Practice Report

How Students with Visual Impairments Can Learn Components of the Expanded Core Curriculum Through Physical Education

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Research indicates that children with visual impairments demonstrate delays in fundamental motor skills, including locomotor, object control, and balance skills (Haibach, Lieberman, & Pritchett, 2011; Houwen, Hartman, & Visscher, 2010; Wagner, Haibach, & Lieberman, 2013). All of these skills are prerequisites to living an independent and successful life. It has been demonstrated that motor activity and balance programs show that significant improvements in these areas are possible (Aki, Turan, & Kayihan, 2007; Jazi, Purrajabi, Movahedi, & Jalali, 2012).

Through quality physical education programs, students with visual impairments can develop the fundamental skills needed to maintain a physically active and healthy lifestyle. According to the IDEIA (2004), physical education is required for all students who qualify for special education. Acquiring skills and engaging in physical activity can increase many important life skills, including components of the expanded core curriculum (ECC).

The field of education has instituted a curricular approach to ensure that children with visual impairments receive the education they need in addition to their core courses. The goal of this approach, the ECC (Sapp & Hatlen, 2010), is for children with visual impairments to leave school with the necessary skills to be independent and self-determined adults. Physical education programs can contribute significantly to instruction of the nine components of the ECC if implemented correctly (Sapp & Hatlen, 2010). Physical education teachers who include meaningful physical activity opportunities in their classes can address recreation as well as all of the other areas, including social skills, orientation and mobility (O&M), self-determination, technology, activities of daily living, and independence (Sapp & Hatlen, 2010). The purpose of the article presented here is to discuss ways in which physical education can contribute to the ECC. It must be understood that in order for physical education teachers to be able to infuse ECC components into physical education classes, it is imperative for them to work in collaboration with other professionals, such as teachers of students with visual impairments and O&M instructors. Teachers of students with visual impairments need to provide access to the curriculum in general education classes, teach ECC areas, and collaborate with physical education teachers. Therefore, it is the intent of this article to provide suggestions to administrators, teachers of students with visual impairments, O&M instructors, and physical education teachers on how to work together to teach the ECC curriculum in all areas of their schools. The article presented here will provide strategies that will foster collaboration among these professionals when teaching the ECC curriculum.

Components of the ECC

The ECC provides an instructional framework for students with visual impairments to be successful in school, the community, and the workplace (Sapp & Hatlen, 2010). The components of the ECC are typically learned incidentally by sighted children through observing role models visually (Lohmeier, Blankenship, & Hatlen, 2009). Students who have significant visual impairments must be taught these components with direct instruction. These components are: (1) compensatory or access skills, (2) O&M skills, (3) social interaction skills, (4) independent living skills, (5)

recreational and leisure skills, (6) career education, (7) use of assistive technology, (8) sensory efficiency skills, and (9) self-determination skills.

According to Sapp and Hatlen (2010), ECC components should be taught by certified teachers of students with visual impairments and O&M specialists. Yet teachers of students with visual impairments spend the majority of their time on academics, teaching communication skills, and tutoring (Wolffe et al., 2002). Further, the level and amount of instructional time spent on ECC components are not as intense as one may anticipate (Wolffe et al., 2002). Research suggests a need for providing instruction in the ECC in various environments (Lohmeier et al., 2009), which can include physical education settings. Teachers of students with visual impairments can help with many aspects of physical education, particularly with adaptations for the students with visual impairments.

One area of the ECC, recreational and leisure skills, is readily accepted as being addressed in physical education programs that infuse meaningful physical activity opportunities into their classes (Sapp & Hatlen, 2010). Physical education also lends itself well to the integration of the component of compensatory or access skills.

Physical education contributions to the ECC

The following section describes the nine components of the ECC and how each can be met in physical education with proper planning. Although specific examples are given, there are numerous ways to infuse each component of the ECC in physical education naturally and easily with some support from teachers of students with visual impairments, O&M instructors, and parents.

Compensatory or access skills

Compensatory or access skills refer to the skills that students with visual impairments need in order to access all areas of the general education curriculum at a level equitable to their sighted peers in the most independent fashion possible (Sapp & Hatlen, 2010). Skills in this area vary, depending on the needs of the student, and can include concept development, braille, spatial understanding, speaking and listening skills, and adaptations (for example, large print or tactile symbols). Sapp and Hatlen (2010) suggest that compensatory and access skills should be taught outside of the core curriculum and should be addressed by a teacher of students with visual impairments.

Well-planned physical education programming can contribute to a student's compensatory or access skills. Through collaboration with teachers of students with visual impairments, physical education teachers can develop instructional tools or cues using braille or large print. For example, if a physical education teacher is implementing a fitness unit, the teacher of students with visual impairments can provide fitness logs that are modified for the individual's needs using the student's preferred reading and writing medium.

Physical education teachers can also teach students modifications to activities that maximize their ability to participate with their sighted peers during physical education classes. For example, students with visual impairments can be taught a variety of different running techniques (with a tether, caller, human guide, treadmill, or guide wire). A second example includes teaching students options, choices of adaptations, for participation in team sports such as volleyball. These options may include: a choice of balls to play with such as a trainer volleyball with bells, a beach ball, a ball with bells, or a balloon; a choice of whether to catch the ball or hit it; a choice of where to serve the ball; and decisions on whether they can walk with the ball up to the net to throw or hit it over. When students have this knowledge, they can

choose whichever modification is appropriate for them during physical education activities.

O&M skills

O&M skills are those needed for individuals with visual impairments to safely maneuver in their environment (Jacobson, 2012). These skills begin with understanding how one's body moves, then advance to navigating complex environments safely. Examples of typical O&M skills include crossing streets and navigating stairs.

Physical education can contribute to the development of O&M skills in several different ways. Its programs provide the basis for movement for all students, teaching fundamental skills such as balance, locomotor skills (for example, walking, running, jumping), and object-control skills (for example, throwing, catching). With the assistance of O&M specialists, physical education teachers can create obstacle courses throughout the gymnasium for students to practice fundamental movement patterns, laterality, directionality, and concept development. Obstacle courses can also act as simulated areas such as parks or street crossings, which can prepare students for authentic experiences.

O&M specialists can assist physical education teachers by teaching students with visual impairments the dimensions of courts and fields before participating in activities. When this "preteaching" is done, students have a better understanding of where they need to be and how to get there when engaging in activities. In activities such as swimming, teachers of students with visual impairments or physical education teachers should assist students with exploration of the pool area before lessons in order to familiarize students with the location of key necessary features of the pool environment (for example, ladders, diving boards, bleachers, locker rooms).

Understanding the layout and dimensions of athletic playing areas, as well as the concepts of games, can help with orientation skills and promote understanding of natural environments. For example, when a family goes to a baseball game and the father says, "We have seats right behind home plate," the child learns where home plate is in relation to the rest of the field. In addition, when a player makes five out of five three-point shots, the student will understand how significant that is given the distance involved.

Social interaction skills

Social interaction skills are the concepts and skills that people use to interact with one another (Sapp & Hatlen, 2010). These skills are learned primarily by observing others interact. Students with visual impairments can benefit from direct instruction on how to socially interact with peers in a variety of settings (Arndt, Lieberman, & James, in press; Wolffe & Kelly, 2011).

During physical education classes, participation in team sports is one avenue for providing peer interactions for all students. When placing students on teams, physical education teachers should emphasize the characteristics of a good teammate. These qualities include sportsmanship, fairness, and communication. To foster social interactions, all students should participate in sports that include modifications for students with visual impairments so they can participate alongside their sighted peers.

Students can also work on social skill development in sport units with partners, which naturally creates the social dynamics of give and take. Working with partners or in dyads is a common teaching strategy in physical education. Teachers of students with visual impairments can help physical education teachers, sighted peers, students with visual impairments, and paraeducators with ideas on how to increase social skills and social interactions for everyone.

Physical education provides a natural environment to teach social dances that students will encounter at weddings, bar mitzvahs, bat

mitzvahs, high school dances, and summer camps. In addition, utilizing trained peer tutors who understand how to instruct and provide feedback to peers with visual impairments will not only increase socialization on a consistent basis, but will also contribute to the development of social skills (Wiskochil, Lieberman, Houston-Wilson, & Petersen, 2007).

Independent living skills

The purpose of teaching independent living skills is to provide students with visual impairments the tools for living rewarding, independent adult lives. Although these activities may come easily to sighted individuals, activities of daily living, including personal hygiene and food preparation, must be taught to students with visual impairments (Sapp & Hatlen, 2010). Even though activities of daily living skills can be embedded into the general curriculum, students may not have an opportunity to practice skills often enough to complete them successfully. Many skills that are practiced in physical education contribute to independent living skills.

Many physical education programs provide opportunities to practice the skill of changing clothes. For example, before most physical education classes, students change into gym shorts and sneakers. Swimming units foster skills in showering and changing clothes and shoes in a natural environment. Activities such as ice skating, bowling, and hiking also foster the skills of changing clothes and shoes. This repeated, daily practice contributes greatly to successful acquisition of independent activities of daily living skills.

Recreational and leisure skills

After leaving high school, individuals with visual impairments may choose to participate in different physical activities that could include running, ice skating, swimming, or bowling. Physical education can provide opportunities for students to learn adaptations to these activities, as well as opportunities to perform them in natural settings. For example, during a trip to a bowling alley, teachers of students with visual impairments, physical education teachers, and O&M instructors can provide instruction on how students should utilize public transportation, pay for games, navigate the alley, rent shoes, keep score, and access other information pertaining to participation in the sport. Providing this type of authentic learning experience allows students to be consumers of physical activities after graduation. Similar skills can be taught and learned during hiking, fishing, orienteering, or geocaching trips. It is important to note here that physical education teachers need to work in collaboration with teachers of students with visual impairments and O&M specialists to determine what accommodations are needed for students in various settings.

It is generally accepted that physical education programs promote access to recreation for individuals with visual impairments. As noted by Sapp and Hatlen (2010), if a child who is visually impaired does not have the opportunity to experience an activity, he or she may not know if it is enjoyable. Therefore, if students are given a wide range of activities to try, they may find activities they will enjoy for lifelong fitness (Lieberman, Modell, & Jackson, 2006).

In elementary school, children typically learn fundamental motor skills such as running, skipping, sliding, and jumping, as well as object manipulation skills such as throwing, kicking, batting, and rolling. In middle school, students typically learn basic sports and fitness skills, and in high school they learn sports, fitness skills, community recreation, and lifetime activities. In middle and high school, students may also have the option to take part in after-school sports and intramurals. These skills are the foundation for fitness, sports, and recreation for a lifetime.

An important note about involvement in active fitness, sports, and recreation is that the

more active a person is, the more an employer may see his or her ability as opposed to their disability. Individuals who are active have a common subject to talk about with employers, and they will be perceived as more competent to work in many positions compared to a sedentary applicant (Roth & Columna, 2011). This concept of competence for employment lends itself well to the next component, career education.

Career education

Career education allows students to understand different job opportunities through hands-on experience. Sapp and Hatlen (2010) suggest that sighted students have many opportunities to learn about careers and work habits through visual observation. Students with visual impairments need authentic experiences with various jobs, which will allow them to make educated and independent decisions regarding employment. Youths with visual impairments are more likely to obtain paid jobs after graduation when they receive career counseling, help in finding jobs, training in job skills, or vocational education while still in school (Wolffe & Kelly, 2011).

Physical education teachers can contribute to career education by presenting guest speakers who have visual impairments and work in sport-related industries to speak with students. People with visual impairments have been successful physical education teachers, athletic directors, directors of nationally known sport-related nonprofit organizations, Paralympic athletes, and college professors. Creating open communication between students and professionals with visual impairments can enhance students' perceptions about their job choices. Speakers can also be people in the community with visual impairments who participate in physical activity in their free time.

Another way that physical education can contribute to career education is through the use of a common curricular approach in middle and high school called the sport education model. Through *sport education,* students fill all the roles related to a given sporting activity. Roles include: official, scorekeeper, publicist, equipment manager, team captain, statistician, and record-keeper (Schneider & Marriott, 2010). Participation in a sport education curriculum introduces professions within athletics that students may enjoy and pursue independently.

Use of assistive technology

Assistive technology helps provide access to educational material that is generally inaccessible. Technology equalizes the ability to access information between individuals with visual impairments and sighted peers (Sapp & Hatlen, 2010). Assistive technology must be taught by a professional who understands how to use the equipment and how to teach its use. Quality instruction in the use of assistive technology can be related to a student's future social activity, continuation to postsecondary education, and paid employment (Wolffe & Kelly, 2011).

Reinforcement of the use of assistive technology in a physical education program can be accomplished by having students search the Internet for the rules of the game, use a portable braille notetaking device to set a timer, or locate goalposts in the field using distance video magnification devices. Physical education teachers should work with students to research information on blind sports, prominent athletes who are blind, and organizations that coordinate blind athletics such as the United States Association of Blind Athletes (USABA; website: <http://usaba.org). For example, a physical education teacher can assign homework to a student to write a paper about the history of their favorite blind sport or blind athlete, then provide guidance on how to research topics. The teacher of students with visual impairments can assist the student in learning the skills to investigate and write a research paper. Other assistive technology used in physical education such as

talking pedometers; talking heart rate monitors; and exergames (exercise-focused video games), including modified Wii U games and Xbox Kinect; can also be included in the curriculum. Talking pedometers and talking heart rate monitors provide students with feedback about their physical activity levels, motivating them to set and work toward physical activity goals (Lieberman, Stuart, Hand, & Robinson, 2006). VI Fit (website:) is an open-access exergame platform dedicated to developing exergames for individuals with visual impairments (Morelli, Folmer, Foley, & Lieberman, 2011). The use of modified exergames provides students access to cutting-edge technology that is used by sighted peers in physical education classes. Exergames are also a great venue for facilitating socialization, self-determination, and even career education.

Teaching students to use equipment such as treadmills, elliptical machines, and exercise bikes promotes participation in fitness activities at facilities like community centers or YMCAs. All of these machines can be made accessible to youths with visual impairments through braille markers and tactile cues. Modifying such equipment to provide students access to printed information will show general educators the meaningfulness and purpose of adding such tactile cues. As the use of assistive technology can increase potential postsecondary educational opportunities for students, this similar relationship suggests that the use of accessible treadmills, elliptical machines, or exercise bikes may increase future physical activity and exercise.

Sensory efficiency skills

Sensory efficiency addresses the use of residual vision, hearing, and other senses to enable or enhance access to the environment. One example is learning how to use touch and smell rather than visual cues to identify one's personal possessions or one's location. Another example is the use of hearing and the other senses to identify familiar people without the use of visual cues.

Teachers of students with visual impairments and O&M specialists can assist physical education teachers in these approaches to learning through various sports with their students with visual impairments (Brian & Haegele, 2014). A possible adaptation that promotes sensory efficiency skills in physical education is the use of residual vision in a soccer game using a yellow ball on green grass. Sports designed specifically for athletes with visual impairments, such as beep baseball and goalball, can encourage the use of hearing while participating in sports. Additional examples include using tactile senses to locate lockers, towels on the pool deck, and shoes at a bowling alley. Physical education is a perfect avenue to assist children in enhancing all senses to develop sensory efficiency. Again, sensory efficiency skills must be intentionally and methodically taught to ensure concrete improvement and understanding by students.

Self-determination skills

Self-determination is the ability of individuals to make choices and have control over their lives. Students with visual impairments have a greater need than sighted peers for self-determination skills to be taught in a deliberate way (Robinson & Lieberman, 2004). Unfortunately, teachers report that self-determination skills are one of the least likely ECC components to be taught (Lohmeier et al., 2009). Instruction in the various areas of self-determination must be taught clearly and methodically to students with visual impairments, especially in secondary school (Agran, Hong, & Blankenship, 2007).

In order to facilitate self-determination, physical education professionals, in collaboration with O&M instructors and teachers of students with visual impairments, can teach children with visual impairments the same sports and activities as their peers. Professionals

must consider the characteristics of activities, such as whether they are opened or closed activities, when making accommodations for students with visual impairments. *Open sports* are ones that have variables such as quick transitions from offense to defense, or varying trajectories of the ball. Examples of open sports include volleyball, soccer, tennis, and badminton. *Closed sports* are those that have minimal variation in pace, direction, or position and require little or no modification to include children with visual impairments (Lieberman, Ponchillia, & Ponchillia, 2013). Examples of closed sports are archery, swimming, field events, bowling, and bicycling. Open sports typically require more time and thought related to modifications and adaptations than do closed sports.

When a physical education curriculum covers age-appropriate units (including both open and closed sports), children with visual impairments will learn how to participate in the same activities as their peers (Lieberman, 2011). In addition, sports designed specifically for individuals who are blind or visually impaired such as beep baseball, goalball, showdown, or tandem cycling can be incorporated into the curriculum to educate sighted peers about these activities. Once sighted peers learn about sports for people with visual impairments, then children with visual impairments will have even more opportunities to participate with their peers in accessible sports.

Practical implications for educators

This article provided a sampling of the various ways ECC components can be met in the physical education curriculum. These examples can be accomplished with collaboration between teachers of students with visual impairments, O&M instructors, and physical education teachers, and can be promoted by professors who teach prospective teachers of students with visual impairments, O&M instructors, and physical education teachers. In order for these components to be included successfully, the authors suggest six steps: working with parents, preteaching, training paraeducators, incorporating trained peer tutors, incorporating after-school programming, and including ECC components in teacher-education programs for teachers of students with visual impairments and physical education teachers.

Working with parents

The inclusion of parents in the curriculum planning and implementation process is imperative. Parents of a child with visual impairment may be able to provide his or her teachers with ideas related to the family's and child's interests outside the school environment in relation to physical activity (Columna et al., 2008; Perkins, Columna, Lieberman, & Bailey, 2013). They can also reinforce instruction given in school by practicing movements and skills with their child in a nonstressful home environment. Teachers should share the curriculum and successes of the student with the parents on an ongoing basis.

Preteaching

Children with visual impairments and blindness need more instruction and practice time in order to learn new concepts and movements (Lieberman et al., 2013; Perkins et al., 2013). Part of the difficulty experienced by students with visual impairments in learning new skills is their lack of background knowledge in relation to the skills or concepts being taught. The teacher can meet the child where he or she is in understanding and begin to build the background knowledge related to the new sport or skill. Sapp and Hatlen (2010) suggest that children with visual impairments need preteaching, teaching, and reteaching in order to obtain ECC skills. This teaching cycle is also extremely important in learning skills and concepts related to physical education.

Training paraeducators

Although trained paraeducators are instrumental in ensuring that specific component skills for the ECC are addressed during physical education, Lieberman and Conroy (2013) found that paraeducators who worked with children with visual impairments had not been trained to provide support in physical education classes. Trained paraeducators may be necessary to ensure that ECC skills are addressed in physical education and to monitor the progress of students. It is the role of the teacher of students with visual impairments along with the physical educator to design a student's Individualized Education Program (IEP) in these areas and to set and monitor progress toward IEP goals.

Paraeducators can help monitor the student's progress toward the selected components of the ECC that are emphasized during physical education instruction. Changes to instruction can be made based on this performance data. In addition to paraeducators, peer tutors may provide age-appropriate support in physical education, and can be used in conjunction with paraeducators if necessary.

Incorporating trained peer tutors

As discussed earlier, trained peer tutors can assist in increasing socialization and motor skills for children with visual impairments by providing positive role models and honest feedback. With some planning and effort from physical education teachers and teachers of students with visual impairments, peer tutors can be trained and used to reinforce instruction and provide feedback that will help children with visual impairments improve on the ECC components (Lieberman & Houston-Wilson, 2009).

Incorporating after-school programming

It has been recommended that support for learning components of the ECC should extend to after-school programming (McDonough, Sticken, & Haack, 2006). In collaboration with visual impairment professionals, physical education teachers can continue to contribute to ECC components through school-based after-school physical activity and sport programs (for example, intramural sports, fitness clubs, or sports clubs). It is important for all school personnel who are involved in the education of students with visual impairments to work together in order to enhance the students' abilities during these activities. This team of professionals can determine adaptations and specific needs for children with visual impairments such as by allocating time for preteaching (Conroy, 2012).

Including ECC components in teacher-education programs

Sapp and Hatlen (2010) recommend that components of the ECC be incorporated into teacher of students with visual impairments preparation programs as early as possible. ECC components should also be part of education programs for physical education teachers. If physical education professional preparation programs taught strategies for infusing the ECC components in classes, these future teachers may be more likely to include the components throughout their classes. If teachers of students with visual impairments and O&M instructors collaborate with physical education teachers, this group of professionals may be very successful in incorporating the ECC into everyday lessons and activities. Thus, physical activity can become a way of life rather than a school subject.

Conclusion

The purpose of the article presented here was to discuss the importance of including all components of the ECC into physical education. Collaboration between the teachers of students with visual impairments, O&M instructors, and physical education teachers can facilitate inclusion of all areas of the ECC. With this team

extended to parents, paraeducators, and the students themselves, all children with visual impairments can have adequate exposure to all components of the ECC and reach their full potential.

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