included five children with restricted mobility, five children with severe visual impairment, five children with moderate developmental disabilities and five children without disabilities. Results from this study compared many similar experiences typically developing children and children with disabilities had on the playground. All of the children viewed the playground as a place they knew well and would miss if it were gone. They identified the playground as a place that promoted role-playing, with play equipment shaped in recognizable designs, such as a car, house, boat, or animal promoting the most role-playing. Children also identified the playground as a place that allowed for some sort of challenge, and as a place for private conversation away from adults. However, children with disabilities

mentioned that playground equipment often hindered their participation, whereas typically developing children did not (Prellwitz, 2007).

Four research articles discussed barriers children with disabilities experienced on the playground. (Prellwitz, 2007; Skar, 2002; Taub & Greer, 2000; Wooley et al., 2006). Taub and Greer (2000) identified social and physical barriers that limited access to the playground for children with disabilities. The population for their study included 21 boys and girls with physical disabilities between the ages of 10 and 17. First, children with disabilities experience social barriers from their peers. Taub and Greer (2000) found that typically developing children often do not think children with disabilities are capable of engaging in physical play, whether it is in physical education classes or on the playground. In addition, Taub and Greer (2000) found that teachers frequently have stereotypical perceptions regarding what children with disabilities are capable of doing to be physically active. Wooley et al., (2006) discovered that the schedules of children with disabilities can also act as a barrier. For example, many children with disabilities have specific routines for playtime and lunchtime that are different than their typically developing peers. This often caused children with disabilities to arrive at the playground later, therefore putting them at a disadvantage to join in cooperative play with their peers. The population for this study included 18 children with a wide range of impairments including; autism, muscular dystrophy, epilepsy, Down's syndrome, hearing or sight impairments, cerebral palsy, congenital heart disease, spastic quadriplegia, impaired growth, developmental delay, communication difficulties, and spina bifida. Several children had multiple impairments.

In addition to social barriers, children with disabilities encountered many physical barriers on the playground. The physical design of equipment and the way the equipment was

arranged frequently made it inaccessible to children with physical disabilities. Skar (2002) reported that children with disabilities often had difficulty accessing popular playground equipment, such as the swings, slides, and climbing facilities. The eight children in this study were between the ages of six and eleven and each had a motor disability, which required the use of a mobility aid. These children described that it was difficult to get on and off of the playground equipment without the help of an adult. The results of this study showed that the children did not view their mobility aids as barriers to play, but rather the playground environment as posing a barrier (Skar, 2002).

Prellwitz (2007), found that of 2,266 playgrounds assessed, only two were built to be accessible to children with disabilities. Only 46 of these playgrounds had at least one piece of playground equipment that could be accessed by a child with restricted mobility. The main reason the playgrounds were not accessible for children with disabilities was because the ground cover was either sand or gravel and the openings onto the playgrounds were too narrow. Results from the Prellwitz (2007) study also showed that people in charge of creating the playgrounds had limited knowledge about accessible design and had not discussed accessibility before planning and building the playgrounds. The playgrounds were built without consulting with organizations or skilled professionals knowledgeable in designing spaces and playground equipment for children with disabilities.

Two researchers provided information about ways the playground affords or limits opportunities for children with disabilities. One researcher (Burke, 2009) examined the playground and what it meant to children with disabilities. Another researcher, (Prellwitz, 2007) interviewed parents of children with disabilities to understand their thoughts regarding their childrens' playground experiences. Burke (2009) identified that children with disabilities seek

and value places on the playground where they can be by themselves at times. Children with disabilities provided many reasons for wanting a place to be alone including; to take a break from play, hide, think and reflect, be safe, and to be independent. The same children identified unlikely spaces as play areas, such as: roof turrets, seats, stairs, spaces under platforms, and shade trees.

Prellwitz (2007) interviewed parents of children with disabilities and found that parents perceived that their children missed opportunities to play and participate with other children on the playground. The parents felt children were dependent on adult support for playground play and that the playground was a place where their children felt different from their peers. The parents had a much more negative view of the playground environment than their children.

Four articles mentioned the difference in play among children with disabilities and typically developing children (Bray & Cooper, 2007; Nabors & Badawi, 1997; Nabors, Willoughby, & Badawi, 1999; Prellwitz, 2007). Nabors and Badawi (1997) and Prellwitz (2007), noted that children with disabilities were most often observed in solitary play on the playground, while typically developing children were observed engaging in cooperative play with their peers. Nabors, Willoughby, and Badawi (1999), examined the relationship between the involvement of children with disabilities in cooperative play and the complexity of the activity. The study's population included the same 64 children from the previous Nabors and Badawi (1997) study. Forty-five of the children were typically developing and 19 had disabilities. The primary diagnoses of the children with disabilities were developmental delay, cerebral palsy, Down syndrome, epilepsy, hearing impairment, Apert's syndrome, behavioral/emotional problems, autism, ADHD, and speech/language impaired. This study explored activity and the type of play in which children were engaging. Activity type consisted

of complex activities (those involving fine motor skills as well as higher levels of social, cognitive, and language abilities), low-demand activities (predominantly gross motor skills such as sliding or running), and talking. Results indicated that when children with disabilities and typically developing children were playing in inclusive groups, they were 20 times more likely to be engaged in low-demand activities than when playing in groups of only typically developing children or children with disabilities. In contrast, when one child with a disability was observed engaging in play with only typically developing children, the child with a disability was 10 times more likely to be engaged in complex activities and 30 times more likely to be talking than when playing in inclusive groups or groups consisting of only children with disabilities. The six most common activities identified were: talking, playing with small toys in the sand, playing on the tire swing, riding bikes, swinging, and chasing or running. Children with and without disabilities were found to engage in low-demand activities more frequently than complex activities, and all children spent a significant amount of time on the playground talking.

Prellwitz (2007) and Bray and Cooper (2007) reported that children with disabilities engaged in less creative play than typically developing children. Bray and Cooper (2007) also discovered that preschool children with disabilities played on the playground at a developmental level well below their chronological age. The preschool children in this study included three children with Down syndrome, four children with autism spectrum disorder, three with severe speech delay, and two with developmental delay. Likewise, children with developmental disabilities explained that much of the playground equipment was too complicated for them to understand and they did not want to use the playground when other children were present because they were afraid they might use it wrong and get teased (Prellwitz, 2007).

Readiness to Learn

The search of the databases produced five articles fitting the inclusion criteria, supporting readiness to learn for various populations in the school setting. The populations targeted in these articles included children with Attention-Deficit Hyperactivity Disorder (ADHD), children with both physical and cognitive impairments, and typically developing children. The students in the studies spanned in age from kindergarten to fifth grade. Key research for this portion of the review provided support for activities that promote readiness to learn at school.

One research study described the use of readiness to learn techniques for students with Attention-Deficit Hyperactivity Disorder (ADHD). Ridgway, Northup, Pellegrin, LaRue, & Highschoe (2003) examined the effects that participation in recess had on classroom behavior of children diagnosed with ADHD and their typically developing peers. The study measured the amount of inappropriate behavior exhibited by students in the classroom on days with and without recess, along with recess being offered at various times of the day. The results indicated that students with and without ADHD, when provided morning recess, exhibited less inappropriate behavior than when they did not receive recess in the morning. Additionally, when recess was offered later in the morning, the inappropriate behavior of both students with and without ADHD progressively increased over time until after recess. This study provided a direct correlation between recess and improved classroom behavior for students with ADHD and typically developing students.

In addition to the student population with ADHD, readiness to learn has also been researched for typically developing students. Castelli, Hillman, Buck, and Erwin (2007) found a connection between physical activity and academic achievement. The group examined the correlation between scores in fitness training and academic achievement testing for third and

fifth grade typically developing students. The results identified a significant positive correlation between physical fitness and academic achievement, indicating that students who are more physically fit are more likely to perform better on academic tests. Two aspects of the physical fitness test, BMI and aerobic fitness, were linked directly to academic achievement scores.

Today, opportunities for physical activity in the schools are being eliminated to provide more instruction time in the classroom (Dills, Morgan, & Rotthoff, 2011). Dills et al. (2011) conducted a study to provide evidence that having time during the academic day for children to engage in physical activity is not harmful to academic performance. The researchers surveyed teachers from a variety of schools to determine the time students in kindergarten through fifth grade spent engaged in physical activity either at recess or in physical education (PE) classes. A longitudinal study tracked the test scores of these students over several years along with the amount of physical activity engaged in weekly. Results indicated that no significant negative correlations existed for the inclusion of physical activity during the school day, either through recess or PE class, and test scores. Therefore, decreased time spent in the classroom to allow for physical activity does not diminish academic performance.

Ramstetter, Murray, and Garner (2012) conducted a systematic review to identify how recess benefitted the cognitive, social, emotional, and physical functioning of students and to reinforce the need for recess in the school day. The researchers' systematic review found evidence stating that children are more attentive in the classroom following engagement in physical activity at recess. Additionally, children benefit from the hands-on, manipulative learning that occurs regularly on the playground. This type of learning, which boosts cognition and increases academic performance, is missed when recess is not provided during the school day.

Readiness to learn has also been investigated to connect the benefits of physical activity for students with disabilities. Mancini and Coster (2004) utilized the School Function Assessment (SFA) to determine what skills were needed for participation of children with both cognitive and/or physical disabilities in various settings in the school environment. The assessment indicated that in the classroom, two of the key skills indicated for participation were the ability to maintain a stable posture and to transfer from one position to another. On the playground, participation was linked significantly with the ability to perform movements required for recreational activities. For participation in both the classroom and the playground, physical activity is a main component, and the ability to perform these physical tasks is significantly linked with successful participation.

Chapter Four: Discussion

The purpose of this systematic review was to examine the best practice for inclusive playgrounds and to explore the role of occupational therapy on the playground. The results of this study will provide Muskegon Public Schools with the information necessary to design inclusive playgrounds for all students. The research questions addressed in this study were:

(1)What are evidence-based best practices for use of playground equipment to foster inclusion for children with disabilities and typically developing children?

(2) How do occupational therapists use playgrounds to facilitate interventions for children?

The findings of this systematic review identified the playground as a natural environment that was familiar to all children, yet a variety of barriers existed for children with disabilities that hindered full participation. These barriers included physical, social, and cognitive factors that inhibited the child's ability to engage in the occupations of play and education. The implications of this study will assist Muskegon Public schools in decreasing the barriers encountered on the playground by the students with an IEP. In addition, occupational therapists can benefit from the findings of this systematic review, as they are equipped to identify barriers, promote independence, and create optimal learning environments for children with disabilities as well as typically developing peers in the school system.

Playground Inclusion

Inclusive play on the playground, as suggested by literature, is limited based upon the numerous physical and social barriers for children with disabilities (Prellwitz, 2007; Skar, 2002; Taub & Greer, 2000; Wooley et al., 2006). Physical barriers included uneven surfaces on the playground, narrow openings to access the playground, and playground equipment that could not

be accessed by children with disabilities without assistance from an adult (Skar, 2002). These physical barriers denied the opportunity for social engagement between children with disabilities and those without, which formed a social barrier. Other social barriers resulted from negative perceptions of typically developing students regarding the ability of their peers with disabilities to play. This led to children with disabilities being stereotyped and excluded from social play (Prellwitz, 2007). Cognitive barriers were present when children were unable to recognize how playground equipment should be utilized, and thus did not engage in play. Research supported the use of both fixed and loose equipment to promote accessibility, create familiar and inviting environments, and elicit social play among children of all abilities (Bundy et al., 2008; Bundy et al., 2009; Nabors et al., 2001; Yuill et al., 2006).

To increase physical accessibility, researchers suggested having accessible surfaces in the playground area so that children with mobility equipment, such as wheelchairs, walkers, and forearm crutches could navigate fluidly. It was also desirable to have one continuous surface in order for mobility throughout the playground to be accomplished with ease (Skulski & York, 2011; Willenburg et al., 2008). Both providing accessible entrances and barrier-free equipment was necessary for children to participate in play and to navigate the equipment.

The actual design of the playground promoted socialization. Children with autism spectrum disorders rarely interact with others in free play situations and have difficulty with imaginative play. This review found that the use of a circuit-style structure for fixed equipment encouraged children to fluidly navigate the playground and maintain continuous activity. This design was especially beneficial for children with autism spectrum disorders it provides sufficient structure that leads children through a clear, continuous play circuit, allowing more social and imaginative play with the appropriate level of physical challenge (Yuill et al., 2006).

A circular design, with equipment arranged in a circle with a central open area, promotes social engagement in the middle section because it created structural boundary (Menear et al., 2006). In addition, if a playground has a high density of equipment in one area, children are more likely to interact with each other (Yuill et al., 2006).

Cognitive barriers can be reduced with fixed equipment that is inviting and recognizable to all children. When playground equipment is too complicated for children with disabilities, they are less likely to use it for fear of improper use, leading to isolation (Bray & Cooper, 2007). Research indicated that when playground equipment was designed as common objects, such as a car, house, boat, or animal, a more inviting environment was established for children of all abilities to play (Prellwitz, 2007; Willenburg et al., 2008). The presence of objects that were familiar to both children with and without disabilities created a play environment well known to all children. This elicited a more inclusive environment, increasing role-playing, creativity, and social engagement (Prellwitz, 2007).

In addition to fixed equipment, loose equipment provided opportunities for inclusive play. Loose equipment, such as small blocks, balls, buckets, shovels, trucks, action figures, cars, hay bales, and jump ropes can provide opportunities for social play, especially when equipment is inaccessible for children with disabilities. With the presence of loose equipment, children with disabilities were not required to access fixed equipment to engage in play with their peers. Instead, they were able to create their own games and establish their own play options because the equipment could be moved to them (Bundy et al., 2008; Bundy et al., 2009; Nabors et al., 2001).

With the consolidation of six elementary schools, Muskegon Public Schools has to evaluate how they will utilize the current playground equipment. These findings should be used

to determine how to best promote inclusion with the current fixed equipment. If funding is available to purchase new fixed equipment, an accessible and inclusive design should be considered. The addition of loose equipment can also be a cost-effective way to supplement the playground with inclusive play options for all children.

Playgrounds and Readiness to Learn

The second research question addressed how occupational therapists use playgrounds to facilitate interventions for children. The findings of this systematic review did not produce concrete evidence regarding the presence of occupational therapy interventions on the playground. However, evidence supported use of the playground by occupational therapists to increase participation in the occupations of education and play.

The role of an occupational therapist working in the school setting is to create an environment that supports participation in school occupations for all students. According to the MTSS, all students should be supported by prevention-oriented and evidence-based interventions provided by occupational therapists (KSDE, 2008). One aspect of the school environment that influenced children's participation in the classroom was the amount of play opportunities implemented throughout the day, either at recess or in physical education classes. Physical activity throughout the school day increased academic performance, improved behavior in the classroom, and provided health benefits for students (Ramstetter, 2010; Dills et al., 2011; Bundy et al., 2009). Recess and time spent on the playground provided opportunities for children to engage in physical activity using both fixed and loose playground equipment (Ramstetter, 2010; Dills et al., 2011; Bundy et al., 2009). The opportunities to participate in physical activity at recess needs to be provided to all students regardless of ability level and age to ensure readiness for classroom learning as well as to improve classroom behavior.

For successful participation in classroom occupations, children must develop a wide range of cognitive, physical, and social skills. While many of these skills are developed through curriculum in the classroom, some skills cannot be as easily learned in this environment. The playground environment fosters hands on learning and social play that is not implemented in the structure of the classroom (Ramstetter, 2010). Decreased time spent on the playground limits the amount of time that children are allowed to engage in the development of these skills. Additionally, the skills learned through creative, social, and physical play on the playground are generalized and applied in the classroom and improved the student's ability to learn and participate in this environment (Nabors et al., 2001; Bundy et al., 2008; & Bundy et al., 2009). Skills that develop on the playground are vital to the success of the child as a student in the classroom.

With the implementation of the MTSS at Muskegon Public Schools, occupational therapists will be considering the school environment and supports necessary for all children. The amount of physical activity provided during the day is important to consider for successful participation for children with and without disabilities. With the addition of inclusive playgrounds, all children at Muskegon Public Schools will have the opportunity to engage in physical activity in a natural environment daily.

Implications to Occupational Therapy

Occupational therapists perform many roles in a school setting, by providing all students the support needed to be successful in the occupations of education and play. However, there are many other roles of an occupational therapist in this setting: educator, advocate, and researcher. Occupational therapists can use the findings from this systematic review to eliminate the social, physical, and cognitive barriers in practice by evaluating the environment, educating

stakeholders, identifying future needs for research, and advocating for children in school and on the playground.

Educate.

One major role of occupational therapists is to educate students, their families, and members of the community. Therapists working in the school setting must educate stakeholders including the students, parents, teachers, administrators, and others in the community that have a role in making decisions impacting the students and their educational experience.

The results from this review provided evidence for therapists in regards to best-practice for inclusion of all children in the occupations of play and education. First, occupational therapists should take part in the planning of playgrounds in order to ensure inclusive environments for all students. The research indicated that the majority of existing playgrounds do not provide accessible play opportunities for children with disabilities. No child should have to forgo the opportunity to engage in the occupation of play on the playground because they cannot access the playground. Occupational therapists have expertise in accessible designs and adapting environments, and therefore should be involved in educating school staff, as well as the playground builders, about the best practices for playground designs that eliminate barriers. If all students have the ability to access the playground, they have the opportunity to engage in physical activity. Also, teachers and playground staff need to be informed of the importance of physical activity to enhance performance in the classroom.

Occupational therapists can also educate school staff on ways to foster inclusion at recess because they have knowledge about disabilities and types of interventions. Playground supervisors would benefit from in-services to promote the importance of play between children of all abilities. These in-services could also empower the playground supervisors to observe

interactions more closely and vocalize any social, cognitive, or physical barriers they notice on the playground.

Advocate.

Occupational therapists also assume the role of an advocate for students. Within the schools, it is important for occupational therapists to advocate for all children to teachers, parents, school staff, and administration.

School schedules are changing due to the increased demand for time in the classroom while time on the playground is diminishing. With an increased demand to meet academic standards, occupational therapists need to advocate for physical activity as a necessary component of the educational experience as a way to increase test scores and promote learning opportunities for all children. Results of this systematic review confirmed the need for recess to remain an integral part of the school day and demonstrated that increased time allotted for physical activity does not diminish academic performance (Dills et al., 2011).

Another way that occupational therapists can advocate for children with disabilities is to recommend similar recess schedules to those of children without disabilities. Many children with disabilities have specific routines for playtime and lunchtime that are different than their typically developing peers. This often caused children with disabilities to arrive later for recess putting them at a disadvantage to join in cooperative play with their peers. For this reason, occupational therapists should advocate for children with disabilities to have similar schedules in order for them to be there at the start of recess and not miss out on the opportunity to engage in cooperative play with their typically developing peers (Wooley et al., 2006)

Occupational therapists possess knowledge that allows them to make necessary adjustments in the playground equipment so that it is accessible for all. Budget cuts are severely

affecting schools nationwide and they do not have the means to provide new fixed equipment. Occupational therapists should advocate for the implementation of loose equipment on the playground as a cost-effective way to increase inclusion and active play for typically developing children and children with disabilities.

Research.

Occupational therapists need to be involved in research in order to develop evidence-based practice for students and to advance the profession. Within the school setting, research addresses the students' occupations of education and play.

This systematic review suggested a need for further research regarding the use of playgrounds for play and the role of occupational therapy on the playground. Research that is currently available investigated the use of loose equipment and how it fosters inclusion, but more research is needed to better understand the best practice for fixed equipment for a variety of disabilities. For example, what are the most accessible and useful types of swings, slides, and ramps? What playground equipment will be the best for building social skills and fine or gross motor skills for all children?

The results of this study also determined that the best surface for playgrounds was the use of one, consistent material because it required less force for mobility (Skulski & York, 2011). Further research is needed regarding what surface material would be the best to use for safety and to promote an accessible playground environment.

Lastly, research regarding interventions that could occur on the playground would be beneficial to the field of occupational therapy due to the fact the playground is a natural environment for all children. Use of a playground allows children to be taken out of the classroom setting and encourages them to generalize the skills they are working to improve.

Limitations

Limitations were evident in this systematic review. The exclusionary criteria omitted any research articles pertaining to play or physical activity that did not occur on the playground. There were articles with beneficial information about inclusive play or readiness to learn, but because the interactions did not occur on the playground, the articles were excluded from the results.

Another limitation was the inability to access all of the potential articles on this topic due to grey literature restrictions. There were several instances when the researchers were not able to obtain permission to access a grey literature website due to password restrictions and doctoral theses that were not available for public access.

References

ADA Accessibility Guidelines for Play Areas. (2000 November). Retrieved from http://www.access-board.gov/play/finalrule.htm.

AOTA. (n.d.). Role of occupational therapy with children and youth in school-based practice. Retrieved from http://www.aota.org/Practitioners/PracticeAreas/Pediatrics/Resources/41768.aspx?FT=.pdf.

Bray, P., & Cooper, R. (2007). The play of children with special needs in mainstream and special education settings. *Australian Journal of Early Childhood, 32*(2), 37-42.

Bundy, A. C, Luckett, T., Naughton, G. A., Tranter, P. J., Wyver, S. R., Ragen, J., Singleton, E., & Spies, G. (2008). Playful interaction: Occupational therapy for all children on the school playground. *American Journal of Occupational Therapy, 62*(5), 522-527.

Bundy, A. C., Luckett, T., Tranter, P. J., Naughton, G. A., Wyver, S. R., Ragen, J., & Spies, G. (2009). The risk that there is 'no risk': A simple, innovative intervention to increase children's activity levels. *International Journal of Early Years Education, 17*(1), 33-45.

Burke, J. (2009). *Enabling play: Insider accounts of disabled children's playworlds in accessible playgrounds* (Doctoral thesis, University of Ballarat, Ballarat, Australia).

Castelli, D.M., Hillman, C.H., Buck, S.M. & Erwin, H.E. (2007). Physical fitness and academic achievement in third-and fifth-grade students. *Journal of Sport and Exercise Psychology, 29*, 239-252.

Dills, A.K., Morgan, H.N., & Rotthoff, K.W. (2011). Recess, physical education, and elementary school student outcomes. *Economics of Education Review, 30*, 889-900.

Edmondson, L., Fetro, J. V., Drolet, J. C., & Ritzel, D. O. (2007). Perceptions of physical and psychosocial aspects of a safe school. *American Journal Of Health Studies, 22*(1), 1-9.

Huberty, J. L., Siahpush, M., Beighle, A., Fuhrmeister, E., Silva, P., & Welk, G. (2010). Ready for recess: A pilot study to increase physical activity in elementary school children. *Journal of School Health, 81*(5). 251-257.

KSDE. (2008). Kansas Multi-Tier System of Supports. Retrived from http://www.kansasmtss.org/index.htm

Law, M., Cooper, B., Strong, S., Stewart, D., Rigby, P., & Letts, L. (1996). The Person-Environment-Occupation Model: A transactive approach to occupational performance. *Canadian Journal of Occupational Therapy, 63*(1), 9-23.

Mancini, M.C. & Coster, W.J. (2004). Functional predictors of school participation by children with disabilities. *Occupational Therapy International, 11*(1), 12-25.

Menear, K.S., Smith, S.C., & Lanier, S. (2006). A multipurpose fitness playground for individuals with autism: Ideas for design and use. *Journal of Physical Education, Recreation, and Dance, 77*(9), 20-25.

Mulligan, S. (2012). Preschool. In Lane and Bundy (Eds.), *Kids can be kids.* (63-82). Philadelphia: PA: F.A. Davis Company.

Nabors, L. & Badawi, M. (1997). Playground interactions for preschool-age children with special needs. *Physical and Occupational Therapy in Pediatrics, 17*(3), 21-31.

Nabors, L., Willoughby, J., & Badawi, M.A. (1999). Relations between activities and cooperative playground interactions for preschool-age children with special needs. *Journal of Developmental and Physical Disabilities, 11*(4), 339-352.

Nabors, L., Willoughby, J., Leff, S., & Mcmenamin, S. (2001). Promoting inclusion for young

children with special needs on playgrounds. *Journal of Developmental and Physical Disabilities, 13*(2), 179-190.

Pellegrini, A.D., & Bjorklund, D.F. (1997). The role of recess in children's cognitive performance. *Educational Psychologist, 32*(1), 35-40.

Playgrounds (n.d.). In *National Center on Accessibility*. Retrieved from http://www.ncaonline.org/?q=taxonomy/term/136

Prellwitz, M. (2007). Playground accessibility and usability for children with disabilities. (Doctoral Thesis, Lulea University of Technology, Lulea, Sweden).

Ramstetter, C.L., Murray, R. & Garner, A.S. (2012). The crucial role of recess in schools. *Journal of School Health, 80*(11), 517-526.

Ridgway, A, Northup, J., Pellegrin, A., LaRue, R., & Highschoe, A. (2003). Effects of recess on the classroom behavior of children with and without attention-deficit hyperactivity disorder. *School Psychology Quarterly, 18*(3), 253-268.

Skar, L. (2002). Disabled children's perceptions of technical aids, assistance, and peers in play situations. *Scandinavian Journal of Caring Sciences, 16*. 27-33.

Skulski, J. K., & York, S. (2011). A longitudinal study of playground surfaces to evaluate accessibility: Year one findings. *National Center on Accessibility*. 1-11.

Taub, D.E., & Greer, K.R. (2000). Physical activity as a normalizing experience for school-age children with physical disabilities. *Journal of Sport and Social Issues, 24*(4), 395-414.

Taylor, R. W., Farmer, V. L., Cameron, S. L., Meredith-Jones, L., Williams, S. M., & Mann, J. I. (2011). School playgrounds and physical activity policies as predictors of school and home time activity. *The International Journal of Behavioral Nutrition and Physical Activity, 8*(1), 38.

Willenberg, L. J., Ashbolt, R., Holland, D., Gibbs, L., MacDougall, C., Garrard, J., Green, J. B., & Waters, E. (2008). Increasing school playground physical activity: A mixed methods study combining environmental measures and children's perspectives. *Journal of Science and Medicine in Sport, 13*(2), 210-216.

Woolley, H., Armitage, M., Bishop, J., Curtis, M., & Ginsborg, J. (2006). Going outside together: Good practice with respect to the inclusion of disabled children in primary school playgrounds. *Children's Geographies, 4*(3), 303-318.

World Health Organization. (2011). Global strategy on diet, physical activity and health: Physical activity and young people. Retrieved from http://www.who.int/dietphysicalactivity/factsheet_young_people/en/index.html

Yuill, N., Strieth, S, Roake, C., Aspden, R., & Todd, B. (2006). Brief report: Designing a playground for children with autistic spectrum disorders-Effects on playful peer interactions. *Journal of Autism Development Disorders, 2007*(37), 1192-1196.

Appendix A: Research Strategy

CINAHL Plus with Full Text (Ebsco)
Keywords, results, and articles used:

- Playground design—13 results
    - Articles included:
        - Yuill, N., Strieth, S, Roake, C., Aspden, R., & Todd, B. (2006). Brief report: Designing a playground for children with autistic spectrum disorders—Effects on playful peer interactions. *Journal of Autism Developmental Disorder, 37*. 1192-1196.
        - Huberty, J. L., Siahpush, M., Beighle, A., Fuhrmeister, E., Silva, P., & Welk, G. (2010). Ready for recess: A pilot study to increase physical activity in elementary school children. *Journal of School Health, 81*(5). 251-257.
- Playground + disabilities—5 results
    - Articles included:
        - Mancini, M. C., & Coster, W. J. (2004). Functional predictors of school participation by children with disabilities. *Occupational Therapy International, 11*(1), 12-25.
        - Skar, L. (2002). Disabled children's perceptions of technical aids, assistance, and peers in play situations. *Scandinavian Journal of Caring Sciences, 16*. 27-33.
- Inclusive playground—1 result
- Recess + Playground—10 results
    - Article included:
        - Ramstetter, C. L., Murray, R., & Garner, A. S. (2010). The crucial role of recess in schools. *Journal of School Health, 80*(11), 517-526.
- Physical activity + elementary students
    - Article included:
        - Castelli, D.M., Hillman, C.H., Buck, S.M. & Erwin, H.E. (2007). Physical fitness and academic achievement in third-and fifth-grade students. *Journal of Sport and Exercise Psychology, 29*, 239-252.
- Recess + Inclusion—3 results
- Recess + disabilities—8 results
- Learning readiness + school—17 results
- Learning readiness + recess—0 results
- Play + recess—25 results; 2 included (already found in previous search)
- Classroom behavior + recess—3 results
- Playground + mainstream—0 results
- Playground + learning—15 results; 2 included (already found in previous search)
- School performance + playground—3 results; 1 included (already found in previous search)
- School performance + Recess—7 results

- Academic achievement + recess—1 result
- Academic achievement + playground—0 results
- Inclusion + disabilities—17 results
- Inclusion + playground—0 results
- Inclusion + recess—0 results
- Disabled child + inclusion + play—6 results
- Disabled child + inclusion + playground—0 results
- Equipment design + inclusion—46 result
- Playground equipment design + inclusion—0 results
- Equipment design + disabilities + children—21 results

PubMed:

Keywords, results, and articles used:

- Playground + inclusion-- 6 results
- Playground + disabilities-- 16 results; 1 included (already found on CINAHL)
- Playground+ mainstreaming—4 results
- Equipment design + playground—58 results
    - Article included:
        - Willenberg, L. J., Ashbolt, R., Holland, D., Gibbs, L., MacDougall, C., Garrard, J., Green, J. B., & Waters, E. (2008). Increasing school playground physical activity: A mixed methods study combining environmental measures and children's perspectives. Journal of Science and Medicine in Sport, 13. 210-216.
- School readiness + playground—1 result
- School readiness + playground + recess—0 results

ERIC - CAS

Keywords, results, and articles used:

- Playgrounds + Equipment —419 results
    - Articles included (also found in CINAHL):
        - Huberty, J. L., Siahpush, M., Beighle, A., Fuhrmeister, E., Silva, P., & Welk, G. (2010). Ready for recess: A pilot study to increase physical activity in elementary school children. Journal of School Health, 81(5). 251-257.
- Academic Achievement + Recess —35 results
    - Articles included:
        - Ridgway, A., Northup, J., Pellegrin, A., LaRue, R., & Highschoe, A. (2003). Effects of recess on the classroom behavior of children with and without attention-deficit hyperactivity disorder. *School Psychology Quarterly*, *18*(3), 253-268.

        - Dills, A. K., Morgan, H. N., & Rotthoff, K. W. (2011). Recess, physical education, and elementary school student outcomes. *Economics of Education Review, 20*, 889-900.
- Inclusion + Recess breaks— 6 result
- Inclusion + Playground activities – 15 results
- Inclusion + Children, disabilities—1949 results
- Playground activities—144 results
- Playgrounds + disabilities—166 results
- Playgrounds + Exceptional child —70 results
- Swing + playgrounds—48 results
- Playground + Slide—40 results
- Playground + Sandbox—4 results
- Readiness to Learn + playground—1 result
- Academic achievement + playgrounds—24 results
- Academic achievement + playground activities —12 results
- Learning readiness + playground—12 results
- Playground + accessibility—60 results

OT Seeker

Keywords, results, and articles used:

- Learning readiness—2 results
- Recess—1 result
- Playground—4 results
- Playgrounds—1 result
- Playground activities—1 result
- Academic achievement—20 results
- Inclusive playground—0 results
- School performance—29 results

Grey Literature

Keywords, results, and articles used:

- Children with disabilities + playgrounds- 406 results
    - Articles included:
        - Prellwitz, M. (2007). Playground accessibility and usability for children with disabilities. "Doctoral Thesis," Lulea University of Technology.
            - From this reference page, found this reference.
                - Prellwitz, M., & Skar, L. (2007). Usability of playgrounds for children with different abilities. *Occupational Therapy International, 14*(3), 144-155.

        - Woolley, H., Armitage, M., Bishop, J., Curtis, M., & Ginsborg, J. (2006). Going outside together: Good practice with respect to the inclusion of disabled children in primary school playgrounds. *Children's Geographies, 4*(3), 303-318.
- Inclusive playgrounds- 367 results
    - Articles included:
        - Nabors, L., Willoughby, J., Leff, S., & Mcmenamin, S. (2001). Promoting inclusion for young children with special needs on the playgrounds. *Journal of Developmental and Physical Disabilities, 13*(2), 179-190.
        - Nabors, L., Willoughby, J., & Badawi, M.A. (1999). Relations between activities and cooperative playground interactions for preschool-age children with special needs. *Journal of Developmental and Physical Disabilities, 11*(4), 339-352.
- Occupational therapy + playgrounds- 412
    - Articles included:
        - Nabors, L., & Badawi, M. (1997). Playground interactions for preschool-age children with special needs. *Physical and Occupational Therapy in Pediatrics, 17*(3), 21-31.
- Disabled child + playgrounds- 513
    - Articles included:
        - Burke, J. (2009). Enabling play: Insider accounts of disabled children's playworlds in accessible playgrounds. "Doctoral Thesis," University of Ballarat; Victoria, Australia.
- Physical activity + children with disabilities
    - Articles found- 2,546
        - Taub, D.E., & Greer, K.R. (2000). Physical activity as a normalizing experience for school-age children with physical disabilities. *Journal of Sport and Social Issues, 24*(4), 395-414.
- Playground + disabilities- 917
- Playgrounds + exceptional child- 391
- Disabled child + inclusion- 1,733
- Inclusive playgrounds + children with disabilities- 278
- Universal design for playgrounds- 661
- Disabled child + playgrounds- 513
- Physical activity and playground- 1,101
- Physical activity and inclusion- 2,508
- Play + children with disabilities- 2,564

These articles were obtained through the bibliographies of sources that did not meet the inclusion criteria.

- Bray, P., & Cooper, R. (2007). The play of children with special needs in mainstream and special education settings. *Australian Journal of Early Childhood, 32*(2), 37-42.
- Bundy, A. C, Luckett, T., Naughton, G. A., Tranter, P. J., Wyver, S. R., Ragen, J., Singleton, E., & Spies, G. (2008). Playful interaction: Occupational therapy for all children on the school playground. *American Journal of Occupational Therapy, 62*(5), 522-527.
- Bundy, A. C., Luckett, T., Tranter, P. J., Naughton, G. A., Wyver, S. R., Ragen, J., & Spies, G. (2009). The risk that there is 'no risk': A simple, innovative intervention to increase children's activity levels. International Journal of Early Years Education, 17(1), 33-45.
- Menear, K.S., Smith, S.C., & Lanier, S. (2006). A multipurpose fitness playground for individuals with autism: Ideas for design and use. *Journal of Physical Education,* Recreation, and Dance, 77(9), 20-25.

Appendix B: Research Articles

Table 2: Playground Design for Inclusion

	Author	Year	Population	Methods	Findings
QN	Huberty, Siahpush, Beighle, Fuhrmeister, Silva, & Welk	2010	93 children in 3rd, 4th, or 5th grades (64 male)	BMI and physical activity levels (using ActiGraph accelerometers) were measured pre- and post-intervention. Ready for Recess Plan was implemented using specified zones with 10-15 pieces of equipment available in each zone	Participation in moderate physical activity (from 18.1% to 31.2%) and vigorous physical activity (7.2% to 16.8%) was significantly higher at post-intervention. Results indicated that children with higher BMI engaged in less MPA at recess.
QL	Menear, Smith, & Lanier	2006	There were no participants in this study, but the research was concerned with children diagnosed with autism on the playground.	Research provided a five-step process that included a review of the literature, identification of the special needs of individuals with autism that could be addressed on a multipurpose playground, understanding the school's physical education and curriculum goals, identification of a playground designer and manufacturer willing to create a unique product to meet the needs of children with autism. Lastly step five was receiving feedback from school personnel about the proposed design.	The five step process result was a multipurpose fitness playground well suited to meet the needs of children with autism. Playground design was somewhat circular in shape, includes a fitness course, half-court basketball, swings, tether-ball area, funnel-ball area, and walking track around the perimeter. There were also many entrance/exit points. The design offered children many choices in a structured environment and gave staff flexibility when working with the children.

QL	Nabors, Willoughby, Leff, & Mcmenamin	2001	Young children with special needs	A review discussing ways to promote inclusion on the playground. Teacher-mediated ideas were discussed as well as activities and ideas that do not require significant environmental change.	Toys and activities that facilitated inclusion should be moved from the classroom to the playground. Toys typically used in sand and water tables should be available on playgrounds to help promote pretend play between children. Toys that encouraged social interaction include: balls, dress-up clothes, puppets, and toy vehicles. Closed spaces promoted more social interaction and open spaces more gross motor play. Teacher-mediated interventions were important and teachers should design activities in which several children can participate.
QL	Skulski & York	2011	Newly constructed public playgrounds	Five playground surfaces were used, nine different areas of inspection were used within 12 months of installation, and four instruments were used for data collection	There is no perfect playground surface, as each surface had some type of issue within 12 months of installation. Although, playgrounds with unitary surfaces required less force to move across the surfaces.
QL	Yuill, Strieth, Roake, Aspden, & Todd	2006	8 boys between 5 to 7 (mean age was 6 years) with autistic spectrum disorders	New equipment, that provided enough difficulty to master with effort, was added to the playground in the form of a circuit. Children were videotaped at recess and play behaviors were categorized into types of play: solitary, parallel, group, adult.	There was a significant increase in group play and social interactions at recess.

Mixed Methods	Bundy, Luckett, Naughton, Tranter, Wyver, Ragen, Singleton, & Spies	2008	20 children 5-7 (6 male)	Loose materials were added to the playground. Test of Playfulness (ToP), an observational assessment, was used to categorize the level of play that the children engaged in. Teacher interviews occurred to gain their impressions of the intervention.	There was a significant increase in play between pre- and post-intervention as assessed using the ToP scores. Teachers noticed an overall increase in social, active, and creative play.
Mixed Methods	Bundy, Luckett, Tranter, Naughton, Wyver, Ragen, & Spies	2009	12 children between 5 and 7 (7 male)	Loose materials were added to the playground during an eleven week study. Physical activity was measured using Actigraph accelerometers pre- and post-intervention. A semi-structured interview with teachers was also conducted.	Children's physical activity levels were significantly higher with the new playground equipment. Teachers perceived an increase in active, creative, and social play with the loose equipment.

Mixed Methods	Willenberg, Ashbolt, Holland, Gibbs, MacDougall, Garrard, Green, & Waters	2008	23 schools with 4th and 5th grade children	System for Observing Play and Leisure Activity in Youth (SOPLAY) gathered split-second snapshots of types and level of activity at recess. Focus groups were used to understand the perspectives of the children regarding the playground equipment.	44% of children observed participated in sedentary play, 30% in moderate PA (used more fixed equipment), and 27% in vigorous PA (used more loose equipment). Child interview themes included: grass was better than bitumen surface, playground surfaces/fixed equipment supported play options, and weather affected play.

Table 3: Readiness to Learn

	Author	**Year**	**Population**	**Methods**	**Findings**
QN	Castelli, Hillman, Buck, & Erwin	2007	259 public school students in third and fifth grades (not receiving special education services)	Results from the Fitnessgram, which assessed physical fitness in children, were compared with results from Academic Achievement. Testing for each student to determine if a correlation existed between physical fitness status and academic level.	Physical fitness was directly related to academic performance for third and fifth-grade students, with children who were more physically fit performing better on standardized academic achievement tests.

QN	Dills, Morgan, & Rotthoff	2011	National representative sample of kindergarteners through fifth graders. (Excludes any students receiving special education services)	The Early Childhood Longitudinal Survey Kindergarten Class of 1998-1999, which surveyed this cohort of students in kindergarten, first grade, third grade, and fifth grade, was used to gather data. The data was used to assess changes in proficiency of students over the different grade levels, with attention placed on the time spent in recess and PE class for each individual student.	Time spent in either recess of Physical Education (PE) class did not have any statistically significant impact on student learning. The time spent in PE or recess neither harmed nor helped the student's learning or test scores. Therefore, the inclusion of these activities during the school day does not impact student learning significantly.
QN	Ridgway, Northup, Pellegrin, LaRue, & Highschoe	2003	Six 8-year old boys in second grade, 3 with a diagnosis of ADHD, 3 with no diagnosis.	All six children were observed in the classroom setting at 10-minute intervals during set times in the morning. Recess was offered on alternating days, with the children not participating in recess on the other days. The observations recorded any "off task" behavior of the students during classroom instruction. The behavior of students before and after recess, as well as on days without morning recess was then compared.	For the students with ADHD, on days without recess, the level of inappropriate behavior increased progressively throughout the morning. On days with recess, this increasing trend did not occur, with inappropriate behavior occurring much less and not increasing throughout the morning. For the students without ADHD, the behavior patterns in the classroom were identical to those of the students with ADHD on days both with and without recess. Therefore, the study concludes that the presence of recess in the morning can help to decrease the amount of inappropriate behavior for students diagnosed with ADHD, but also for typical students in the general education setting.

QL	Mancini & Coster	2004	266 children, 77 with a primary physical impairment, 113 with a primary cognitive-behavioral impairment, and 76 with both types of impairments	The School Function Assessment (SFA) was complete for each student to determine the student's participation in different school settings and the functional factors that influence participation in these settings.	A variety of factors were found to be predictive of participation in different school settings, including both physical and cognitive/behavioral activities. For participation on the playground, the ability to perform physical activities was a high predictor of participation, along with the cognitive and behavioral components of complying with rules, demonstrating safe behaviors, and regulating behaviors during conflict. This demonstrated that both types of impairments will impact participation on the playground.
QL	Ramstetter, Murray, & Garner	2012	N/A	A systematic review was performed of the current literature to evaluate the role of recess as a component of the school day.	Children are more attentive in the classroom following engagement in physical activity at recess. Additionally, children benefit from the hands-on, manipulative learning that occurs regularly on the playground. This type of learning, which boosts cognition and increases academic performance, is missed when recess is not provided during the school day.

Table 4: Playground Play for Various Populations

	Author	**Year**	**Population**	**Methods**	**Findings**
QL	Burke	2000	72 children with impairment, as well as parents of children with impairments.	Children looked at pictures of different places on the playground and described what it meant to them.	Most children placed value in places on the playground where they can be by themselves at times. Reasons for wanting to be alone include: to rest from play, hide, think and reflect, be safe, and to be independent. Some of the places children with disabilities identified as play places were unlikely ones such as: roof turrets, seats, stairs, spaces under platforms, and shade trees.

QL	Nabors & Badawi	1997	64 children, ages 3-5 years old (45 typically developing, 19 with special needs)	Children were observed during playground play using a scan-sample technique. Each child was observed for 10 seconds to record a snap shot-observation. . Three types of play were noted: playing alone (solitary and parallel play), play one-on-one with a teacher, and cooperative play. Children with special needs were observed for average of 36 scans and typically developing children an average of 42.	Children with special needs were observed playing alone or with a teacher more often than their typically developing peers. They were also observed engaging in less cooperative play than their typically-developing peers.
QL	Nabors, Willoughby, & Badawi	1999	70 children, 49 typically developing, 21 with special needs.	Children's behaviors were observed on the playground using a scan-sample technique and recorded using a checklist that included child's first name and identification numbers. The checklist looked at activity type and type of play. The activity types consisted of complex, low-demand activities, and talking. The type of play was either solitary or one of three cooperative play options:	When children were playing in inclusive groups, they were 20 times more likely to be engaged in low-demand activities than when playing in groups of exclusively typically developing or children with special needs. In contrast, when typically developing children and children with special needs were interacting in groups with only typically developing classmates, they were 10 times more likely to be engaged in complex activities and 30 times more likely to be talking. The six most common activities were: talking, playing with small toys in the sand, playing on the tire swing, riding bikes, swinging, and chasing or running.

				interacting in a group of only typically developing children, in a group of only children with special needs, or in an inclusive group.	
QL	Prellwitz	2007	Ninety people participated in four total studies. There were 11 participants in the first study. The second study had 41 participants. The third study had 20 children (9 girls, 11 boys), ranging in age from 7-12 years (mean age 9.4). The children had restricted mobility, severe vision impairments, moderate developmental disabilities, and no disabilities. The fourth study involved 18 parents of the children from study 3 with the various disabilities.	Semi-structured interviews were conducted for Study 1, 3, and 4 and a questionnaire was used in study 2. In studies 1 and 3, children ages 7-12 were interviewed and qualitative content analysis was used to interpret the results. Study 4 used phenomenographic interpretation to determine the results. A self-administered questionnaire was used in Study 2 and answers were analyzed with descriptive statistics.	Study 1- Results indicate that those who were involved with creating playgrounds had little knowledge regarding accessible design. Children with restricted mobility expressed the playground was not a place for them as there were too many barriers for them. Study 2- This study showed that in the 41 municipalities, only 2 of the 2,266 playgrounds were built to be accessible to children with restricted mobility. The primary reasons children could not enter or use the equipment was because the ground cover was either sand or gravel, or had narrow openings onto the playground. Study 3- All children viewed the playground as a place they knew well. However, children without disabilities viewed the playground as a place to play with friends, while children with disabilities rarely played with friends and mentioned playground equipment hindering their participation. Study 4- The parents of children with disabilities perceived that their children missed opportunities to play and participate with other children on the playground. The parents also said playgrounds make their children feel different, as they are dependent on support from adults on the playground.

QL	Skar	2002	8 children between 6-11 with motor disabilities	Interviews took place with each child to identify his/her recess experience using these topics: type of games played, play environment, and playmates.	Children with disabilities have three various types of relations in play situations: relation to ambulation devices (devices are helpful, but socially isolating with peers), to adult assistants (playmates vs. embarrassing), and to the play environment (indoors had no obstacles, outdoors was fun but limiting because of accessibility).
QL	Woolley, Armitage, Bishop, Curtis, & Ginsborg	2006	Seven schools participated and there were more than 200 children that participated as well as teachers, personal assistants, caretakers, and lunchtime supervisors. There were 18 children identified as the "focus" children. These children had impairments ranging from autism, muscular dystrophy, epilepsy, down's syndrome, hearing or sight impairments, cerebral palsy, spastic quadriplegia, developmental delay, and spina bifida.	Semi-structured discussions were done in friendship groups of up to 5 or 6 children. Children also showed researchers where on the playground they took part in play using a map of the playground. Researchers also observed children at play during play periods using video cameras. Semi-structured interviews were also conducted with school staff responsible for playtime and those who had close contact with the children.	Several strategies existed to help playgrounds be an inclusive place for all. Sometimes the "focus" children created their own opportunities for play, either with themselves or with peers. Being in the same group of children over a period of time was important. Researchers found that it was important for personal assistants not to supervise the children too much because it interferes with their ability to form relationships, but they should encourage them to try new things. One school had a training session where staff imitated having a disability so as to better understand how the focus children could participate on the playground better. Some teachers also reported using PE lessons as a way to help focus children develop aspects of play that could be translated to the playground.

QL	Taub & Greer	2000	Twenty-one students with disabilities (18 boys, 3 girls, mean age 12.7). About half had cerebral palsy and all but 2 were born with the disability.	A semi-structured in-depth interview was used to ask students about their physical activity and how this involvement impacted their lives.	Results indicated physical activity can be viewed as a legitimation of a social identity and strengthening social ties. Physical activity can be a normalizing experience and can be self-enhancing. However, not all children felt their abilities were viewed as adequate. Participants noted often others do not think they are capable of being physically active.
Mixed Methods	Bray & Cooper	2007	Twelve preschool age children (48 to 84 months) with mild to moderate disabilities, who attended both mainstream and special education settings	Free play of the twelve children was observed for 15 minutes on the playground during recess at both educational setting. The Knox Revised Preschool Play Scale and the Lunzer Scale of Organization of Play Behavior were used to rate the observed play.	Preschool children with disabilities played on the playground at a developmental level well below their chronological age. The children's play did not vary significantly between settings. The similarity of the play at the settings indicated that children do not adjust their play behavior when switching between school settings, meaning that inclusion at the mainstream settings is more difficult to achieve

Appendix C: Executive Summary

The findings from this systematic review have many important implications for Muskegon Public Schools (MPS).

- Advocate for only the fixed equipment that is accessible to be salvaged with the consolidation of elementary schools
- Advocate for purchasing accessible equipment and to consider the benefits of
    - Circular design, circuit style design
    - High density of equipment in one area
    - Equipment shaped as identifiable objects
- Identify whether the surface is accessible for students of all abilities
- Implementation of loose equipment, especially when new, accessible fixed equipment is out of the budget
- Advocate for recess time to be maintained despite the increasing academic requirements in the classroom
- Advocate for all students to have similar schedules, regardless of ability level
- Provide in-services for playground supervisors to encourage them to make sure inclusive play is occurring, to determine if there are any barriers they have identified, and to help them understand how to utilize the playground to meet the child's therapy goals

Mejeur, Schmitt, and Wolcott
2012