

AccessSports: A Model for Adapting  
Mainstream Sports Activities  
for Individuals with Visual Impairments

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Abstract

This paper describes a model for adapting mainstream sports and recreational activities for use by individuals who are blind or visually impaired. The model has been tested for more than six years at a sports education camp for mainstreamed youths in Michigan. A summary of the literature pertaining to access to physical education and sports and a list of major resources regarding this subject are also presented.

Access to physical education, recreation and athletic programs is generally limited for individuals with visual impairments. Impaired vision usually prevents adults from participating in community

basketball or softball leagues and it limits youngsters participation in physical education classes and in school athletics. Now that students with visual impairments are primarily served in their local schools, rather than in special residential facilities, they often do not have instructors who understand their special needs. Mainstream physical education instructors face a twofold problem when they have students with visual impairments: their training generally does not fully prepare them to work with special students and they seldom have sufficient time to give individualized instruction.

The problem is even more difficult, because special education teachers as a whole commonly have little or no expertise in teaching a wide range of physical education or sports skills. Therefore, unless youngsters have enough residual vision to perform at the level of their sighted peers, there is little possibility that they will receive the full benefits of physical education. The deficit in appropriate physical education services is well documented (Buell, 1982). Irving (1993) conducted a survey of youth with visual impairments and found that more than 50% of

mainstreamed youngsters in Michigan had limited involvement in physical education classes. Subjects in the Irving study who did not receive full inclusion in physical education class reported that they were assigned other activities during scheduled P.E. classes. They kept score, "watched" the others, went to another class, listened to stories, or did school work while the regular education students were actively participating. Sherrill, Rainbolt, and Ervine (1984) found that the visually impaired adults they interviewed reported little involvement in physical education as children and also indicated that they had received little encouragement to participate in sports and recreational activities. Several court judgements have been handed down against physical educators for denying access, further substantiating the lack of access (Appenzeller, 1983).

Lack of participation in physical activities has predictable physical and emotional consequences. For example, the physical condition of visually impaired persons as a group is known to be poorer than that of persons in the general population (Jankowski & Evans, 1981; Kobberling, Jankowski, & Leger, 1991; Seelye,

1983; Short & Winnick, 1986). Furthermore, it appears that the degree of fitness limitation increases with decreasing vision (Hopkins, Gaete, Thomas, & McN'hill, (1987). Irving (1993) also found degree of vision related to athlete attitudes about physical education class. Her subjects who had vision too limited to run safely without assistance held negative attitudes towards physical education class, while those with enough vision to run alone did not.

Many of the limitations described above can be overcome through specific training regimens. Research on aerobic exercise programs for women who are blind has demonstrated that such individuals perform the movements adequately with training (Ponchillia, Powell, Felski, & Nicklawski, 1992), and that they can eliminate the fitness deficit described earlier (Blessing, McCrimmon, Stovall, & Williford, 1993). In addition, Kobberling, Jankowski, and Leger (1991) demonstrated that age appropriate fitness could be achieved by their visually impaired study population through daily 30-minute exercise regimens. Certain psychomotor skills like jumping have also been found to improve through physical activity programs (McGinn,

(1984).

The problem we face in providing physical education relates to instructor expertise on the one hand and lack of individual student sports skills on the other. The youngster's skills cannot be expected to improve significantly without providing educators methods through which to adapt sports activities for the visually impaired youngsters who are enrolled in their classes.

The six years experience we have gained through the "Sports Education Camp" (SEC), which is a week-long residential program focused on skills training for severely visually impaired youth has taught us that there are relatively few sports activities that are not accessible in some way. Either they need little adaptation because they are simple, as in the case of recreational swimming, or they have been adapted by athletes with visual impairments or their advocates. Many athletic activities such as track and field, swim racing, wrestling, gymnastics, judo, power lifting, tandem cycle racing, goal ball, baseball, and bowling are commonly performed by athletes who are visually impaired. Although not well-known by the general

population, the adaptations required for these sporting events are relatively well-known among leaders of organizations for athletes with visual impairments such as The United States Association for Blind Athletes (USABA) and the Canadian Blind Sports Association (CBSA). The CBSA distributes a publication entitled: Integrating Visually Impaired Students into Mainstream Physical Education Classes: A Resource Guide, which contains an excellent compilation of adaptive techniques (See resources below). In spite of the efforts of organizations like the USABA and the CBSA, there remain a great number of sports and recreational activities that have not been adapted. Many of the games included in mainstream physical education classes are among those yet to be modified. As a consequence, it appears that using a model framework through which individual activities might be analyzed for adaptation would provide physical educators and vision teachers a tool through which to increase physical education access. Such a model is presented below.

#### The Model

The AccessSports Model (ASM) was designed to adapt activities at the SEC and has been used for that

purpose for more than five years. The ASM allows professionals who have a basic knowledge of visual impairment and who know something about mainstream sports to analyze any sports activity by investigating three of the game's components. The three include: (a) the targets or goals utilized in the sport, (b) its boundaries, and (c) its rules. The process requires the user to think through each of these aspects of the sport and to design adaptations needed for each. Targets or goals would include balls, archery or dart board bulls eyes, goal nets, and the like. Boundaries would be the edges of playing surfaces, such as the out of bound lines on a football field or the edge of a shuffleboard court. Rule modifications usually simplify games by reducing the number of players, increasing the ease of scoring points, or decreasing the possibility of player injury.

#### Adapting targets or goals

Since most youngsters have some functional vision, the most common modifications to activities utilize well-known methods of increasing the visibility of the targets and boundaries. Modifications made for those with no functional vision rely on tactual and auditory

clues. Examples of increasing target visibility include placing highly contrasting tape on a volleyball or weaving bright flagging tape through the net on a basketball hoop. In addition, increased lighting might be focused on an archery target or the glare from a glass basketball backboard might be reduced by taping nonglare paper onto its rear surface.

Modifications made for those with little or no functional vision rely on auditory or tactual cues. Auditory cues can also be used to indicate the location of a target. The most commonly used audible indicators are commercially available sound beacons, or strategically placed portable radios or bells. Examples of such modifications would include bell-filled or beeping balls, such as the table tennis ball from Japan which is modified by placing a ball bearing within it at the time of manufacture. Also, the outside perimeter of a soccer goal could be indicated by placing a portable radio on its left and right sides. Bells are commonly included in volleyballs and have recently been added to a high quality basketball (See resources below).

#### Adapting boundaries

Adaptations to boundaries are similar to those for targets. The visibility of edges of playing surfaces, like those of shuffleboard or volleyball courts, can be increased by adding highly contrasting gymnasium marking tape to the existing lines. Gymnasium marking tape, which is a light vinyl substance that comes in widths up to three inches, is especially useful because it is readily available at sporting goods stores. Also, owners of gymnasiums generally prefer gym marking tape to masking or duct tape because it does not leave a sticky residue on the floor after use.

Examples of tactual modifications to boundaries include cord placed under gymnasium marking tape on a basketball end line or a strip of wood placed along the edge of a shuffleboard court. If raised cord is to be used for marking the edge of the playing area of a sport played while standing, it is advisable to place two or three lines side by side separated by three or four inches, since a single line might easily be stepped over and missed when running.

Auditory modifications can also serve to mark boundaries. Portable radios or beepers are useful for delineating the playing areas of outdoor sports like

baseball or soccer. However, auditory cues are less useful in gymnasiums and swimming pool areas because the sound reflects from interior walls, sometimes making it difficult to locate the sound source. It should also be noted that sounds made at high frequencies do not make good sound beacons.

#### Adapting rules

Rules modifications relate to decreasing the complexity of the playing environment. The major changes generally relate to number of players, difficulty of locating the goal or target, decreasing the size of the playing area, and safety. Even if goals and boundaries were made usable by the methods described above, playing basketball in the traditional way would be difficult and unsafe. However, if the number of players is reduced to three per team, scoring is simplified, the game is played on only one-half the usual court, and a "stop" command is implemented; the game is more feasible. Scoring, in this case, can be simplified by awarding some points for hitting the backboard, more for hitting the basketball goal rim, and still more for making a basket. The "stop" command is used to stop play immediately to prevent collisions.

Games involving hitting a ball back and forth over a net generally require modifications to scoring. In most cases, these games can be adapted by playing under, rather than over the net. A Japanese volleyball game has the players volley a bead-filled ball back and forth on the gym floor under a low net. The net is lowered to a height that just allows the passage of the ball under it. If the ball is hit off the floor and strikes the net, point loss occurs.

Modifying baseball: An example

One of the more well-known sports activities to be adapted for use by groups of individuals with visual impairments is baseball. Many visually impaired athletes across the U.S. play beep baseball. Although the ASM was not used to modify the game, beep baseball serves as a good example of how the Model works. It should be noted that beep baseball rules require all players to be blindfolded, so adaptations are confined to those that are tactual and auditory.

The targets or goals in baseball are the ball and the bases. The ball has a built-in beeper which emits intermittent beeping tones and the bases emit continuous tones. The boundaries of the playing area

are the left and right foul lines, which are again indicated by the auditory tones emitted by the bases. When the batter comes to home plate to hit, each of the bases is momentarily activated to indicate its location.

The rules of baseball have also been modified to make it more feasible for athletes who are functionally blind. In this case, the modifications are related to the number of players, scoring, and safety. The number of players on the fielding team is reduced from nine to six; the players generally being placed in two rows of three in the outfield.

Significant modifications have been made to scoring. The pitcher, who is on the fielding team in baseball, becomes a member of the beep baseball batting team, and instead of trying to strike the batter out, attempts to hit the batter's evenly swung bat with the pitched ball. The batter is alerted to the upcoming pitch when the pitcher announces: "ready-pitch" in a standard cadence; the ball being released on the command "pitch". A good deal of practice between batter and pitcher results in the ball being struck more often than not. This unique pitcher-batter

relationship also requires a no walk rule.

The scoring modifications also include how outs and runs are made. While runs are scored in baseball when a player reaches "home plate" after traversing the other three bases, a run is scored in beep baseball when a player reaches either first or third base before a fielder gains control of the ball the batter has just hit. As such, only first and third base are required, thus eliminating second base and the complexity of having to traverse all bases before scoring a run. Batters are considered "out" if the ball is picked up by a fielder before they reach base, which eliminates the need for a throw from the fielder to the first baseman, as is required in baseball.

Rule changes relating to safety are also implemented in beep baseball. A "spotter", who is a sighted assistant, is employed by the fielding team to prevent collisions. Spotters also inform fielders of the direction of a fly ball, since the ball is moving too fast to be easily located auditorily.

#### Adapting Table Tennis: Example Two

Many games require less extensive modifications than baseball. Table tennis provides a good example of

a game needing minimal adaptation.

The targets or goals. The target in table tennis is, of course the ball. As mentioned earlier, a commercially available ball containing a ball bearing is one of the possible modifications. However, the modification could be a more "homemade" one like using an air hockey puck or a bell-filled ball of some sort.

The boundaries. The boundaries are the edges of the table and the bottom of the net. The outside boundaries can be modified by nailing a 3-inch high wooden "railing" along the edges of the table. This railing keeps the ball on the table, but also indicates by the sound of the ball striking the wood that the ball has been hit through the defensive player.

The rules. The only rule modification relates to the near impossibility of hitting the ball with the paddle when it is flying through the air. If the rule is changed so that the ball is not hit into the air, but volleyed back and forth on the table top below the net; the game is not only feasible, but just as much fun as the standard game.

#### Adapting school sports activities

The adaptations discussed above are, for the most

part, designed for activities that allow several visually impaired individuals to play a game among themselves. They may also allow visually impaired and sighted youngsters, who are blindfolded, to share a sports activity in a mainstream physical education class or in a recreational setting. Modifications of school athletics programs are somewhat more difficult because the sports activity is governed by formal interscholastic rules, which are more difficult to change. The adaptations to baseball described above would surely not be acceptable to mainstream sports officials. Therefore, if youngsters with visual impairments want to compete against their sighted fellows, the modifications cannot be as drastic. Consequently, modifying the games rules must be avoided or kept to a minimum. Many sports lend themselves well to only target or boundary adaptations, which in turn allows mutual competition between sighted and blind or visually impaired athletes well. For example, some of the athletes who have attended Sports Education Camp are presently competing in the mainstream in swim racing, wrestling, track, discus throw, shot put, high jump, and cross country racing. The following is an

outline of adaptations the young athletes are using in these sports. However, the reader should consult the CBSA publication listed above for a more thorough coverage.

Swim racing. One of the SEC athletes, who is totally blind, is competing in the mainstream by modifying the target; in this case the finishing line or end wall. She uses a common lawn sprinkler, which is attached to a hose in the pool area and which is placed on a board in such a way that the spray is directed onto her back as she swims under it. Sighted swimmers know when to expect the wall because they see a "T" painted on the floor of the pool just preceding the wall. The sprinkler is placed at that point on the wall of an outside swimming lane. She has, with practice, learned to judge the upcoming wall accurately. A sprinkler placed at both ends can be used in longer races when turns are required. Although she does not use it, a "tap stick" can be used in place of the spray. The tap stick is made by placing a tennis ball on the end of a bamboo pole of three to four feet in length. A sighted "tapper" warns swimmers of the upcoming wall by tapping them between the

shoulder blades a stroke or two before they reach the wall.

Modifications to the boundaries, which are the lane markers in this case, are not necessary because they are tactual by their nature. The Sports Camp athlete practiced straight-line swimming before attempting to compete, however.

Wrestling. Several SEC athletes compete successfully in high school wrestling. The only modification required is a tactual one, which relates to the target, or the opponent in this case. Under this simple rule change, the opponents are required to maintain hand-to-hand contact while in the standing position.

Track and cross country racing. At least three youngsters are competing in these events in their mainstream schools. The modification required relates to staying within the boundaries, that is, on the race course or within a particular racing lane. All three youngsters overcome this boundary problem by running with a sighted guide. The two who have severe visual impairments maintain contact with the guide by holding a rope tether, while the one with significant

functional vision follows the brightly clothed guide. It is also somewhat helpful if the runner and guide are given two lanes rather than one in which to run.

Discus throw and shot put. Both of these events are tactual by their nature, since the playing areas are circles either enclosed by a raised steel ring or are recessed in concrete. Thus, they require little modification. However, some throwing areas are indicated only by painted circles and can be marked with cord taped over the painted line. The boundaries of the area into which the implement will be thrown also need to be known. As such, athletes, who want to do either of these events need to be oriented to the throwing circle. Orientation to the shot put throwing area is simple because it has a raised "toeboard" in the front. The SEC athlete who puts the shot, uses no special adaptations.

The discus throwing circle usually has no tactually discernable front, but it can be indicated by placing a towel in a contrasting color just outside the front edge. The SEC athletes have learned to throw the implement in the proper direction through practice.

High jump. At least one SEC athlete competes in

high school high jump competition. He marks the target, which is the crossbar, with easily-visible tape. Functionally blind youngsters can perform this activity by limiting the number of steps they use in their approach to one to three and practicing until the distance between starting point and bar is familiar.

Long jump. Modification of the long jump is somewhat easily accomplished by modifying the long jump board (target) and the approach track (boundaries). Those with some functional vision have marked the board and edges of the running approach track with easily visible tape. Those with severe limitations or no functional vision locate the board by limiting and counting the number of steps they take during the approach and by practicing a great deal. Maintaining a straight-line approach within the confines of the running track can be accomplished by using a "caller".

The sighted caller stands at the end of the long jump pit facing jumpers and gives them a sound source at which to run. Before jumpers begin their running approach, the caller gives them a verbal cue and asks them to point in the proper direction. When the caller is satisfied with the jumper's alignment, he gives

permission to start the jump. Since this activity is somewhat dangerous, a "stop" command should be established between caller and jumper, so the jump can be immediately aborted if the jumper strays from the boundaries.

### Summary

It is sincerely hoped that the ASM will be a useful tool for physical educators, coaches, and teachers of visually impaired students. However, it should be clear that it is only one of the many tools that are needed to increase physical education and sports access. Certainly the ASM can be used to adapt activities in a physical education class, but it would be unrealistic to think that every class that contained a student with a visual impairment could be modified every day simply to meet that one student's needs.

Therefore, the practical aspects of providing access go well beyond the instructor's knowledge of adaptations.

Consequently, it should be recognized that even under the most ideal conditions mainstream physical education cannot fully meet the needs of children with disabilities. Recognizing this problem, those of us who provide supplemental sports education through

programs such as the Sports Education Camp, feel that a continuum of services is needed. This continuum would include at least provision of mainstream physical education classes, sports skills delivered in programs supplemental to mainstream education, inclusion in interscholastic or intramural mainstream sports, and special programs that provide a vehicle for ongoing participation in sports and recreation activities. The supplemental programs are necessary because they inform youngsters of the special adaptations required for participation, which in turn empowers them to advocate for themselves. A supplemental approach can also result in spin off programs that provide ongoing activities. For example, the SEC has resulted in several local sports programs for visually impaired youngsters throughout Michigan, in an annual event termed "The Michigan State Games for Visually Impaired Youths," and in two annual statewide high school goal ball tournaments. For information regarding the operation of a supplemental program contact the MBAA or the USABA (See resources below).

Resources

Track & field, swimming, wrestling, cycling, judo,  
gymnastics, goal ball, power lifting:

The Canadian Blind Sports Association

333 River Road  
Ottawa, Ontario  
K1L 8H9

The United States Association for Blind Athletes

33 N. Institute Street  
Colorado Springs, CO 80903

The Michigan Blind Athletic Association

1541 N. Oakland Dr.  
Kalamazoo, MI 49008

The Braille Sports Foundation

4601 Excelsior Ave. South  
St. Louis Park, MN 55416

Basketball:

The Visually Impaired Athletic Association

P.O. Box 39507  
Chicago, IL 60639

Baseball:

The National Beep Baseball Association

Dr. Ed Bradley

712 w. Fairmont

LaPorte, TX 77571

Adapted Balls, beepers, games:

LS&S

P.O. Box 673

Northbrook, IL 60065

Ann Morris Enterprises

26 Horseshoe Lane

Levittown, NY 11756

Maxi Aids & Vis Aids

86-30 102nd Street

Richmond Hill, NY 11418

Science Products

Box A

Southeastern, PA 19399

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