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A Catalog of Physical Activities for Visually Impaired Youth

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Abstract

Among blind and partially sighted people, there is a tendency to lead a more sedentary life. In order to encourage a more active, healthier lifestyle, this project, sponsored for the Videncenter for Synshandicap in Copenhagen, Denmark, created a catalog of physical activities for visually impaired youth. The catalog also contains suggestions for adapting new games and provides other resources that parents, educators, or coaches can consult. The catalog was published by the Videncenter for Synshandicap.

Executive Summary

There are varying degrees of visual impairment. In general, visual impairment can range from simply very unclear vision to the ability to detect motion or the presence of light to total blindness. In Denmark, a large, state-run system is in place to aid the disabled, including visually impaired people. The objective of Danish disability policy is equalization of opportunities and the integration of the disabled into society instead of being placed in special institutions. In 2005, there were 1,785 visually impaired persons between the ages of 0-18 in Denmark (Jensen). These children are integrated into local school systems whenever possible. Consultants are assigned to each visually impaired student to aid the student when needed and to help educate the parents and teachers who may not be familiar with the specific needs of visually impaired people (Teilmann).

Consistent athletic activity can lead to better health, more social interaction, and better physical coordination for visually impaired youth, however, this level of activity is hardly obtained by visually impaired people. As a result of little or no vision, visually impaired children often have slower motor development and they learn to move on their own at a much slower pace. Lack of mobility reduces motivation to participate in physical activity which, in turn, reduces physical fitness. In addition, isolation from peers and lower social interaction means that play occurs much less frequently. Other obstacles to physical fitness include concerned parents and uneducated teachers who may not believe the child has the ability to play the games and may not know how to properly adapt common games.

In order to overcome these obstacles, there must be educational opportunities for the parents, classmates, and even educators of visually impaired students. The catalog, created for the Visual Impairment Knowledge Center, contains both instructions for games and sports and local athletic associations for visually impaired people. The catalog also contains games which integrate sighted and visually impaired children beginning at an early age. By exposing children to people of differing abilities at an early age, it will be more likely that visually impaired children will continue physical activity throughout their lives.

There is no shortage of options to encourage visually impaired children to participate in physical activity. There are countless sports and games available to visually impaired youth. Adapted sports include a variety of developmental activities, exercises, games, rhythms, and sports designed for the specific needs of a broad group of visually impaired persons. Visually impaired children have the basic needs of sighted children and should be allowed to participate in experiences with their sighted peers with the proper adjustments. When adapting a game for visually impaired people, the most important factors to look at are safety of the activity and the value of the skills taught.

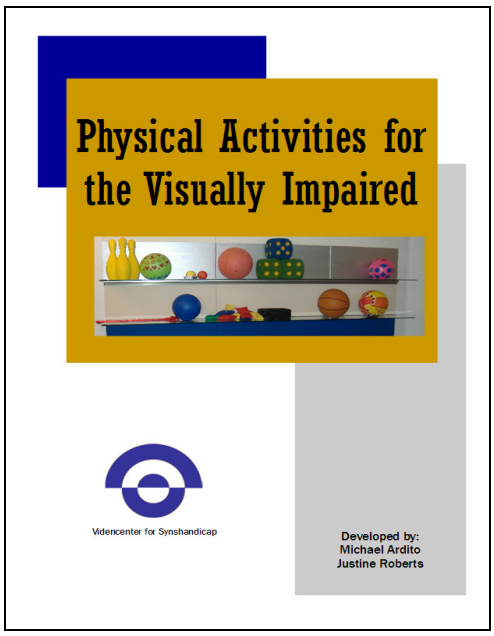
In this project report, we research different approaches to the design of games which promote social interaction between sighted and visually impaired children. We conducted extensive onsite research which included literature reviews, classroom observations, and interviews with disability sports centers, consultants and educators. We underwent blindness sensitivity training in the United States and in Denmark. Our classroom observations included a goalball practice with only visually impaired children, as well as an integrated physical education class with just one blind girl. This data

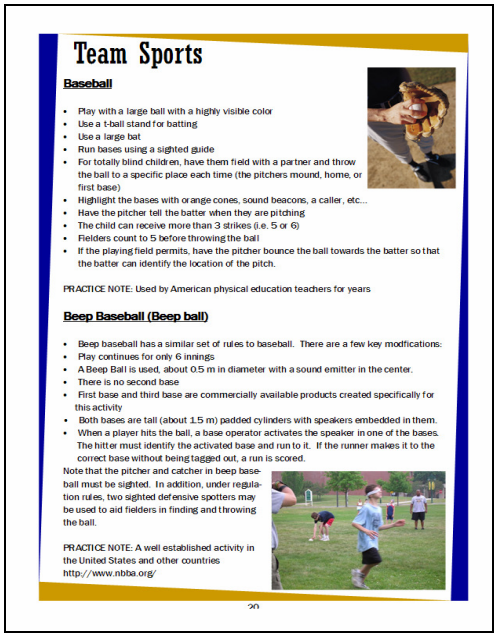
collection enabled us to identify several characteristics common to adaptations for inclusive sports. Games which encourage audio perception, verbal ability or tactile acuity are identified as being fully accessible to both blind and sighted children.

While in Denmark, the project team undertook cultural observation as well as more formal research into physical education. Upon compiling a list of common activities in Denmark, we compared our list of American activities and applied our methods of adapting physical activities to Danish physical activities. Adaptations accounted for the safety of those involved, appropriate age groups, and skills which can be improved with participation. Skills that we hoped to improve include but are not limited to orientation, mobility and motor skills.

After interviewing and performing classroom observations the project team formatted the catalog into a comprehensive and accessible group of games with instructions for adapting them. The catalog contains a list of ideas for instructing visually impaired youth including a discussion of different kinesthetic, visual, and auditory cues that can be helpful. Within the catalog, there are different ideas for adaptation and assistive technologies. For each activity, different suggestions are made for adaptations to the equipment. The adaptations and modifications can often be done with common equipment, such as bright tape, cords, and different size balls. For example it is suggested for soccer that there be a bell in the ball and sound beacons near the goals. Also, for bicycling it is suggested that tandem or duo bicycles be used. These adaptations to the activities make inclusive participation easier for all involved. The catalog is divided into several convenient sections that can be used in all settings. The games are divided into indoor and outdoor activities and further subdivided into team and individual sports. The

activities under each heading are listed alphabetically. After these lists, there is a shorter list of Challenging Activities, those activities which may be too fast paced for visually impaired people to participate in regularly, but of which all children should be aware. These games include those that are designed specifically for visually impaired youth, such as goalball, and games that are for integrated settings, such as track and field. As an illustration of the catalog included below are two sample pages.





The Videncenter for Synshandicap published the catalog and posted it on its website. Educators and consultants with whom we spoke agreed that the catalog would be a useful and necessary tool. Further recommendations identified for this project include the translating of the catalog into Danish in order to make it more accessible and continuing the dissemination of the catalog through print and web publication. The recommendations contained in the guidebook reflect a range of games and sports as diverse as the children for whom they are designed.

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1. Introduction

Being physically active can lead to a longer and more comfortable life (Farrenkopf 438). In addition, games and competitions teach values such as responsibility, cooperation, leadership, social skills, turn taking, and sportsmanship (Winnick 71). Positive physical education educational experiences also enhance self-esteem. Although many children experience the positive effects of being physically active, there is, unfortunately, some difficulty ensuring that children who are visually impaired enjoy the same experience. There are various differences in the physical development of visually impaired and sighted children (O'Donnell 287). Among them, there is a tendency towards limited interaction and play among visually impaired people, and this lack of activity leads toward a potential for childhood obesity and other health risk factors (Sherrill 562, Lockette 136, Winnick 307, Cataruzolo).

Currently, there are two techniques for including visually impaired people in physical activities. The first technique is to adapt the rules and equipment of common games, such as soccer, for inclusion of both sighted and visually impaired children. The second technique is to make games specifically for visually impaired people, such as goalball. These two techniques are both helpful in instructing visually impaired children and integrating them into physical activity. As the decision of how much interaction should be with sighted peers and how much should be with other visually impaired children needs to be made on an individual basis, a comprehensive catalog of physical activities integrating both types of games would be useful for educators and parents involved in the development of visually impaired children.

With the goal of promoting physical health and fitness among blind children in mind, our objective was to develop this catalog. We began with research of the physiological and developmental needs of visually impaired children and in what manner strategies to meet these needs are implemented in Denmark. We continued by looking at current assistive technologies and adapted games. Ultimately, the catalog contains current strategies for integration of visually impaired children. It also includes new strategies and guidelines for other physical educators to take even further steps forward. The catalog includes a diverse range of activities to accommodate varying age groups and levels of visual impairments.

In the following report, we will lay out our research and ideas for this catalog. Chapter two will discuss the background of the need to develop and adapt physical activities for blind children. We will also report on current games and activities for both visually impaired children and the integration of physically impaired and sighted children. Chapter three will present our research methodology and our procedures for creating the catalog. Chapter four will present our results followed by our analysis in chapter five and our conclusions and recommendations in chapter 6.

2. Background

2.1 Development of Visually Impaired Children

There are varying degrees of visual impairment. Visual impairment affecting young children can be due to many different causes including infection, tumors, or neurological disorders, and congenital conditions. Visual impairment can take many forms. There is no universal definition of blindness, as vision can be impaired by degrees. In general, visual impairment can range from simply very unclear vision to the ability to detect motion or the presence of light to total blindness (Lockette 136). In addition, either central or peripheral vision or both could be lost. For children who are anything but totally blind, residual vision may be a useful aide for physical educators.

Although characteristics vary widely among the diverse population of visually impaired people, there are certain characteristics which occur much more readily among visually impaired people as a direct result of their disability. As a result of little or no vision, visually impaired children often have slower motor development and they learn to move on their own at a much slower pace. Low spatial awareness and self awareness contribute to a lack of mobility (Lieberman and MacVicar 755).

At an early age, the development of motor skills can be hampered by a lack of visual stimuli and the inability of visually impaired toddlers to imitate the movement of adults. Body awareness, posture, sensory integration, and motor skills are all hampered among infants (0-24 months). In particular, the development of mobility of toddlers (24-36 months) is severely slowed (Koenig 237). In general, children who are blind from birth have less developed motor skills than children who lose their sight after early childhood (Koenig 441).

2.2 Need for Physical Activity

As is readily found in literature (Sherrill 562, Lockette 136, Winnick 307), this decrease in mobility and motor skills puts visually impaired children at a health risk of obesity. Lack of mobility reduces motivation to participate in physical activity which, in turn, reduces physical fitness. In addition, isolation from peers and lower social interaction means that play occurs much less frequently (Stuart et al.). Studies have suggested that visually impaired people have, in general, much lower levels of physical fitness than their sighted counterparts (Lockette 136). This lack of physical activity can lead to, not only obesity, but also muscle weakness and low cardiovascular endurance (Lockette 136).

The problem of obesity is particularly serious. Being overweight increases the risk of developing several other serious medical conditions such as osteoarthritis, diabetes, heart disease, and even certain types of cancer (AOA). In addition to a healthy diet, one of the most effective and most accessible ways to prevent obesity is engaging in frequent physical activity (AOA). It is imperative that children be given to opportunity to be active. It is the role of the parents and educators of visually impaired children provide this opportunity. Excluding visually impaired people from physical activity puts them at significant risk for serious medical complications in the long term. Moreover, excluding children from physical activity makes it much less likely that they will develop active habits later in life, putting them at even greater risk.

Aside from health benefits, the advantages of athletic activity are numerous. Physical activities allow children to master basic motor skills and lay a further foundation for complex motor skill development. Activities lead to increased cardiovascular endurance, balance, and overall coordination. Over time muscular strength, flexibility and

range of motion will improve (Kaufmann 28). The child also gains spatial orientation through exercise. Until children become oriented, they display tentative movements. Physical training teaches people with visual impairment how to use other senses, hearing and touch, to orient themselves (Miller 34).

In addition to physical benefits there are emotional benefits. Like all children, visually impaired children experience a range of emotions. They can be seen as selfish, impatient and subject to temper tantrums. Learning to work with others as partners is a good release for children (Kratz et al. 5). Their self-awareness and self-confidence increase as they use their imagination in games and learn to express themselves. Intellectual benefits can be seen in the strategy and teamwork skills. Also there is improved observation, listening skills, memory, concentration, and decision making. In addition, sports have numerous social benefits. Children can connect with one another for a sense of belonging and community. Groups allow for mutual respect and cooperation, which develops an increased appreciation for diversity (Kaufmann 28-29).

Finally, physical activity positively influences many other aspects of visually impaired people. Poor posture is relatively common among blind children who have no way to observe to the carriage of adults. Physical activity can help to improve posture. In addition, congenitally blind people have a tendency to develop stereotypical behavior known as "blindisms." Examples of blindisms are rocking back and forth, rubbing ones eyes with one's fists or fingers and other socially unaccepted behaviors (Lockette 136). Having an outlet for physical movement, participating in regular physical activity can help to reduce blindisms (Miller 34). In addition to these benefits, being physically active carries with it the same benefits for blind children as it does for all children. Improved

metabolism, reduced risk of developing heart conditions, stronger immune system, and endurance; all of these things can be achieved with regular exercise (Kaufmann 30).

2.3 Barriers to Physical Activity for Visually Impaired People

Unfortunately, there are some difficulties in creating and abiding by a plan of physical activity for visually impaired people. As might be expected, poor motor development early in life often leads to less capability and desire for mobility later in childhood. As such, it is imperative that barriers to physical activity in young children be identified and overcome. Often, one of the largest obstacles to the continued physical education of visually impaired people comes from the most well-intentioned source: concerned parents (Lieberman Overcoming, Stuart et al.). A recent survey conducted showed that many parents of visually impaired children perceive that the largest difficulty to providing their children with a physical education is the possibility of injury (Stuart et al.). This understandable over-protectiveness lessens the opportunity for children to participate in physical activity. Additionally, if the attitudes of the parents are negative towards physical activity, this negativity leads to decreased motivation for the child to engage in physical activity (Stuart et al.).

An extension of this over-protectiveness, it has been shown that as the level of visual impairment increases, the parents' expectations for physical activity decrease (Stuart et al.). It is necessary that the expectations are kept high for children regardless of disability (Lieberman Overcoming). If expectations are kept high and physical activity is made a priority, confidence, mobility, and spatial awareness will increase, facilitating further activity. Finally, a major barrier toward physical activity is the attitude of the

peers of visually impaired children (Koenig 438, Lieberman Overcoming, Stuart et al.). There is a tendency for visually impaired children to become isolated. Lack of education and experience in dealing with people with disabilities causes hesitation among sighted children to interact with their sightless peers (Lieberman Overcoming). In addition, teasing and bullying are not uncommon phenomena, and surveyed visually impaired children list the fear of being made fun of as the primary difficulty with engaging in physical activity (Stuart et al.).

In order to overcome these obstacles, educational opportunities for the parents, classmates, and even educators of visually impaired students must be prevalent. To this end, the catalog contains both games in which visually impaired people can participate and methods of instruction. The catalog also contains games which integrate sighted and visually impaired children beginning at an early age. By exposing children to people of differing abilities at an early age, it will be more likely that visually impaired children will be able to continue playing with there peers through and past their formative years.

Goals should be created to track progress and also to help create a sense of accomplishment for visually impaired people individual. Long term goals for overcoming barriers to physical activity are mostly concerned with the awareness of the environment and awareness of their body and movements. Activities should encourage spatial movement and exploration to help build the mobility of visually impaired children (Cataruzolo). Most importantly, the child should have fun (Kratz et al. 41). By encouraging the child and creating a fun environment, parents and educators can help ensure that the desire to engage in physical activity will continue into later years.

2.4 Current Physical Activities

There is no shortage of options to encourage visually impaired children to participate in physical activity. There are countless sports and games available to visually impaired youth. Adapted sports include a variety of developmental activities, exercises, games, rhythms, and sports designed for the specific needs of a broad group of visually impaired persons. Visually impaired children have the basic needs of sighted children and should be allowed to participate in experiences with their sighted peers with the proper adjustments.

It is often encouraged that adapted activities for visually impaired students do not differ significantly from sighted activities (Kratz et al. 21). There are many activities that can be done without modification. Often when working with visually impaired students it is preferred to do activities that do not largely depend on visual input and feedback and require small amounts of adaptation. A few activities that require minimal modification include (Winnick 214):

- Folk and square dancing
- Rope Jumping
- Tug-of-war and parachute play (for younger children)
- Canoeing and tandem bicycling (with a sighted person in the front)
- Wrestling

Wrestling is a good activity because it is one of the few where sighted and visually impaired youths are nearly matched for skills. Visually impaired children have a history of championships against their sighted peers in wrestling (Winnick 216).

If the activities require some vision it can be helpful if the child is physically moved through the correct motions of an activity. A movable scale model, such as a doll,

can be useful in showing students more difficult positions and activities (Winnick 215). Students can also ‘Braille’ as another individual goes through the motions. The action is demonstrated and the participant feels the movements (Miller 163). Brailling allows for an improved sense of kinesthetic awareness which, in turn, allows the child to feel the sensation of movement or strain in muscles, tendons, and joints so that they can mimic others. Along with physical cues, auditory cues can be used. Precise verbal descriptions should be used when giving feedback (Winnick 215).

Visually impaired students can perform in many common activities with only slight modifications. In swimming, children can count their strokes or a coach can tap them when they are near the end of the pool. For gymnastics, vaulters can start with their hands positioned on the horse, floor competitors can count their steps to the edge of the mat or different textured mats can be used, and children on the balance beam can be warned when they are near the edge. A few examples of other common activities that can be modified include baseball, volleyball, and cross country skiing. Outdoor activities include camping, hiking, kayaking, and horseback riding (Lieberman Recreation).

When adapting a game for visually impaired people, the most important factors to look at are safety of the activity and the value of the skills taught (Cataruzolo). Michael Cataruzolo, the volunteer coordinator at Perkins School for the Blind, recommends the breakdown of a game into its component parts and modification of the rules such that each major skill can be practiced by visually impaired people. A modification created by Cataruzolo for Perkins' physical education classes uses a standard basketball with modified rules. By placing a metronome behind the backboard, students can locate the basket. All passes to other players are bounce passes and players clap or call out when

they are open to receive a pass. As a means of encouragement, one point is awarded for a shot hitting the rim in addition to the standard two points for making a shot and three points for making a shot past the three-point line.

Some sports have been designed specifically for visually impaired people. Goalball is a sport where all children wear blindfolds and they roll a ball with a bell or beeper across a gym and attempt to stop it from passing a goal line behind them. This sport helps in improving mobility because it teaches students to stretch, dive, or lunge to block the ball (Winnick 216).

Not only are sports modified, but common games are also modified for children with visual impairments. For games such as tag the person who is ‘it’ can carry a bell and to minimize arguments about whether or not someone was tagged a brightly colored flag can be worn and 'it' must remove the flag from another player to 'tag' them. Water games such as Marco Polo can be modified so that everyone in the pool wears a blindfold and the person that is ‘it’ must continuously talk while attempting to find their peers (Winnick 354).

Dance is another exceptional way to improve children’s spatial awareness. Continuous sound and textured surfaces allow an improved sense of direction. Sighted persons can be paired with the severely visually impaired or it may be helpful if visually impaired people dancer puts their hands on a partner’s shoulders or hips to receive a better sense of time, space, and size (Winnick 386).

2.5 Current Assistive Technology

Aside from adapting the rules, technology can be used to create games in which visually impaired people can actively participate. Current assistive technology focuses on the child's other senses as a method to improve inclusiveness in games with sighted peers. To allow visually impaired students to compete with their peers, the sense of touch and sound are particularly helpful, however, visual cues can also be enhanced, (Winnick 215-216). Many companies make adapted products that can be useful for physical activities with visually impaired people such as tandem and Surrey bicycles.

Targets and goals can be adapted by increasing their visibility. For example, highly contrasting tape on a volleyball or weaving bright flagging tape through nets and hoops. Additionally, increased lighting can be focused on a target or glare can be reduced by taping non-glare paper onto its rear surface (Ponchillia 6). Brightly colored goals, mats, field markers and balls that are in sharp contrast with the background allow for students with any residual vision to play. If students are playing indoors, the lights can be slightly dimmed to improve the contrast, or if dimming does not help non-glare lights can be used (Ponchillia 6).

Auditory cues are key for incorporating visually impaired youth. Target location can be indicated using commercially available sound beacons or strategically placed radios or bells. For example, sports such as baseball can be played with balls that have bells or beepers inside. Also, portable radios can be placed on the outsides of a soccer goal. Sounds made at high frequencies do not make good sound beacons (Ponchillia 7).

Targets, balls, and goals can be adapted to increase the inclusion of visually impaired students. Modifications can allow visually impaired students to remain safe while playing certain games. Soft balls and balls of different shapes can be useful in

games such as volleyball. For baseball not only should the ball beep, but a batting tee will also help students to strike the ball with greater ease. For bowling bumpers can be used to help improve aim (Letcher). For volleyball highly contrasting tape can be used and bright flagging tape can be weaved through nets. Additionally, increased lighting can be focused on a target or glare can be reduced by taping non-glare paper onto its rear surface (Ponchillia 6). Brightly colored goals, mats, field markers and balls that are in sharp contrast with the background allow for students with any residual vision to play. If students are playing indoors, the lights can be slightly dimmed to improve the contrast, or if dimming does not help non-glare lights can be used (Ponchillia 6).

2.6 Visual Impairment in Denmark

The difficulties faced by visually impaired people in Denmark are very similar to the issues in the United States. In 2005, there were 1,785 visually impaired persons between the ages of 0-18 in Denmark (Jensen). These children are integrated into local school systems whenever possible. Consultants are assigned to each visually impaired student to aide the student when needed and to help educate the parents and teachers who may not be familiar with the specific needs of visually impaired people (Teilmann). Although the problem of obesity in Denmark is not as widespread as in the United States, there is still a growing number of cases of overweight and heart disease (Denmark.dk). Physical education courses occur for only two hours each week in Danish schools and most athletic activity occurs in sports clubs (Jensen Interview). For these reasons, the need for this catalog exists in Denmark as well.

This project is sponsored by The Videncenter for Synshandicap or Visual Impairment Knowledge Center in Copenhagen, Denmark. The VIKC's goal is to "collect, process and disseminate information about visual impairment and people with visual impairment" (Videncenter). Funded by the state under the Danish Ministry of Social Affairs, the VIKC maintains a resource library, both physical and electronic. In addition, they publish the newsletter *Synshandicap.* VIKC maintains relations with several national organizations with similar goals including the Danish Association of the Blind, The National Association of Parents of Visually Impaired Children and Youth and other education and rehabilitation services for visually impaired children and adults (Videncenter).

3. Methodology

The goal of our project was the formation of a catalog of physical activities for visually impaired youth that can be used by parents, educators, and coaches. We began with research into the social and physical development of visually impaired children. A list was compiled of current games and activities which were adapted for visually impaired people in the United States. While in Denmark, we evaluated the effectiveness of our catalog. Information was gathered about common behaviors, intellectual skills, and physical aptitudes of visually impaired youth and this information was applied in revisions of the catalog. We also created new adaptations based on feedback which we received. These adaptations were designed for integration of visually impaired people and sighted and accommodated specifically to the developmental needs of visually impaired people.

In order to collect data in Denmark, qualitative interviews were conducted with consultants and educators of visually impaired youth. It should be noted that we recognize and accept the ethical responsibilities of collecting data from human subjects. We also realize the need to collect data from a demographically diverse sample size (see appendix DOYLE). We proceeded by collecting data through observational studies of both Danish and American physical education settings of visually impaired people. Again, we understand and abide by all ethical considerations.

This project was completed on site in Copenhagen, Denmark from March 12, 2007 to May 9, 2007. The following is a summary of our key objectives in the completion of our project.

Objectives:

- Investigate the physical and developmental needs of visually impaired youth
- Research current activities for visually impaired people
- Research methods of adapting common physical activities to the needs of visually impaired youth
- Develop new adaptations that incorporate both sighted and visually impaired children
- Catalog athletic activities for visually impaired youth
- Conduct further research through classroom observation and interviews with visual impairment consultants and educators
- Revise and develop catalog

3.1 Preliminary Investigation and Research

Investigation into the different needs of visually impaired youth, current available physical activities, and common adaptations can be accomplished via similar methods. A search through the current literature within the United States yielded a tremendous amount of information. Searches through a vast array of online sources provided potentially useful source material such as articles, books, and schools for visually impaired people. Journals, such as the Journal of Visual Impairment and Blindness, have many articles about studies that compare the physical fitness levels of sighted and visually impaired children and correlate visual impairment and poor physical fitness (Blessing et al 50, Ponchillia 5, Williams et al 495). In addition to background material, these articles also showed adaptations to physical activities and some common sports that can be done with visually impaired youth which were incorporated into the catalog.

Research into books provided information on the development of visually impaired people, especially in relation to the development of sighted children. By

researching the development of visually impaired people we were able to recognize areas where they tend to fall behind sighted children and adapt games that emphasize improvement in these areas. This research also provided areas where visually impaired people require specific training. Physical education and conditioning texts provided a wealth of information about common curricula and activities. Although some common activities that children participate in were not acceptable and could not be adapted for visually impaired people, many required only minor changes to allow for the participation of visually impaired people. Searching for texts on physical education for visually impaired people gave an understanding of how educators should interact with visually impaired students when they are participating in physical activities. One author, Professor Lauren J. Lieberman from the Department of Physical Education and Sport at the State University of New York in Brockton, was particularly helpful. She is an expert in the field of education of students with sensory disabilities and has written dozens of books and articles, several of which have proven useful to the completion of our project.

Other sources were of particular value. There have been several previous projects conducted by Worcester Polytechnic Institute students involving assisted living for visually impaired people. One project, in particular, Developing Toys for Blind and Visually Impaired Children by Erika Hall, Ryan Lizewski, and Elizabeth McCoskrie was particularly useful and served as a model for our basic methodology and catalog.

Conversations with Sharon Strzalkowski, a counselor for the Massachusetts Commission for the Blind, provided information on what it is like to be blind and grow up in a sighted community. Through this we received a better understanding of development and availability of activities for visually impaired persons. Sharon

Strzalkowski was also able to suggest the names of several organizations that have activities such as yoga and skiing for visually impaired people.

Interacting with educators that work with visually impaired students enabled us to gain firsthand understanding of games and adaptations that students enjoy. The Perkins School for the Blind was the first school for visually impaired people in the United States. It is located in Watertown, Massachusetts and is committed to helping people who are blind, visually impaired, deafblind or with multiple disabilities. An interview with Michael Cataruzolo, the former Head of Physical Education and Recreation, at the Perkins School for the Blind helped us to better comprehend visually impaired youth and their perception of physical activity. Mr. Cataruzolo helped to explain adapted activities that he created for use at the Perkins School and the process of developing new adaptations. We also participated in sensitivity training at the Perkins School to help us better personally understand the needs of visually impaired people.

Upon arrival in Copenhagen, we had a primary catalog completed. This primary catalog focused on activities and adaptations that are common in the United States. The resources at the Visual Impairment Knowledge Center provided information on visual impairment in Denmark. The Visual Impairment and Knowledge Center "collects processes and provides information about visual impairment and people with visual impairment" (VIKC). Their resources provided us with adaptations and physical activities that are common in Denmark.

3.2 Developing New Activities

Upon arrival on site, we researched popular Danish activities for a broad range of age groups, from pre-school age through secondary education. We spoke with local educational consultants to investigate the physical education curriculum for all age groups. Basic cultural observation took place as well as more formal research into physical education in Denmark. Upon compiling a list of common activities in Denmark, we compared our list of American activities and applied our methods of adapting physical activities to Danish physical activities. Adaptations accounted for the safety of those involved, appropriate age groups, and skills which can be improved with participation. Skills that hoped to improve include but are not limited to orientation, mobility and motor skills.

3.3 Creating and Refining the Catalog

Upon completion of the above activities, we compiled a comprehensive catalog. This catalog included information on common adaptations of games and instruction techniques specific to visually impaired people. Finally, we included all of the sports and games which have been acquired through our previous research.

Upon arrival at the VIKC, we began the process of scheduling meetings with educators, consultants, and other Danish organizations that deal with visually impaired people. Through these organizations and consultants we learned of any differences in the needs and development of Danish children and American children which we may not have considered. In addition, observation of physical education classrooms and extra curricular activities provided us with more qualitative information about the developmental needs on which our activities were focused. The preliminary catalog and

all further revisions were made available to the community of educators and consultants who work with visually impaired people in Denmark through an internet forum. Feedback from this forum validated our efforts and demonstrated that the desire for such a catalog existed and that our catalog would be helpful. Finally, after incorporating this new information into the catalog, a revised, completed catalog was presented to the VIKC.

4. Results

In this section, we highlight the interactions with educators and consultants who deal with visually impaired people, how these interactions influenced our final catalog, and their response to our catalog. A full description of the interviews and classroom observations performed can be found in appendix INTERVIEWS. We go on to briefly summarize the completed catalog. The catalog can be found in its entirety as an attached document.

4.1 Interviews with Consultants

After the compilation of the initial draft of our catalog, we interviewed various educators and consultants who work closely with visually impaired people or with disability sports organizations. These interviews gave us the opportunity to improve our catalog such that it would more adequately meet the needs of those who would be most likely to use it. In addition, we were able to learn of new ideas for adaptations and other possible activities that have been successful among visually impaired youth in Denmark. For more information on these interviews, see Appendix INTERVIEW SUMMARIES.

On March 27, 2007, we conducted a meeting with Kristian Jensen and Tine Soulié from the Danish Disability Sport Information Center and Tine Teilmann, a school consultant for visually impaired people. Also included in the meeting were Bendt Jensen and Dorte Silver from the Videncenter for Synshandicap. This interview gave us a better sense of what disability services are offered in Denmark, in particular by the Disability Sport Information Center. Jensen and Soulié were also able to give us a better understanding of literature which already exists, and where there may be a need for more

information. In their opinion, much literature exists which already focuses on broad adaptation principles that people can employ, but there are few examples of concrete ideas for adaptation. At their behest, the catalog focuses more strongly on specific possible adaptations for specific sports which will allow educators and consultants to have many options which they can either use or take as inspiration for their own adaptations.

In addition, speaking with Teilmann, an educator and visual impairment consultant who works directly with visually impaired people, gave us a better understanding of the more practical problems that arise when instructing blind children and motivating them to participate. In general, the concern is that even the most athletic of visually impaired children are at a disadvantage in terms of mobility. As such, there should be adaptations in which visually impaired people and sighted children can be placed at similar skill levels, perhaps by lowering the mobility of all children involved.

On April 4, 2007, we observed a gymnastics class held at the Institute for the Blind and Visually Impaired conducted by Steffen Adamsen. During this observation, we had the opportunity to witness some of the methods for instructing visually impaired people in actual practice. In addition, we noted the differences in movement and necessary instruction between students who were completely blind and students who still retained some residual vision. As might be expected, the student who was completely blind required much more individual attention and kinesthetic instruction in order to ensure that he was moving his body in the prescribed manner. Talking with the instructors, we also came to understand the need to improve balance and coordination among visually impaired people, one of the primary goals of their physical education

course. The idea of moving from the trunk of the body to maintain balance is something that must be explicitly explained and demonstrated for visually impaired people, who can not simply mimic the motions of others. In addition, the need to perform simple warm up exercises and stretches was emphasized. We received several ideas for type of activities which focused primarily on martial arts and yoga and would accomplish both goals.

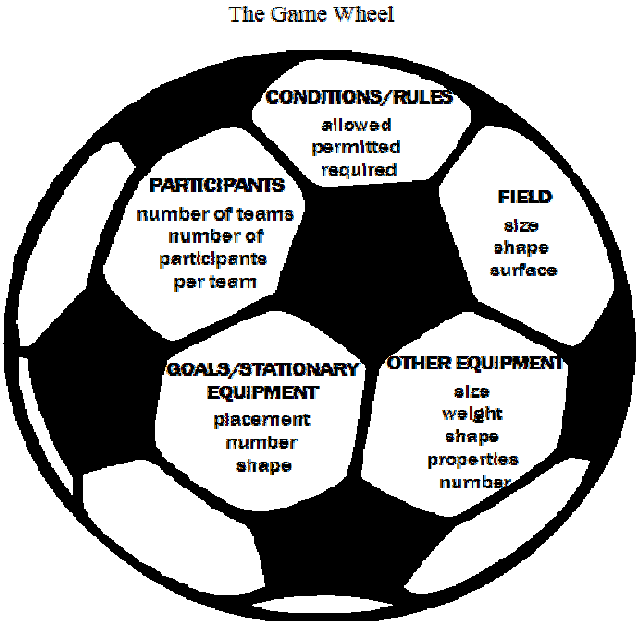
On April 11, 2007 during our meeting with Jens Winther, an employee with the Danish Sports Organization for the Disabled, we were able to evaluate each catalog idea individually. This intensive look at our adaptations provided us with a necessary idea of which activities visually impaired people can realistically excel in. Sharing much the same concerns as Teilmann on sports which require a high degree of mobility, Winther suggested that some activities which are very fast paced or require the movement of large groups of people are unsafe or require so many adaptations as to completely alter the nature of the sport. As such, many of these challenging activities became suggestions for activities that visually impaired children can try, and should certainly be familiar with, but which may not become a major aspect of an active life style. In addition, Winther informed us of several ongoing serious sports competitions for visually impaired people in various activities that we identify, giving more validation to the adaptations in our catalog and giving any readers greater confidence in trying new activities with visually impaired children.

On April 18, 2007, we performed a classroom observation in Roskilde. This classroom was a first grade, integrated setting with one visually impaired student, a young girl named Ida. This observation gave us the opportunity to witness the actual Danish integration policy in practice. We also had the chance to observe the behavior

and abilities of a completely blind student in comparison to her sighted peers and how educators who are not specialists deal with these issues. Finally, we had the opportunity to speak with Ida, through Tine Teilmann as a translator, and discovered what games and activities she enjoyed. The games she enjoyed were the fisherman's game and chain tag (see appendix INTERVIEWS). Of particular interest, the games that Ida enjoyed were not necessarily the ones which she received the most benefit from, but the games which she enjoyed participating and socializing with the group. From Ida's perspective, having fun is the priority above clinical fitness.

4.2 The Final Catalog

The final catalog was published to the Videncenter for Synshandicap's website as a Portable Document Format (PDF) file as well as a standard print publication. The catalog opens with a simple introduction and moves on to a list of challenging or surprising activities in which visually impaired people can and, on several occasions, have participated. The main purpose of this beginning is to widen the horizons, immediately, of parents who justifiably are reluctant to encourage their blind or partially sighted children to participate in apparently dangerous activities. After this initial introduction, the catalog begins by listing common adaptations that can be applied to nearly every sport or game. The adaptations are divided into auditory, tactile, and visual (for the partially sighted) cues which mark the goals, boundaries, or balls of a game. The catalog then continues briefly with the basic ideas of what parts of a game can be adapted. The catalog borrows, with permission, the Game Wheel created by Max Rasmussen. In addition, we include safety information and some clues on instruction



designed to help educators and coaches who are less familiar with dealing with visually impaired students. Instructional cues include the use of kinesthetic instruction rather than simple demonstrations and the potential need for additional positive reinforcement and encouragement. Finally, we include ideas on possible warm up exercises and stretches which do not, in general, require any adaptation except for the use of different teaching strategies.

Finally, the largest portion of the catalog is a list of 41 activities which have been adapted for visually impaired people. This list is sub-divided into indoor and outdoor activities and further subdivided into team and individual sports. The activities under each heading are listed alphabetically. After these lists, there is a shorter list of Challenging Activities, those activities which may be too fast paced for visually impaired people to participate in regularly, but of which all children should be aware. Finally, the catalog closes with a list of recommended reading for further ideas on adapted games and a list of Danish associations which can be contacted for other resources. The final full catalog is available as a PDF file as an attached document. By way of illustrating the catalog's depth and organization single pages from the main categories can be found below in reduced format:

Adventures for Everyone

Although parents and educators of visually impaired children may be concerned about their child's ability and safety in performing physical activities there are many exciting opportunities available. Just as any other child, these students should be allowed to 'scrape their knees' with minimal additional precautions. Below you can see several of the fun opportunities that visually impaired children can participate in.

Paralympics

The Paralympics is a series of competitions for disabled participants, similar in style to the Olympics. Visually impaired athletes, as well as athletes with other disabilities, compete in a variety of games from goalball, designed specifically to the visually impaired, to alpine skiing which may, at first glance, seem completely inadaptable. These games, however, are completely safe and sure proof that people are limited more by their drive than their disability. Games in which the visually impaired participate successfully include:

- Archery
- Track and Field
- Cycling
- Equestrian
- Sailing
- Shooting
- Swimming
- Skiing
- Goalball
- Judo
- Swimming

You can visit their website for more information: http://www.paralympic.org

Camps

Camps are a great way for children to socialize and to increase their physical activity level. Most camps have time specifically for physical activity, which can help visually impaired children enjoy sports. In the United States there are even summer camps that specifically focus on giving children who are visually impaired the opportunity to become physically active and productive. One such camp is, Camp Abilities, which is a week long summer camp that gives individual instruction and evaluation to children. Camps that have physical activities give an understanding of what visually impaired children are capable of doing on their own as well as ideas for activities they might like to continue participating in. To find out more about camps that would be good for your child, talk to your local consultant.

http://www.campabilities.org

Ideas for Adaptation

Adaptations

The following adaptations are very common and can be applied to nearly every game or sport that a visually impaired child can participate in. Included are also some tips to remember when using these types of adaptations.

Tactile Cues

Different surfaces on the floor can improve orientation and signal field boundaries and out-of-bounds areas.

- Put a cord underneath tape so the child can feel when they have gone out of bounds (you may want to do this 3 or 4 rows deep to ensure that the child will not stride over the out of bounds marker)
- A thin strip of wood or mats can also be used to mark boundaries

Auditory Cues

Using auditory cues enables the student to know where balls are, where to run, and where boundaries are located. Descriptions of activities should be precise, consistent, and easy to follow.

When using auditory cues, do not use sounds at high frequencies. Also, auditory cues are less useful in gyms and indoor swimming pools because the sound echoes off the walls making it difficult and confusing to locate boundaries and targets.

- Describe all activities verbally in good detail and/or print them in Braille or large print
- Start with basic commands and make sure the child understands and can perform those, before moving onto more complicated activities
- Provide immediate and accurate feedback so that necessary adjustments can be made
- When using music for activities, consider something instrumental, without lots of vocals that will compete with verbal commands
- Use audible balls, goals, and boundaries. These can be purchased commercially or created using common items such as bells and radios. Note that placing a bell in a light weight ball might cause the ball to move erratically.
- Have a receiver give an auditory signal

Ideas for Instruction

Safety

There are important safety considerations to remember. Make sure that all necessary precautions are taken.

- Orient the child within the facilities paying special attention to exits
- Allow the visually impaired child to examine the playing area prior to playing and practice using the equipment
- Once a child has become oriented, do not change equipment locations
- Keep doors closed or fully open
- Keep areas well lit
- Ensure safety rules are known by all students
- Remove hazards from the play area
- Approve possibly hazardous activities with an ophthalmologist

Kinesthetic Instruction

Moving the child's body into the correct position will help them learn the correct way to do an activity. A doll can be used to help show how the body parts function together.

When manually guiding a child always:

- Request permission before touching them
- Explain how and where you will be moving and touching them
- Make sure to be gentle
- As you are moving the child explain the verbal command for the motion

Positive Reinforcement

- Encourage students to work independently, where possible
- Motivate the child by telling them if they are performing correctly and reassure him or her if it is taking him or her a long time to learn a skill
- Make sure the teacher or parent chooses the teams
- Switch teams or partners often
- Physical games do not have to be competitive, they can be cooperative
- Simplify scoring

Individual Activities

Aerobics

Step Aerobics: The child steps on and off a platform in different directions at varying tempos.
Low Impact Aerobics: Constant activity where the individual is moving and keeping their heart rate up. The child can march in place, walk briskly, do toe touches, kick forward, etc. Only one foot leaves the floor at a time.
High Impact Aerobics: Constant activity where the child doing large amounts of conditioning. Both feet leave the floor. Some activities that can be done include pendulum leg swings, side and front jumps, and jumping jacks.

PRACTICE NOTE: Suggested by Lauren Lieberman, a prominent professor in the area of adapted physical activities

Bowling

Equipment:
Bowling ball
Pins (should be high contrast with the floor)
Bumpers

Rules:
There are very few adaptations to bowling, with the exception of bumpers. If the ball is too heavy small ball bowling can be done. If playing in a gymnasium, wooden boards can be used to mark off lanes and rubber balls can replace bowling balls. If playing at a bowling alley, choose the lane with the best lighting. Also, mark the foul line with a tactile cue.

To improve visualization have the child walk the lane to sense the distance of the alley. To improve bowling skills among younger students, relay which pin numbers remain standing after the student bowls a ball. Have the student describe back the positions of the remaining pins.

Also for young children, bowling pins can be made by filling milk jugs or similar items with differently sized grains of material such as dry rice, sand, etc. Have the child try to identify which pins were knocked down by sound.

PRACTICE NOTE: Suggestions from various American and Australian schools for the Visually Impaired. More information can be found at http://www.tsbvi.edu/Education/sports-mod.htm

Team Sports

Basketball

- Insert a bell into the basketball
- Use a bright colored ball
- Use nonglare paper on the backboard
- Place a sound source behind the backboard
- Have players use bounce passes
- Players may be allowed to shoot without interference.
- Score one point for hitting backboard, two points for hitting the rim, and three points for getting the ball in the net
- Lower the basketball hoop
- Call to the partially sighted child when passing

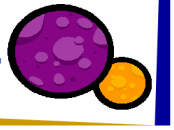
PRACTICE NOTE: Used at Texas School for the Blind and Visually Impaired and the Perkins School for the Blind. More information can be found at http://www.tsbvi.edu/Education/sports-mod.htm

Curling

- Use a sighted sweeper for curlers who are totally blind
- Have children walk the length of the ice to familiarize themselves with the distance of the shot
- Be sure curler is squarely aligned in the hack
- Tap on the ice to help child aim shot
- Provide an audible cue at the hog line

PRACTICE NOTE: Suggested by the Canadian Council for the Blind. Sports publications can be found at http://www.ccbnational.net/

Dodge Ball



- Pair the visually impaired child with a sighted child to assist them.
- When the blind student is attempting to hit someone with the ball the other children should clap hands or shout.

PRACTICE NOTE: Suggestions by expert in field of adapted physical activity

Recommended Reading

Games for People with Sensory Impairments
by Lauren Lieberman and Jim Cowart

Written in English, this book is a very useful guide for anyone who is willing to take the time to read through it. With contributors from several American schools for the visually impaired, including the Michigan School for the Blind and the Perkins School in Massachusetts, this book contains several dozen ideas for games and activities in a simple, concise format. These activities are designed specifically to improve mobility skills, physical endurance, and coordination among visually impaired children. Note that, most games are geared towards younger children. Although there are some examples of more common modified sport activities that are appropriate for older children, many activities are simple games or lead-up exercises.

Examples from Games for People with Sensory Impairments

Diamond Ball

An adaptation of tee ball for the visually impaired, this activity helps communicate the basics of baseball.

Brightly colored rope is to be placed in the shape of a baseball or softball diamond. The rope should run at about waist height of the students and should be marked with tape a few feet from the bases so that students can judge when a base is coming up. Bases can be taped to the floor or marked on the floor with brightly colored tape.

Children are divided into two teams. The batting team takes turns hitting a beep ball off of a tee and running the bases. The fielding team attempts to locate the ball and throw it to one of the bases to tag the hitting student out. Points are scored 1 for a base hit, 2 for a double, 3 for a triple, and 4 for a home run.

Sockley

Equipment:

Long rope, eye hooks or volleyball net stands, bell ball attached to a string, small pulley or paper clip, two "flags"

Setup:

Run the rope between two eye hooks placed in opposite walls or between two volleyball net stands.

Hang the ball and string by the pulley of paper clip to the rope.

Suspend the flags an equal distance from the center of the rope.

Rules:

Divide children into two teams or one, two, or three students each. Players use some prescribed motion type (kicking, underhanded strike, etc.) to try and push the hanging ball past the opposing teams flag.

5. Analysis

5.1 Practices Governing Assistance for visually impaired people in Denmark

Denmark has a large, public system in place to aid the disabled, including visually impaired people. The objective of Danish disability policy is equalization of opportunities. Equalization is the outcome of integration of the disabled into society instead of being placed in special institutions. There are several principles and objectives of the disability policy including the environment-based perception of disability, the principle of compensation, and the sector responsibility principle. The environment-based perception of disability explains that there is no one fixed definition of the concept of 'disability,' because disability is a dynamic concept undergoing constant development and change, and therefore no list exists of the disabilities that make a person eligible for special rights. The principle of compensation implies that society offers disabled persons a number of services and aids in order to limit or offset the consequences of their disabilities as much as possible. The principle of sector responsibility implies that responsibility for the equalization of opportunities for disabled people in a specific area in society is placed with the authority responsible in general for the area in question. The authorities include the ministries, local authorities and other bodies exercising authority, and, on the other hand, individual organizations for disabled persons, local disabled person's organizations and committed individuals. They provide for the disabled individuals based on legislation that covers the following aspects of life (Wiederholt):

- Accessibility
- Education
- Work and social security

- Support measures
- Family life and personal freedom
- Housing – other types of accommodation
- Health
- Transport
- Culture

In Denmark there are ninety eight municipalities divided into five regions. Each region has consultants who help visually impaired people socially and with education. In general, people with disabilities are encouraged to be independent and are included in mainstream social activities. Assisting individuals with disabilities is primarily controlled and funded by the municipalities. When a young child is declared visually impaired an early childhood consultant from their municipality is assigned to them to advise the family, preschool teachers, and everyone else that is involved with the child. The consultant helps with everything from orientation and mobility training to providing general guidance to help teachers plan inclusive lessons. If the child has additional disabilities they may have multiple consultants. Once the child is of age to enter school a new consultant helps the child and their family with school and extracurricular activities. After high school, assistance for education as well as for social aspects of life continues. Any special needs, including assistive technology, are paid for by public funding. For example, if the student needs a special computer. The municipality also will help with the daily life of visually impaired people. They help give money for driving to places, guide dogs, and any other social help that the person needs (Silver).

Several consultants have informed us that this catalog will provide useful ideas for physical education teachers and parents. In particular, the catalog will be a useful tool for educators who do not necessarily have extensive training in education of children with disabilities to help integrate children with visual impairments. This catalog will

save educators time and effort in having to search out the many activities that they may need to help integrate blind and partially sighted children.

5.2 Analysis and Impact of Interviews on the Catalog

After learning about the culture and social customs in Denmark, as well as meeting with consultants, children, and educators, we were able to format our catalog in a manner that would be the most useful for educators and parents. Meeting with our liaison helped us to better organize the introduction to our catalog. The introduction was divided into a section that included 'Ideas for Instruction' and a section that included 'Ideas for Adaptations.' The meeting also led to the creation of several new sections. We inserted a 'Recommended Reading' section, a 'Associations' section, and an 'Adventures for Everyone' section which includes activities such as the Paralympics and summer camps which show what children can do when they're physically active. Our initial literature research at the Videncenter for Synshandicap showed us that physical activity in Denmark is divided into two categories, sports and exercise. Sports are competitive, whereas exercise is a more relaxed and cooperative form of physical activity. We also found through our research that the games and sports are very similar to games in the United States. We kept our games that we had devised while in the United States and incorporated several new games into our catalog based on ideas found through research at the VKIC.

Following this research, we met with several consultants at the Danish Disability Sports Information Center in Roskilde. They had many encouraging comments and several suggestions on the organization of the catalog and additions to incorporate into

the catalog. This led to our catalog being organized into indoor versus outdoor games and individual versus team games. We were also given information about the principles of adapting sports for the disabled. We incorporated the different principles of adaptation, such as changing the participants, the field, and the equipment, into 'The Game Wheel' section.

At the Institute for the Blind and Visually Impaired we watched a gymnastics class taught by Steffen Adamsen. After observing the class and discussing our catalog with the instructor we elected to insert the 'Exercises and Strengthening Activities' section. This section has inclusive warm-up and strengthening exercises that are essential to safety and physical fitness and can be done prior to sports and rigorous physical activity. We were also able to meet with Jens Winther who works with the Danish Sports Organization for the Disabled in Northern Zealand and specializes in sports for visually impaired people. Jens had encouraging comments about the catalog; however felt that some of the activities were too fast paced. Jens felt that visually impaired students needed a working knowledge of the sports, such as soccer, but they may not be able to play them without severe modification. For example, if hockey is played with a Frisbee and brooms it is no longer hockey and the student would not be able to get a working knowledge of the sport. Jens also expressed concern that in the fast paced games the students would not be able to be competitive with the other students and may lose the respect of their peers. After analyzing the games in our catalog we selected all of the activities that were too fast paced and put them in the 'Challenging Activities' section. We suggested that visually impaired students are encouraged to try the games; however, we state that it is much

more challenging for these games to be made inclusive because the players and the balls are moving fast.

6. Conclusions and Recommendations

6.1 Conclusions

Based on our observations, research and analysis, we have drawn several conclusions with regard to adaptations of physical activities for visually impaired people. Visual impairment is a broad category of individuals. For visually impaired youth, it is common that their physical development and motor skills are slowed by their inability to observe the motions of others. Orientation and mobility training are critical prior to physical education. This training helps students to better understand their environment and how to move freely with in it. Due to the varying degrees of visual impairment, lesson plans need to be created based on the individual child, however our catalog is useful for general adaptations and activities. Students should be integrated into normal settings whenever possible so that they can adapt to being independent in society. There should, however, be interaction with other visually impaired youth to increase the feeling of inclusiveness. Students cannot only work with one assistant or partner, because it makes them dependent, and unable to participate properly in a social and independent environment.

When creating adaptations for physical activities instructors should rely on tactile cues, auditory cues, and visual cues. The adaptations should also slow down the speed of play. To make the necessary adaptations the rules, participants, field, targets, and equipment must be taken into consideration. When instructing students, it is critical that safety considerations are observed and that the student is given positive reinforcement for their efforts. One of the best methods of instruction is manually moving the child's body

into the correct position, which is also known as kinesthetic instruction. When dividing up different physical activities the categories should be based on several considerations:

- If the games are specifically for visually impaired people or for visually impaired people and sighted children
- If they are sports or exercises, competitive versus cooperative
- If they are indoor or outdoor activities
- If they are team or individual activities
- What the level of difficulty is for blind and partially sighted youth

After having met with education consultants for visually impaired people and employees from several Danish Blind Organizations, we can conclude that the catalog is a success. All interviews that we conducted indicated that, overall, our catalog is moving in the correct direction and that it will be a useful tool for physical education teachers and other education consultants who may lack for ideas on how to integrate their visually impaired students into activities. Although several details were brought to our attention for possible revision, the catalog on the whole was met with a great deal of enthusiasm. In addition to positive feedback, the willingness of people with whom we conducted interviews to offer further advice and services served as evidence of the positive opinion of our work among those who deal closely with blind and visually impaired children.

In summary:

- Visual impairment includes a broad category of individuals
- Orientation and mobility training are required when children are blind from a young age
- Individual lesson plans should be adapted for each visually impaired child
- Students should learn independence
- Games should be adapted to each student
- The catalog will be helpful and give ideas for sports modifications for children with visual impairments

6.2 Recommendations

Following the positive reaction to our work, the Videncenter for Synshandicap published our catalog as it was submitted. In addition, several further revisions of the catalog may be made beyond the scope of this project. In particular, the catalog should be disseminated as widely as possible. In order to do this, the catalog may be made available for download from the website for the Videncenter for Synshandicap or print copies may be distributed by conventional post or through networking opportunities at conferences and symposiums. Also, in order for the catalog to be more readily accessible to people without strong English backgrounds, the catalog should be translated into Danish or other appropriate languages. Finally, further feedback may be given after the project deadline from educators or consultants who viewed our catalog online. Any such suggestions or revisions which are deemed appropriate can be made to the catalog as we see fit. As a future endeavor, the project recommends that follow up lesson plans for the most popular games or adaptations be created.

Appendices

Appendix DOYLE

The use of survey and interview data was necessary in order to obtain feedback on our catalog and to perform any revisions. For this project, we interviewed educators and consultants to determine the quality of the catalog itself.

In order to collect data from human subjects, there are several necessary considerations, foremost among these, the ethical issues of using human data sources. All project members have completed the required NIH training for the ethical treatment of human subjects. All information obtained from interviews or surveys must be given completely voluntarily. All participants must be made aware of the purpose of the data being collected and give informed consent to the interview. In addition, participants must be allowed to withdraw at any time. All information must be kept confidential.

There are other considerations to be made when collecting data with surveys or interviews. When using a survey it is important to distribute the survey to a large enough sample size to avoid statistical bias. In addition, the sample must be representative of the general population. Survey questions must be concise and clear. Language and age considerations mean that survey questions will have to be relatively simple. Interviews are allowed to be more fluid than surveys and can provide more detailed information. There is, however, no statistical confidence and language barriers may prove difficult to overcome.

Appendix INTERVIEW TOPICS

Was the catalog presented in a clear and easy to use manner?

Was the catalog well edited, concise, and professional?

What did we do wrong? What was the least useful aspect of the catalog? What parts were done incorrectly?

What would you as an educator/parent like to see more of in the catalog?

Would it be helpful to include which areas each activity will help improve? For example, if a particular game is helpful in developing stronger motor skills, would you like to see that denoted?

Were the visual aids helpful? Should more visual aids be included?

We are both American students. Were there any activities in the catalog which are not common or would not be accepted among Danish children? Are there activities that Danish children participate in that you did not see and think might be adaptable?

In a similar vein, are the directions easy to follow? Were there any assumptions on the part of the authors with regards to what information Danish educators have (i.e. What a baseball diamond is, the rules of tag, etc.). Should more space be devoted to explaining the rules of games? Should less space be devoted to explanation?

Would the catalog be readily translated into Danish?

Would you recommend the use of this catalog to other educators/parents?

Appendix INTERIEW SUMMARIES

Meeting at the Danish Disability Sports/Information Centre in Roskilde

(March 27, 2007)

Participants:

Tine Soulié, Disability Sport Consultant

Tine Teilmann, School Consultant for visually impaired people

Kristian Jensen, Director at the Danish Disability Sport/Information Centre in Roskilde

Justine Roberts, WPI student

Michael Ardito, WPI student

Dorte Silver, Visual Impairment Knowledge Center

Bendt Nygaard Jensen, Visual Impairment Knowledge Center

Subjects for the meeting:

- Danish Disability Sport / Information Centre presents results from a study on inclusion and sport education - participation of pupils with disabilities
- Presentation of the Danish Disability Sport / Information Centre
- Short WPI presentation of the project (Catalog of Physical Activities for Visually Impaired Youth)
- Questions and dialogue about the catalog:
    1. Catalog is on the right track
    2. Maybe add 'principals of adaptations' (i.e. things that can be changed in most games: the number of participants, equipment, goals, rules, field size)

3. Modify some games so that visually impaired people are on the same level as sighted children or are at an advantage over sighted children

Observation of a Gymnastics class at the Institute for the Blind and Partially Sighted

(April 4, 2007)

We observed a class taught by Steffen Adamsen. He had two students that we observed.

Observations:

One student was entirely blind and the other had partial light and motion vision. Each student had different levels of instruction, one having been a part of the exercise program for about 9 months and the other for 2-3 months. Both students were older, between 20 and 30 years old. The small group size allowed for good one on one interaction, which would be especially relevant for parents and children, as well as assistant educators taking extra time with visually impaired students during physical education courses. Yoga, martial arts, and other warm up stretches and exercises are good for balance and coordination which are basic skills students should master prior to playing games. The students were doing a set of five exercises called the 'Five Tibetans,' which worked on moving from the center of the body. These exercises are very useful for all motion, but especially massage, in which the students were training. The instructor helped the students through the motions by gently moving them and constantly talking to them. In general, the student who was completely blind relied on kinesthetic instruction while the student with some residual vision was able to perform the exercises with only verbal descriptions. The constant feedback helped the students to better understand proper positioning and movement. Proper form needs to be kept to ensure proper safety and

muscle strengthening. Prior to all rigorous activity students should start with basic stretches and warm up exercises. Students should also focus on isolating movement to certain areas and muscle groups. For example, when lying on your side, only use hip muscles to raise your leg and not stomach muscles. Also, focus on breathing helps for all of the core exercises.

Meeting with Jens Winther from Handicapidraet (Dansk Handicap Idraets-Forbund)

(April 11, 2007)

We met with Jens Winther who works with the Danish Sports Organization for the Disabled in Northern Zealand and specializes in sports for visually impaired people. He went through our catalog page by page with us and gave us advice on sports in Denmark. For our 'Adventures for Everyone' section he talked to us about the camps, skiing, and repelling trips available in Scandinavia. He also asked us to include all of the activities available to visually impaired people when we discuss the Paralympics. He enjoyed our 'Ideas for Adaptations' and 'Ideas for Instructions' sections, but told us to include a note on how putting a bell in a ball may affect the movement of the ball and may make play more difficult.

When we discussed all of the games he told us that we had many good ideas, however some of the sports were too fast paced for visually impaired students. The fast paced games are very good for students to participate in and to gain a working knowledge, but they are very difficult without severe modification. For example, by

using a Frisbee instead of a puck for hockey, the game is modified so much that it is no longer hockey. Changing the size of the ball, size of the field, number of players, etc. are good modifications for games, however when too many changes are made, the sport is no longer what it was before and the student does not learn a working knowledge of the actual sport. These sports would be best if they were made into entirely new games that were cooperative instead of competitive. The games that fell into this category were badminton, handball, hockey, table tennis, soccer, and tennis. We moved all of these sports to the back of our catalog into a section labeled 'Challenging Activities.'
In addition, Jens noted that some of our information was not specific to visually impaired people such as "wear life jackets while boating" which applies to all participants regardless of the presence or absence of a disability.

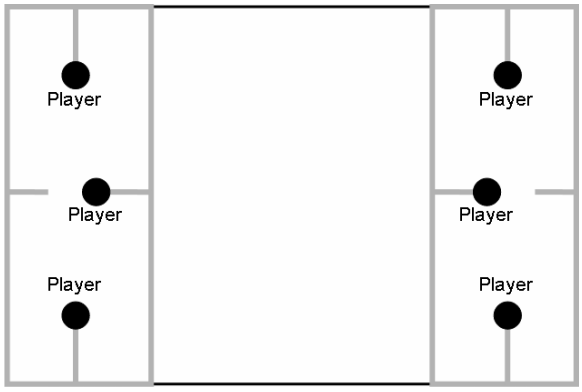
Jens also suggested that we add the game 'Showdown,' which is a sport specifically for visually impaired people. He gave us several contacts and websites that can be put into our 'Associations' section. Prior to the conclusion of our meeting we were given several photos of visually impaired athletes that we could insert into our catalog. He also told us to get in touch with Tom Freiling, head of the BSI who teaches a goalball class to children at the Institute for Blind and Visually Impaired.

Observation of a Children's Goalball Practice at the Institute for the Blind and Partially Sighted

(April 12, 2007)

We observed a goalball team practice for eight children between the ages of 9-12. The children ranged from partially sighted to totally blind, and their instructor, Tom

Freiling, is entirely blind. The children started off with warm-ups, taught by Tom's assistant coach, Maria. The warm-ups all included the use of a goalball ball which is a specially designed rubber ball, approximately the size of a basketball, with bells inside of it. Exercises included activities such as, lying on your back with the ball between your legs and lifting the ball up and down with your legs and doing sit ups while holding the ball. The warm-ups not only helped to stretch out the students but also helped with strengthening because they were done with the heavy ball. If the child was not doing the correct motion the coach gave them kinesthetic cues by positioning them. The warm-up session was completed by the students practicing rolling the ball across the gym and stopping it with their bodies and then with running sprints across the gym. The sprints were run in pairs (partially sighted children with blind children) and the children ran towards the coach who was clapping and standing on top of a large, soft mat that the children could run into to stop. Halfway through practice the children switched from warm-ups to playing goalball, and the parents were allowed to watch. The parents had not been allowed for the first half of the session because the coaches wanted to breed independence into the children. For the match the children with residual vision wore blindfolds and all of the children wore special padded pants for diving on the floor. There were tactile cues on the floor so that the students could position themselves. The tactile cue was white gymnasium tape with a rope underneath it so that the children could feel the boundaries. The figure below is what the playing field



looked like and the light grey lines indicate where the tactile tape was put down. The players positioned themselves based on the tactile tape. They ran their hands along the tape until they came to the end of it and they stayed in that position. Their positioning is indicated on the figure. On each team there were four players and only three played at a time (one rotated in). The ball was rolled across the gym and the opposing team tried to stop the ball. If the ball hit the back of the gym a point was scored. Play rallied back and forth until a point was scored.

Observation of a Physical Education Class for Ida, a Six Year Old Blind Girl That Goes to Klostermarksskolen in Roskilde

(April 18, 2007)

We observed a 6 year old, 1st grader at Klostermarksskolen, a school in Roskilde. Her physical education (PE) class consisted of approximately twenty, six year old girls. The boys and girls were separated for their indoor PE lesson. Ida is integrated into a normal school and was the only blind girl in the class. Before Ida began at Klostermarksskolen, Tine Teilmann, her consultant, worked closely with the administration and maintenance crew of the school to place tactile cues around the building so Ida could orient herself without help.

Ida is nearly totally blind, and can only detect changes in the amount of light in a room. She is helped throughout the day by an assistant teacher. The assistant teacher helps Ida with all school activities throughout the day, as well as holding her hand to guide her around the school and PE class. Ida likes the assistant helping her, and she isn't

entirely independent. Tine, Ida's consultant, is working with Ida to become more independent from the assistant teacher so that Ida will partner up with other girls instead. For the warm-ups the girls ran around the room and Ida had a guide (the assistant teacher) with an elastic rope. Ida held very close to the assistant teacher on the rope because she was insecure about the rope. However, when Ida is older she will run behind a guide at the full length of the rope, which was 3-5ft long. Next the girls did jumping jacks, stretching, and twisting for an active warm-up. To help Ida, the teacher gave very descriptive commands of the activities. The assistant teacher provided kinesthetic cues to supplement the verbal and visual cues that the PE instructor gave. The students stood in a circle which helped Ida get her bearings for where the other students were and she also stood on a small mat, approximately 2ft by 2ft, so that she could feel if she was drifting left or right.

Their first game was the fisherman game where one child stood at the end of the gym and all of the other students sat at the end of the gym. The individual child calls out 'How far is it' and the other students give a reply. The individual student gives a method, such as hopping, twisting, or crawling, and the group of students runs across the gym and attempt to be the first one to the individual. This was one of Ida's favorite activities. Next they played tag where everyone had a flag as a 'tail' and the objective was to collect as many 'tails' as you could from the other students. This activity was too fast paced for Ida because she was the only one with a 'partner.' Tine, the consultant of Ida, suggested that the activity might be more fun if all of the girls had partners. If everyone had partners the activity would be slowed down and easier for Ida.

Following this they played a game with cones set up all over the room. There were 'policemen' and 'bandits.' The class was divided in half and the bandits attempted to knock the cones over, while the policemen tried to pick up the cones. In the end the cones were counted and the teams switched position from being a policeman or bandit. Ida's assistant led her to the cones, but Ida felt for them and turned them over or put them up.

After 'Policemen and bandits' they played Ida's next favorite game of the day, chain tag. For chain tag two students link arms and chase down other students. When the other students have been 'tagged' they link up and eventually the chain has all of the students in the classroom.

The final game was a game where the students threw a ball that was soft and tried to hit other students in the classroom. Once a student was hit they couldn't stand again until the person who hit them was hit. This was not a good game for Ida because she could not see the ball or the person that hit her. After this activity Ida left the gym early to change and shower because it was quieter and calmer and this gave her extra time to change.

<u>Meeting with Flemming Davidsen from the Institute for the Blind and Partially Sighted</u>

(April 19, 2007)

We met with Flemming Davidsen from the Institute for the Blind and Partially Sighted. He works as an occupational and physical therapist for many different people with visual impairments, however one of his large focuses is younger adults between 17 and 25 years old. He discussed how 'visually impaired' is a very broad category of

people to instruct in physical activity because there is a range of vision from partially sighted to entirely blind. Also, often people with visual impairments have other disabilities that may impede the speed at which they learn. Davidsen focuses on dynamic movements that help his students to better know their own body. These movements that he teaches them can be applied to sports, but also to everyday activities. His work with the students includes very basic orientation and mobility training to games and sports for visually impaired people. When he starts with new students he uses very basic movements and builds his way up, depending on the level and ability of the student. He feels that it is best to keep all activities fun, and that the students don't always have to focus on doing the 'correct' movement. When he concentrates on movement, he often works with creative movements that can be seen in activities like dance and yoga. These activities allow the students to relax themselves and to gain a feeling of body awareness. Davidsen feels that it is best if the students realize the best way to move their bodies for themselves. Although he helps the students to do correct movements, he keeps the activities fun because his students are so varied in their interests and abilities. Some students, such as his younger students do not have as much of an active life with students their own age because the sighted students move too fast. As a result of little physical activity, the students do not use their full range of motion. Davidsen feels that this lack of interaction can change the young person's personality and severely decreases their interest in movement and physical activities. He understands that the younger students will always have some impedance to their movement, but he attempts to give people confidence in their daily life with his activities. Through yoga, martial arts, swimming and other water gymnastics, Davidsen helps the younger group understand the difference

between good and bad pain. These students may have previously had ‘unnatural’ movement because they have little spatial awareness and were afraid to run into objects when they were younger. Davidsen shows them that athletic activity may be ‘painful,’ because it takes time to build up muscle and physical fitness, but he emphasizes the beneficial long term effects of free movement. For individuals that became visually impaired at a young age, it takes a lot of energy to just want to do the movement and for Davidsen’s classes there needs to be much more explanation about how its ‘good for you,’ as compared to people who become visually impaired later in life. When people are born blind, they don’t know how to move freely and naturally because they can’t watch others. They tend to be afraid of large movements and allowing their joints to move freely. Learning to move freely can help with everything from posture to vacuuming the floor in sweeping strokes.

Davidsen’s overall message to us was that he helps students to graduate to new levels with their orientation and mobility so that they can do activities like those in our catalog. He enjoyed our catalog and felt that the ideas were helpful and necessary for social interaction and everyday life. He felt that our ideas about yoga, martial arts, and dance were very good because dance and small movements help give students’ self-awareness and spatial awareness.

Appendix OTHER RELATED ACTIVITIES

Dialogue in the Dark
(March 22, 2007)

We went to the exhibit 'Dialogue in the Dark' at the Experimentarium in Copenhagen. Our sponsors suggested this activity, which was similar to our 'sensitivity training' at Perkins. The exhibit employs people who are blind or partially sighted, who are given an opportunity to show the many resources they possess. Together, with other visitors, we were brought into a room without light. We were given only a cane, a visually impaired helper to guide us, and had to use our other senses to find our way. The guide 'showed' us around various environments with which we were familiar from our daily life, such as a park and a busy street. The trip ended in a café, where we bought refreshments and talked to our guide while still in complete darkness. With our sense of sight out of action, we were obliged to make use of your other senses. This helped us to better understand how to make adaptations for our catalog because we learned to navigate in the world of visually impaired people.

Visiting the Blind History Museum at the Institute for the Blind and Partially Sighted

(April 17, 2007)

We visited the Blind History Museum and were led around by a blind tour guide. He showed us teaching tools for the blind, the old Danish institute for visually impaired people before students were integrated into normal schools, the jobs visually impaired people used to participate in, the sports that visually impaired people typically participate in, and the equipment that visually impaired people use to learn. Teaching tools included scale models of animals and Braille type writers. The jobs that visually impaired people

used to participate in included piano tuning, basket weaving, cloth weaving, shoe repair, and making brushes. The equipment that visually impaired people use, include Braille typewriters, tape recorders for texts, and close circuit televisions that magnify text. Visiting the Blind History Museum reinforced our understanding of visual impairment in Denmark and the rest of Europe.

Observation of an Occupational Therapy Gymnastics class at the Institute for the Blind and Partially Sighted

(April 27, 2007)

We observed a gymnastics class at the Institute for the Blind and Partially Sighted taught by Flemming Davidsen and Annette Laub Hansen. The class had three, middle aged students that ranged from partially sighted to blind. The group did exercises that focused on body stability and strength. To warm up, they rode on exercise bikes for 15 minutes. Following this warm up, the group did exercises to the beat of music. The exercises focused on certain body parts, such as the calves, the arms, and the hips. One of the students was distracted by the light while exercising, so he requested a blindfold to remove all of the light. The blind student moved with more hesitation, since she had been born blind and had been very sheltered. The blind student would move the part of her body that she was told to move, however the rest of her body would remain rigid and not move freely with the music. The other students moved with much more freedom, and followed the beat of the music much better. The activities were a form of dancing and free movement. The movements were those that could be used in everyday activities, such as the motion of mopping or bending at the knees to pick up a heavy object.

Davidsen and Hansen attempted to keep the activities fun and relaxed while still helping the students to do the correct motions.

For the second half of the class, Davidsen and Hansen taught yoga and Justine joined in the activities. She wore a blindfold that blocked out all light and was able to feel the difficulties of physical education while being blind. Davidsen and Hansen had to help move Justine through the motions through kinesthetic cues (moving her hands and legs) and through verbal cues. When the instructors used verbal cues, it was very difficult for them to entirely describe the motion or shape, even with the most precise commands. One activity was described as 'A dog trying to catch its tail,' which would not be a helpful description if the student was born blind or was blind from a young age. It was also very difficult to translate the verbal commands into moving the correct body parts. Justine had to think about which body part was which and how to move it, whereas normally she would just mimic the visual motion of the instructor without thinking that she was moving her right arm or left leg. Justine also found that it was challenging to move all of her body parts in rhythm to the music because it took so much extra effort to listen to what was going on around her and to try and focus on the instructors that she didn't listen to the beat.

Appendix INTERNET FORUM

We had several responses to our catalog posted on an internet forum. The respondents wrote in Danish and the text was translated into English by Dorte Silver, our liaison from the Visual Impairment Knowledge Centre.

Response from Tine Soulié who is a Disability Sport Consultant:
Sorry for my late reply - I have been ill. I think you've put together a very attractive looking and useful material! I guess you'll be about done by now? Otherwise, I've remembered one activity that I think might fit, and that is the construction of an "equipment track" with ropes, Swedish boxes, mats, booms, rings, trapeze, etc. The "equipment course" is just any idea where you use the different kinds of equipment, it could be like an obstacle course, or more like a playground setup, or any other model you can think of. The equipment can be combined in different ways. In Sweden I have seen examples where the individual equipment activity (part of the track) had a communication symbol in the form of a toy or something: a small teddy bear, a monkey, a crocodile, a parrot, whatever might be appropriate for the activity: climbing, swinging, balancing, sliding, etc. Good luck with the rest of your project.

Response from Tine Teilmann who is a School Consultant for the Visually Impaired:
It was nice to meet the students and discuss the project. My only concern is the validity of their ideas, because they do not say if they are tested or not and if they are not tested they may not work in practice. I think it would be important to clarify in some way what has

been tested and who tested it. Have you got any considerations concerning this? Other than that the catalogue is heading in the right direction.

Response from Margit Larsen, who is a consultant for schoolchildren in Aalborg, Northern Jutland:

I just looked through the catalogue and thought it looked great because is very broad, and can be used for PE teachers and parents. The nice thing is that it is based on normal sports and adapts the activities to blind and partially sighted students, which is what we would like to encourage for PE teachers. I would recommend that the catalogue is translated into Danish. I have some ideas for other activities. Is that the kind of thing you're looking for? I would love to have a beautiful catalogue like this to hand out to the PE teachers we counsel.

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