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Infusing the Expanded Core Curriculum into Physical Education for Children with Visual Impairments

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Abstract

The Expanded Core Curriculum (ECC) has been adopted by teachers of students with visual impairments (TVIs) in order to provide students who are blind or visually impaired with the support they need to become independent and successful adults. Physical education is an educational setting where teachers can infuse the nine components of the ECC into their everyday lessons. The purpose of this article is to describe the nine components of the ECC and provide examples on how to infuse these components into physical education lessons.

Keywords: *visual impairments, infusion, curriculum, physical education*

Visual impairment is a low-incidence disability, affecting approximately 59,000 students enrolled in elementary or secondary schools in the United States (American Printing House for the Blind, 2012). The Individuals with Disabilities Education Act (2004, also known as IDEA) defines "visual impairment" as an impairment of vision that, even with corrections, has an adverse effect on a child's education. The term *visual impairment* encompasses a wide range of visual disabilities (Lieberman, Ponchillia, & Ponchilla, 2013), including students who are totally blind or have only light perception as well as those with poor or reduced visual acuity, difficulty tracking moving objects, poor depth perception, light sensitivity, and/or peripheral field loss. Students eligible for special education services under "visually impaired" can differ greatly in their type and degree of vision impairment and use of remaining functional vision.

IDEA (2004) also states that children with disabilities must be educated in the least restrictive environment or with their peers without disabilities to the maximum extent appropriate. IDEA extends to all educational settings, including physical education (PE). Students with visual impairments should have every opportunity to participate in PE with their sighted peers, with adaptations when necessary (Tutt, Lieberman, & Brasher, 2011). Although visual impairment does not in itself cause poor physical skills or lack of fitness, it may create obstacles to participating in activities in PE (Conroy, 2012; Lieberman et al., 2013).

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, called the Expanded Core Curriculum or ECC (Sapp & Hatlen, 2010), is for children with visual impairments to leave school with the necessary skills to be independent and self-determined adults. PE programs can contribute significantly to instruction of the nine components of the Expanded Core Curriculum (ECC) if implemented correctly (Sapp & Hatlen, 2010).

The Expanded Core Curriculum

Although individuals with visual impairments may be included in the same instructional settings as sighted peers, they may not gain all of the skills related to being successful students through common core curriculum instruction. The ECC refers to the necessary nine areas of instruction that individuals with visual impairments need to be successful in school, the community, and the workplace (Sapp & Hatlen, 2010). The nine components of the ECC include (a) compensatory or access skills, (b) career education, (c) independent living skills, (d) orientation and mobility (O&M) skills, (e) recreational and leisure skills, (f) self-determination skills, (g) social interaction skills, (h) use of assistive technology, and (i) sensory efficiency skills. Each component is explained in more detail later in this paper.

The components of the ECC are typically learned incidentally by sighted children using all of their senses including visual observation of their world and by watching others (Lohmeier et al., 2009). However, skills and knowledge acquired by visual observation by sighted children must be explicitly taught to children with visual impairments. The ECC is designed to go beyond the core components of curriculum to address essential areas and experiences that are unique to students with visual impairments (Lohmeier et al., 2009). Yet, time limitations often restrict the level and amount of ECC instruction TVIs are able to provide to their students. Research indicates that TVIs typically spend the majority of instructional time on academics, tutoring, or teaching communication skills (Wolffe et al., 2002) with little time left to focus on other components of the ECC. Therefore, it is essential that ECC components are integrated into every day instruction, including in PE.

Physical Education for Individuals With Visual Impairments

Although students with visual impairments may find PE to be fun and enjoyable (Ward, Farnsworth, Babkes-Stellino, & Perret, 2011), these students typically find barriers to participation in physical activity settings. Barriers to physical activity may consequently cause (a) a lack of concept development including spacial

The PE teacher should allow the student who is visually impaired the opportunity to access printed information in alternative formats.

awareness (Lieberman et al., 2013); (b) delays in motor competence concepts including object control, locomotor, and balance skills (Houwen, Visscher, Hartman, & Lemmink, 2007; Haibach, Lieberman, & Pritchett, 2011; Wagner, Haibach, & Lieberman, 2013); (c) low physical activity levels (Kozub & Oh, 2004); and (d) low levels of health-related fitness (Lieberman, Byrne, Mattern, Watt, & Fernandez-Vivo, 2010). By overcoming barriers to participation in PE programs, students with visual impairments may avoid or overcome the aforementioned deficiencies. For example, research studies have demonstrated that participation in physical activity programs that have been tailored for their needs can increase motor competence (Aki, Turan, & Kayihan, 2007) and physical activity levels (Cervantes & Porretta, 2013) for individuals with visual impairments.

While planning and implementing physical activity programs, PE teachers focus on incorporating cognitive, social, and affective goals alongside motor objectives of movement skills (e.g., elementary level) and sport concepts (e.g., secondary level) in lessons (NASPE, 2004). A well-rounded learning experience that takes cognitive, social, affective, and motor domains into consideration prepares students to be successful in different learning and daily life settings. For students with visual impairments, more support may be needed in order to gain those same successes. The ECC has been instituted to ensure that children with visual impairments are receiving the support they need in addition to the core curriculum in order to be independent and successful adults. Like the NASPE standards, the goal of these components is for students to receive a holistic learning experience. For children with visual impairments in PE, components of the ECC can be infused along with cognitive, affective, social, and motor domains throughout the curriculum.

Infusing the Expanded Core Curriculum and Physical Education

The nine components of the ECC encompass skills that students with visual impairments need to learn throughout their education in order to independent and successful adults. The following sections describe each component in detail and provide examples of strategies to infuse the ECC in PE. In addition, Table 1 provides additional strategies to infuse the ECC in PE, and Table 2 demonstrates a specific example of how ECC components can be included in a sample dance unit. It is important to note, though, that each strategy may not be appropriate or successful for each student based on their visual impairment and ability level. It is imperative for PE teachers to discuss students' specific visual impairment with TVIs and Certified Orientation and Mobility Specialist (COMS) prior to infusing these strategies into classes.

Compensatory or Access Skills

Compensatory or access skills include skills that students need to access all areas of the general education curriculum as independently as possible in a manner that is equal to that of his or her sighted peers. Classroom examples include learning different communication modes such as braille, applying organizational skills, or identifying needed accommodations to complete a task (Lohmeier et al., 2009). Compensatory and access skills vary on the basis of the students' needs and must be taught on an individualized level.

An example of supporting compensatory skills in PE class can include equipment storage accommodations. First, PE equipment should be well organized and stored in consistent and familiar loca-

Table 1
Strategies to Infuse the Expanded Core Curriculum (ECC) into Physical Education (PE)

ECC Component	Strategies for Infusion
Compensatory or functional academic skills, including communication modes	• Provide instructions to activities in braille. [B] • Teach students a variety of guide-running technique options. [B] • Include movement games and activities using sound sources as signals. [E] • Provide a tactile map of floor seating. [E] • Teach all students sports who use sound sources and are inclusive. [S] • Provide access to rules of sports or activities using braille or computers instead of handouts. [B] • Teach strategies to access control panel of workout equipment including treadmills or ellipticals. [S]
Orientation and mobility	• Pre-teach the physical activity area and games prior to class beginning. [B] • Collaborate with O & M instructor to provide simulated environments for travel practice. [B] • Create an obstacle course that may allow all students to participate in activities to practice fundamental movement patterns (e.g., walk, run, gallop). [E] • Teach the dimensions of courts and fields. [S] • Teach the process of traveling to and from the pool. [B] • Promote body and spacial awareness with physical activities such as yoga or stretching.[B]
Social interaction skills	• Teach physical activities in which sighted peers can play with children with visual impairments by making simple modifications such as adding bells to a ball. [B] • Train peer tutors and paraeducators to facilitate social interactions during class. [B] • Teach team sports and highlight the importance of teamwork to achieve. [S] • Include teambuilding games and adventure-based learning units to facilitate positive communication among all students. [B] • Encourage students to participate in sport camps or recreational activities designed for individuals with visual impairments outside of school. [B] • Rotate roles (leader, team member) between all students within group. [B]
Independent living skills	• Emphasize health topics during their classes (appropriate sport attire, healthy snacks, and encourage a bath after participating in physical activities). [B] • Teach dressing skills for activities such as swimming, bowling, or ice skating. [B] • Teach skills for community involvement such as bowling alleys, health clubs and skating rinks. [B] • Discuss accommodations needed during fitness units. [S] • If possible, take field trips to community recreation facilities to practice navigating and using various environments.[S]
Recreation and leisure skills	• Pre-teach sport skills in the classroom and facilitate participation in the community by contacting sport clubs or recreational facilities that students can visit. [S] • Teach how to navigate trails and bicycle paths in parks. [S] • Teach fundamental skills for all life-long leisure activities. [S]
Career education	• Introduce guest speakers who are visually impaired to talk about their career opportunities. [B] • Connect with individuals who are visually impaired with careers in sport and recreation via email or postage, create a pen-pal relationship with students. [E] • Perform Internet searches of individuals who are visually impaired whom are athletes, coaches, or are involved in sport or recreation. [B] • Utilize the sport education model so students learn about careers in sport (coach, announcer, journalist, and statistician). [S] • Discuss how a higher level of physical fitness may increase an individual's marketability while job searching. [S]
Use of assistive technology	• Teach the use of exercise technology such as talking pedometers and talking heart rate monitors. [B] • Incorporate modified Wii or other exergames into the curriculum. [B] • Help children navigate the web for assignments on blind sport, role models, or the history of a sport. [B] • Use sound sources or sound balls in common PE activities. [B] • Navigate the internet with students to find sport related opportunities such as camps for individuals with visual impairments (e.g., Camp Abilities) or sport organizations (e.g., USABA). [B]
Sensory efficiency skills	• Use music, sound, and other modalities that indicate a beginning or an ending of an activity. [B] • Infuse games like goalball and beep baseball to promote the use of hearing to play the game for every player as each one is blindfolded. [B] • For students with low vision, use brightly colored or neon tape to outline boundaries. [B] • For target sports (such as archery), place a sound source behind the target to assist in localization. [B] • In movement activities such as sprinting, sound can be the target for the student to move to. [B]
Self-determination	• Prepare students to be successful in different activities using sport as a medium. [B] • Teach the same sports and units as their peers so they will have choices in the future. [B] • Provide a variety of choices in terms of sports that may allow students to develop a sense of autonomy, competence, and at the same time allow them to relate to their peers and family members. [B] • Include students in process of making accommodations or modifications of activities. [B] • Allow students to make choices as to what accommodations they need to participate, do not assume based on previous students. [B] • Keep track of personal bests and athletic goals. Beating these records can lead to higher self-confidence in sport and activity.[B] • Teach lifelong activities that students can choose to participate in after graduation, including what modifications students may need to participate. [S]

[E] indicates an appropriate strategy for elementary PE program.
[S] indicates an appropriate strategy for secondary PE program.
[B] indicates an appropriate strategy for both elementary and secondary PE program

Table 2
Infusing the Expanded Core Curriculum into a Dance Unit

Component of the Unit	ECC Component	How it is infused in a dance unit
Partner or group dancing	Social Interaction Skills	By dancing with different partners or within different groups throughout a dance unit, students with visual impairments practice social interaction skills such as initiating conversations and joining peers in conversation.
Students choosing songs or choreographing dances	Self-Determination	Allowing students with visual impairments to make decisions on the type of music or dance used in class can promote decision making skills and allow students to express their preferences.
Discussion of dance-related careers, guest speakers	Career Education	Dance-related careers such as choreographer, dance teachers, or dancer can be introduced to students with visual impairments during a dance unit. One way of doing so could be having individuals in those careers meet students during the unit.
Social or line dancing	Sensory Efficiency Skills	For beginner dance units, songs such as the "cha cha slide" or "the cupid shuffle" provide instructions within the song that students listen to in order to learn movements. More advanced dance units may teach students to follow the beat or rhythm of a song. In either example, students are using their sense of hearing to direct their movement.
Downloading songs used in class on personal music devices	Assistive Technology	Teaching students to download music used in class can allow them to practice their dances at home or afterschool with a group of classmates. Dance practice can act as homework during a dance unit, particularly when students are the choreographer.

tions. This allows the student who is visually impaired to be more independent while retrieving and storing his/her equipment. For additional support, shelves and storage bins may be identified with braille or large print labels.

Another example may include working with a middle or high school student to adapt the control panel on a treadmill. Accommodations such as applying braille labels, tactile indicators, or large print labels will increase a student's ability to access the treadmill, as well as promote problem solving skills and self-advocacy. Furthermore, the student may then apply these same strategies to treadmills or other equipment within community fitness clubs.

Finally, the PE teacher should allow the student who is visually impaired the opportunity to access printed information in alternative formats. For instance, the rules of archery may be more easily accessed on the computer instead of a printed hand-out. This will ensure that students with visual impairments have the same information as their peers before activities begin. The students' TVI can provide support and materials to make these accommodations possible. One alternative for support is to use sighted peers to provide assistance during physical activities.

Career Education

Students with visual impairments must have firsthand experiences with various jobs and roles in life in order to make decisions about their future. The concepts and skills that students typically acquire through vocational education may not be enough for students with visual impairments (Sapp & Hatlen, 2010). Since one way that sighted students learn about work habits and available careers is through visual observations, educators must purposefully teach those skills to individuals with visual impairments or blindness. Examples of teaching career education may include exploring areas of interest, job awareness, or work ethic (Lohmeier et al., 2009).

Sport-related careers such as sports journalist, sports announcer, statistician, yoga instructor, athletic trainer, coach, as well as any other sport, physical activity, or fitness-related career, can be introduced in PE. Each of these professions can be experienced in class through units using the sport education model (Siedentop, Hastie, & van der Mars, 2004; Siedentop & van der Mars, 2012). The sport education model is a teaching model which educates students on all roles involved in a sport. Further, research shows that students with visual impairments can improve self-perception of knowledge and abilities in sport as well as willingness to participate through sport education experiences (Fittipaldi-Wert, Brock, Hastie, Arnold, & Guarino, 2009). Another avenue to teaching career education is to invite guest lecturers to speak in class who are active in these sport-related professions and have visual impairments.

In addition to teaching students about available careers, PE teachers can work with their students to increase their fitness level according to the type of job they will be performing. Some jobs require a certain level of fitness to be successful. For example, if the job requires that the student stand and walk for a long period of time, such as in a hospital, then a supervised program can be developed to work on muscular strength and endurance.

Independent Living Skills

Independent living skills consist of tasks and functions that people perform to live as independently as possible (Lohmeier et al., 2009). Independent living skills such as dressing, showering, toileting, grooming, banking, and budgeting are performed by sighted individuals without much thought. These skills must be taught to students with visual impairments directly and purposely. Although some skills are embedded into the general curriculum for all students, they are usually presented in a manner that is insufficient for students with visual impairments (Sapp & Hatlen, 2010).

Independent living skills are already essential components of many recreational activities such as swimming, bowling, and ice skating. During a swimming unit, students learn how to change their clothes and shower before and after the activity. During bowling or ice skating outings, students learn about transportation to and from facilities, how to pay for activities, and how to change footwear prior to participation. In each of these examples, PE teachers can address skills related to each activity which supports independent participation.

By teaching how to access physical activity environments, PE teachers can enhance student's ability to live an active lifestyle outside of the school setting and after graduation. The development of knowledge and skills needed for lifelong participation in physical activity is the focus of the health optimizing physical education (HOPE) curriculum (Metzler, McKenzie, van der Mars, Barrett-Williams, & Ellis, 2013). The HOPE curricular approach spans across each environment students experience (e.g., commu-

Glynnis, 12, who is visually impared, takes batting tips from her PE teacher.

nity-based, before and after school, and home) and emphasizes the importance of high moderate to vigorous activity levels (Metzler, McKenzie, van der Mars, Barrett-Williams, & Ellis, 2013). While teaching within the HOPE curriculum, it is essential for teachers to discuss needs and accommodations for students with visual impairments, as well as where and how to access facilities and equipment across each environment that instruction is taking place. This knowledge can then translate to further physical activity participation outside of school or after graduation.

Orientation and Mobility Skills (O&M)

O&M is the systematic way in which individuals with visual impairments orient themselves to their environment and move as safely and independently as possible (Sapp & Hatlen, 2010). In the educational setting, most students with visual impairments will receive O&M instruction from a COMS. O&M instruction may address spatial awareness, body positioning, white cane skills, trailing technique, sighted guide technique, and route travel such as walking from the classroom to the cafeteria, office, or gym. The goal of O&M instruction is for the student to achieve safe and independent travel to the fullest extent possible.

Prior to infusing O&M skills, the PE teacher should discuss specific techniques that students are working on with the COMS. It is important to note that specific O&M skills should first be introduced and taught by the COMS. Subsequently, the PE teacher and COMS can collaborate to support and reinforce techniques during class. For example, if the COMS is teaching an elementary student how to use a sighted guide technique, the PE teacher may integrate the same techniques during transitions or within PE activities to reinforce skills.

The PE teacher can also support O&M skills by verbally describing the activity area and by allowing the student who is visually impaired to explore the venue ahead of time. Addressing prerequisite skills, including orientation skills, before the activity begins is called pre-teaching (Perkins, Columna, Lieberman, & Bailey, 2013). By presenting the activity area prior to class, students have a better understanding of where they need to be as well as how to get to designated areas for activities. For example, when a teacher pre-teaches the playing area for the game of baseball, students then have a better understanding of what it means to be at first base and where they need to go next.

Further, PE teachers can infuse O&M skills through the development of body awareness and spatial awareness. Students who are blind are often unaware of differences between their posture or body positioning and that of their peers. To promote body and spacial awareness, the PE teacher can provide verbal feedback to the student regarding his/her body positioning, posture, and/or head positioning. Also, activities such as stretching, yoga, and other fitness exercises naturally promote body and spacial awareness and can contribute to this component.

Recreational and Leisure Skills

Recreation and leisure skills, including sport and exercise, must be planned and taught deliberately to children with visual impairments. As sighted students may decide to try an activity because they have observed others participating, students with visual impairments may not know whether an activity is enjoyable unless they have been taught in an accessible manner. If students are taught a wide range of activities to try, they may find activities they will enjoy for life-long fitness (Lieberman, Modell, & Jackson,

2006). Students learn foundational motor skills and fitness related skills in PE. Therefore, it is generally accepted by the vision community that PE programs promote the skills for students to access recreation and leisure skills (Sapp & Hatlen, 2010). Recreation and leisure skills included in PE include sports, games, and physical fitness activities.

PE classes are filled with examples of facilitating growth in recreation and leisure skills for students with visual impairments. Examples include teaching fundamental movement skills (e.g., running, jumping, throwing, kicking), teaching rules and strategies of games and sports, and teaching access points for community recreation facilities such as pools or biking trails. Each of these skills contributes to future recreation and leisure participation for all students.

Self-Determination Skills

Self-determination refers to a person's ability to decide, without the influence of others, how he or she would like to live his or her life (Sapp & Hatlen, 2010). Students with visual impairments must acquire specific knowledge and skills and have many opportunities to practice them to be successful (Lohmeier et al., 2009). To do so, instruction must be clear and methodical while teaching self-determination skills (Agran, Hong, & Blankenship, 2007). Although students with visual impairments have a need to be taught self-determination skills in an intentional way (Robinson & Lieberman, 2004), teachers report this area as one of the least likely ECC components to be taught (Lohmeier et al., 2009). Self-determination skills can include decision-making skills, problem-solving ability, self-advocacy, and goal setting.

In order for students with visual impairments to make informed decisions as to whether or not they enjoy participating in an activity, they must learn the same activities as their sighted peers in PE. If students do enjoy an activity, they can then make the decision to continue to participate outside of school with friends or family. Participating with sighted peers in PE may also create friendships for participation outside of school. Teachers must also include students in the process of making accommodations for activities so they have the knowledge needed to advocate for future activity in other environments and increase problem-solving skills when faced with new activities.

Goal-setting in sports or exercise is another example of how PE teachers can support self-determination. Examples of goal-setting can include achieving a new personal best in track and field events, reaching the top of a rock wall, or learning a new game or skill. While setting personal goals, students must also develop a plan to achieve success and become accountable for reaching their objective. Success in reaching objectives can show students their ability to be successful in activities, increasing their self-determination and self-confidence. To facilitate goal-setting, PE teachers can help students decide on attainable goals and help track each progress toward that goal.

Social Interaction Skills

Social interaction skills are those that people use to interact with one another. Sighted students typically learn social interaction skills through a casual or incidental fashion, whereas students with visual impairments must have sequential teaching and modeling (Lohmeier et al., 2009). Children with visual impairments often miss out on learning basic and complex social interaction skills such as making eye contact, joining a group of peers for a conversation, initiating a conversation, and reading nonverbal cues such as body language and facial expressions. Direct, sequential instruction in social interaction skills can decrease the chance of students being socially isolated throughout their life (Sapp & Hatlen, 2010).

PE provides many natural opportunities, such as participating in team sports, where students with visual impairments can practice social interaction skills. Further, team-building and adventure-based learning activities highlight the need for communication and interactions to be successful. Through activities such as these, PE teachers can facilitate social interaction skills for all students. In order for students to experience activities fully, teachers should provide activities where students have different roles within the group including leadership roles (e.g., acting as a team captain, coach, or player during a basketball unit).

In other physical activity settings, participation in sporting events or sport-related camps (e.g., Camp Abilities) can provide opportunities for students to socialize with peers with visual impairments. These settings provide opportunities for instructors to teach social interactions skills to children with visual impairments in group settings. PE teachers should be aware of opportunities such as sporting events or sport-related camps that are available to students with visual impairments so they can encourage their student's participation.

Use of Assistive Technology

Assistive technology devices are typically used to equalize the ability to access and retrieve information between sighted individuals and those with visual impairments (Sapp & Hatlen, 2010). Instruction focused on the use of assistive technology can include teaching how to select, use, and maintain appropriate assistive devices. Assistive technology makes information that may be inaccessible readily available and expands the world for individuals who have visual impairments. Instruction in the use of assistive technology can be related to students' future social activities, continuation to postsecondary education, and paid employment (Wolffe & Kelly, 2011).

Talking pedometers, talking heart rate monitors, and modified Wii games (See Vifit.org) are examples of common technology used in PE that has been modified for use by individuals with visual impairments. Further, common sport balls such as basketballs or soccer balls are available with either bells or beeping devices for use by individuals with visual impairments (see APH.org). In addition to equipment, the use of the Internet is an application of technology that can increase students' awareness of sport and physical activity. PE teachers can introduce students to websites about sport organizations (e.g., USABA.org) or sport camps (e.g., campabilities.org) for individuals with visual impairments. Teachers can also demonstrate Internet searches for sport-related opportunities that are available in the student's area.

Sensory Efficiency Skills

Sensory efficiency skills include teaching students to use their remaining functional vision, along with other senses, efficiently to promote independence. According to Sapp and Hatlen (2010), it is known that visual efficiency skills must be taught to children with any level of remaining vision so all sensory input can be used for learning. Auditory and tactile learning are essential for students with visual impairments to access information through listening skills and to learn braille if appropriate. Examples of sensory efficiency skills taught by teachers for students with visual impairments can include identifying environmental cues and developing auditory and tactile skills for learning (Lohmeier et al., 2009).

PE teachers can promote sensory efficiency skills by using different sounds or music as an indication of activities beginning or ending. For example, in a PE activity where teachers want students to perform locomotor skills (e.g., running, hopping, skipping) activities continuously in a circle, they may play music while students are in motion. To stop the activity, the teacher would then stop the

music. Using this format instead of visual symbols (e.g., stop/go signs) allows an activity to be inclusive while students also practice sensory efficiency skills.

Another example is playing sports designed for individuals with visual impairments, such as beep baseball or goalball. While playing these sports, participants rely on their sense of hearing to locate the ball, strike or roll the ball, and play defense. To make these activities inclusive for all students, sighted peers can wear blindfolds during activities.

Conclusions

For students with visual impairments to become independent and successful adults, they need specific instruction in addition to the schools general curriculum. The nine components of the ECC focus on ensuring that students receive the additional support they need. Yet, TVIs cannot explicitly teach each component alone, and the nine ECC components must be embedded throughout the school day, including in PE courses. By implementing some of the recommended strategies and communicating with COMS, TVIs, and students themselves, PE teachers can promote the full potential of all students with visual impairments.

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