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Using Visual Supports for Teaching Students with Autism Spectrum Disorder in Physical Education

A Critical Analysis Project Submitted in Partial Fulfillment of the Requirements for the Master of Science in Exercise and Sport Science-Physical Education Teaching Adapted Physical Education Teaching Concentration

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ABSTRACT

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Approximately 1 in 68 children are diagnosed with autism spectrum disorder (ASD) and the diagnosis is five times more common in boys than in girls. Often times, students with ASD have difficulty in the physical education class environment. Physical education is an important subject for these students to develop physical fitness, fundamental motor skills, and social skills that will improve their overall quality of life. However, research has consistently demonstrated delayed locomotor, object control, and fundamental motor skill development. Research has also shown that students with ASD often have trouble processing auditory information. Visual supports bring structure and can help the processing of information for students with ASD. The purpose of this project was to develop a video to provide general and adapted physical education teachers with students with ASD in their classes with instruction on how to use visual supports to enhance skill development in physical education. In addition to the video, descriptions of and how to use visual supports are included in this project.

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CHAPTER I

INTRODUCTION

Autism spectrum disorder (ASD) is the fastest growing developmental disability (Fittipaldi-Wert & Mowling, 2009). Approximately 1 in 68 children are diagnosed with ASD (Centers for Disease Control and Prevention, 2010), and it is five times more common in boys than in girls. There is no known cause for ASD but many factors are suspected. Children with ASD have delays in social reciprocity and expressive and receptive language (Todd, 2012). They also often have low language comprehension and production. Echolalia, the routine replication of words and phrases, is a common language characteristic in children with ASD (Silla & Burba, 2008). Many of these characteristics have an impact on participation in physical education (PE) because students with ASD have difficulty processing sensory input that occurs around them in this environment.

Children with ASD are placed on a continuum. A diagnosis of ASD can be classified from mild to severe. Children with ASD have a wide range of abilities and no two children with ASD are the same. There has been a recent change in the Diagnostic and Statistical Manual of Mental Disorders (DSM)-4 to DSM-5 (American Psychiatric Association, 2013). In the DSM-5, children are no longer being diagnosed with Aspergers or Rett syndrome; instead they are placed on the autism spectrum. Children who require very substantial support may be solitary and withdrawn and can be nonverbal. Children who require substantial support may not initiate interactions but act in passive ways when approached. Finally, children who require minimal support may be active in interactions but can seem awkward to other children (see Appendix A).

Repetitive or stereotypical behaviors are characteristics in some children with ASD. These include finger flicking, spinning, hand-flapping, rhythmic jumping, gazing at lights, rocking, or self-injury, like biting or pinching. Children with ASD can also be very literal when interpreting directions, situations, or objects. For instance, if you told a student with ASD to run home when playing baseball they might get confused and think that they should literally leave the gym and to their run home.

Children with ASD learn differently than their typically developing peers. They may have hypersensitivities, meaning they may be overstimulated, or hyposensitivities, meaning they are understimulated. Some senses that can be affected in ASD are auditory (loud noises, music playing, kids screaming, shoes screeching), visual (where to go in open space, equipment scattered throughout the gym, children running everywhere), tactile (feel of equipment, texture of a basketball, tag on a shirt, shoes are tied too tight), olfactory (smell of equipment, lotion, perfume, body odor), and kinesthetic (body awareness, how to move body/perform activity). Structure and routine are necessities when teaching children with ASD. Both can minimize behavior meltdowns or tantrums and help make transitions easier. Many children with ASD also have trouble processing auditory information, meaning they have strong visual processing or they learn better by seeing, not hearing. If students have difficulty processing information in PE, they may be less active because they don't know what to do.

Physical and Motor Development of Students with Autism Spectrum Disorder

Physical activity (PA) is an important goal of PE. Physical activity provides many physical, psychological, and social benefits to all. Physical activity can reduce the risk of obesity, strengthen bones and muscles, and improve the ability to complete daily

living tasks (Alexander & Leather, 2013). Many children with disabilities do not get enough physical activity and often do not or cannot participate in sports teams. Autism spectrum disorder is a disability that can cause children to have difficulty with participating in PA.

In PE settings, many children with ASD show fundamental motor skill deficits. Locomotor skills, such as running, jumping, and skipping, and object control skills, such as catching, throwing, dribbling, and striking, are delayed in many students with ASD (Todd, 2012). There is a great need for motor and object control skill development interventions for students with ASD (Berkeley et. al., 2001). Debolt and colleagues found that early intervention programs have shown the best results when developing gross and fine motor skills. Children with ASD perform meaningful movements easier than nonmeaningful movements, meaning the actions they perform need to have a goal they understand (Todd, 2012). For example, in the game Capture the Flag, the goal is to capture all of the other team's flags. Students with ASD need to be told why they are trying to gather all of the flags in order for the movement to have meaning for them.

Understanding how to communicate with children with ASD in PE is a high priority for teachers because each child with ASD has unique learning patterns. The use of visual supports (i.e., picture cards and picture stories) is helpful in teaching skills to children with ASD. According to Liu and Breslin (2013), when teachers used visual supports and minimal verbal commands it helped children with ASD to better understand tasks presented to them. Children with ASD can process visual information easier than auditory information. Breslin and Rudusil (2013) found that children with high percentages of on-task behavior also had higher motor skill proficiency on the Test of

Gross Motor Development (TGMD-2). In this instance, the picture task cards helped to keep the student with ASD focused on the task at hand. Obrusnikova and Dillon (2011) found that keeping a student with ASD on task helped prevent behaviors that negatively affect classmates' learning while still providing the individualized attention that they need and adequate time to focus on the skill being learned.

Need for Project

The increase in students with ASD challenges all teachers, including in PE, to meet their unique educational needs. However, many teachers don't have training or experiences in teaching students with ASD. Many of these students will be in special education receiving services and therefore will require specially designed PE. Teachers need resources to effectively teach students with ASD in PE. This is a significant concern for the field of adapted physical education (APE) because there will be more students with ASD who may be in need of specially designed or APE services as required by the Individual's with Disabilities Education Act (IDEA). Providing children with ASD the appropriate learning tools will help them be successful in PE settings. Visual supports are one tool that both general and APE teachers can use when teaching students with ASD.

Purpose of Project

The purpose of this project is to provide general and adapted PE teachers with multiple visual support strategies to use when teaching students with ASD. Research has demonstrated that visual supports increase comprehension, engaged physical activity time, and social interactions for students with ASD (Breslin & Rudusil, 2013; Obrusnikova & Dillon, 2011). Along with including motivation and rewards for students, social stories, activities schedules, picture exchange communication system (PECS), task

cards, visual warning devices, boundaries, visual demonstrations, and iPads are evidence-based practices to incorporate into the PE environment.

Definition of Terms

For the purpose of this project, the following terms are defined.

Autism Spectrum Disorder (ASD)

Students with ASD have persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following: deficits in social-emotional reciprocity, nonverbal communicative behaviors used for social interaction, and developing, maintaining, and understanding relationships (American Psychiatric Association, 2013).

Visual Supports

Visual supports are any tool presented visually that supports an individual as he or she moves through the day. Examples include: pictures, written words, schedules, maps, and labels (U.S. Department of Education – Office of Special Education Program, 2010).

Physical Education

Physical education is defined as the development of physical and motor fitness; fundamental motor skills and patterns; and skills in aquatics, dance, and individual and group games and sports (including intramural and lifetime sports) (U.S. Department of Education – Office of Special Education and Rehabilitative Services, 2006).

Summary

Autism spectrum disorder is the fastest growing developmental disability being served in schools. Children with ASD have many repetitive or stereotypical behaviors which require varying levels of support and teaching methods. In PE, many students with

ASD demonstrate fundamental motor skill deficits, lack of understanding, and decreased participation in PA. It is important to know how to effectively communicate and teach students with ASD using visual support strategies.

General and adapted physical education teachers may use the video in the project as a reference when utilizing visual supports in the PE classroom with students with ASD. Examples of visual supports explained in the video and in Chapter III include: social stories, activity schedules, Picture Exchange System (PECS), visual warning devices, boundaries, visual demonstrations, and technology.

CHAPTER II

REVIEW OF RELATED RESEARCH AND TEACHING LITERATURE

Introduction

Students with autism spectrum disorder (ASD) are often at risk for not learning or refining fundamental motor skills necessary to participate in physical activity. Autism spectrum disorder is defined as persistent deficits in social communication and social interaction across multiple contexts (American Psychiatric Association, 2013). Children with ASD are placed on a continuum (Berkely et. al., 2001). This means that no two children with ASD possess the same abilities and that each child has a unique way of processing information.

Students with ASD learn in different ways than their nondisabled peers. Students with ASD often have trouble processing auditory information and have underdeveloped motor skills compared to their nondisabled peers. Many students with ASD learn best when shown pictures of tasks or a schedule. Visual supports are any tool presented visually that supports an individual as he or she moves through the day. Examples include: pictures, written words, schedules, maps, and labels (U.S. Department of Education, Office of Special Education Program, 2010).

Through structured analysis of the use of visual supports while assessing object control skills, general and adapted physical educators can develop appropriate learning experiences for students with ASD. With appropriate instruction, children with ASD will be more likely to learn and practice object control skills and improve their physical ability. This review of research literature includes the following topics: physical activity of students with ASD, effects of visual supports on motor performance, parent and

student perspectives on instructional strategies for teaching motor skills, teaching students with ASD in PE, and using visual aids in PE.

Physical Activity of Students with Autism Spectrum Disorder

Students with ASD often get left out of physical activity because of the physical and individualized attention they require to participate. Tyler and colleagues (2014) investigated the physical activity and fitness of school-aged children with ASD compared to their typically developing peers. Seventeen students with ASD and 12 students without ASD, ages 9 to 18, participated in this study. The participants were assessed over a 2 day period using a diagnostic assessment (the Autism Diagnostic Observation Schedule), a developmental assessment (the Standford-Binet Intelligence Scale, 5th Edition and the Differential Ability Scale, 2nd Edition), followed by a series of physical fitness assessments in aerobic fitness, muscular strength, flexibility, and height and weight. Participants also wore accelerometers over a 7 day period for all waking hours of the day. Students with ASD were less physically active and had lower strength than their typically developing peers. There were no significant differences in flexibility, BMI, or Vo2 max.

Based on the results of this study, strength development should be a focus of physical education programs for students with ASD. The cardiovascular endurance data were encouraging because it showed that students with ASD are comparable to their typically developing peers and can improve cardiovascular fitness. Peer mentoring was found useful in data collection. Parents, teachers, and administrators should include students with ASD in physical fitness and physical activity assessments and provide them with individualized information about associated behaviors that can impact their health

into adulthood (Tyler et. al., 2014). Focusing on skills that will allow them to be healthy, active, and successful is essential for the continuation of a physically active lifestyle. Individuals with ASD seemed to prefer activities that focused on individual goals rather than group goals. Sowa and Meulenbroek (2012) evaluated 16 behavioural studies reporting on a total of 133 children and adults with a formal diagnosis of ASD who participated in structured physical activities either in an individual or group context. Physical exercise improves physical condition but also reduces the maladaptive behavioural patterns of people with ASD. Other studies also reported positive effects on social behavior, communication, academic engagement, and sensory skills. Individual interventions provided more personal attention, while group interventions facilitated behaviour and communication skills.

In the 16 studies reviewed by Sowa and Meulenbroek (2012), half described individual and the other half described group-based interventions. Swimming, jogging, horseback riding, cycling and weight training, walking, and other physical activities were reported in the studies. Motor, social, and communication skills were measured. For each study, an overall improvement score was calculated which was 37.5%. Participants with ASD benefited more from individual interventions in motor skills and social deficits. Jogging and swimming were most frequently used exercise activities. Swimming showed higher improvement rates in group interventions. The more a child enjoys the activity, the more participation they will have in the physical activity (PA). Physical activity is an important part of every child's life. Many students with disabilities (SWD) do not get enough PA throughout their daily routines. Children with ASD tend to have poor motor functioning and low motivation which can be challenging for participating in PA. Todd

and Reid (2006) suggested that activities that do not require team environments or high skill levels may be more appealing to individuals with ASD. Their study investigated the impact of an intervention program that included edible reinforcement, verbal cueing, and self-monitoring on sustained PA. The activities the students with ASD performed were snowshoeing and jogging/walking.

Three young men, aged 15 to 20 years, with ASD who attended a Canadian school for individuals with severe disabilities participated in a 6-month snowshoeing and jogging/walking program. Each circuit was in the shape of a diamond marked with flags at each point. Every time participants completed a circuit, they put a sticker on a board. Edible reinforcement and verbal cueing decreased as the study progressed, while self-monitoring stayed constant. Participants put a sticker on a board each time they completed a circuit. Edible reinforcement (candy) and verbal cuing ("good job") were used in the classroom on a regular basis, as used in the study, but there was no self-monitoring done in the classroom. Both activities took place at a local park for 30 minutes each session. Weather permitting, each session was conducted outside, and on rainy days the sessions were inside. These activities were chosen because they were common activities and were new to the participants.

Throughout the program, as the edible reinforcement and verbal cues decreased, PA increased. Each participant increased the number of circuits as the program continued. The participants grew more independent as the program continued. They did not need edible reinforcement and verbal cues but were still able to self-monitor by putting a sticker on a board. The more physically active a person was, the more improvement they saw in the set of skills they practiced.

Children with ASD often lack the motor skills to effectively participate in sports with their typically developing peers. Early intervention programs have showed the best results for improving gross and fine motor skills. Debolt and colleagues (2010) studied the effects of a community based adapted physical education (APE) program on locomotor and object control skills in children with ASD. Three children with ASD participated in an APE program, associated with Eastern Kentucky University, one night a week for one academic year. Locomotor and object control skills instruction occurred for 45 minutes in the pool and 45 minutes in the gymnasium at a YMCA. Each participant was matched up with a university student. The Test of Gross Motor Development, 2nd Edition (TGMD-2) was used to assess seven locomotor skills and five object control skills. The test was administered during the first and last weeks of the 10-week APE program.

After one academic year, participants either gradually increased their locomotor score or their score did not change (Debolt et. al., 2010). There was a gradual increase in TGMD-2 object control scores. The results support that a once a week APE session can help improve gross motor skills in children with ASD. Getting children involved in PA is vital in improving their quality of life and participation in various physical activities.

A main concern of physical educators in the U.S. is that students with disabilities (SWD) are not engaged in as much PA as their nondisabled peers. Pan, Tsai, and Hsieh (2011) identified environmental and personal correlates that might influence the PA of adolescents with ASD in physical education (PE). They conducted a study using uniaxial accelerometers with 95 male students, around 15 years old, from nine Taiwanese junior high schools (Pan et al., 2011). Social engagement was also measured through direct

observation. The participants were in two 45-min PE lessons per week. Overall, 38 lessons were taught to 19 classes by 11 PE specialists and 8 PE nonspecialists. The lessons were taught outdoors, indoors, and using both spaces. The content of the classes in all nine schools consisted of: team activities (18 lessons), individual activities (14 lessons), and fitness and free play (6 lessons). Participants wore accelerometers for two PE lessons 1 week during their regular school classes. At the start of PE class, the accelerometers were attached, and at the end of PE class they were removed and the data were immediately downloaded. Social engagement data were collected in 10-s intervals based on occurrence or nonoccurrence.

Students with ASD had fewer steps/min than their peers without disabilities. All students were also found to be more active in an outdoor setting, most likely due to more space. Results also showed that students with male teachers were less active than those with female teachers (Pan et al., 2011) and students taught by certified PE teachers were less active than students taught by noncertified PE teachers. This could be because of teacher behaviors, lesson context, and instructional objectives. Students with ASD had more social interaction with their nondisabled peers compared to with adults. Fitness testing and free play activities were found to have higher moderate-to-vigorous PA, at least 50% of the time, than team or individual activities. Providing students with ASD with the knowledge, skills, and social interactions are crucial to involvement in the physical education setting.

Berkeley and colleagues (2001) examined the locomotor and object control skills of children with autism and compared their performances with the norms on the Test of Gross Motor Development (TGMD). The participants were 15 children, ages 6 to 8 years,

classified as having high-functioning autism. The participants had to have a diagnosis of autism by a clinical psychologist, basic repetitive and expressive communication ability, and tolerance for the gross motor setting. Parents/guardians were sent an informed consent form as well as a brief survey about the child's communication ability. The TGMD was used to assess seven locomotor skills (run, gallop, hop, leap, horizontal jump, skip, and slide) and five object control skills (two-hand strike, stationary bounce, catch, kick, and overhand throw). The TGMD was administered two times, 3 to 7 days apart, in the participant's school setting or at a university-based facility where several of the children attended a special PE clinic. All sessions were videotaped. Two observers watched the videotapes on two occasions at least 3 days apart to score the participants. The raw scores were then converted into standard scores and the subtest scores were used to determine the gross motor development quotient (GMDQ) for each participant. Differences were found between boys and girls in object control skill performances. Fundamental skill delays were found in 73% of the participants.

This study provides data that supports the need for locomotor and object control skill development interventions in children with autism. The earlier children are introduced to skills, the easier it can be for them to develop the necessary skills to perform in a group or team setting. Children who are at the high-functioning end of the autism spectrum possess the communication and social skills necessary to participate in group settings. It is the teacher's and parent's responsibility to see that these children have the gross motor skills necessary to continue to be involved in group physical activities.

In summary, PA is an important aspect of health for all individuals. Individuals with ASD are often left out of PA because of the physical and individualized attention that they require to participate in an activity. According to Tyler and colleagues, strength should be a focus of PE programs for students with ASD as well as cardiovascular training. Children with ASD also tend to have poor gross motor functioning and low motivation which can discourage participating in PA. Todd and Reid suggest that individuals with ASD participate in activities that do not require team environments or high skill levels. The more a child is involved in PA, the better quality of life they may experience and will allow for increased participation in PA. Pan and colleagues found that students were more active in an outdoor setting and interacted with their peers more than they interacted with adults in a PE setting. Individuals with higher functioning ASD possess the communication and social skills necessary to participate in group settings. The earlier children are introduced to an activity, the sooner they can develop the skills necessary to play in group settings (Berkeley et. al. 2001).

Effects of Visual Supports on Gross Motor Performance

Children with ASD are in many general physical education (GPE) classrooms and influence the instruction, management, and social tasks that the teachers prepare. Obrusnikova and Dillon (2011) studied teaching challenges when having students with ASD in GPE. Forty-three GPE or APE teachers from 19 states participated the in the study. To be eligible for participation, teachers needed to have a current license to teach GPE or APE in at least one state, have a current full-time teaching position in GPE or APE in a public school in any grade, a minimum of at least two years of full-time experience teaching PE, and experience teaching PE to a student similar to the

hypothetical student in the questionnaire. Data were collected through two online questionnaires: a background questionnaire and an elicitation questionnaire. The elicitation questionnaire gathered information about the participant's perceptions of challenges that occurred when teaching students with ASD in GPE classes (Obrusnikova & Dillon, 2011). A written vignette described a hypothetical student who was included in GPE.

Teachers listed challenges related to cooperative, competitive, and individualistic learning situations. Inattentive and hyperactive behaviors, social impairment, emotional regulation difficulties, difficulties understanding and performing tasks, narrow focus and inflexible adherence to routines and structure, isolation by classmates, negative affects on classmate's learning, and need for support were the nine themes the teaching challenges were categorized into. Physical educators should plan for and address inattentive and hyperactive behaviors and the social and emotional difficulties. Physical educators also need to be proactive in preventing behaviors that negatively affect classmates' learning, as well as balance the need for educational support for students with ASD. Visual supports are strategies that can help prevent negative behaviors as well as provide educational support.

Many children with ASD are at risk for not learning fundamental gross motor skills. Breslin and Rudusil (2011) examined the effects of visual supports on the performance of the TGMD-2 for children with ASD. Twenty-two children with ASD were assessed using the TGMD-2 with three different protocols: the traditional protocol from the TGMD-2 *Examiner's Manual*, the use of task cards with modeling and short verbal commands, and the use of a picture activity schedule with modeling and verbal

commands. Each participant went through a 20 minute acclimation period the day before the testing began. The TGMD-2 was administered three times on three consecutive days using the different protocols. All testing was videotaped.

The picture task card condition resulted in significantly higher gross motor scores than the traditional protocol (Breslin & Rudusil, 2011). Visual support with a physical demonstration allows children with ASD to focus on the visual processing and minimize the auditory information. The cognitive and communicative functioning was not assessed in this study, which plays a role in understanding the movement concepts. Providing picture task cards is a way to effectively communicate instructions to children with ASD resulting in a more valid test score.

Understanding how to communicate with children with ASD is a high priority for teachers. Children with ASD have strengths in processing visual information as opposed to auditory information. Liu and Breslin (2013) investigated the impact of an assessment protocol utilizing a picture activity schedule on the performance of the Movement Assessment Battery for Children-2 (MABC-2) by children with ASD. Twenty-five children ages 3 through 16 years participated in this study. The participants had to have been diagnosed with ASD, the ability to understand and communicate with the examiners, the ability to perform the required fine and gross motor skills, and the ability to follow instructions. The MABC-2 is used to identify children who are significantly behind their peers in motor skill development. The MABC-2 was administered two times, one week apart, using two different protocols: using the traditional MABC-2 *Manual* instructions and using a picture activity schedule with minimized verbal instructions.

Children using the picture activity protocol showed significantly higher scores than those of children in the traditional protocol across all tasks (Liu & Breslin, 2013). The results suggest that children with ASD benefited from using the picture activity schedule regardless of age or gender. Visual support and minimal verbal commands help children with ASD to understand the tasks presented to them. Teachers should utilize visual supports when teaching children with ASD to improve gross motor skills.

Children with ASD often require more education supports than their typically developing peers. One type of support found useful is visual supports, such as picture task cards and picture activity schedules. Breslin and Rudusil (2013) studied the relationships among assessment time, time on task, and motor skill performance in children with ASD. The same 22 children with ASD, who participated in Breslin and Rudusil (2011), were assessed with the TGMD-2 using three different protocols: the traditional protocol from the TGMD-2 *Examiner's Manual*, the use of task cards with modeling and short verbal commands, and the use of a picture activity schedule with modeling and verbal commands. The TGMD-2 assessment was conducted one participant at a time with one assessment per participant per day in a large multipurpose room. The Behavior Evaluation Strategy and Taxonomy (BEST) software was used to measure engaged and nonengaged time.

The use of a picture activity schedule with modeling and verbal commands took the most time to complete the TGMD-2. There were no significant differences for time on-task during the assessments by the protocol used. The longer the assessment took, the lower the participant scores attained. A positive relationship was found between the TGMD-2 scores and time on-task, meaning the children with high percentages of on-task

behavior also had higher motor skill proficiency. This study shows that using visual supports to improve motor skills on assessments may not extend assessment time (Breslin & Rudusil, 2013).

In summary, inattentive and hyperactive behaviors, difficulties understanding and performing tasks, and structure are some of the ways that visual supports can help individuals with ASD in PE. Physical educators need to balance the need for educational support for students with ASD (Obrusnikova & Dillon, 2011). Children with ASD have strengths in processing visual information as opposed to auditory information. Breslin and Rudusil (2011) found that using visual supports with a physical demonstration allows children with ASD to focus on the visual processing and minimize the auditory information. Liu and Breslin (2013) also found that using visual supports with minimal verbal commands helped children with ASD to understand the tasks presented to them.

Parent and Student Perspectives on Instructional Strategies for Teaching Motor Skills

Experiences and meaning of parental involvement in the PE setting from the perspective of the parents of students with developmental disabilities was the purpose of a study by An and Hodge (2013). Eight parents of children with developmental disabilities took part in this study, seven mothers and one father. The parents, who were recruited through an adapted recreational sports program at a local university, had to have children with a developmental disability who were included either in elementary or secondary GPE programs and had to be active members in their child's school. Information was gathered through one-on-one interviews, photographs, school documents, and the researcher's journal. The children were all included in GPE and

received APE services once a week. Three themes emerged to represent the meaning of parents of children with developmental disabilities ascribe to their involvement in PE: 1. Being an advocate for my child, 2. Understanding the big picture, and 3. Collaborative partnerships were undeveloped in GPE.

One of the main concerns the parents in this study expressed was that they did not feel comfortable communicating with the GPE teacher because they felt like the APE teacher had more knowledge of disability than the GPE teacher did and the GPE teacher was not present at individualized education program (IEP) meetings. Teachers should work with parents to find out what the most important aspects of PE are for their child. Parents are essential in discovering the needs and the individual capabilities of their child.

Parents' perspectives play a key role in determining how to best accommodate for students with ASD in the learning environment. Alexander and Leather (2013) conducted a study on parents' perspectives on appropriate sports programs for children with ASD. The purpose of their study was to gain knowledge about parents' perspectives about specific characteristics of sports programs, coach-child ratios, coach qualifications, and the primary focus of the program.

Participants were 54 parents of children with ASD who were in segregated classrooms for the majority of their education. The students attended either a private school or a primary school for children with ASD in a local public school district. The parents were given a questionnaire of questions to complete and return within a 2-week period. It included 20 questions about demographic information, types of sports programs, specific goals of sports programs, specific characteristics of sports programs, and coaching ratios (Alexander & Leather, 2013).

Results found that most parents wanted their child involved in a sports program for 2 to 6 hours per week that focused on developing social skills as well as fitness and recreation. More training for coaches and PE teachers may need to be given on how to teach social skills and how to incorporate them into sport settings without interfering with the sporting experience (Alexander & Leather, 2013). Swimming was an activity that the parents said their child expressed interest in, along with basketball and baseball. Parents expressed that they wanted one to five children on a team with one head coach and one-on-one volunteer help, and that the coach have more knowledge about their child's disability than the sport they were coaching. A limitation of the study was that the students were in segregated classrooms for the majority of their education. Some of the parents chose not to answer all of the questions, and some parents provided more than one answer for a question. Getting a perspective from someone who is not teaching the activities can help the PE teacher plan a more appropriate lesson.

The perspectives of students with ASD are important to consider while developing an appropriate PE program or other activity programs. Having students with ASD participate in adapted physical education (APE) is a way for the lessons to be more developmentally appropriate for every student and to ensure that they are fun for students. Healy, Msetfi, and Gallagher (2013) saw the need for APE to meet the needs of SWD. Their study investigated the students with ASD perspective's about PE. They examined individual experiences of students with ASD and categorized the issues raised by the participants into three areas: individual challenges, peer interactions, and exclusion.

Eleven boys and one girl from a summer camp for children with ASD in southwest Ireland, ages 9 to 13 years, participated in the study. This low number limits the insight of this study because participants only accounted for a very small percentage of children with ASD. All 12 took part in mainstream primary school PE without support. The author of the interview was a PE teacher and also carried out the interviews with the participants. The interviews included visuals, a quiz board poster, sheets and markers for drawing, and a semi-structured schedule to guide the interviewer with questions (Healy et al., 2013). Children all gave verbal agreement to participate, and parents also gave consent.

Physical ability was a concern of the students. As stated earlier, APE would serve as a means to provide the same objectives as general PE, but with some adjustments made to better meet the needs and abilities of individual children. High volume and other sensory issues were also a concern for the students interviewed. Teachers should consider sensory issues when planning for their PE classes so that they do not become negative factors. Fear of injury was another concern brought up by the students, which can be avoided by teachers planning appropriately challenging and safe environments, with the necessary equipment and space (Healy et al. 2013). Students were also concerned with bullying and exclusion. Most of the bullying was due to lack of physical ability, and exclusion was mostly self-requested by the students due to safety issues or lack of physical ability.

In summary, teachers should work with parents to find out what are the most important aspects of PE for their child (An, 2013). Alexander and Leather (2013) found that parents want their child with ASD involved in a sports program that focused on

developing social skills as well as fitness and recreation. Parents also expressed that they wanted a low child to coach/teacher ratio. Student's with ASD perspectives are also important to consider while developing an appropriate program for PE classes or other activity programs. Physical ability, high volume and other sensory issues, and bullying and exclusion were concerns of students. Teachers should take these issues into consideration when planning programs and lessons.

Literature Related to Teaching Students with Autism in Physical Education

This section presents a review of professional teaching literature and strategies for general and APE teachers for students with ASD.

Teaching Students with Autism Spectrum Disorder in Physical Education

Autism is a spectrum disorder. This means that no two individuals with ASD learn and process information in the same way. Alexander and Schwager (2012) provide multiple curriculum models and implications for students with ASD. A curriculum includes all knowledge, skills, and learning experiences that are provided to students within the PE program (Alexander & Schwager, 2012). They recommend five curriculum models: multi-activity (MA), sport education (SE), adventure education (AE), fitness education (FE), and teaching personal & social responsibility model (TPSR).

The MA curriculum provides students with opportunities to develop basic motor skills to participate in a variety of activities such as: dance and rhythmic activities, locomotor and manipulative skills, and activities associated with developing and maintaining fitness (Alexander & Schwager, 2012). The MA curriculum switches activities every three to four weeks. Students with ASD may need more time to acclimate themselves to an activity before transitioning to the next. Alexander and Schwager (2012)

also suggest keeping warm-up and skill-development activities as consistent as possible to provide students with ASD with a predictable class routine.

The SE model aims to provide students with an authentic sport experience. The SE model includes six features or organized sport: 1. seasons, 2. affiliation, 3. formal competition, 4. a culminating event, 5. record-keeping, and 6. festivity (Alexander & Schwager, 2012). Students with ASD should be provided a season schedule and specific instruction about each part of the season (i.e., pre and post season and the culminating event). They also may need to be told what is socially appropriate in a team environment (i.e., team cheering).

The focus of the AE model is on learning outcomes in the affective domain. This model can be very challenging for students with ASD because of hypersensitivities to touch, problem solving, and relying on others. Students with ASD may need assistance in making a task more concrete or simplified. Peer mentors can help students with ASD who have difficulty with particular activities (Alexander & Schwager, 2012).

The purpose of the FE model is to develop knowledge about the importance of, different activities in, and skills needed to develop and maintain appropriate levels of fitness and physical activities. Students with ASD may need equipment or activity modifications, external motivators, and visual representations of goals or activities (Alexander & Schwager, 2012). Peer mentors can also be useful in starting activities. Alexander and Schwager (2012) also suggest letting students know in advance about fitness testing.

Challenging students to pay attention to their actions and how those actions affect themselves and others is the purpose of the TPSR model. This model is well-suited for

students with ASD because it encourages them to consider their own behavior and actions (Alexander & Schwager, 2012). Teachers may need to assist student with ASD with conversations that are more abstract and transferring information to another setting. Each student with ASD will need varying levels of support.

Students with ASD can have a wide range of characteristics: mild cognitive with social and behavioral deficits or severe intellectual disabilities and nonverbal. Autistic disorder, Asperger's Syndrome, childhood disintegrative disorder, Rett syndrome, and pervasive developmental disorder otherwise not specified are 5 subtypes of ASD. Students with ASD make up for approximately 4.97% of all students with disabilities (Ryan et. al., 2011). Ryan and colleagues (2011) recommend that school districts ensure timely eligibility decisions, develop an IEP to address all areas identified in the evaluation, and that services in the IEP result in meaningful educational development to the student. Also, school districts should integrate the students to the maximum extent appropriate and adopt empirically validated instructional strategies and programs. Ryan and colleagues (2011) suggest five evidence-based educational programs for students with ASD: applied behavior analysis (ABA), the developmental, individual-difference, relationship-based approach model (DIR), picture exchange communication system (PECS), social stories, and treatment and education of autistic and communication related handicapped children (TEACCH).

Applied behavior analysis has 3 steps: stimulus/event that occurs prior to behavior, child's action response to stimulus, and the outcome or result of the behavior. The DIR serves as a framework to understand the developmental profile of an infant or child and the family (Ryan et. al., 2011). It enables parents and educators to plan an

assessment and intervention program specific to the needs of the child and their family. It involves floor time, where the parent/educator literally gets on the floor with the child and encourages appropriate, interactive play and socialization.

Picture exchange communication system is a communication system that uses pictures of objects and symbols. The student is able to associate the picture with an item or action. This system can be very beneficial for students who are nonverbal or have limited communication (Ryan et. al., 2011). Social stories are shown before the situation occurs and describe a social situation and expose the student to a better understanding of an event and encourages an alternate and proper response. Social stories can be used to encourage replacement of a student's maladaptive behaviors or to promote prosocial behaviors (Ryan et. al., 2011).

Treatment and education of autistic and communication related handicapped children is composed of 4 structured teaching components: physical structure and organization of the workspace, schedules indicating details about the required task, work systems depicting detailed expectations of the individual during the task, and task organization explicitly describing the learning task (Ryan et. al., 2011). The TEACCH system requires the environment to be arranged to meet the unique needs of the students in a given situation.

There is a wide range of ability levels represented among individuals with ASD. To accommodate the needs of every student, Menear and Smith (2011) suggest working with the student's IEP team to determine what accommodations students need. Using the same accommodations in many settings, such as visual supports, timers, social stories, or a peer tutor, can provide a maintained, structured routine for the student. For example,

during physical education, starting and ending class in the same way everyday can give the student expectations, predictability, and an idea as to what is the next activity (Menear & Smith, 2011).

Many students with ASD have trouble tracking time during PE. Not knowing how much time is left in class can cause stress with some students. Menear and Smith (2011) suggested three accommodations to address this concern: giving the student a stopwatch, giving the student a small timer that fits in their pocket and is set to beep 5-minutes before class ends, and/or hanging a wall clock and teaching the student how to read it or marking with an arrow according to what time class will end.

When teaching group activities in PE, they should be meaningful, provide maximum participation, and not provide negative stimulation (Menear & Smith, 2011). Sensory challenges should be considered when developing lesson plans. How bright the space is, how loud, the texture of the equipment, and appropriate body awareness are some examples of sensory considerations when teaching students with ASD. When working on individual activities, initial focus should be on lifelong and fitness activities. Bowling is an example of a lifelong recreational activity. Riding a stationary bike is an example of a lifelong fitness activity that can be adjusted to allow the student to be successful and challenged. Teachers should tailor their teaching to meet the specific needs of the students.

Each individual with ASD processes information uniquely. Understanding variations in stress responses and particular sensory needs is crucial in providing an optimal learning environment for them (Lytle, 2014). Stress is defined as any demand on the mind or body, good or bad. Students with ASD experience more intense and more

frequent stress than their same aged, nondisabled peers and may take longer to recover from stressful events (Lytle, 2014). Students with ASD may have problems processing visual (sight), auditory (sound), gustatory (taste), olfactory (small), tactile (touch), vestibular (balance), and/or proprioceptive (how to move in space). According to Lytle (2014), any child who has difficulty with processing information will experience a detrimental effect on performance, especially children with ASD who tend to have multiple sensory systems affected.

Strategies to reduce stress are important for providing the optimal learning environment. Lytle (2014) suggests five techniques for reducing stress in students with ASD: physical activity, meditation or quiet spaces, environmental changes, music, and breaks. Students with ASD have shown improved attention to tasks, reduced stereotypical behaviors, and positive responding following familiar and sustained exercise bouts (Lytle, 2014). Walking, jogging, or dancing to music are examples of activities for students with ASD can perform before PE to relax and release energy. Taking 15-minute breaks to walk or some other desired movement is also suggested by Lytle (2014).

Physical education teachers should work closely with parents, special education teachers, and occupational therapists to provide the appropriate environment for a student with ASD. Lytle (2014) suggests providing a break corner for a student with ASD where they can play for a few minutes before returning to the lesson. When students have control over their environment, they typically feel safe. Schedules, pictures, routines, preteaching skills, and providing choices help to create a more comfortable environment for students with ASD (Lytle, 2014). Teachers must be careful not to provide too many choices because that can create chaos or discomfort. Each student with ASD is unique so

finding the right balance of stress is key in setting up a positive and supportive learning environment.

Children with ASD are often thought of as uncoordinated, physically slow, and often withdrawn from physical activities. They tend to fall below their same aged peers in fundamental motor skills. Adequate motor abilities are required for a person to perform a motor skill well (Todd, 2012). Motor planning, imitation of movements, and postural control are all contributing factors that affect children with ASD's ability to participate in physical activity.

Motor planning refers to the ability to mentally prepare and perform coordinated movement patterns. People with motor planning problems, like children with ASD, know what they should do with their body but are unable to perform a sequence of movements properly (Todd, 2012). Individuals with ASD can often perform the motor tasks but need help organizing the nervous system to produce a specific sequence. Todd (2012) suggests that skills should be taught in small parts in a predictable environment without a time constraint. Visual and verbal cues help children with ASD remember the sequences.

Imitating movements play an important role in the development of motor skills for all children. Children with ASD often have trouble imitating the actions of others. They often demonstrate inaccuracies in timing and force while reproducing a movement. Individuals with ASD can imitate actions better if the act if meaningful, goals oriented, and motivating (Todd, 2012). Mirroring, providing positive feedback, and explaining the meanings of the actions are strategies suggested by Todd (2012) for teaching students with ASD.

Another contributing factor in performing motor skills for children with ASD is postural control. Children with ASD often have deficient balance which can lead to problems when performing motor skills. Todd suggests providing clear visual information to children with ASD to make postural adjustments.

The more proficient a child is in fundamental motor skills, the more likely they are to participate in physical activity. Physical activity can help to reduce body mass index and disruptive and repetitive behaviors. As their skill ability increases, so will their motivation to participate in physical activity.

Using Visual Aids in Physical Education

Autism is the fastest growing developmental disability which increases the likelihood that general physical education (GPE) teachers will teach students with ASD sometime during their career (Fittipaldi-Wert & Mowling, 2009). Students with ASD often have trouble with how and when to perform movements. Visual supports help to increase social interactions, improve skill development, and increase on-task behaviors (Fittipaldi-Wert & Mowling, 2009). They also create predictability, order, and consistency throughout the student's day. The visual supports must meet the needs of the individual student.

A Picture Exchange Communication System (PECS) consists of drawings that depict an object or skill and also has the corresponding description written above the object or skill (Fittipaldi-Wert & Mowling, 2009). These pictures can be placed on a lanyard or ring so that the PE teacher has easy access to them during class. PECS cards can be used to create an activity schedule to establish a routine before the student with ASD enters the gymnasium. Picture cards are placed on a board with Velcro in sequential

order. The student's name is at the top and the student places the card in an envelope at the bottom of the schedule before performing the task. PECS can also be used to create task cards of specific activities to be completed (Fittipaldi-Wert & Mowling, 2009). Giving a student with ASD a visual warning device can provide them with a visual cue that there is no time remaining in the activity and that they need to check the schedule for the next activity. Fittipaldi-Wert and Mowling (2009) also suggest setting boundaries that designate the exact area in which a task is to be performed while promoting independence. Boundaries can be made with cones, floor tape, or mats.

There is no single best teaching method for students with ASD. Each student learns in their own way and the teacher should develop instruction based on those needs. Having an understanding of the characteristics of ASD will help physical educators provide appropriate modifications and adaptations to facilitate a successful environment for students with ASD and their peers (Fittipaldi-Wert & Mowling, 2009).
Children with ASD often exhibit hypersensitivities or hypersensitivities with auditory, visual, tactile, olfactory, and kinesthetic modalities (Silla & Burba, 2008). Children with ASD can respond to these sensitivities with self-stimulatory behaviors such as finger flicking, spinning, hand-flapping, and rocking. These self-stimulatory behaviors can affect the child's social and play skills. Silla and Burba (2008) suggest inclusion in PE as a means to help teach students with ASD how to function in more complex group situations where they will be more likely to develop peer relationships. Appropriate social and play skills with peers can be encouraged by providing play opportunities.

Children with ASD have strong visual processing skills and struggle to process multiple components of auditory information. Silla and Burba (2008) suggest increasing

the use of visual supports, like social stories, in PE. Social stories are individualized short stories that are designed to increase suitable social exchanges of children with ASD by instructing them on the appropriate actions in a given situation. Social stories can be visual supports for students with ASD in many different situations, as they provide them with expectations of the selected activity. Stories should be read to the student prior to PE class to produce the expected behavior (Silla & Burba, 2008).

Silla and Burba (2008) also suggest using picture or written schedules during transition times. Schedules help students with ASD because they specify what has been completed and what must be completed next. Activities, represented by pictures or written words, should be displayed in a vertical progressions starting with the first activity at the top. Time for each event can also be included. The PE teacher should communicate and cooperate with parents and other teachers of the student to develop a consistent set of policies and agendas (Silla & Burba, 2008).

Summary

A main concern of teachers of students with ASD is that they are not as active as, and lack the gross motor skills necessary to effectively participate in various physical activities with their same aged nondisabled peers. Individuals with ASD frequently prefer individual activities, like swimming or running, as opposed to team activities like basketball or hockey. Having students with ASD in a GPE class can influence the instruction, management, and social tasks that the teachers prepare.

Students with ASD learn differently than their nondisabled peers. Stress can often affect a student with ASD in the PE environment due to hypersensitivities the student may have. When choosing a curriculum model, teachers should modify the presentation

and instruction based on the needs of the students. Students with ASD have strengths in processing visual information. Visual supports bring structure and can help the processing of information for students with ASD. Visual and verbal cues help children with ASD remember the sequences. Social stories, PECs, activity schedules, and boundaries are some useful strategies for teaching student with ASD.

CHAPTER III

CRITICAL ANALYSIS

Introduction

Many types of instructional supports have been shown to increase social interactions, improve motor skill development, and enahnce on-task behavior in students with autism spectrum disorder (ASD) in physical education (PE). Visual supports combined with a physical demonstration, allow children with ASD to focus on the visual processing and minimize auditory information (Breslin & Rudusil, 2011). Liu and Breslin (2013) found that visual supports and minimal verbal commands help children with ASD to understand the tasks presented to them. Visual supports should be used as positive motivators and can include a reward for a completed task like free time, iPad use, or an edible treat.

This chapter presents several common visual supports that are utilized for students with ASD in PE and explains how these visual supports can be used during assessment. Also included in this chapter is a description of the project video that explains and demonstrates several visual supports used for students with ASD in PE. Recommendations for future research and critical analysis projects are also provided in this chapter.

Teaching Strategies for Students with Autism Spectrum Disorder

Social Stories

A social story is a common visual support used for students with ASD. In the book "*Meeting the Physical Education Needs of Children with Autism Spectrum Disorder*" (Alexander & Schwager, 2012) social stories are described as individualized

stories designed to increase acceptable social exchanges. They are read prior to activity as a prompt for expected behaviors and conversations. These stories can be shown on an iPad, SmartBoard, or in a booklet. Some sample situations for which stories can be written include: locker room procedures, swimming pool situations, and field trips. For instance, if your class was taking a bus trip to a local pool, the social story could include procedures on how to act on the bus, at the pool, and in the locker rooms. A social story can also be used to prepare a student with ASD for assessment. The story can show what activities or skills will be assessed, what the student should do during the assessment, and what the teacher will be doing. See Appendix B for examples.

Activity Schedules

Activity schedules are common visual supports used for children with ASD. These are very effective, frequently used in general and adapted PE, and can be expanded for students with ASD. An activity schedule helps with transitions, provides consistency, uses a visual approach, and gives the student a routine in the classroom, gym, or other instructional settings. It is a series of pictures and/or words and can be arranged in vertical order on a white board with Velcro. The student's name is at the top of the board and an envelope for completed tasks is at the bottom. Times for each task can also be included. For assessment, each activity being assessed can be on the schedule. When the student has completed one activity of the assessment, they can place the picture in the envelope at the bottom. This allows the student with ASD to see what activities have been completed and what is still to come. See Appendix C for examples.

Picture Exchange Communication System (PECS)

Picture Exchange Communication System (PECS) are symbols that represent an object or skill with a description written above. They can be attached to a lanyard or keychain and worn by the teacher, paraeducator, or be on an iPad or other mobile device. PECS can be used to show the student what activity to perform or what activity is coming next. Some examples of behaviors include: sit, stand, check schedule, throw, and catch. PECS are pictures of fitness activities or yoga positions on poly spots that student can perform. Task cards are similar to PECS. They have a specific exercise or task to be completed on them. PECS and task cards are made with commercial programs like Boardmaker. When completing assessments, PECS and task cards are shown to the student with ASD to show them what activity they are to perform. See Appendix D for examples.

Visual Warning Devices

Students with ASD often have trouble transitioning from activity to activity. Visual warning devices let students know when an activity is ending and it is time to transition. Examples of visual warning devices are a timer, stopwatch, clock, or iPad counter. This helps the student to plan and organize for the next activity. Visual warning devices show students how much time they have to perform an activity or how much time is left during assessment. See examples related to PE in Appendix E.

Boundaries

Boundaries designate an exact area where a task should be performed by the student. Boundaries promote independence and provide students with more time to organize movements in space. Examples of objects that create boundaries are: cones, poly

spots, floor tape, gym floor lines, or high mats to block the student's view of activities that are going on in other parts of the gym. Children with ASD often have a literal interpretation of objects, meaning they struggle to use their imagination. When explaining activities, tell students with ASD what they will literally be doing. For example "Jump from spot to spot", don't say "Jump from lily pad to lily pad". Placing boundaries, like a poly spot as a visual cue for foot placement when throwing, will help students with ASD identify where to move their body when assessing motor skills.

Visual Demonstrations

Visual demonstrations are useful in any PE teaching setting. They help improve inaccuracies in timing, force, and form when imitating movements. Students with ASD can imitate movements better if the action is meaningful to them, goal oriented, and motivating. Teachers need to make sure that they have the student's full attention or the student will have difficulty understanding the task. Mirroring the image or standing beside the student is best when demonstrating a movement for a student with ASD. This strategy allows them to see exactly what they are supposed to do, not the opposite. Utilizing peer modeling for demonstration is a useful tool in PE classes. When assessing students with ASD, visual demonstrations help them see what action they are supposed to perform and how to move their body.

Instructional Technology

Technology, such as an iPad, is another useful visual support for all students in a PE setting. iPads are portable and can be carried easily by the teacher and student. There are specific applications made to help students with expressive communication, identifying feelings, and point out images for content. iPads can also be used to review

skills before and during class. Video modeling, a recorded video of the teacher's or student's point performance, is a way to introduce new skills or review skills already learned. Some helpful apps include: Proloquo2Go, Picture Planner, Coaches Eye, and TouchChat. All of these apps use picture icons or video to help communication between the students and the teacher. Technology can also be very useful when assessing a student. General and adapted PE teachers can make checklists on an iPad and simply check off criteria or skills that the student performed correctly. Teachers may also record students performing skills and review and score the criteria later.

In summary, students with ASD benefit greatly from the use of visual supports in PE. Visual supports bring structure and assistance to the PE environment. Providing students with ASD with the necessary visual supports help them functionally and meaningfully participate with their typically developing peers.

Description of Project Video

The instructional video for this critical analysis project provides general and adapted PE teachers with multiple visual supports and strategies to use with students with ASD. Research has demonstrated that these visual supports increase comprehension, engaged physical activity time, and social interactions for students with ASD. In the video, several common visual supports are described and demonstrated to help teach and assess students with ASD in general and adapted PE.

Resources on Autism Spectrum Disorder for Physical Education

Websites

1. Autism Speaks - https://www.autismspeaks.org

Autism Speaks is an autism science and advocacy organization. It is dedicated to funding research into the causes, prevention, treatments, and a cure for autism; increasing awareness of autism spectrum disorders; and advocating for the needs of individuals with autism and their families. The Autism Speaks website, provides videos, news articles, and stories about individuals with ASD, sport, and physical activity. Teachers can use this site as a reference to gain knowledge about and advocate for students with ASD.

2. The National Autism Association - http://nationalautismassociation.org

The National Autism Association (NAA) is a parent-run, nonprofit, advocacy organization. The NAA provides information about ASD, screening, causes, research, prevention, and treatment. The organization also provides family support and autism safety information. Teachers can refer parents to this site to help educate themselves about ASD, current research and other information about ASD.

3. National Institute of Mental Health - http://www.nimh.nih.gov/health/topics/autism-spectrum-disorders-asd/index.shtm

The National Institute of Mental Health website provides information on ASD characteristics, causes, signs and symptoms, diagnosis, treatments, tips for families with children with ASD, and information on clinical trials. Teachers can use this site to gain knowledge about ASD characteristics and how they would affect student learning in PE.

4. The Autism Society- http://www.autism-society.org/

The Autism Society is an organization whose goal is to improve the lives of all who are affected by ASD. They do this by increasing public awareness about the day-to-

day issues faced by people on the spectrum, advocating for appropriate services for individuals across the lifespan, and providing the latest information regarding treatment, education, research, and advocacy. The Society also hosts a national conference on ASD that teachers can attend. The Society also has booklets with information on educating individuals with ASD, transitioning to various school levels, siblings, puberty, and other daily life topics.

Books

1. Alexander, M., & Schwager, S. (2012). *Meeting the physical education needs of children with autism spectrum disorder*. Reston, VA: National Association for Sport and Physical Education.

This book provides teachers with an indepth overview of how to meet the needs of students with ASD in PE. Chapters highlight characteristics of student with ASD, instructional strategies, social-skills development, curriculum models, behavior management strategies, and effectively working with others involved in the students education. Teachers can reference this book when planning lessons in PE for students with ASD. This is one of the most comprehensive books about ASD and PE

2. Grenier, M. (Ed.). (2014). *Physical education for students with autism spectrum disorders: A comprehensive approach.* Champaign, IL: Human Kinetics.

This book provides strategies and tools to help PE teachers develop a curriculum that includes students with ASD. Included are numerous individual and small-group games and activities that teachers can utilize to enhance skill development for students with ASD. Physical education teachers can implement the strategies mentioned in their classes with students with ASD. Chapters are written by several experts in APE.

3. Notbohm, E., & Zysk, V. (2006). *Ten things your student with autism wishes you knew*. Arlington, TX: Future Horizons.

This book provides a unique perspective of a child's voice with ASD to help the reader understand the thinking patterns that guide their actions and create a learning environment that is beneficial. The chapters give insight about what the students feels and how to effectively communicate with them. Teachers can use this book to learn how to better communicate with students with ASD.

4. American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders: DSM-5.* (5th ed.). Washington, DC: Author.

This manual includes several sections with indepth analysis of the most up-to-date diagnostic criteria for ASD. This manual also gives examples of the severity of the disorder based on the level of support a student requires. Also included in this manual are the diagnostic features, prevalence, the development and course of ASD, differential diagnosis, and other related issues associated with ASD.

5. Higashida, N. (2007). *The reason I jump: The inner voice of a thirteen-year-old boy with autism*. NY: Random House.

This book was written by a 13 year old boy with ASD. The author describes what it is like to have ASD, not be able to communicate properly with other people, and answers frequently asked questions about individuals with ASD from his own perspective. Teachers can use this book to understand some of the actions or behaviors of students with ASD.

6. Lynn, G., & Lynn, J. (2007). *The Asperger plus child: How to identify and help children with Asperger syndrome and seven common co-existing conditions: Bipolar disorder, nonverbal learning disability, obsessive compulsive disorder, oppositional defiance disorder, high-functioning autism, Tourette's syndrome, and attention deficit disorder*. Shawnee Mission, KS: APC.

This book provides ways of identifying and helping individuals with ASD and a coexisting condition (bipolar disorder, nonverbal learning disability, obsessive compulsive disorder, oppositional defiance disorder, high-functioning autism, Tourette's syndrome, and attention deficit disorder). The book devotes a chapter to each coexisting condition and provides strategies for helping these individuals for teachers, parents, counselors, and medical professionals. Teachers can refer to this book to help identify characteristics of coexisting conditions and gain information on strategies to help their student be successful in PE. Many students with ASD have coexisting conditions.

Book Chapters

1. Hodge, S., Lieberman, L., & Murata, N. (2012). Autism spectrum disorders. In *Essentials of teaching adapted physical education: Diversity, culture, and inclusion* (pp. 309-325). Scottsdale, AZ: Holcomb.

This chapter explains the definition of ASD, subcategories, prevalence, etiology, attributes, and PE teaching considerations for students with ASD. Included in the teaching considerations are guidelines for choosing activities, inclusion ideas, and communication considerations. Teachers can use this chapter as a reference when planning PE classes for including students with ASD in PE.

2. Dunn, J., & Leitschuh, C. (2006). Autism spectrum disorder. In *Special physical education* (10th ed., pp. 225-242). Dubuque, IA: Kendall/Hunt.

This chapter defines ASD from federal education law and discusses motor deficits, social and communication skills, assessment in PE, placement considerations, and PE program suggestions for students with ASD. In the section on physical activity

programs, motor planning and motor learning, fitness, and language development for students with ASD are discussed. Resources on ASD are also provided. Teachers can utilize this chapter to guide them through lesson planning, assessment, and educating students with ASD in PE.

Journal Articles

1. Menear, K., & Smith, S. (2011). Teaching physical education to students with autism spectrum disorders. *Strategies: A Journal for Physical and Sport Educators, 24*(3), 21-24.

This article discusses working with the student's Individualized Education Plan (IEP) team to determine what accommodations are needed, considering time when teaching PE, and determining appropriate activities for students in group and individual settings. A table of possible sensory challenges and solutions for students with ASD is provided. Teachers can use this article, and the table provided, to consider challenges and accommodations when teaching students with ASD in PE.

2. Ohrberg, N. (2013). Autism spectrum disorder and youth sports: The role of the sports manager and coach. *Journal of Physical Education, Recreation & Dance, 84*(9), 52-56.

This article discusses the role of a sports manager and coach when working with an individual with ASD. The article also discusses how the community should be involved, what could be included in a program handbook, training for coaches and other staff, family support, and reasonable accommodations and safety considerations for individuals with ASD. Physical education teachers and coaches should refer to this article to see what unique needs should be considered when including individuals with ASD on sport teams and how to implement those considerations.

3. Todd, T. (2012). Teaching motor skills to individuals with autism spectrum disorders. *Journal of Physical Education, Recreation & Dance*, 83(8), 32-48.

Motor deficits, motor planning, imitation of movements, postural control, and physical activity of students with ASD are discussed in this article. In the discussion, some reasons why students with ASD often have difficulty with these in PE and some suggestions to help students with ASD perform better in PE are provided. Teachers can use this article to better understand how to help students with ASD be more successful in PE.

4. Menear, K., & Smith, S. (2008). Physical education for students with autism: Teaching tips and strategies. *Teaching Exceptional Children, 40*(5), 32-37.

This article discusses placement options and teaching strategies for students with ASD in PE. The article gives teaching tips to include students with ASD in PE. Suggestions for equipment and how to set up an appropriate environment are discussed. Teachers should use this article to learn teaching strategies to help instruct students with ASD in their PE classes.

5. Colombo-Dougovito, A. (2015). Successful evidence-based practices for autism spectrum disorder and their use for the development of motor skills in physical education. PALESTRA, 29(2), 34-41.

Many children with ASD have significant gross motor skill deficits along with social, communication, and behavioral deficits. There is a correlation between motor skill impairments and severity levels of ASD. Motor skill development can increase participation in physical activity and may help reduce stereotypical behaviors, increase appropriate responding, and social opportunities. Intervention models, such as applied behavior analysis (ABA), structured teaching (TEACCH), peer–tutoring, and video modeling can be adapted to provide a more inclusive and specialized PE setting.

Colombo-Dougovito's article provides current intervention models used successfully with students with ASD and strategies and suggestions for applying the models to teach motor skills in PE. Adapted and general PE teachers can use this article as a reference for modifying teaching models for students with ASD.

Blog

"Diary of a Mom" by Jess Wilson, WordPress. - https://adiaryofamom.wordpress.com/

This blog is written by a mother of two daughters, one who has autism. The author shares unfiltered experiences she has as a mother with an autistic (a term the author chooses to use) child. She is an advocate, public speaker, and a working mom. Books, websites, and articles are recommended on her blog for parents and families with children with ASD. This blog is authentic, powerful, and can be useful to teachers to provide some insight into the home lives of students with ASD and their family's experiences.

iPad Applications

1. Proloquo2Go

Proloquo2Go is a symbol-supported communication app to promote language development and grow communication skills, from beginning to advanced communicators. The app allows the user to personalize the vocabulary so that students are able to better communicate. Students can touch pictures and hear the word or phrase that was clicked on. Proloquo2Go can be used in PE settings to create social stories, activity schedules, video modeling, and assessment.

2. Social Stories Creator and Library

Social Stories Creator and Library is an app that allows teachers and parents to create and share educational social stories and visual schedules with students with ASD.

Stories and schedules are created by using personalized pictured and phrases. Teachers and parents can also record their voices saying the phrases with the pictures.

3. Kiddie Countdown

Kiddie Countdown is a visual activity timer app that helps students keep track of time. The app makes it easy for your students to see how much time they have left for a particular task. The timer changes colors when time is running out. The timer starts at green, then turns to yellow when time is running out, and then to red when time is out. Kiddie Countdown can be helpful for students with ASD when transitioning from one activity to another in PE.

4. Exercise Buddy Visual Exercise System

This app is a visual exercise and motor skills system for students with ASD. Included in the app are workouts, body system identification tools, exercise pictures and videos, and teaching tools (worksheets and tests). The videos are of individuals with ASD performing the exercises and motor skills. Exercise Buddy was created by special education professionals to teach individuals with ASD and other special needs to exercise. Teachers and parents can use Exercise Buddy to help students with ASD to understand the movements and exercises they are to perform. This app is in development. Information can be found at http://www.exercisebuddy.com/.

Recommendations for Future Research

Future research is needed on the following questions to illuminate the most appropriate interventions for individuals with ASD in PE.

1. What are the most common sensitivities for individuals with ASD and what are the best ways to prevent sensory overload in PE?

2. Which supports do children with ASD prefer in PE and what aspects of those supports do they like?
3. How does physical activity affect social interaction between individuals with ASD and their typically developing peers?
4. What role does the use of visual supports have on coping with change?
5. When is the appropriate time to decrease the use of visual supports to minimize overdependence on these supports?
6. What should the priorities be for PE teachers regarding behavior when teaching students with ASD?

Recommendations for Future Critical Analysis Projects

In the future, a worthwhile project would be to develop social stories for common PE class situations. Social stories could include: changing in the locker room, transitioning in the hallways, choosing teams, or switching from indoor to outdoor activities. Teachers should use the information provided in this project and video to guide the creation of those stories for APE and GPE teachers.

Another project could be a workshop for APE and GPE teachers lead by professionals who work with students with ASD, to create visual supports such as: social stories, PECS, activity schedules, and ways to utilize technology. Physical education teachers would have the opportunity to develop multiple visual supports to use with current students in their PE classes.

Also, a technology workshop could be developed and implemented in the future. The workshop would teach APE and GPE teachers how to use multiple applications on several technologies such as iPads and SmartBoards. The teachers would gain

understanding of how to use technology and how to incorporate it into their PE lessons and assessments.

A "tool box" for APE and GPE teachers could be created. In the "tool box" common visual supports could be developed and ready to use for teachers. The visual supports created would be developed with common PE units or activities in mind.

Finally, a detailed, written manual and accompanying video that provided information on specific visual supports and how to make and utilize them would be a meaningful project. Each visual support in the manual and on the video would be described in detail, specific materials needed would be provided, as well as how to assemble and use the visual supports.

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APPENDIX A

COMPARISON OF THE DIAGNOSTIC CRITERIA FOR AUTISM SPECTRUM DISORDER ACROSS DSM-5, DSM-IV-TR, AND THE INDIVIDUALS WITH DISABILITIES EDUCATION ACT (IDEA) DEFINITION OF AUTISM

Comparison of the Diagnostic Criteria for Autism Spectrum Disorder Across DSM-5,[1] DSM-IV-TR,[2] and the Individuals with Disabilities Education Act (IDEA)[3] Definition of Autism

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September 2014

Table 1: Comparison of DSM-5 and DSM-IV-TR Diagnostic Criteria

	DSM-5	DSM-IV-TR	
Diagnostic Classification	**Autism Spectrum Disorder (ASD)**	**Pervasive Developmental Disorders**	**Key Differences**
Diagnostic Subcategories	None *(However, it is specified that individuals with a well-established DSM-IV diagnosis of Autistic Disorder, Asperger's Disorder, or PDD-NOS should be given the diagnosis of ASD).*	1. Autistic Disorder 2. Asperger's Disorder 3. Pervasive Developmental Disorder, Not Otherwise Specified (PDD-NOS) 4. Rett's Disorder 5. Childhood Disintegrative Disorder (CDD) (1–3: Autism Spectrum Disorder(s))	In DSM-5: • There are no diagnostic subcategories, reflecting research indicating a lack of reliability across clinicians in assigning subcategories. • ASD encompasses Autistic Disorder, Asperger's Disorder, and PDD-NOS. Rett's Disorder and CDD are no longer included in the ASD diagnosis.
Requirement for Diagnosis	Must meet all 3 behavioral criteria in category A and at least 2 in category B. (See below).	Must meet at least 6 behavioral criteria overall, with at least two from category A.1, one from category A.2, and one from A.3. (See below.)	In DSM-5: • It is now specified that behavioral criteria can be met on the basis of historical report.

	Social Communication & Social Interaction (Category A)	Social Interaction (Category A.1)	
Specific Behavioral Criteria: **SOCIAL**	**A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by <u>all three</u> of the following, currently or by history:** 1. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions. 2. Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication. 3. Deficits in developing, maintaining, and understanding relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.	**A.1. Qualitative impairment in social interaction, as manifested by <u>at least two</u> of the following:** a. Marked impairments in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body posture, and gestures to regulate social interaction. b. Failure to develop peer relationships appropriate to developmental level. c. A lack of spontaneous seeking to share enjoyment, interests, or achievements with other people, (e.g., by a lack of showing, bringing, or pointing out objects of interest to other people). d. Lack of social or emotional reciprocity (e.g., not actively participating in simple social play or games, preferring solitary activities, or involving others in activities only as tools or "mechanical" aids).	In DSM-5: • Social communication and social interaction are combined into one category, in recognition that communication is necessarily social in nature, and based on factor analytic studies. • It is specified that social communication/ interaction deficits must be manifested across multiple contexts.
	N/A	Communication (Category A.2)	
Specific Behavioral Criteria: **LANGUAGE/ COMMUNICA-TION**	*Symptoms in this area are now subsumed under Categories A (Social) and B (Restricted Activities)*	**A.2. Qualitative impairments in communication as manifested by <u>at least one</u> of the following:** a. Delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime). b. In individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others. c. Stereotyped and repetitive use of language or idiosyncratic language. d. Lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level.	In DSM-5: • Language impairment (a) is not included in the diagnostic criteria, but is included as a specifier (see 'Specifiers'). • Impaired conversation (b) is considered an aspect of social-emotional reciprocity (A.1). • Stereotyped language (c) is considered an aspect of restricted/repetitive behaviors (B.1). • Social and imaginative play(d) are incorporated into A.3.

	Restricted, repetitive behavior, interests, activities (Category B)	Restricted repetitive & stereotyped patterns of behavior (Category A.3)	
Specific Behavioral Criteria: **RESTRICTED/ REPETITIVE ACTIVITIES**	**B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history.** 1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g., simple motor stereotypies, lining up toys or flipping objects, echolalia, idiosyncratic phrases). 2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns or verbal nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route or eat same food every day). 3. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interest). 4. Hyper- or hyporeactivity to sensory input or unusual interests in sensory aspects of the environment (e.g., apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).	**A.3. Restricted repetitive and stereotyped patterns of behavior, interests and activities, as manifested by at least one of the following:** a. Encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus. b. Apparently inflexible adherence to specific, nonfunctional routines or rituals. c. Stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements). d. Persistent preoccupation with parts of objects.	In DSM-5: • Sensory issues are now included as a behavioral symptom (B.4.).
Age of Onset	**C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life).**	**B. Delays or abnormal functioning in at least one of the 3 behavioral must be present prior to age 3 years.**	In DSM-5: • Symptoms do not have to be apparent before age 3.

Level of Impairment	**D. Symptoms must cause clinically significant impairment in social, occupational, or other important areas of current functioning.**	Optional: Global Assessment of Functioning (0-100) may be used.	In DSM-5: • Functional impairment must be present for a diagnosis. • Severity levels for behavioral criteria A and B must be specified: • Level 3: Requiring very substantial support • Level 2: Requiring substantial support • Level 1: Requiring support
Rule-Outs	**E. These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay.**	**C. The disturbance is not better accounted for by another Pervasive Developmental Disorder.**	In DSM-5: • Social (Pragmatic) Communication Disorder (SCD) is presented as an alternative (new) diagnosis for individuals who have marked deficits in social communication, but whose symptoms do not otherwise meet criteria for ASD.
Comorbidities	The following "Specifiers" should be indicated: • With or without accompanying intellectual impairment. • With or without accompanying language impairment. • Associated with a known medical or genetic condition or environmental factor. • Associated with other neurodevelopmental, mental, or behavioral disorder. • With catatonia.	ADHD and Stereotyped Movement Disorder cannot be diagnosed along with Autistic Disorder.	In DSM-5: • Comorbidities with other conditions are recognized; Specifiers are used to further describe the symptomatology.

Summary of Research Findings Comparing DSM-5 and DSM-IV-TR Criteria for Autism

Several studies have compared the DSM-5 criteria to the DSM-IV-TR criteria in clinical samples. The majority have used retrospective methods (e.g., record review) to apply DSM-5 criteria to individuals with an established DSM-IV-TR diagnosis.[4-9] Interpretation of these findings is challenging, because the initial diagnoses were based on the DSM-IV-TR criteria, which did not include some behavioral criteria specified in DSM-5. Four studies compared the use of DSM-IV-TR and DSM-5 diagnostic criteria on the same contemporaneous sample,[10-13] and one conducted a meta-analysis[14] of studies that used both contemporaneous and retrospective approaches. Only three studies used the current published DSM-5 criteria;[9, 11,13] the others used draft versions from either 2010[7] or 2011.[4-6,8,10,12]. The meta-analysis reported similar findings for studies applying the 2010 and 2011 DSM-5 draft criteria.[14]

Most studies report that DSM-5 criteria, compared to DSM-IV-TR criteria, result in fewer individuals diagnosed with ASD.[5-7,10,12,13] The reduction rate across these studies ranged from 25%-68%, though one study found only a 9% reduction, or sensitivity of .91.[8] One study reported that higher-functioning individuals in the PDD-NOS subgroup were less likely to receive a DSM-5 diagnosis of ASD than were individuals in the other DSM-IV-TR subgroups.[10] While some studies reported that females, young children, and/or non-cognitively impaired individuals with a DSM-IV-TR diagnosis were disproportionately under-identified using DSM-5 criteria,[4-6] others reported similar identification rates for these subgroups.[6,13] One study found that a failure to satisfy all three criteria in the social-communication domain of DSM-5 was the most common reason (39%) that individuals with a DSM-IV-TR diagnosis did *not* receive a DSM-5 diagnosis of ASD.[13] Findings are mixed regarding the extent to which the new DSM-5 diagnosis of Social Communication Disorder (SCD) is successful in capturing individuals with a DSM-IV-TR diagnosis who do not meet DSM-5 diagnostic criteria for ASD.[11,12]

Table 2: Comparison of IDEA Definition of Autism and DSM-5 Diagnostic Criteria

IDEA Definition	Similarities with DSM-5	Differences from DSM-5
"Autism means a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three, that adversely affects a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences. A child who manifests the characteristics of autism after age three could be identified as having autism if the aforementioned criteria are satisfied. Autism does not apply if a child's educational performance is adversely affected primarily because the child has an emotional disturbance, as defined in paragraph (c)(4) of IDEA."	• Both definitions include symptoms in the areas of social interactions, nonverbal communication, repetitive activities, stereotyped movements, resistance to change, and unusual sensory responses. • Both definitions indicate that symptoms need not be apparent before age 3.	• IDEA uses the classification of 'autism,' while DSM-5 uses the classification of 'autism spectrum disorder (ASD).' • DSM-5 presents more detailed behavioral descriptions for each symptom. • DSM-5 provides an algorithm for how many symptoms in each behavioral domain are required for a diagnosis. • IDEA provides more detailed description for stereotyped activities than for social impairments, suggesting an emphasis on the former. • IDEA specifies that the symptoms must adversely affect the child's educational performance, while DSM-5 requires impairment in social, occupational, or other important areas of functioning. • DSM-5 requires the specification of severity levels for the two behavioral domains. • DSM-5 uses "specifiers" to describe co-morbidities, such as language and intellectual impairment.

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VANDERBILT PEABODY COLLEGE Claremont GRADUATE UNIVERSITY IDEA Work

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APPENDIX B

SOCIAL STORIES

Jack

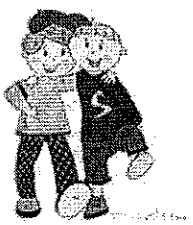
Playing in PE

Playing games with other kids in
PE can be very fun,
but I won't always win.

Sometimes I will lose
and that is OK!

I will tell others "Good game!" or
give them a high five and say
"Nice job!"

I will smile and have a good time.
It's OK to not win all the time.



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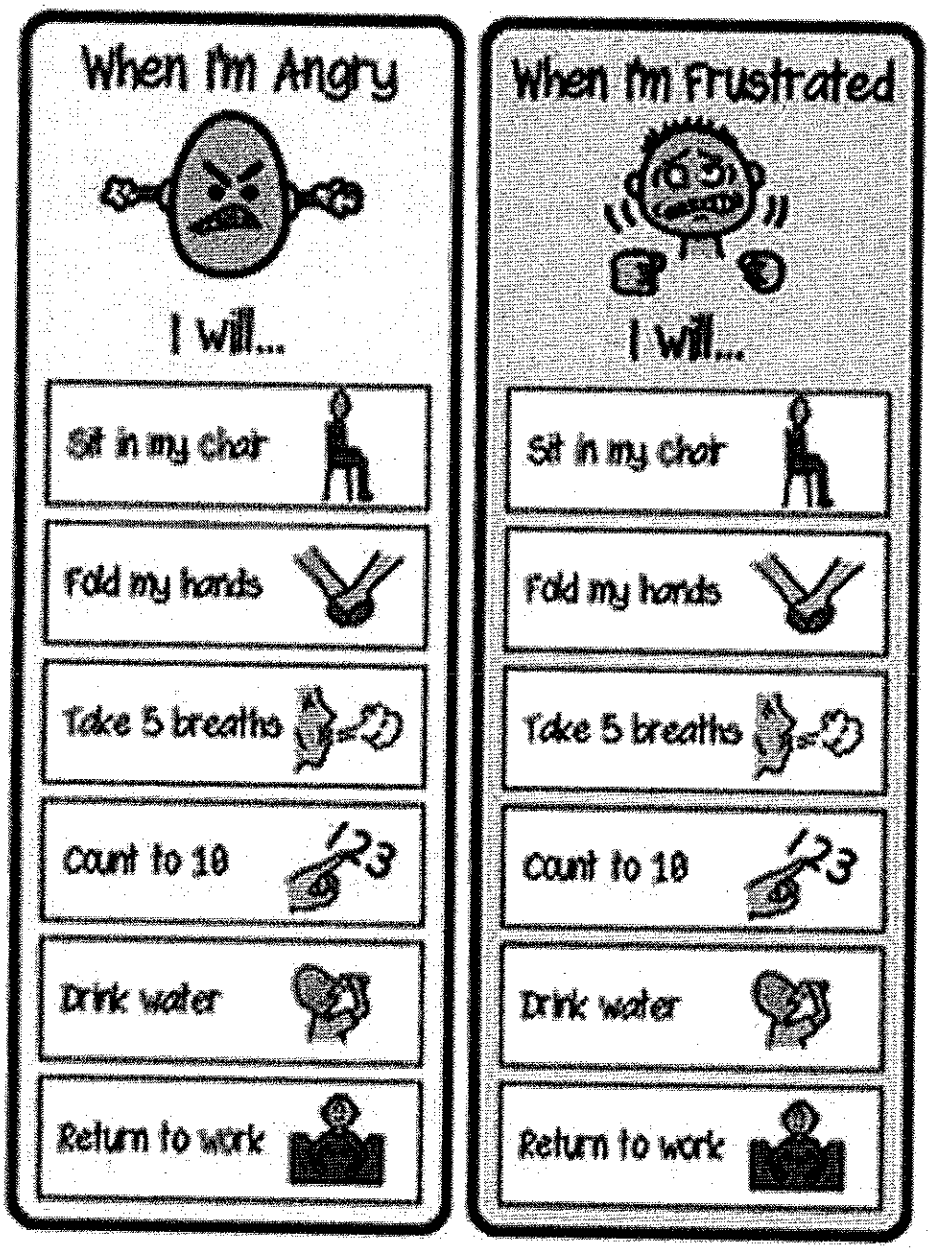

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APPENDIX C

ACTIVITY SCHEDULES

P.E. Class Routine

Warm-Up Activity with Class

☐

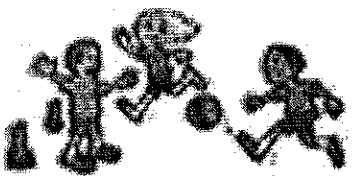
Stretch on your number

☐

Listen to Mrs. Donlea

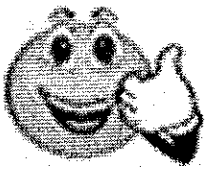
☐

Participate with your classmates



☐

Follow the rules of the game

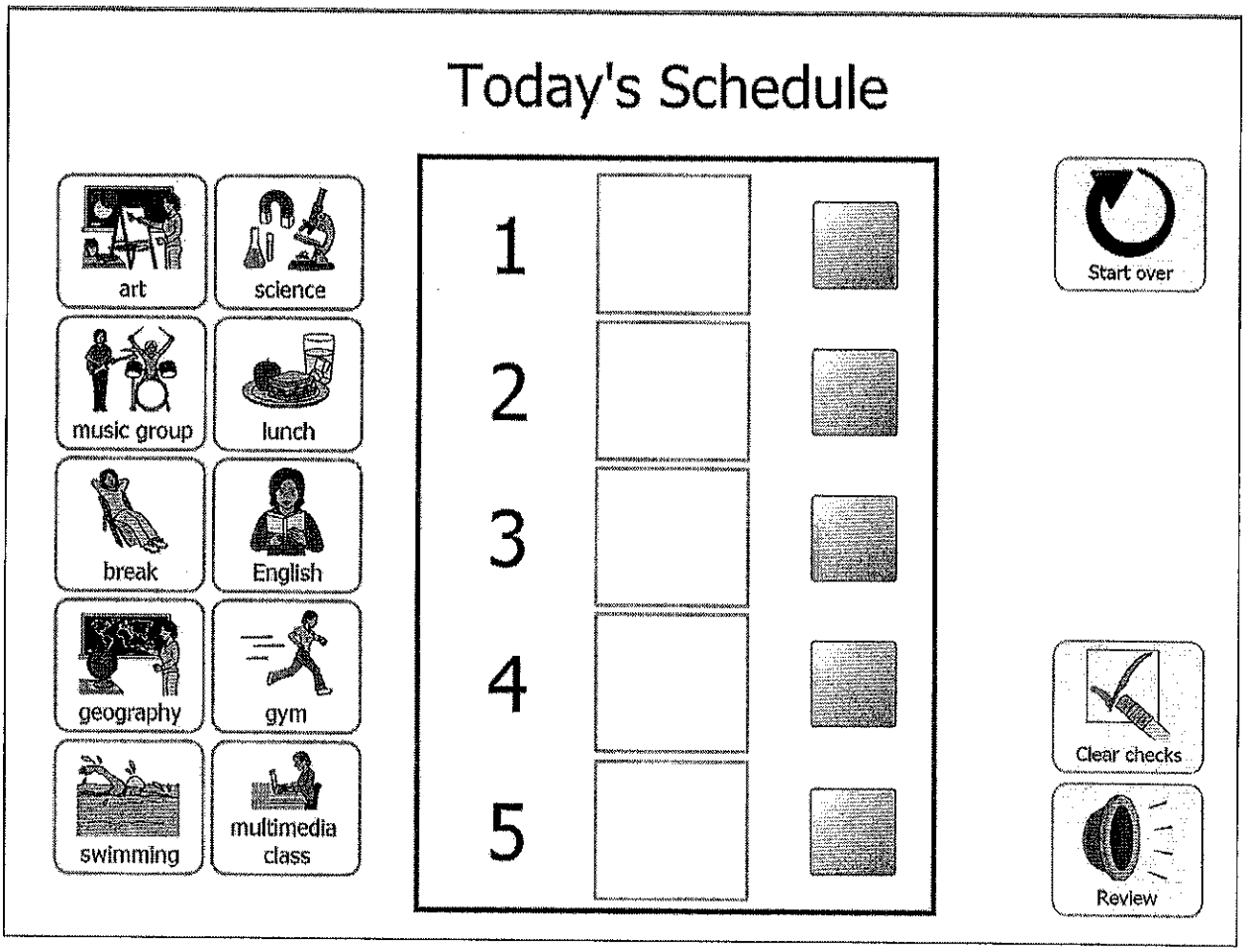


☐

Check Schedule

☐

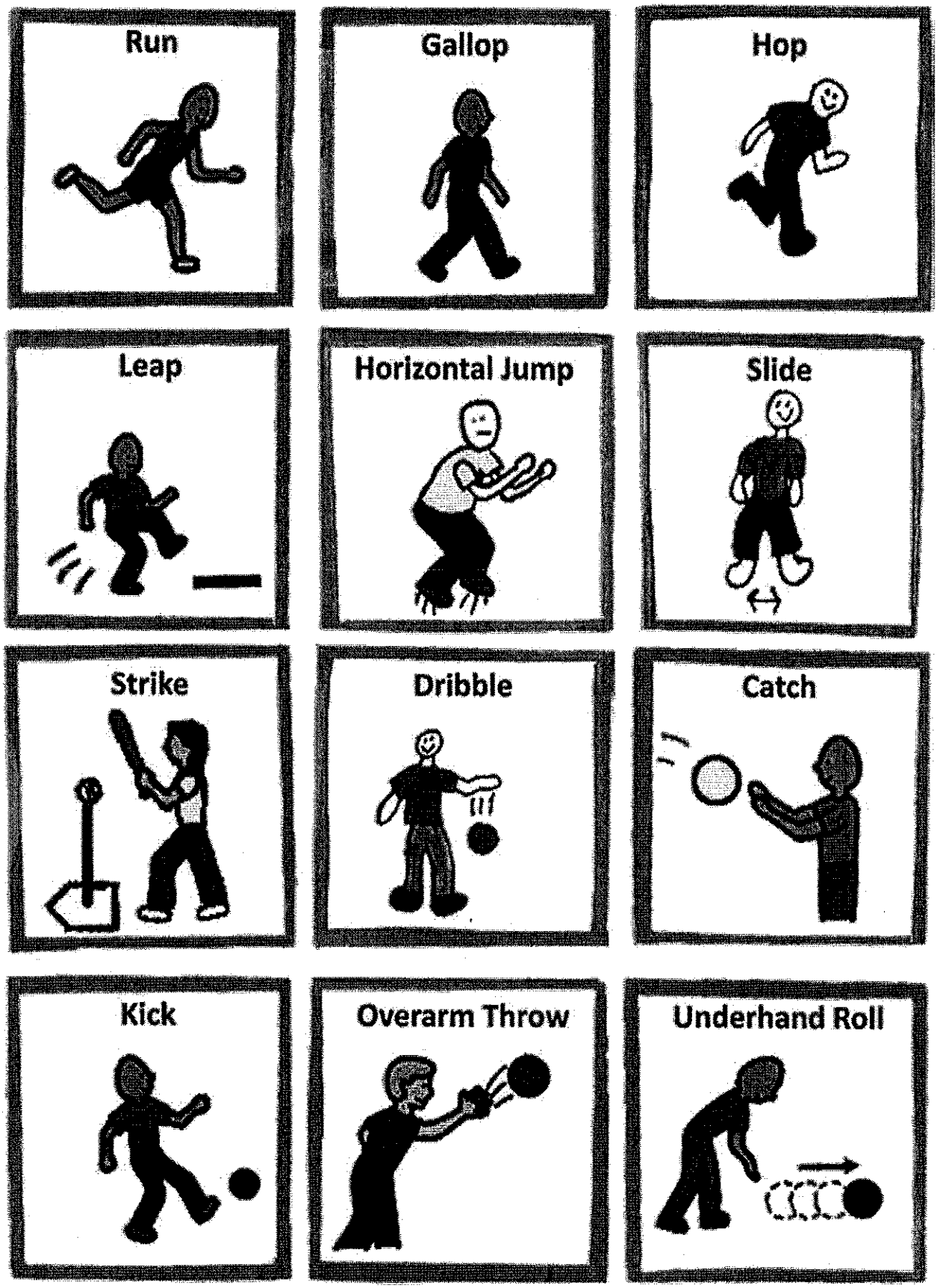
https://www.google.com/search?q=Physical+education+social+stories&espv=2&biw=1680&bih=949&source=lnms&tbm=isch&sa=X&ei=9-tQVZHQBYTEogSNmYHoCg&ved=0CAYQ_AUoAQ#imgrc=_



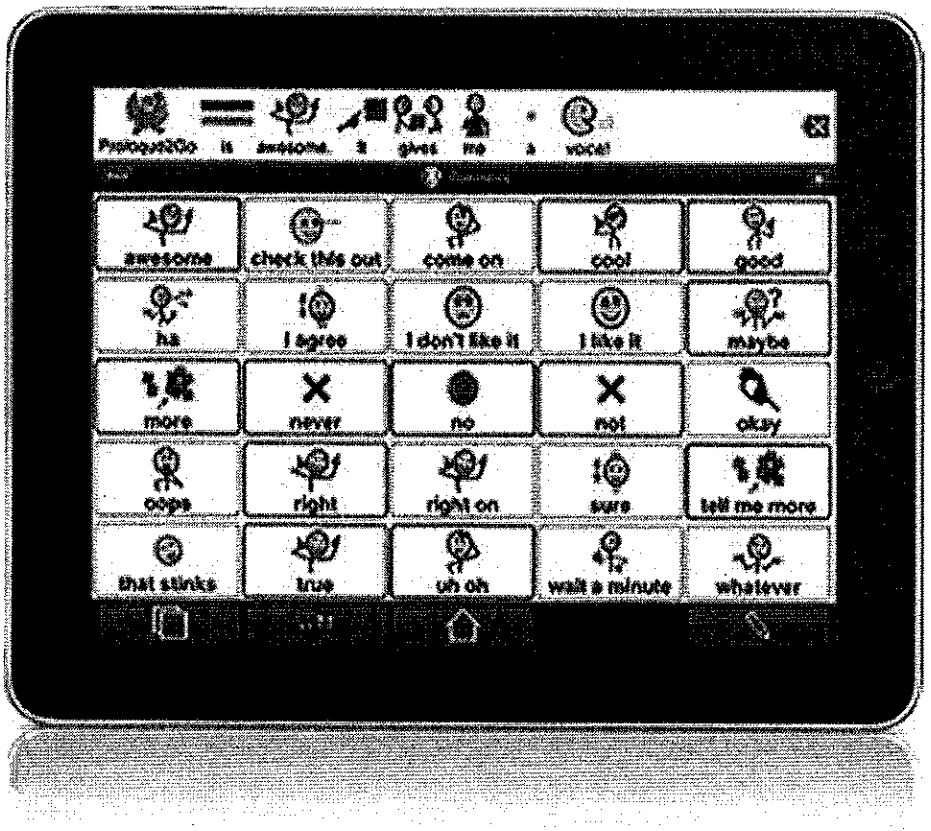
Source: http://www.mayer-johnson.com/autism-article3

APPENDIX D

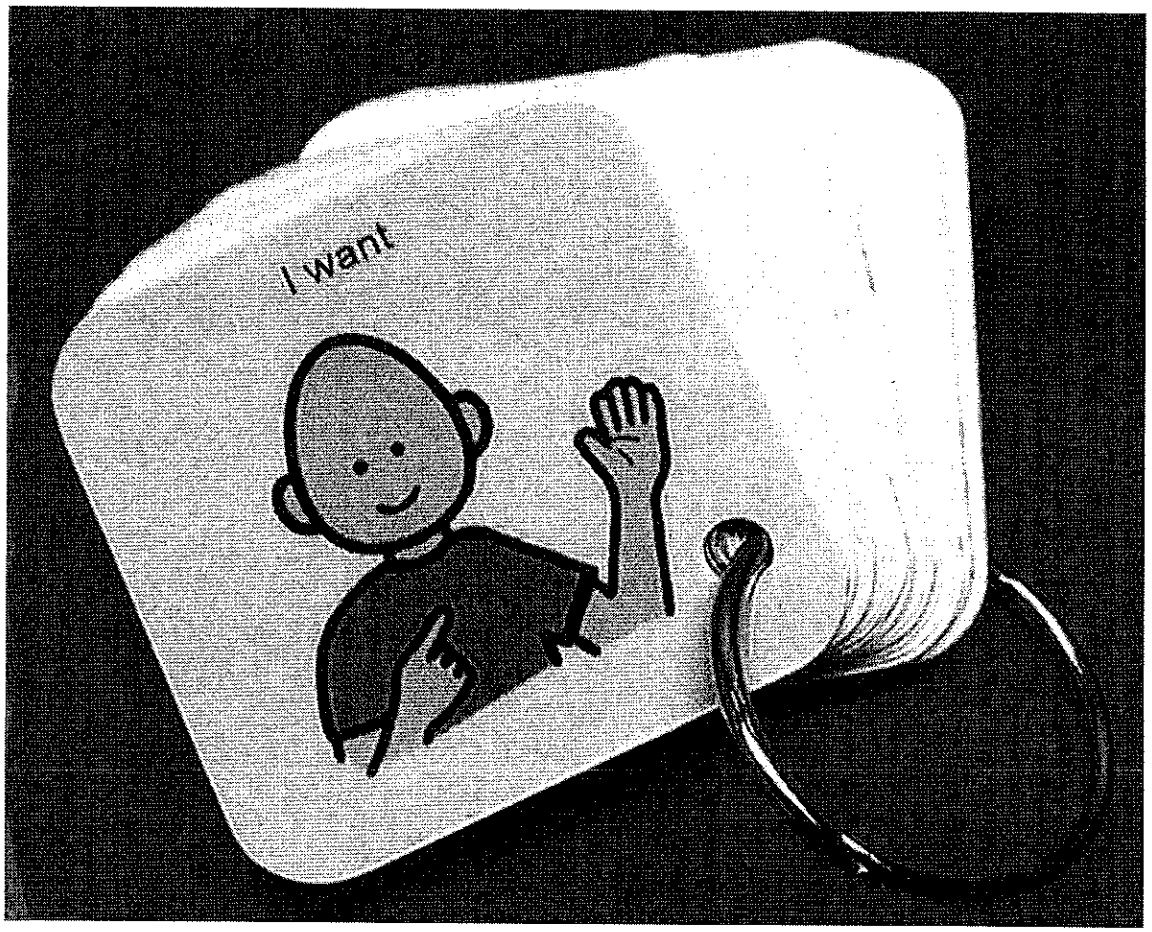
PICTURE EXCHANGE COMMUNICATION SYSTEM (PECS)


Run
Gallop
Hop
Leap
Horizontal Jump
Slide
Strike
Dribble
Catch
Kick
Overarm Throw
Underhand Roll

Source: http://visuals.autism.net/main.php?g2_itemId=98



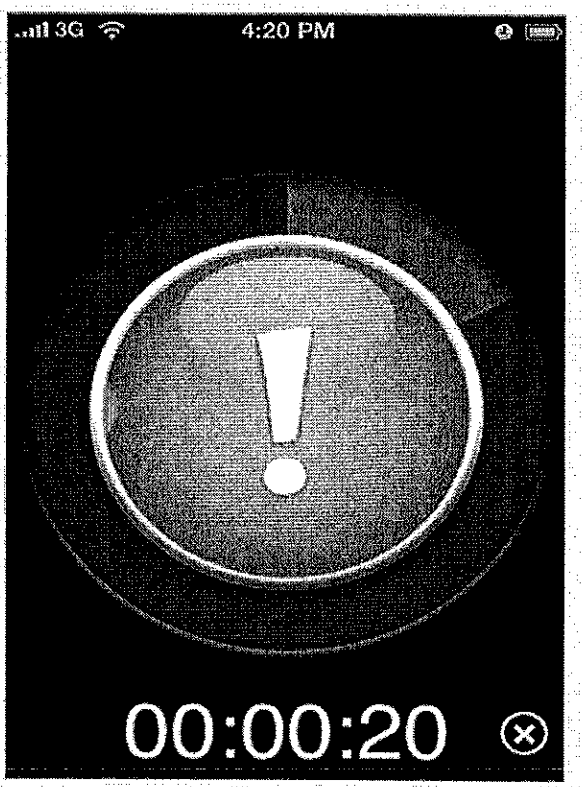
Source: http://www.assistiveware.com/products

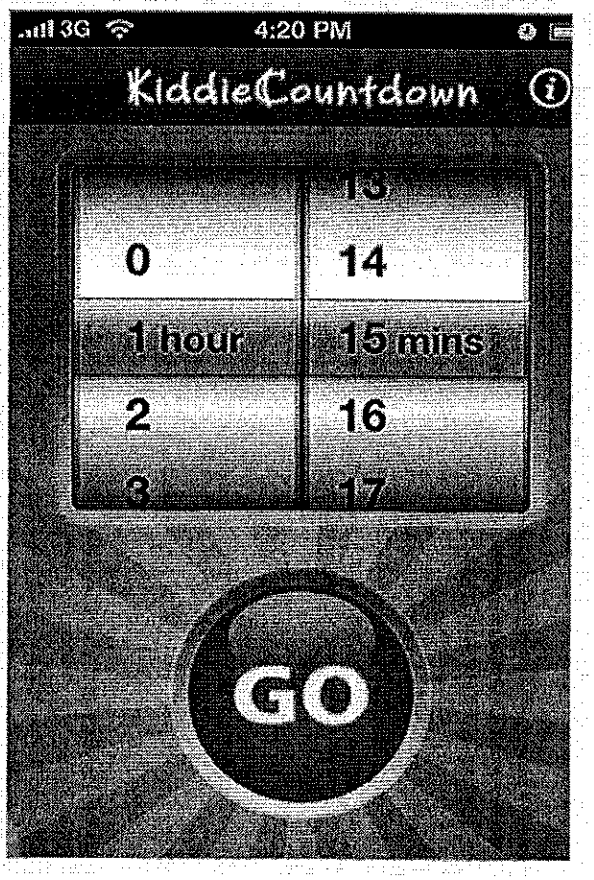


Source: http://the-autism-store.myshopify.com/collections/all/pecs-key-ring

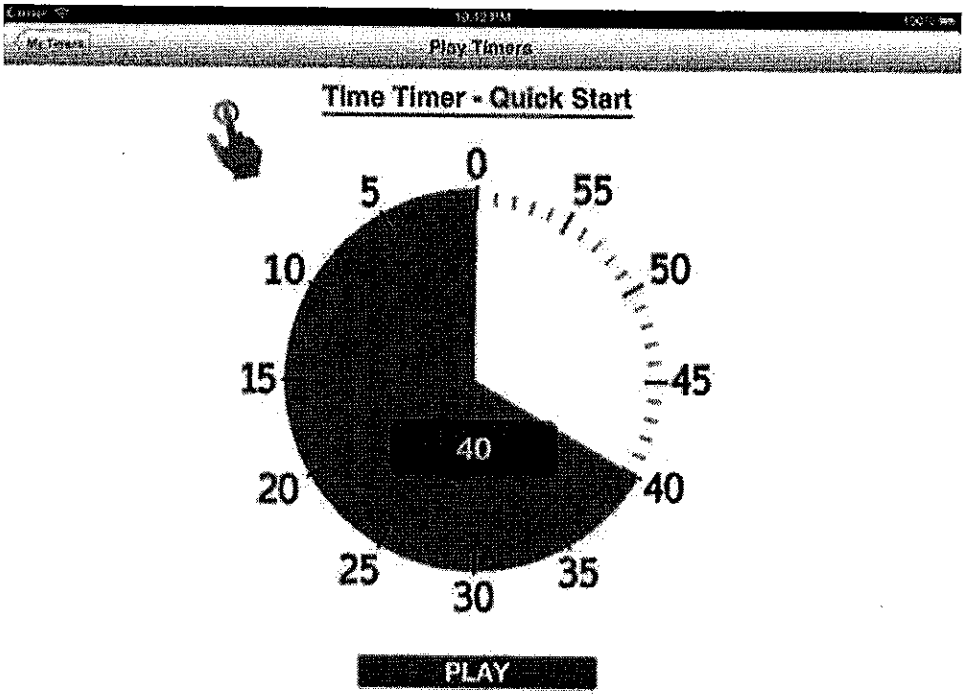
APPENDIX E

VISUAL WARNING DEVICES

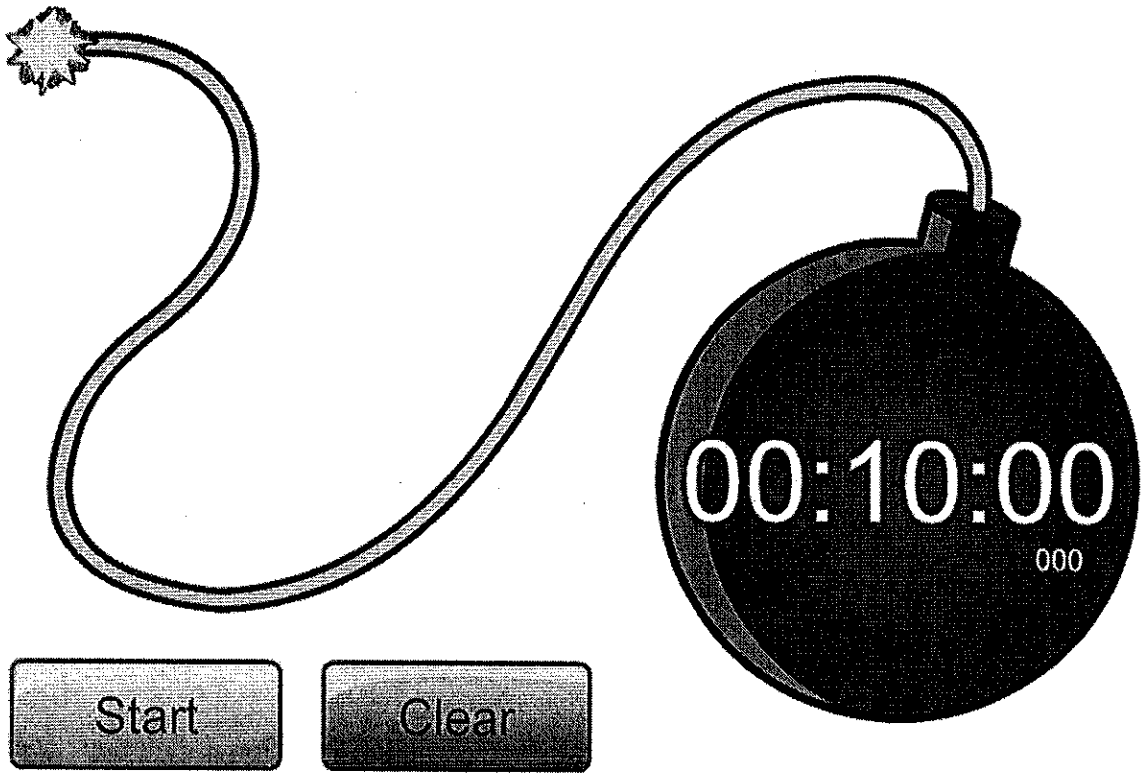




Source: KiddieCountdown



Source: Playtimers



Source: TimeBomb

APPENDIX F

VIDEO SCRIPT

USING VISUAL SUPPORTS FOR TEACHING STUDENTS WITH AUTISM SPECTRUM DISORDER IN PHYSICAL EDUCATION

Video/Project Title:

Using Visual Supports for Teaching Students with Autism Spectrum Disorder in Physical Education

Time in Video	Content and Script	On Screen in Video
0-1:45	Introduction Imagine yourself teaching a physical education class. A student starts running around, flailing his arms, yelling and making screeching sounds, and covering his ears with his hands. You approach the student and try to explain that the behavior is inappropriate and try to calm him down. The student does not understand your comments and begins to rock back and forth, looks very anxious, starts hitting his head with his hands, and continues the screeching noise. Now, imagine yourself as this student standing in a physical education class. Your clothes feel itchy and heavy on your body. You hear many other children talking, yelling, voices echoing throughout the gym. There is music playing, balls bouncing, lights buzzing, and sneakers screeching on the floor. You	*Gym setting through eyes of a teacher with a student with ASD in PE class, GoPro video*

	see balls moving through the air, cones and equipment scattered on floor, and many other children moving around in all sorts of directions. You don't know how to process all of the commotion going on in the gym so you cover your ears, make loud noises with your mouth to drown out the noise, wander away from the group of kids, and start rocking back and forth to calm yourself. This may be what a typical physical education class feels like for a child with Autism Spectrum Disorder (ASD). It is common for kids with ASD to say that these situations affect how they function in PE class. With the significant increasing prevalence of ASD, it is very likely that most general physical education (GPE) teachers will have students with ASD in their classes. Therefore, GPE teachers will likely work closely with the student's parents, special education teacher, adapted PE teacher, IEP teams, and students with ASD in developing realistic individual goals.	*Gym setting through eyes of student with ASD, GoPro video* *Me talking*

	Purpose	
1:45-2:10	The purpose of this video is to provide general and adapted physical education teachers with multiple visual support and strategies to use with students with ASD in the physical education setting. Research has demonstrated that visual supports increase comprehension, engaged physical activity time, and social interactions for students with ASD. In the next 20 minutes, many visual supports will be described and demonstrated to help you assist students with ASD in your physical education classes.	*Me talking*
2:10-6:30	**Characteristics of Autism Spectrum Disorder** According to Fittipaldi-Wert and Mowling, ASD is the fastest growing developmental disability. The Centers for Disease Control and Prevention estimate that approximately 1 in 68 children are diagnosed with ASD and it is 5 times more common in boys than in girls. There is no known cause of ASD but many factors are suspected. Children with ASD often have delays in social reciprocity and expressive and receptive language (Todd, 2012). They also often have delayed or low language comprehension and production. Echolalia, the routine replication of words and phrases, is a prevalent language	*Me Talking*

	characteristic in children with ASD (Silla & Burba, 2008). Many of these characteristics have an impact on participation in PE because students with ASD struggle to process all of the sensory input that occurs around them in the gym. In the physical education setting, many children with ASD show fundamental motor skill deficits. Locomotor skills, such as running, jumping, and skipping, and object control skills, such as catching, throwing, dribbling, and striking, are delayed in many students with ASD. There is a great need for motor and object control skill development interventions for students with autism (Berkeley et. al., 2001). Debolt and colleagues found that early intervention programs have shown the best results when developing gross and fine motor skills. Children with ASD perform meaningful movements easier than non-meaningful movements, meaning the actions they perform need to have a goal (Todd, 2012). For example, in capture the flag, the goal of the game is to capture all of the other team's flags. Students with ASD need to be told why they are trying to gather all of the flags in order for the movement to have meaning.	*Students in gym?? *Me talking*

	Children with ASD are placed on a continuum. A diagnosis of ASD can be classified from mild to severe. Children with ASD have a wide range of abilities and no two children with ASD are the same. There has been a recent change in the Diagnostic and Statistical Manual of Mental Disorders (DSM)-4 to DSM-5. In the DSM-5, children are no longer being diagnosed with having Aspergers or Rett syndrome; they are placed on the autism spectrum. Children who require very substantial support may be solitary and withdrawn and can be non-verbal. Children who require substantial support may not initiate interactions but act in a passive way when approached. And children who require minimal support may be active in interactions but can seem awkward to other children.	*Pages from DSM-5 with charts and definitions*
	Repetitive or stereotypical behaviors are characteristics in some children with ASD. These include finger flicking, spinning, hand-flapping, rhythmic jumping, gazing at lights, rocking, or self-injury, like biting or pinching. Children with ASD can also be very literal when interpreting things, situations, or objects. For instance, if the student was	*Possible mock interview with Grad student (Brandon) saying paragraph to the right*

	running and you said to them "Wow! You are really flying", they might reply something like "I am not flying. I am running fast." Another Example would be telling a student with ASD to run home when playing baseball. That might confuse the student and make them think that they should literally leave the gym and go home. Children with ASD learn differently than their typically developing peers. They have hypersensitivities, meaning they are overstimulated, or hyposensitivities, meaning they are understimulated. Some senses that can be affected by these are auditory (loud noises, music playing, kids screaming, shoes screeching), visual (where to go in open space, equipment scattered everywhere, children running everywhere), tactile (feel of equipment, texture of a basketball, tag on a shirt, shoes are tied too tight), olfactory (smell of equipment, lotion, perfume, body odor), and kinesthetic (body awareness, how to move body/perform activity). Structure and routine are necessities when teaching with children with ASD. Both can help to prevent meltdowns or tantrums and	*List examples of affected senses and what can affect them in PE setting*

	help make transitions easier. Many children with ASD also have trouble processing auditory information, meaning they have strong visual processing or they learn by seeing, not hearing. Visual supports are a way to help students with ASD understand the tasks and activities presented to them in physical education.	
6:30-7:30	**Visual Supports** Many types of instructional supports have been shown to increase social interactions, improve skill development, and increase on-task behavior in students with ASD in PE. Visual supports combined with a physical demonstration allows children with ASD to focus on the visual processing and minimize the auditory information (Breslin & Rudusil, 2011). A finding from a 2013 study by Liu and Breslin found that visual supports and minimal verbal commands help children with ASD to understand the tasks presented to them. They should be used with positive motivator and can include a reward for a completed task, like free time, iPad time, or an edible	Flash "Visual Supports" on screen for Transition *Me talking*

	treat. In the next section of the video, I will discuss several common visual supports that can be utilized with students with ASD in physical education and how these visual supports can be used for assessment.	*Me talking*
7:30-8:20	A social story is a common visual support used with children with ASD. In the book "Meeting the Physical Education Needs of Children with Autism Spectrum Disorder" by Alexander and Schwager, social stories are described as individualized stories designed to increase acceptable social exchanges. They are read prior to activity as a prompt for expected behavior and conversation. They can be shown on an iPad, SmartBoard, or in booklet. Some example situations for which stories can be written for include: locker room procedures, swimming procedures, and field trips. For instance, if your class was taking a bus trip to a local pool, the social story could include procedures on how to act on the bus, at the pool, and in the locker rooms. A social story can be used to prepare a student with ASD for testing and assessment. The story can show what activities will be assessed, what the student should do during	Flash "Social Stories" on screen for Transition *show examples on iPad and SmartBoard*

8:20-9:20	the testing, and what the teacher will be doing. Activity schedules are another common visual support that are used for children with ASD. These can be very effective and are commonly used in general and adapted PE and can be expanded for a student with ASD. An activity schedule helps with transitions, provides consistency, and gives the student a routine in the classroom and gym setting. They use pictures and/or words and are arranged in vertical order on white board with Velcro. The student's name is at the top of the board and an envelope for completed tasks is at bottom. Times for each task can also be included. For assessment, each activity being assessed can be on the schedule. When the student has completed one activity of the assessment, they can place the picture in the envelope at the bottom. This will allow the student with ASD to see what activities they have completed and what is still to come. Picture Exchange Communication System (PECS) are drawings that represent an object or skill with a	Flash "Activity Schedules" on screen for Transition *show example of schedule, possible APE teacher demo*

9:20-10:20	description written above. They can be attached to a lanyard or key chain and worn by the teacher or on an iPad or iPhone. They can by pulled out to show the student what activity you want them to perform or what activity is coming next. Some examples of skills include; sit, stand, check schedule, throw, and catch. Task Cards are similar to PECS. They have a specific exercise or task to be completed on them. PECS and Task Cards can be made on programs like Boardmaker. When completing assessments, PECS and Task Cards can be shown to the student with ASD to show them what activity they are to perform. Students with ASD often have trouble with transitioning from activity to activity. Visual warning devices let the student know when an activity is ending and it is time to transition to the next. Some examples of visual warning devices are a timer, stopwatch, clock, or iPad. This helps the student to plan and organize themselves for the next activity. Visual Warning Devices can show students how much time they have to perform an activity or how much time is left during assessment.	Flash "PECS and Task Cards" on screen for Transition *have Matt Meyers show/talk about PECs* Flash "Visual Warning Devices" on screen for Transition *show timer, stopwatch, clock, and iPad*

10:20-10:50	Boundaries designate an exact area where a task will be performed by the student. Boundaries promote independence and provides students more time to organize movements in space. Examples of objects that create boundaries are: cones, poly spots, floor tape, or high mats to block student's view of other activities that are going on in other parts of the gym. Children with ASD often have a literal interpretation of objects, meaning they struggle to use their imagination. When explaining activities, say what they will literally be doing. For example "Jump from spot to spot", not "jump from lily pad to lily pad". Placing boundaries, like poly spot as a visual cue for foot placement when throwing, will help students with ASD identify where to move their body when assessing skills.	Flash "Boundaries" on screen for Transition *show examples of cones, poly spots, floor tape, or high mats used as boundries*
10:50-11:50	Visual demonstrations are useful in any physical education teaching setting. They help improve inaccuracies in timing, force, and amplitude when imitating movements. Students with ASD can imitate the movements better if the action is meaningful, goal oriented, and motivating. You need to make	Flash "Visual Demonstrations" on screen for Transition

11:50-12:40	sure that you have their full attention or they will have difficulty understanding the task. Mirroring the image or standing beside the student is best when demonstrating a movement to a student with ASD. This strategy allows them to see exactly what they are supposed to do, not the opposite. Utilizing peer modeling as a demonstration can be a useful tool in a large class. When assessing a student with ASD, visual demonstrations can help the student to see what action they are supposed to perform and how to move their body.	*show peer modeling, one student/teacher demonstrating to student with ASD a movement from onlooker's view and student's view*
12:40-13:45	Technology, such as an iPad, is another useful visual support for all students in a physical education setting. iPads are portable and can be carried easily by both the teacher and student. There are specific applications made to help students with expressive communication, identifying feelings, and point out images for content. iPads can also be used to review skills on the screen before and during class. Video modeling, a recorded video of teacher/student/point of view performing task, is a way to introduce new skills or review skills already learned. Some helpful apps include; Proloquo2Go, Picture Planner, Coaches Eye, and TouchChat. All of these apps use picture icons to help communicate to the student or	Flash "Technology" on screen for Transition *show Proloquo2Go lesson and Coaches Eye app., possible APE teacher demo*

	help the student communicate to the teacher. Technology can also be very useful when assessing a student. General and Adapted PE teachers can make checklists on an iPad and simply check off criteria or skills that the student performed correctly. Teachers can also record students performing skills and re-watch and score the criteria later.	
13:45-15 (Will be longer with demonstrations included in filming)	**Conclusion** To review what we just covered:The prevalence of Autism Spectrum Disorder is dramatically increasing in schools, and therefore, in physical education. Deficits in social, communication, and motor development are common characteristics of children with ASD. No two children with ASD learn in the same way. Every student needs individualization and differentiation when learning in physical education. Students with ASD are visual learners. Structure and routine can facilitate their success in physical education. Social stories, activities schedules, PECS, task cards, visual warning devices, boundaries, visual demonstrations, and iPads are helpful visual supports	*Me Talking*

	to incorporate into any physical education class, along with including motivation and rewards for students. All of the visual supports can be helpful tools for general and adapted PE teachers when assessing students with ASD in PE. Students with ASD can greatly benefit when adapted and general physical education teachers work with the student's parents, IEP team, and possibly the child to determine what accommodations will best align with each learner's needs throughout their school day and at home.	*List visual supports on screen* *Me Talking*