Facilitating Social Interaction between Visually Impaired and Sighted Children through Toys and Games

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Abstract

This project examines different approaches to designing toys and games which promote social interaction between blind and sighted children. Onsite research includes literature reviews, classroom observations, a parent workshop and interviews in Copenhagen, Denmark, in collaboration with the Videncenter for Synshandicap. We conclude that the play environment is equally as important as toys and games, and that the best approach is one in which play resources are developed specifically for blind children, using techniques such as audio and tactile adaptations.
Executive Summary

Playing and social interaction with peers are integral aspects of childhood development. It is during interactive playtime that children acquire valuable social, problem solving and motor skills which are carried with them into adulthood. However, interaction between blind and sighted children often presents a complicated challenge due to their vastly different developmental needs and experiences. Despite these differences, toys and games should offer the opportunity for children to come together around similar interests and exercise similar play strategies. However, without proper design and forethought, some games may actually enhance differences by providing primarily sight-dependent challenges. In Denmark, where blind children are incorporated into local, inclusive classrooms, educators and specialists who work with the visually impaired have often had to develop their own play materials.

In this project report, we research different approaches to the design of toys and games which promote social interaction between sighted and visually impaired children. We conduct extensive onsite research which includes literature reviews, classroom observations, and interviews with parents, consultants and educators. This enables us to identify several characteristics which promote the use of senses other than vision, providing non-visual challenges and opportunities. Games which encourage audio perception, verbal ability or tactile acuity are identified as being fully accessible to both blind and sighted children. Instead of looking for ways to modify sight-oriented toys and games, we conclude that a better approach is to begin by designing play resources specifically for the visually impaired, using characteristics and qualities which provide fully accessible challenges.

We also conclude that the play environment in which toys and games are implemented is equally as important as the toys and games themselves. Factors including facilitators, playmates and the physical setup and layout of the play environment all have an interrelated effect on the social atmosphere of the play environment. The navigability and accessibility of the play environment promotes mobility and a sense of independence, enhancing social interaction. Adult assistance should primarily focus on enhancing independent decision making and free interaction with peers. Sighted playmates should be provided with information which helps them to understand the reference frame of their visually impaired peers.

The recommendations identified through this project have been documented in guidebook format such that they can easily be supplied to the local community of parents, educators and
consultants who work with visually impaired children. The recommendations contained in the
guidebook reflect a range of toys and games as diverse as the children for whom they are
designed.
1.0 Introduction

According to the World Health Organization (2006), there were 1.4 million children with severe visual impairments in the year 2000. For blind children, growing up in a sight-oriented society presents significant social, physical and educational challenges. Activities and events designed for sighted individuals are often unintentionally exclusive for visually impaired children, making participation difficult. Sighted children tend to play quickly, basing their behavior and actions on visually acquired information. This information is often inaccessible to blind children, who rely mainly on senses and perceptions other than vision. Thus, blind and sighted children often exercise different play strategies and social behaviors, making play interaction between them complicated. In place of playtime with peers, visually impaired children may become dependent on classroom aids and other grownups for social interaction, because adults are generally more predictable.

It is during social play that most children acquire valuable interactive, problem solving and motor skills which are carried with them into adulthood (Kerka, 2000). Thus, it is important to offer all children the opportunity for healthy social and playtime interaction. Toys and games should offer the opportunity for children to come together around similar interests and exercise similar play strategies. However, because of the variation in play behavior of blind and sighted children, it is often difficult to design play resources which offer similar challenges, and are, at the same time, appropriate and interesting for both blind and sighted children.

Resource centers such as the Videncenter for Synshandicap and the Danish Association for the Blind and Partially Sighted provide information relative to visual impairments, often on an individual basis, according to the needs of children within the community. Historically, effective toys, games and implementation strategies have also been developed individually on a case-by-case basis by parents, educators and consultants who work with visually impaired children. Many toys and games exist which are specially designed for visually impaired children. However, it is difficult to locate resources that have been designed to encourage social interaction with sighted peers. Blind children have found some of the toys and games available to them to be boring, or that they offer a visual advantage to sighted children. Toy adaptations, while they promote accessibility, do not necessarily facilitate social interaction.

Thus, there is a need for toys and games which are designed with both blind and sighted children in mind, with the goal of promoting social interaction. Currently there is no common
resource available which compiles effective toy, game and implementation strategies from the many varying sources which provide this type information. Because the process is infrequently occurring and case-by-case a lot of time is spent gathering information, developing suggestions and then testing the effectiveness of the suggestions. This research can result in ineffective adaptations made simply for the sake of a visually impaired child being able to play with the game instead of for their genuine enjoyment.

The goal of this project is to work with the Videncenter for Synshandicap to develop an approach to designing toys and games which promote interaction between sighted and visually impaired children. In order to accomplish this, existing toys, games, play environments, and the play behaviors which influence the interaction of blind and sighted children are researched and examined. Information is gathered through extensive onsite research which includes literature reviews, online research, classroom observations and interviews aimed at gathering feedback and suggestions of parents, educators, and consultants who work with visually impaired children. One result of our research is a guidebook describing the best practices in developing an approach to interactive toy and game designing. The team has also developed some original toy and game suggestions, which incorporate some of the ideas and implementation strategies identified through onsite research and information gathering.

2.0 Background

There is an extensive network of social and educational issues surrounding childhood blindness. In this background chapter, we examine some of the issues, such as integration in local, inclusive classrooms, facilitators, and physical and emotional development, which may all impact the social interaction of visually impaired children with their sighted peers. We also address the importance of social play in the development of all children by examining the ways in which play promotes valuable social, problem solving and motor skills. Finally, a great deal of research and effort has been devoted to designing toys and games which are fully accessible to the visually impaired. We examine the physical aspects of these toys and games in order to develop an understanding of play resources which provide the same kinds of fun and interesting challenges for both sighted and visually impaired children.
2.1 Childhood Blindness

The effects of blindness and partial sight in children are far reaching, and impact many areas of childhood development, including physical activity (Oh, et al., 2004), play behavior (Troster & Brambring, 1994), motor activity (Brambring, 2001) and social interaction (D’Allura, 2002). There are a variety of causes for visual impairment in children, the most prevalent being congenital cataracts and cerebral visual impairment (CVI). Both of these conditions are usually detected at birth and sometimes improve with early intervention and proper treatment (Lighthouse International). Congenital cataracts are characterized as an opacity or cloudiness in the lens, which can result in severely blurred vision (Royal National Institute for the Blind, 2005). CVI is a direct result of brain damage, which can occur due to an insufficient oxygen supply to the brain.

There are many different degrees of visual impairment, ranging from a low vision condition in which the child has some useful vision, to complete blindness (Crocker & Orr, 1996). Children with CVI may have eyes that function perfectly from a physiological standpoint; however the visual impairment is caused by a breakdown in the internal processing of the signal. Infants and children with this condition may experience drastic, day to day variations in the quality and amount of vision available to them. Consequently, visually impaired children may have some unique or crude form of vision depending on how their eyes and brain work together to process the signals. Approximately 53% of visual impairment in children is accompanied by additional disabilities, which are often related to the original cause of the visual impairment. For young visually impaired children, it is important to ascertain the type and degree of visual sense they possess in order to offer the proper services and assistance.

2.2 Effects of Visual Impairment on Learning and Development

Visually impaired children, particularly those who have been blind since birth, learn differently even from sighted children who are blindfolded (Iverson & Goldin-Meadow, 1997). The ability to visualize cause and effect, which strengthens and reinforces cognitive skills, is hindered by visual impairment. Visual clues which promote the sight dependant development of sighted children are often inaccessible to those with a visual handicap. Additionally, visually impaired children are unable to ascertain behavioral cues by watching and imitating the actions of their parents, caregivers or peers. For example, a blind child cannot directly visualize that funny things cause people to smile, while sad things cause them to look upset. In addition to
behavioral cues, visual cues which assist sighted children in drawing associations between real and inanimate objects are inaccessible to visually impaired children.

Nonverbal communication and behavioral cues are not clearly received by non-sighted children who are unable to ascertain the gestures and common facial expressions of others. Thus, the communication offered by visually impaired children is not necessarily familiar to their sighted peers (Erwin, 1993). Iverson and Goldin-Meadow (1997) conducted a study which explored the role of physical gesture in visually impaired individuals who had never before seen gesture. Sighted children were blindfolded and their performance in different tasks was compared with that of non-sighted children. The tasks were narrative, directional, and conversational in nature. The study established that visually impaired children spoke a great deal more than sighted children, which may be a means of compensating for a general lack of gesturing. It was concluded that gesturing and nonverbal communication plays a significant role in social interaction, verbal communication, and education.

Based on the discussion above, it is clear that impaired vision significantly alters the way in which children explore and perceive the world around them to such an extent that they must often be taught how to play. Generally, the daily activities and play time of children with visual impairments have been more closely monitored by parents and caregivers than their sighted peers. Freedom to explore their surroundings is often accompanied by strict instructions designed to ensure the child’s safety. Accustomed to following directions and relying on the guidance of others, visually impaired children are often more hesitant to try new activities lying beyond boundaries which have been externally established for them (Atkins, 2002). Visually impaired children show an increased tendency toward sedentary lifestyles, with a level of physical activity which is significantly lower than that of sighted children (Oh et al., 2004). Additional studies indicate a significant discrepancy between the motor skills and physical competence of visually impaired preschoolers as compared with their sighted counterparts (Ophir-Cohen et al., 2005). This is especially important, considering there is an increased demand for physical ability and energy when compensating for the functional limitations associated with visual impairment.

Visually impaired children tend to play less frequently with peers and more often direct play toward adults and caregivers. This may be partly attributed to the communication barrier which exists between sighted and non-sighted children. Research regarding characteristic play behavior of sight impaired preschoolers indicates that they often engage in repetitive, solitary
play with less spontaneity and explore their surroundings less regularly than their sighted peers. While visually impaired children find the play behavior and interaction of their sighted peers to be exceedingly demanding, sighted children find it difficult to adjust to the ability levels of blind children (Troster & Brambring, 1994). Visually impaired children tend to be more socially isolated, having social networks which consist mostly of family and other handicapped individuals (Huurre & Aro, 1998). Stereotypical perceptions of visual impairment on the part of others may also have a negative impact on interactive experiences (Jenks, 2005). This type of emotional challenge can lead to other developmental difficulties.

Ophir-Cohen et al. (2005) compared the development of visually impaired children with and without emotional or behavioral deficits and found a strong correlation between emotional and physical development. Specifically, emotional or behavioral discrepancies significantly delivered a negative impact on gross motor skill development for visually impaired children. The interdependency of emotional and physical development is a strong motivation for the strengthening of educational and community efforts which foster a sense of security and create the desire for social interaction and exploration.

The differences in the needs and abilities of visually impaired children from those of their sighted peers necessitates that special adjustments be made to educational approaches and materials commonly employed by educators of sighted children. In many cases, visually impaired children require training which is not offered as part of a traditional curriculum. For example, orientation and mobility skills, which come naturally to sighted children, may have to be externally reinforced for children with visual impairments. These skills are ideally taught by a specialist (Erin, 2003). For those reasons, visually impaired children require a larger support team of specialists and educators than their sighted peers (Erwin, 1993).

2.3 Social Integration

It has been suggested that the common conception of disability is currently undergoing a transition (Jenks, 2005). The traditional, or medical, view of disability is one in which the impaired individual is changed or modified to better assimilate into society. A more progressive, social approach examines ways in which society can be altered to better accommodate the needs of disabled individuals. Historically, visually impaired children have not consistently been integrated into the community. It was rare for general public school classrooms to incorporate blind or visually impaired students in their educational program. Instead, special schools, such as
the Refsnaes Institute, gave visually impaired children the opportunity to learn in an environment created to address their specific needs. As society becomes increasingly accepting and aware of visual impairments, more emphasis has been placed on inclusive educational approaches which promote integration of visually impaired children into both the classroom and the surrounding community (Giangreco, 1997; Lichman, 2002).

Given the proper resources and assistance, visually impaired students can be successfully integrated in a classroom setting with other sighted students. In fact, specialists are becoming increasingly aware of ways in which the social and academic engagement of visually impaired students is directly facilitated by a classroom setting. At this point, it is generally agreed that an inclusive approach to classroom education is the most beneficial for the development of visually impaired students (Erwin, 1993). However, classroom modifications which reflect an effort to socially accommodate disabilities can be difficult and controversial. Extra attention required by disabled students may detract from the experience of other students. In addition, many visually impaired children are also affected by other disabilities, preventing them from fully benefiting from a classroom experience which doesn’t directly accommodate their needs. It is beneficial to identify special systems and resources whereby children with visual impairments can successfully participate in classroom situations without compromising the experience of sighted children.

There are several varying schools of thought relative to the ideal mode of integrating visually impaired students into sighted classrooms. Some parents and educators feel that the most beneficial approach is a specialist-reliant approach, in which full, individualized assistance is automatically delivered to the child by a classroom aid (Giangreco et al., 1997). In this way, the child is automatically provided with assistance and support which helps to minimize difficulties associated with a lack of vision. The counter argument states that this type of support system creates an artificially constructed environment which can compromise independence and promote isolation from classmates and peers.

Supporters of natural integration are more inclined to encourage a system in which assistance is provided to visually impaired children only as needed, and by the people with whom the child naturally comes into contact such as friends, family, and other community members. In this way, the child is encouraged to develop a realistic sense of independence which helps them to take part in shaping their own lives, rather than relying solely on others. It is
important to recognize that determining the ideal means and extent of integration is an ongoing challenge which may significantly vary from child to child. Generally a balance is achieved between having a specialist there as needed, but also allowing the child to communicate, learn, explore, and create on their own.

A less defined ideology states that it is important for younger children, at the kindergarten and preschool levels, to be integrated for the manner of playtime activities. This more efficiently permits interaction between visually impaired children and their peers. However, once children reach adolescence, it becomes more difficult for them to assimilate and interact amongst their peers. The social norms, clichés and activities of sighted peers can become increasingly exclusive for visually impaired children. This leads to feelings of isolation as children believe that they are alone in their handicap. In order to counteract this, some suggest that after a certain age visually impaired children should transition from an integrated environment to one which can better accommodate their needs, both physically and socially. Establishing a close network of children who have similar disabilities will allow the adolescent child to feel more at ease in their environment. They will be able to progress through their education without feeling excluded from their peers.

2.4 Importance of Playing

Young children acquire a vast quantity of knowledge by simply engaging in play with others. Research has demonstrated that playing is crucial to the development of fundamental skills and abilities in children. Playing encourages children to develop aptitude for tasks such as observation, repetition, interaction and problem solving, all of which foster key intellectual ideas and opinions (Kerka, 2000). In this way, vital lessons are incidentally acquired through instinctive behaviors which are not typically considered to be educational in nature.

Competing in games encourages children to analyze situations and consciously develop and employ strategies in an effort to succeed. In this way, children learn to effectively investigate and approach challenging situations and problems. It becomes extremely difficult for a visually impaired child to learn such skills if they are unable to interact in childhood games. The ability to problem-solve is one which follows children from the playground into the classroom and beyond. A deficiency in the ability causes children frustration and struggle at the same simple problems their peers are easily solving.
Motor skills and physical fitness are also strongly correlated to active and social play in children. Simple games like tag or dodgeball teach agility, balance and coordination, and counteract the increasing tendency toward obesity in children (Lieberman, 1996). The physical activity of children is critical to their development and those who have limited sight often prefer to stay away from such games and are habitually excluded. Though children often do not recognize their play activities as beneficial exercise, they unintentionally develop physical aptitude and strengthen motor skills.

In addition to facilitating physical growth and problem-solving skills, playing often encourages social interaction and communication skills which are vital to development. Successful group involvement is an important ability which begins to develop in early childhood and can affect the future behavior and manners of the individual. Early experiences with peers are critical to laying the foundation for successful interaction which can continue to be developed through adulthood (Erwin 1993). Games and toys which encourage children to interact with peers can establish teamwork skills and promote the ability to compromise and cooperate with others.

The effects of visual impairment in children are apparent in the areas of spontaneity, exploration, and creativity, all of which are fundamental aspects of normal play behavior (Recchia, 1997). Additionally, the ability to interact and communicate with others is significantly impacted. Deficits in these areas often prohibit the types of normal play behavior which promote the maturation of motor skills, problem solving and social abilities. Recognizing the needs of visually impaired children for additional assistance and support in this area, a variety of specialized toys and games which promote social interaction and physical development have been created. The following section examines some common characteristics of specialized play materials, as well as resources which are currently available to visually impaired children.

2.5 Toy Design

A fundamental concept of toy design for the visually impaired is the substitution of alternative characteristics to replace the visual dimensions of play materials which are inaccessible to the blind. Alternative characteristics involve audio, tactile or special features. Toys which stimulate different senses in a child are best for those with a visual handicap. Many existing play materials used by visually impaired children were not originally engineered to
address their specific needs but have been adapted or enhanced based on special characteristics which facilitate usability.

Developing toys which stimulate children to use all their senses in order to move about their surroundings and participate is very crucial. These toys can expand spatial awareness and allow the child to independently explore and use the environment (Evyan, 2000). These characteristics are not necessarily present as part of the original toy. The use of adaptation and altering toys to better suit the needs of a child is extremely helpful. Adaptations are a simple way to convert the abundant stock of toys already available and alter them to fit the abilities of a sight impaired child. A blind child can have difficulties with both the toy itself and the play environment in which it is implemented. Learning to modify the surroundings as well as the toys can help assist the needs of visually impaired children in an integrated environment.

The Perkins School for the Blind is located in Watertown, Massachusetts and provides necessary services to blind, blind-deaf, and multi-handicapped children who live in the surrounding community and at the school. One unique and innovative feature of the school is a toy workshop that provides the resources to produce original, custom-made toys and games for the handicapped children. The staff of the Perkins School for the Blind was gracious enough to give us a tour of the workshop and allow us to explore the area at our leisure. Some of the toys and games described in the following sections were observed at the Perkins School for the Blind and serve as examples of some of the described features of toys and games which have been specially created and modified.

2.5.1 Games Facilitating Interaction

Children use games as interactive tools to play with their peers, thus capturing the interest of all children involved is essential. In our case it is important to capture and hold the attention of both sighted and visually impaired children. This process involves incorporating the features of toys described below, adding features which generally appeal to all children, creating the initial interaction, and maintaining the appropriate environment for the interaction. Specific considerations are necessary to determine the activities and games which suit their limitations as well as their age group. The key in developing a useful game is assuring the accommodations made to incorporate the visually impaired child do not degrade the intent of the game (Lieberman, 1996).
Physical guidance can be a valuable asset to help a disabled child learn a game. A study involving a ten year old boy who was deaf and severely visually impaired was conducted to see if the child could be taught dodge ball. The reasoning behind the study was to try and integrate the child into a regular gym class after he had been taught the sport. Using what little sight the child still had, the instructor taught him the boundaries and rules of the game. Using a unique style of teaching permitted the child to slowly learn how to play the game. Giving immediate feedback evaluating the child’s progress was a main focus of the trainer in trying to teach the game. The child was eventually able to play the game without any physical assistance, but some visual clues were still necessary for him to play the game. He was eventually able to join his peers and play dodge ball in their gym class (Lieberman, 1996). Integrating the child into a social environment which allows his participation on an almost equal level is a great stride.

Proper facilitation often plays an important role in creating an interactive play environment. Facilitators introduce children to each other and provide visual information which would otherwise be inaccessible to blind children. The ultimate goal of facilitation is to allow the child to function completely and freely within a social setting. Specific needs arise for a visually impaired child during interactive play. Therefore facilitating this interaction is not just about creating the ideal toy or game, but also about creating the best environment in which the interaction can take place with the most ease. Presenting and placing the toys and games in the appropriate ways is just as important as the toys and games themselves.

2.5.2 Features and Characteristics

There are certain toy and game features which are applied in order to make play resources more accessible to visually impaired children. The features represent different ways of removing sight advantage from games and making them less visually oriented. By using other senses such as hearing, touch and smell, games can be created or adapted such that they are fully accessible to visually impaired children. The features are both incorporated in the development of toys and games as well as considered in adaptations of existing products.

Audio clues are employed in toys and games so that a child can use sounds to track objects and explore their environment using noise. Messages are sent through noise by the sound produced. For example, a ball hitting gravel on a playground makes a recognizable sound that signifies that the ball is on the gravel. This is called audio feedback. Audio awards are often used as audio feedback in games to inform players of their, or another player’s, success. When used in
this manner, auditory feedback not only creates excitement in the visually impaired players of a game, but in the sighted players who also tend to react enthusiastically to stimulating noises. Loud, exciting noises are used to trigger exhilaration by notifying a player that they have succeeded and can celebrate their victory. A toy was developed at the Perkins School for the Blind as a shooting game where participants try to shoot a ball into a target using a plastic lever. If the ball hits the target cup a loud, echoed thud is produced. Upon hearing this sound, players know they have achieved their goal. The cup is surrounded by a net. If the ball hits the net very little sound is produced. Upon hearing this sound, the player knows that the next shot only needs to be slightly adjusted in order to hit the target cup. The net is securely attached to a rather large board on the opposite end from the plastic lever. If a child shoots the ball and the ball hits the board the sound of contact can guide the player in his or her next shot. If the ball makes a loud thud, close to the player he or she knows that the next shot must go much further. If the shot is further away and a bit softer, the shot must only be adjusted slightly more than if it hit the net.

Auditory feedback is incorporated into games to help visually impaired children locate the objects they cannot see and to signify achievement.

Contrasting textures and surfaces inspire the imagination of visually impaired children and add additional exploration opportunities to toys and games. The Perkins School provided a display of varying textures of materials that assist a visually impaired child to differentiate between objects. The display included materials such as plywood, foam, Velcro, and general odds and ends. Puzzles with varying interesting textures, such as those mentioned, can help a blind child map its design from feeling the pieces. Board games for blind and visually impaired children also have pieces of varying textures, as well as, spaces. Card games use Braille for numbers and assorted textures to represent color. As the visually impaired child tacitly scans the board, its pieces and the next spot on the board are easily identified.

All aspects of the game must be secured to the playing area as a visually impaired child uses tactile scanning to “see” the game board and pieces. Often visually impaired children cannot remember how far a toy is from them and can knock over and move toys without intent. Care is taken so that pieces cannot be easily knocked over or allowed to travel outside of the play area. Velcro and suction cups secure items to one location allowing them to be accessed quickly and easily. This allows the child to directly identify where certain play objects using their sense of touch. This can also be done with the use of magnets which permit movement across a
designated parameter of a toy. Objects and toys are stabilized to keep the item within a child’s reach. Defining a set boundary is also great for limiting the range which a child has to move around in. Setting discrete parameters will lessen the chance of a child becoming disorientated and loosing objects during play. The ball of the shot game from the Perkins School for the Blind was connected to the board by a string so that it could travel no further than the boundary of the game. Dice are difficult for visually impaired children in games which require them because they are easily lost out side of the boundary of the game. This is because they do not contain a stabilization feature. Grip mats are used to reduce the possibility of an object sliding out of easy reach of a child and keep all the pieces in a controlled play area. Attaching materials of a game to a fixed location make it so items can be efficiently reached. Knobs and key features are extended and built up on a toy to make it easier for a child to grasp as well. Pieces of a puzzle can be grasped more easily if a larger knob is placed on the object. At the Perkins School for the Blind, a Chinese checker board was adapted so blind children could also participate. This was done by making the usual round playing pieces out of varying shapes. The shapes were attached to pegs which were placed in deep holes so that the pieces were not easily knocked out of place.

Various shapes used in association with colors allow both sighted and sight impaired children to identify their pieces on the board. Checkers is another common game easily adapted and found in the workshop. By recessing each playable spot the visually impaired child knows where they may place their piece. Along with the pieces being identified by the colors black and red, one player uses square pieces while the opponent uses circles. Also, there are pieces which are of the same shape but larger to indicate the piece has been “kinged”. This eliminates the child form having to stack pieces which can easily be knocked over and misplaced. The varying shapes, textures, and sizes allow easy identification of ownership and location for the visually impaired child.

For children with low vision, highlighting and coloring pieces encourages independent play (Center for Assistive Technology, 2004), by creating interest in an activity. Contrasting and vibrant colors draw attention to an object or task of interest. High contrast and clear outline to objects also allows the child to visually see an item more clearly. Lights add visual stimulation and increase the attentiveness of the user to the toy especially combined with auditory clues (National Lekotek Center, 2006). Different colors are also visually stimulating for sighted children and help keep them interested in the game being played. Many of these features are
currently used in developing toys for sighted children, because they do such an excellent job at stimulating the senses and encouraging a child to interact with the toy.

2.5.3 Resources for Toys and Games

One important outcome of our project is the development of a resource which provides helpful suggestions and ideas relative to creating toys and games which encourage interaction. The Visual Impairment Knowledge Center has identified the need for a resource which allows parents, educators and consultants to share creative ideas. Their ideas, together with those developed by our team can provide suggestions on proper adaptation, as well as implementation techniques. There are many suggestions for toys and games out there, but our goal is to also incorporate the best practices in involving both visually impaired and sighted children in play.

Many organizations like the American Foundation for the Blind, Alliance for Technology Access and the Toy Industry Foundation produce guides and catalogs which assist in the search for specialized games. One of the guides, which is published in the United States, is the Let’s Play: A Guide to Toys for Children with Special Needs. Published every year, this guide is sponsored by the three organizations previously mentioned. By categorizing the toys into different sections, it analyzes what toys already exist and identifies the ones that are more appropriate for a child with certain disabilities. A brief description of the game is also given which provides the reader with clues on how each individual toy fosters particular attributes and what characteristics of the toy meet the child’s needs. Many other catalogs can be found through a simple search on the internet; however, many of these guides offer the same information. Not only toys but active games have been created and adapted to meet the disabilities of visually impaired children.

Published works on games meeting the limitations of a disabled child have been developed, but not as much effort has been put into toys and games that promote interaction between blind and sighted children. Games for People with Sensory Impairments, a book by Lauren Lieberman (1996), selects active games and uses modification to allow participation by sight impaired children. This guide provides detailed information into the types of skills and attributes which a child will learn from participation in the game. Each activity has a goal and objective which are clearly defined to help identify what are the targeted skills. All games are categorized according to age group which makes it effective for locating games for a targets age group. Although this guide offers some innovative solution to allow visually impaired children to
participate in a variety of games, many of them do not involve interaction between blind and sighted peers. Most of the games are mere modifications from the already well-known childhood games which are altered to meet the needs of the disability.

The resource catalog produced at the end of this project will be similar to the resources discussed in the previous section. It is our goal to expand on existing toys, games and resources in order to successfully make toys and games interesting to both visually impaired and sighted children. Throughout our research of toys and games, it has become apparent that the success of these resources is directly indexed to the context in which they are utilized. Although the special attributes and features discussed in this section are an important aspect of accessibility, other factors such as the environment and the level and quality of external facilitation and structure are equally as important. Thus, we have discovered the necessity that our research not only focus on existing toys and games, but also examine the environmental conditions most likely to facilitate social interaction.

2.6 Visual Impairment in Denmark

In Denmark, there are currently just under 2,000 visually impaired children between the ages of zero and eighteen (Ministry of Social Affairs, 2004). The public services provided to each of these children vary depending on the severity of the disability. Whenever feasible, visually impaired children are enrolled in local schools, which provide inclusive social and learning environments. A regional consultant is assigned to work with visually impaired children and their families and teachers, providing information and supporting the inclusion of visually impaired children within the classroom. With the help of these consultants, as well as classroom aids and orientation and mobility (O&M) instructors, blind children are given the opportunity to learn and socialize along with their sighted peers.

Denmark has shown a remarkable commitment to the care and support of its visually impaired citizens, as witnessed by an extensive, socially funded network of organizations and services. This commitment is evident as early as 1858 when the first Royal Institute for the Blind was established by the state of Denmark. Subsequently, they adopted a national policy to provide library materials for visually impaired children, ages seven to sixteen through the School and Resource Center for Blind Children. However, it was not until 1980 when the decentralization of the services to the blind went into effect. This changed the system from providing isolated communities and institutions for the blind, to integration into local school systems and into
mainstream society. Currently, other public policies including the Social Services Benefits Act and Primary Education Act ensure that measures are taken to incorporate visually impaired children and adults into an inclusive Danish society.

The current system for addressing childhood blindness separates Denmark into fourteen different regions which contain numerous counties. Each region is assigned a certain number of consultant’s depending on the number of children and their specific disabilities. The consultants are given a particular group of children which they work closely with. These groups are often comprised of small children, school aged children, or the severely disabled. Copenhagen has two consultants, both of whom hold offices in the Instituttet for Blinde og Svagsynede.

The Videncenter for Synshandicap (Videncentret) is located in the city of Hellerup, Denmark. Videncentret is an independent agency which is financially supported by local counties in Denmark. They are affiliated with other organizations such as the Danish Association of the Blind, The National Association of Parents of Visually Impaired Children and Youth and the council of directors of the counties' advisory services for blind and partially sighted people. The main goal of Videncentret is to collect, process and supply information related to visual impairment to the public. Toward this end, the center stays up to date regarding new publications, projects and research, as well as collaborating with many local and international organizations. Information and references are provided to the public by means of conferences, lectures, publications and databases. In addition to maintaining both a resource library and an online database, the center also publishes and distributes pamphlets and informational materials, including a Danish newsletter called Synshandicap. Perhaps one of Videncentret’s most valuable services is the provision of information and helpful resources to parents and educators of the blind.

In keeping with Denmark’s commitment to excellence in the maintenance and development support networks for the visually impaired, Videncentret has identified the need for improvement in the area of accessibility to toy and game resources. According to the staff of the center, Denmark lacks proactive motivation for the development of specialized toys and games. Currently, specialized toy and game resources and support are provided to children and their families on a case by case basis. Not only is it inefficient for parents and educators to conduct individual research in this area, but all children are not guaranteed the same level of support and access to helpful resources. By researching and examining available resources, our team hopes to
compile a catalog of toys and games to be used by parents, caregivers and educators in their attempt to promote the social integration of visually impaired children.

3.0 Methodology

Our project goal is to develop an approach to making toys and games which promote social interaction between sighted and visually impaired children. In order to accomplish this, we research and examine existing toys, games and play environments, as well as the play behaviors which influence the interaction of blind and sighted children. Researching existing play resources helps us to identify specific qualities of toys and games which are effective in promoting social interaction. Observing the play environments and play behavior of children provides us with specific criteria which should be considered throughout toy and game design. Based on our conclusions relative to effective toy and game development, recommendations for optimal toys, games and implementation strategies are recorded in this report, and offered in guidebook format.

All information gathering takes place through classroom observations, online research, a parent workshop, and numerous interviews and discussions with parents, educators and consultants. The project is completed on sight in Copenhagen, Denmark over a seven week period between March 13 and May 10, 2006. The key objectives to our project are summarized as follows:

- To identify the current approach to promoting integrated play in Denmark
- To identify the play behaviors of sighted and visually impaired children which influence their interaction
- To identify the physical attributes of toys which promote interaction
- To develop an approach to making toys and games that promote social interaction

3.1 Identifying the Current Approach to Promoting Integrated Play

Through trips to various organizations and institutes we can evaluate the current standard of care the visually impaired receive in Denmark. Identifying the areas and approach currently
established in the Danish system will aid us in discovering the most effective means of addressing the problem. A tour of the Danish Institute for the Blind and Partially Sighted allows us to identify the level and quality of care which the state and local communities provide for its handicapped citizens. This institute’s purpose is to provide visually impaired individuals with the skills, training and resources which enable them to live independently. The responsibilities of the entire institute incorporate a variety of fields including advice and counseling, education, career development, aids and appliances, and several others. The Synscenter Refsnæs in Kalundborg is another highly esteemed institution responsible for housing and training of the severely handicapped and visually impaired. Within their facility they house, educate, and provide many services to the blind community. A guided tour of the facility allows us to evaluate the degree of care provided to those children with severe impairments and evaluate their approach in promoting interaction with visually impaired children and their peers. Various workshops and storage rooms filled with toys and games for the visually impaired are also available at these institutions and give us insight into the current method of meeting the needs of visually impaired children through toys and games.

Reviewing the printed materials from the Viđencentret library and from online resources identifies previously written literature which is applicable to the project. Pertinent topics include social engagement patterns and interaction of young children, educational philosophies, play behavior, and characteristics of toys and games which are specially designed for visually impaired children. Information relative to education and social engagement patterns provides a framework for toy and game research, and gives us a perspective on to what has already been accomplished in this field.

Discussions with consultants, classroom aids, and professionals who work within the visually impaired community take place on both a formal and informal basis. These conversations provide important professional insight into social and technical aspects of the project. Receiving information from these interviews, we discover how the current system of government addresses our research problem. Through these contacts we assess the situation in order to better develop an approach to having the most effective toys and games. Toys, games, and implementations strategies which are developed or utilized by contacts provide ideas for our overall evaluations and recommendations. Insight relative to the integration and interaction of
sighted and visually impaired children are taken into consideration when formulating new toy and game ideas.

3.2 Identifying Play Behaviors Which Influence Social Interaction

Classroom observations of local schools and daycares attended by visually impaired children are scheduled in order to identify the play behaviors and even toys and games which are currently found in classrooms. The play habits and toy and game preferences of both visually impaired and sighted children are observed and taken into consideration when making toy and game recommendations. Of particular interest are play resources which are specially designed for, or utilized by visually impaired children, as well as toys and games which are observed to promote interaction between sighted and visually impaired children. Of the many classrooms which are observed we identify the difference in play behavior not only between sighted and non sighted children but also look into the differences in play attitude of different visually impaired children.

A workshop for parents and caretakers of visually impaired children is scheduled to take place midway through the project. Information we gather from parents and caregivers relative to the social and play experiences of visually impaired children assist to identify areas of play behavior which are lacking or unique between each child and thus is addressed when developing our approach. The social interaction in addition to toy and game preferences of visually impaired children who attend the workshop is observed. An established play area will allow the children to interact with one another and play their favorite toys. This play behavior is not limited to sighted and visually impaired but also the interactions between visually impaired children will be monitored as to play preferences and tendencies. Information gathered from discussions and observations taking place at the workshop are taken into consideration when developing toy and game recommendations.

3.3 Identifying the Physical Attributes of Toys

Specific characteristics of toys and games which can be effectively used to promote social and play interaction of visually impaired children we identify throughout onsite research and information gathering. Characteristics are defined as the technical and social aspects of toys and games which tend to hold the interest of both sighted and visually impaired children, address functional challenges associated with a visual handicap and create a playing context in which
both sighted and visually impaired children are encouraged to participate freely. Characteristics are based on conclusions which are drawn from examining existing toys and games, observing the play behavior and preferences of sighted and visually impaired children, and information gathering from professionals who work within the visually impaired community.

Many of the institutions which we visit house rooms and workshops where they produce their own toys and games. Games and toys which have been uniquely developed at the Synscenter Refsnæs can be found in several rooms in the institute. These games are sold and provided to the local communities and schools. The Danish Institute for the Blind and Partially Sighted also accommodates workshops, storage rooms, and a store which possess a variety of games and toys; some have been developed at the center others have been purchased through other means. From analysis of these toys and games which have been produced in associating with discussion from the consultants and employees of these organizations we identify which toys and games and specifically which characteristics best work to meet the requirements of a visual handicap.

Examination of the particular games and toys which are already in the homes of visually impaired children provides ideas for subsequent toy and game recommendations. The parent focus group we hold provides a great resource of information to identify the toys and games which parents have found to work best with their children. We discuss the particular characteristics of the toys with the parents and consultants. We then identify the features and specific toys that we find work well in most of the homes and play rooms of visually impaired children.

3.4 Developing an Approach to Making Toys and Games

Toy and game characteristics are incorporated into original ideas and recommendations developed by the team. The same characteristics are applied in a variety of ways to different games. Recommended toys and games are selected on the basis that they can be effectively used to promote social and play interaction between sighted and visually impaired children. Toy and game recommendations incorporate suggestions and ideas gathered from parents, educators and other contacts, as well as the specific characteristics which are identified as part of the on sight research.

A guidebook resource will be produced from these recommendations for publication and translation into Danish. This is meant to be a means of publishing our findings as a resource for
parents, educators and toy manufacturers who are interested in the social integration of visually impaired children through toys and games. The guidebook contains recommendations for toys and games, which are presented along with playing instructions, graphics or pictures when appropriate. Suggested implementation strategies and ideas for adaptations and enhancements are also provided.

4.0 Observations and Analysis

The following chapter describes our analysis of the research and observations completed during this project. In addition to analyzing toys and games, we also concentrate on the play behaviors of blind and sighted children, as well as the play environments in which toys and games are implemented. Play environments incorporate many distinct components, which have a significant, interrelated impact on social interaction. In addition to toys and games, factors which contribute to play environments include the physical attributes, educators and facilitators and playmates. We discuss each of these contributing factors in the following section, relating them to our research topic of social integration.

4.1 Play Environment

When a sighted child walks into an environment it takes only a few minutes for the child to visually assess their surroundings and draw many conclusions based what they see. This is not the case for children with visual handicaps. When a blind child walks into a new environment, they know nothing about their surroundings until they encounter some non-visual information. For example, a sound is made, they get a chance to feel around, or they smell a familiar scent. These differing forms of information gathering make the time it takes a visually impaired child to become familiar with the environment significantly longer than it that required by a sighted child. Consultants who were interviewed expressed that it takes their visually impaired students longer to become familiar with a classroom and with their playmates than it takes for a sighted child to do the same. One of consultants expressed that although she was working with one of the brightest blind children she had ever encountered, the four year old girl had just recently become comfortable enough to fully participate in the classroom she was attending, nearly a year after the other children. This additional time does not seem to have a negative impact on her current
level of participation. Now that she is comfortable in the classroom, the child excitedly approaches her classmates and asks them to play. She can confidently join the other children, even when they are located in tricky locations such as aloft in the classroom’s tree house.

A child’s ability to navigate the play environment has a direct impact on social interaction. Children who are comfortable moving around their classroom independently seek out the company of sighted peers. The ability to navigate the classroom also allows visually impaired children to easily select their own play resources. Children who are not familiar with their environment remain stationary and depend on others to provide them with toys and games. The physical layout of the play environment directly contributes to accessibility and navigability considerations for visually impaired children. Natural landmarks such as walls, desks and furniture, are placed in classrooms which can be identified and utilized by visually impaired students to navigate their surroundings. In many cases, large, open rooms with fewer landmarks are made navigable to visually impaired children through special orientation skills taught by orientation and mobility instructors. The instructors teach the children helpful techniques, such as following the wall and counting paces, and then guide the children in implementing them.

Various environmental and classroom adaptations promoting accessibility and navigability are incorporated within the play environments of visually impaired children. Tactile pictures mounted on walls outside classroom doors allow visually impaired children to differentiate between rooms. In one classroom, a system is developed whereby a visually impaired student can determine the location of her classmates depending on the position of small rings hung on pegs. The pegs correspond to the names of each of the classmates, which are also spelt out in Braille. This system offers the visually impaired student a means to independently identify the location of her friends. The child can then seek out her friends and request to play with them. This action creates opportunity for social interaction stemming from the child’s comfort within and familiarity of the classroom.

The availability and accessibility of toys and games has an effect on the play behavior of children, in that it influences the children’s decisions regarding how, when and what to play. The reliable, familiar location of toys and games most frequently played with by blind children provides the child freedom to independently access the toys and games which are of the most interest. One kindergarten we visited has a table which is designated for playing with dollhouses. Shelving is located near the table for storage of the dollhouses, as well as bins for dolls and
accessories. This organizational system encourages accessibility and familiarity, since the location of play resources is predictable. When the child incorporates the activity into the social environment, he or she may themselves encourage social interaction by requesting the company of other playmates.

### 4.2 Facilitators and Educators

Facilitators, such as consultants and part- and full-time classroom aids, also contribute to the social climate of play environments. In many cases, classroom aids work closely with visually impaired students. They offer assistance and information which help visually impaired children to function smoothly in a classroom setting. Visually impaired children can benefit greatly from the support and specialized education offered by facilitators, who help students acquire various sets of required skills. One set of parents defines the classroom aid as “eyes” for their visually impaired child. They explain that the consultant rather than helping their child to make decisions, or mandate playtime activities, simply offers visual information which is otherwise inaccessible to the child.

Another classroom aid described a set of circumstances wherein she regularly assists a visually impaired student to improve his social interaction with his playmates. She did this by encouraging and explaining appropriate play behavior to the visually impaired student. The consultants’ work is geared toward preparing the children to become increasingly more independent, and prepare them for life outside of the classroom. This is often done by establishing a balance between giving the visually impaired children the assistance that they need without creating too much dependence on external aid.

Sometimes sighted children shy away from the unfamiliar habits of their visually impaired peers. In this case, the adults who are there to assist the visually impaired child may also help the sighted children feel more at ease with the situation. Sighted children are generally willing to accept the presence of adults who assist their visually impaired classmates and frequently visit their classroom. Children respond with a familiarity and comfort to the aids of the visually impaired children who frequent their play environment. The aid is usually viewed as just another teacher in the classroom. Some children display mere neutrality, while others, especially young children, display a strong desire to interact with classroom aids. Many children gather eagerly around their visually impaired classmate to participate in games which are
facilitated by the classroom aid. Often times, the children appear to appreciate the mild structure of their playtime as much as the adult attention.

As facilitators provide information to the regular classroom educators and sighted peers of the visually impaired children they promote social integration. Promoting awareness and sensitivity toward a visual handicap within the play environment creates comfort with a situation which may be new to many children. Visual impairment had been explained to many sighted children, providing them with a better understanding of, and eagerness to accept their handicapped peers.

4.3 Playmates

The sighted peers and classmates who interact with visually impaired children impact the social climate of the play environment. The initial introduction of sighted and visually impaired children is given special attention by facilitators and educators, who recognize the strangeness of the sighted world to the blind child and the blind world to the sighted child. In this way, they encourage mutual exploration so that children become more familiar with each other’s experiences and perspectives. Common practices and social engagement patterns of sighted and blind children are addressed as needed by the classroom aids. We observed one visually impaired child who often has to be spoken to about engaging in physical contact such as touching and pinching his sighted peers. This behavior is sometimes very uncomfortable for the other children, but it is how he gets to know them and recognize them. The sighted peers are taught to about why the blind child behaves the way they do and as a result, they learn to better understand and tolerate some of the behavior which may have initially been foreign or confusing.

After they become acquainted and familiar with each other, social interaction takes place fairly naturally among young children. Both sighted and visually impaired children socially enjoy one another and seek out their peers for company and entertainment. Young preschoolers seem to be especially tolerant of each other and not at all averse to the incorporation of visually impaired peers. Most of the children, both visually impaired and sighted remain interested in each other throughout their games. They cheer at each other’s good fortune and remind one another to play on their turn.

However, situations also arise in which visually impaired children are unintentionally left behind by their sighted peers, specifically during unstructured playtime. Sighted children use their vision extensively throughout playtime activities to select toys and games, navigate freely
around the play area, identify friends and classmates, and exchange non-verbal information. They often play quickly, making rapid decisions and exercising mobility based on visual feedback which provides immediate, easily processed information. This type of play is difficult for visually impaired children, who are sometimes slowed down by their visual handicap. When a sighted peer has run off without informing their playmates, the visually impaired child has no clues to help them follow and meet their friend.

Sighted children may benefit from toys and games which do not provide them with a sight advantage because it allows them to play more naturally, and compete on the same terms as their visually impaired peers. One boy who attended the parent workshop with his family was eager to engage in playing strategies on the same terms with his younger, visually impaired brother during a game of tactile go fish. Instead of playing cards, cloth bags containing different groups of matching objects were used. In order to determine a proper match, the players had to feel the objects inside the bags. Thus, sighted players could not rely on visually acquired information. The older brother seemed to appreciate the opportunity of experiencing the same challenges as his brother, without having to compensate for, or try to minimize his own sight advantage. He was eager to use his tactile sense in the same way as his younger brother.

Often, visually impaired children will independently take measures to counteract potentially difficult situations in which they are unintentionally excluded. In one classroom, a five year old visually impaired student made sure to secure the help of a classroom aid in preparation for outdoor playtime so that he would be ready just as quickly as his sighted peers. The classroom aid explained that it is difficult for the visually impaired student to join games which have already begun before he has a chance to become involved. She also reiterated that situations often occur in which sighted children suddenly end playtime or walk away without informing their visually impaired classmate. He cannot see the transition taking place and instead of following his peers to the next activity, is lost in the previous activity.

One visit to a first grade classroom supported the idea that older children are more likely to recognize and be aware of handicapped classmates. The play interests of older children become more specialized and exclusive with age. The interests that arise accentuate both the differences and similarities between children, as they develop a desire to choose friends and activities based on what they have in common with their closest peers. In the first grade classroom, many children were interested in Foosball and other games and activities which
require vision. One contact explained that the exclusive interests of older children, as well as heightened senses of self awareness, has an isolating effect on visually impaired children. Visually impaired children and sighted children may discover that they are interested in very different activities.

Another contact discussed the very different frame of references utilized by sighted and visually impaired children. He explains that blind children approach situations relying on other senses and types of feedback to acquire information which is often readily accessible to their peers. He concluded that it is impossible for sighted children to completely understand the reference frame of their blind peers, and for the blind child to completely understand the same for sighted children. Many parents and consultants express that visually impaired children find it helpful to develop friendships with other visually impaired children as they grow older. This is due to the fact they share not only common interests, but also a similar frame of reference, allowing them to experience situations in a similar way.

4.4 Characteristics of Play

Structured play often makes games more accessible to visually impaired children. It allows them to rely on the predictability of the game, rather than immediate visual perception. For example, turn taking allows visually impaired children to anticipate when it is their turn to play. Once the child knows the order of play, they can prepare themselves to perform play activities at the appropriate time. Allowing extra preparation time before games also helps to provide all participants with an equal advantage, in that they are not relying on the ability to acquire information along the way. Games in which each child performs the same action upon their turn tend to be beneficial because it is clear to each child what is to be done on their turn before it is in fact their turn. The first round of the game might be spent trying to make it clear to each child what their role is, but once their role is clear, children are prepared for each round.

Unstructured play allows both sighted and visually impaired children to interact freely through pretending and role playing. This type of play incorporates a great deal of creativity and self-expression, which is beneficial for all children. Unstructured play involves the fast-paced, constantly changing form of play in which sighted children often participate. Visually impaired children may find it hard to participate if they do not receive adequate feedback regarding the status of play activities. One parent explained that group play is sometimes difficult for his daughter, because sighted children often exchange information non-verbally, unintentionally
leaving her out of the game. As a result, the child prefers to play with friends on a one-on-one basis. This allows her to stay better informed through verbal communication.

Several parents and consultants also mentioned the event of visually impaired children playing with other visually impaired children. This arrangement is a very positive experience for many visually impaired children as it allows them to spend time with friends who understand the unique frame of reference associated with a visual handicap. This tendency to want to play with other visually impaired children may be especially evident in older, self-aware children, who become more specific about their friends. The parents of the held focus group express great interest in getting to know other visually impaired children they could invite to play with their children. Blind children’s playing together creates an exciting environment for both children, but they will not be surrounded only by blind peers throughout life. This is evident in the integrated classrooms they attend daily.

A great deal of play occurs on an individual basis within the context of a group. For example, in one classroom children sat around the same table and were each given their own puzzle tray which they filled with pieces from a common, central pile. Another classroom has many separate dollhouses with which children played individually in the same play area. In this way, children are able to socialize around the same game, while working independently. Children may discuss their individual play with others in the group during playtime. This is especially helpful for visually impaired children, who benefit from the verbal element of play. Other examples of individual toys and games commonly played in groups are cars, blocks, dolls, Lego’s, train sets and soldiers.

4.5 Play Behavior of Visually Impaired Children

Despite the fact that they share the same handicap, every visually impaired child is unique, possessing different interests and personalities. As is the case with sighted children, visually impaired children also differ in their natural inclinations to socialize with others. Some children are outgoing and gregarious, and thrive on extensive amounts of social interaction, while other children are more protective of their privacy, and may exercise greater caution in selecting friends and engaging in play with others. The play behaviors discussed in the following section reflect an understanding of the individuality of children within the blind community. Thus, our analysis focuses on the characteristics associated with a visual handicap, and not with the individual children who were observed.
There are many visually impaired children who possess some degree of usable vision. Many consultants choose not to focus on encouraging the use of this limited vision. Instead they work toward supplementing limited vision with other techniques. This prepares children for situations in which limited vision may be inadequate. Sometimes children with partial vision can receive mixed messages if they are encouraged to rely on their sight at home. It can be tempting for parents to encourage dependence on limited vision in an effort to promote play behavior associated with that of the “average child”. However, encouraging this type of play can lead to frustration if visually impaired children take in very little to no information by using their vision.

When interacting with others, blind children may be unaware of unspoken social engagement patterns which are visually ascertained. For example, they may not understand the significance of making eye contact with the people to whom they speak. Visually impaired children are taught to enhance their own verbal communication by addressing others by name in order to ensure that the person to whom they are speaking is ready to listen.

A large amount of information is exchanged silently between sighted children, who use their vision to remain aware of and involved in playtime activities. Conversely, blind children play within a different context, in which information remains hidden unless it is received through sensory perceptions other than vision. Verbal communication provides children with visual information which may otherwise be inaccessible. Thus, they rely extensively on verbal communication throughout playtime activities as a means of both receiving information and expressing their own actions to others.

Blind children extensively use their memory to navigate about the play environment. In the classroom and home, memory is used to know where objects are located and how to navigate to desired locations. One blind child had the number of paces memorized from the table to the trash can. For another child, it was memorized that his dress up clothes were at a one end of a specific row of clothes. Memorization is also used in games. A blind child cannot locate the position of their game piece by sight, but memorizing its location, together with tactile scanning, allows them to find it independently. Memorization is an important play tool, which is commonly used more extensively by blind children than it is by sighted children.

It is common for visually impaired children to have a sense of hearing so acute that they can tune a piano without audio assistance. Hearing, like memorization, helps a blind child gather the information that sighted children often gather visually. Through audio lessons and extensive
practice, many blind children develop a strong sense of hearing, which is often much more sensitive than that of a sighted child. Although it is a common characteristic for visually impaired children to have such a strong sense of hearing, this is not the case with all visually impaired children. Due to the fact that many visually impaired children are also affected by other disabilities, some may also have hearing impairments.

4.6 Toy and Game Characteristics Promoting Interaction

In addition to the toys and games themselves, we have observed several common attributes of play resources throughout our research and analysis. Color, texture, audio stimuli and the construction of simple adaptations are some of the many features of toys and games which are geared toward the visually impaired. In the following sections, we analyze some existing toys and games, as well as some of the common features which make them fun and accessible for all participants.

4.6.1 Use of Color

Even though our project is concerned with children who have limited or no sight capabilities, the use of color is nevertheless extremely significant. Many of the games that have been identified at institutions and schools such as Synscenter Refsnaes and the Videncenter for Synshandicap, make use of color in some way. Visually impaired children often possess some form vision, which they use to identify strategic colors, especially those which provide stark contrasts. For example, the bright colors of Lego’s can sometimes be differentiated by visually impaired children. For many children, identifying color and contrasts proved to be gratifying and enjoyable. One consultant explained that a partially sighted student of hers found many of the simple, mono-colored toys and games to be boring. The student, like his sighted peers, preferred toys and games which incorporated exciting colors.

The use of colors is not only important for the visually impaired child in interactive play, but they also provide visual interest for sighted children. When we explore different ways to facilitate interaction between children of different sight capacities, one focal aim is keeping the games interesting for the sighted children. Thus, in the interest of promoting integration with sighted children, color can be used to make toys and games visually appealing and interesting.

When observing a six year old visually impaired child in an integrated kindergarten, we saw that even though her perception of sight is limited, it plays a crucial role in her play
behavior. One of the most popular games in the classroom involved collecting eggs and placing them into baskets on the game board. The girl is able to use her memory in association with her limited sight to play the game correctly with other children in the classroom. The die involved in the game has not been altered in any way. The black on white contrast is enough to allow her to recognize the number, although at times she needs to pick it up and hold it closer to her face. Once she rolls the die she then has to gather her eggs and place them in the proper spots. The difference between the colors white, green and brown, in conjunction with the memorization of the locations on the board allows her to play with minimal external intervention. However, for many visually impaired children to identify the numbers on the die, it usually needs to be modified through enlarging the die, or by using a die with tactile adaptations.

Another game observed in the same kindergarten is a puzzle game where colored pieces are placed into an outlined board which is in the shape of a familiar object. By seeing and feeling the boundaries, the visually impaired student can tell what design she has to fill in with her pieces. The colors of each piece allow her to identify them easily and then place them in the proper position on the board. This game is very similar to the popular Tangram game which can be found in the United States. Even though direct interaction normally does not take place when solving these puzzles, the game often provides a good opportunity for multiple children to sit down together and play, even if they are not working on the same solution. It should be noted that the visual handicap of this particular student was of a lesser degree as compared to other visually impaired children in integrated classrooms. However, the general concept of contrasting colors such as the ones in her classroom, is utilized in many of the games that are developed.

Colors can often be used in conjunction with textures and shapes so that a sighted child can identify the pieces or the game using colors, while a visually impaired child has the ability to use other means of differentiation. At the Perkins School for the Blind, a Chinese checkers game is adapted in such a way that it is suitable for both blind and sighted children. Not only did they change the pieces from balls to different shapes, but they also have all the pieces identifiable through color. The intent is to allow a sighted child to use the colors to recognize the different pieces, while the different shapes are easily distinguishable for the visually impaired child. If this is not done, then pieces of the uninteresting similar color would not be as appealing for the sighted child.
4.6.2 Tactile Features

During play, blind children use their hands to “view” the game. By feeling toys, game boards, or game pieces, the child is able to ascertain information which is visually accessible to sighted children. This method of viewing through touch is commonly referred to as tactile scanning. The use of texture is a characteristic of many toys and games developed for the blind. Tactile scanning is often used when children play. Incorporating a texture into the games can differentiate several features of the games and make the game more interesting for all the players. Game pieces, dice, spinners can all be adapted to incorporate textures in some way to make the games more efficient and attractive.

One game the Synscenter Refsnæs has developed is a matching game which uses different types of textured paper instead of pictures. The game is relatively simple and makes good use of forcing the players to use their sense of touch. The board consists of six different types of sandpaper, each with a cover of identical paper and thus identical in texture. The players match the covers of each square according to the roll of a dice; identical textures indicate a correct match. However, the game is intended only for use by visually impaired children. The different papers are different shades of color and a sighted child could identify similar squares based on sight, giving them an advantage of being able to identify pieces quicker. The die involved in this game also incorporates a unique tactile adaptation. Instead of numbers or dots, each side is made of a different texture, which for this game corresponds to the sandpaper. In this way a child can roll the dice and then by feeling the top of the die the outcome can be quickly and easily identified.

Toys also use texture as a source of interest to attract children to the game. The Besøge Syværkedet located in Kalundborg, Denmark focuses on producing simple toys and games for children with visual impairments and other related disabilities. One unique design for toy balls is to make them so that they are not completely round, but have small pockets and grooves which make them entertaining to hold and play with. In addition to the distinctive design, the balls are also made from intriguing textures. The interesting feeling and sounds of the balls make them particularly interesting for both blind and sighted children, encouraging interaction. Although the ball is rather simple, rolling this ball is entertaining because of the jingle it creates as it crosses the floor and the feeling of the ball hitting the hands. This toy is the most popular product of the institution.
Games such as Lego games, which can be fastened to each other and to a board, allow a blind child to easily employ tactile scanning. Not only do these toys provide good characteristics to permit play for children who have a visual impairment but also they allow for cooperative interaction. When constructing something from these blocks, children often work together and try to lend a hand in achieving a common goal. These types of games also provide opportunity for children to discuss what they are building. A daycare in Roskilde which was attended by a completely blind child shows the regard for these toys. There is a section of the daycare which the girls, including the blind child, had their Legos and they were able to play with each other through them. Even without the advantage of sight, she was able to participate in building with the Legos, as well as interacting with other girls who also were playing with the toys.

Many game pieces including dice and spinners incorporate the sense of touch to allow the visually impaired child to identify their pieces or their turn. There are many ways to incorporate dice into a game for a visually impaired child. Many dice which we saw the Perkins School for the Blind in Massachusetts and at the Synscenter Refsnaes use enlarged and embossed numbers on each side. This characteristic proves to be rather advantageous for encouraging interaction. A sighted child can easily use the visual number on each side which will keep their interest in the game. On the other hand a visually impaired child may be able to use partial sight in conjunction with the tactile features of the dice in order to identify what has been rolled. The dice are also accessible for children with no sight, who can rely solely on feeling the tactile numbers. This method is also applied to a spinner of a game. The Synscenter Refsnaes developed a spinner which each section is identified by a shape.

We observed in several classrooms that sighted children often have to be reminded not to call out the results of die rolling or game spinners before visually impaired children have a chance to determine the outcome on their own. Visually impaired children may roll the die and try to cover it quickly with their hand in order to discover the result independently. However, in many cases, visually impaired children can almost as quickly identify outcomes though tactile perception.

4.6.3 Use of Audio

Children with a visual impairment often have an acute sense of hearing. Without sight visually impaired children tend to both hear more and have the ability to better locate and identify sounds. This is true because they rely on their hearing instead of their sight and therefore
practice their hearing more often. In a game aimed at creating interaction between sighted and low sighted children, audio clues may actually give the visually impaired child an advantage over the sighted child. If incorporated properly, adding an audio dimension to games can remove the sight advantage, creating a level playing field with equal challenges for all players. Many toys and games have been developed for visually impaired children which replace the sight dimension with the audio dimension. Visually impaired children and sighted children can use audio features as a guide, a clue, or a notification of achievement.

When a feature of a game creates a sound, listening to the sound can help the player identify where the feature is located. For example, at Perkin’s School for the Blind, we viewed the Basketball Game, which involves shooting a ball towards a hoop. The hoop and ball were both rooted on a wood board. The hoop was located over a soft net. After the ball is shot, the child can listen to where the ball hits the board. If it hits the net, the shot was close and only needs to be adjusted a little for the next shot. If the ball hits the board, the next shot needs to be adjusted more depending on if the sound came from the left or the right.

Sound is also used to notify the player to try again or to signal that they are getting closer to their goal. Audio features are commonly used in this way as clues in a game. At a daycare center in Roskilde we were shown a handful of games that had been set aside specifically for visually impaired children. One game is a set of film canisters set in a circle which can be spun around. The game is played as children spin the circle of canisters and pick up one of the canisters closest to them. After the child picks it up they are to shake the canister. Players go around the circle and guess the identity of the contents of the canister. After everyone makes their guess, the contents are revealed and whoever guessed correctly is awarded the next turn. The consultant who explained the game expressed that it is popular among both visually impaired and sighted children because it provides the opportunity to exercise auditory perception.

Another way audio features are implemented is when they are used to notify something happening in a game such as a bell which sounds to indicate that a game has been won. One popular game which included this type of audio feedback is called “Banko” (or Bingo). This game was identified as being a favorite of one student at the Synscenter Refsnaes. Our group participated in the game, in which each player receives a card with different pictures or pieces. The game requires a facilitator, which is generally an adult, though children would also be
capable of performing this role. The facilitator reaches into the bag pulls out a piece that corresponds to one of the pieces on a player’s card. This player receives the piece, which is placed on top of the matching card. Play continues in this manner until one of the players fully completes their card. When a player’s card is filled, the cardholder is to exclaim “Banko!” Not only does this allow the child to celebrate his or her win, but it also notifies the other players that someone had won the game.

Audio feedback in the form of verbal communication is also an effective way to make games accessible to visually impaired children, while promoting conversational exchange between peers. One father said that playing dolls with sighted children was sometimes difficult for his daughter. He described a scenario in which his daughter takes a very verbal approach to playing. Since the actions performed throughout the playtime are not visually evident to her, she describes them out loud. Sighted children, who have visual access to play activity, often do not utilize verbal communication to the same extent. However, this sometimes has an exclusive effect in that the visual impaired child may remain uninformed of the actions of her playmates. For this reason, the father felt that the most fulfilling scenario is one in which the visually impaired girl plays with one friend at a time. In this way, both girls are able to remain better informed of play activity.

4.7 Adaptations

Many common games produced for sighted children may be adapted in order to make them more accessible for those with a sight handicap. These adaptations are a good way to utilize the current toys available on the market even if they are not designed specially for visually impaired children. Many children’s toys use certain characteristics which are also favorable for a blind child. Often times, toys incorporate a variety of stimuli such as colors, sounds, and textures, which are attractive to sighted and visually impaired children alike. However, many of the games that are developed require the use of visually acquired information, or inadvertently give an advantage to children who can see. A visually impaired child often needs some assistance in playing these games. However, simple adaptations to the game may permit more independent play.

One board game observed at a daycare involves gathering several safari animals while traveling around the game board. However, the board is completely flat, and its boundaries can only be visually determined. In order to make the game accessible for her visually impaired
student, a consultant had applied a thin line of tacky craft glue which allows the student to identify boundaries on the board and where to put her pieces. This idea is also incorporated in a variety of other games like dominoes, where dots and markings can be outlined so a child can quickly identify which pieces are being played. Not only do these adaptations provide helpful assistance to those with a visual impairment, but they can also make the games more exciting to play for all the children at the daycare center.

Many of the qualities and characteristics discussed in the sections above represent simple features or modifications which are easily incorporated into toy and game design. Often, complete accessibility can be provided to the visually impaired just by making a small adjustment, such as the incorporation of different shapes in addition to colors. Similarly, strategies for integration are quite straightforward, and stem from a practical approach to inclusive learning. However, the simplicity of adaptations and integration strategies can sometimes lead to simplistic thinking when approaching toy and game design. This can prove to be detrimental if adaptations to sight-oriented games prevent game designers from considering toys and games which are accessible from the beginning, and require no modification.

A slightly different way of looking at toy and game design, is to start by creating play resources specifically for visually impaired children, instead of modifying existing resources. This can be done by designing toys and games to provide challenges which are fully accessible to the visually impaired through the use of sensory perceptions and skills other than vision. This approach to toy and game design is, in effect, a reversal of simplistic thinking which focuses only on minimizing sight advantages of toys and games designed for sighted children. Instead, toys and games are created first for the blind, and then adapted to promote interaction with sighted children. Adaptations should be thought of in a positive light. They are not a means of compensating for something that is lacking, but rather, they promote the use of skills and sensory perceptions which are fully accessible to visually impaired children.

5.0 Conclusions

Based on our observations, research and analysis, we have drawn four main conclusions which are discussed in the following chapter. The first two conclusions have to do with creating a play environment which is both socially and physically conducive to the interaction of sighted
and visually impaired children through toys and games. The remaining conclusions address the matter of identifying an effective approach to toy and game design.

Our first conclusion is that the play environment in which toys and games are implemented is equally as important as the toys and games themselves. An appropriate game is simply the tool used to facilitate interaction between visually impaired and sighted children. Visually impaired children feel more comfortable in an environment which they are easily able to navigate. This generally means a familiar environment and if not a familiar environment, one that is easy to explore and keep track of. Small pieces of a game are easily lost in an unfamiliar environment because a visually impaired child cannot simply look around the room and locate the piece. In a familiar setting, such as a child’s daily kindergarten, it is easy to know where the child might find their peers playing. In an unfamiliar environment the quick transition of sighted children between activities leaves a visually impaired child even more lost because the child cannot see where the peer just ran off too. The ability to navigate the play environment promotes a feeling of independence which can be carried over into playtime and is a positive aid to playing. When visually impaired children are confident about their surroundings, they are more likely to make the kind of social overtures which promote successful social interaction.

Facilitation, which is another aspect of the play environment, is an important and positive part of creating interaction between sighted and visually impaired children. Even so, children often do not enjoy having adults around when they are interacting with other children. It is important to them to be able to play with their peers on their own accord. This also holds true for visually impaired children. While they rely heavily on having a consultant, they would often rather enjoy the company of only peers their own age. It would be ideal to for a visually impaired child to be independent and be able to navigate through the sighted world on his or her own, but this is just impossible. A visually impaired child whose playmate has just run off to a new activity often turns to a consultant for guidance. In games the guidance must also be provided, and while it is often more reliable for this guidance to come from an adult, it can also be given by sighted peers.

Our second conclusion has to do with creating a suitable social climate within the play environment. It is important to maintain an atmosphere of respect and sensitivity within the play environment because it helps all children to feel more comfortable and secure in expressing themselves and interacting freely with others. This is especially true in older classrooms, as
children become increasingly self aware. One way to encourage respect and sensitivity is to provide educators and sighted peers with sufficient information relative to visual handicaps. For example, when sighted children understand that their blind playmate must “read” the face of a die with their fingers instead of their eyes, they are more easily encouraged to be patient or to refrain from calling out the answer themselves. Educators should also be supplied with information which helps them better understand the needs and social engagement patterns of visually impaired students, as well as the role of facilitators and classroom aids.

Visually impaired children should also be provided with information regarding the experience of their sighted peers. Interaction is important in that it gives both the visually impaired child and the sighted child a better understanding of the other’s experience and frame of reference. At the same time, it is also important for visually impaired children to interact with peers who have the same disabilities, with whom it is more easy to relate. Interaction between visually impaired children and sighted children is different, than the interaction between visually impaired children with each other and both scenarios can be beneficial to all the children involved.

Our third conclusion has to do with the toys and games themselves. When a game is implemented between a blind and sighted child, it is important for the game to create an interesting chance for strategizing and winning for both children. Strategizing and playing in many games requires the player to have standard vision. In these cases a visually impaired child’s chances of winning the game are drastically reduced. The interest of the blind child is lost because the child cannot follow what is happening in the game. Similarly, the interest of the sighted child is lost because the challenge of winning does not exist and therefore does not stimulate the child’s interest. A truly successful game is one which creates a level playing field which is interesting for all players. Some of the strategies for designing these kinds of toys and games are outlined in the recommendations chapter of this report. These play resources involve the use of non-visual senses and perceptions, and require all players to utilize similar problem solving strategies.

When the dimension of sight is inaccessible, children create and operate within a different frame of reference in which other methods of gathering and processing information such as smell, memory, touch, and hearing are used in place of visual feedback. This frame of reference, which differs from that of sighted children, must be openly acknowledged when
designing toys and games for visually impaired children. Understanding these considerations allows the toy designer to avoid creating situations in which visually impaired children may be slower or have more difficulty than their peers, thus emphasizing the handicap. It is important to identify the sensory perceptions, skills and abilities which are fully accessible to visually impaired children, in order to create challenges which allow children to successfully exercise these problem solving strategies.

Children with partial sight often incorporate some visual cues into play. However, children with limited vision cannot rely on their vision to the extent that a sighted child can. During playtime, it may take a low vision child more time to take in the same visual information as a sighted child. Thus, visual cues give an advantage to the sighted child, allowing them to play faster. A child with limited vision should not be expected to fully rely on his or her vision. Although it may be tempting to encourage the use of limited vision, it is important that toys and games do not force visually impaired children to rely on visual strategies, especially if it compensates the development of alternative means of information gathering, such as auditory and tactile perceptions.

Our fourth conclusion is that the ideal approach to designing toys and games for sighted and visually impaired children is to start by designing play resources specifically for the visually impaired. This can be done using the strategies outlined in the recommendations chapter, which incorporate the use of non-visual information. This approach is advantageous in that it guarantees that the challenges offered by toys and games are fully accessible to visually impaired children. Adapting sight-oriented games can also be a successful way of creating a game which is enjoyable for blind and visually impaired children. Tactile features, sounds, or even brighter colors are added to the game so the children can use senses, other than vision, to play the game. However, some adapted games still permit sighted children to rely fully on the use of visually acquired information, which inadvertently gives them an advantage. Although adaptation is a valuable technique, it is important that toys and games are not adapted simply for the sake of creating accessibility. The fact that a toy or game is accessible does not mean that it is enjoyable or valuable, or that it promotes the desire for social interaction between sighted and visually impaired children.
6.0 Recommendations

Based on the conclusions defined in the previous chapter, we have identified several strategies for utilizing toys and games in order to facilitate interaction between visually impaired children and their sighted peers. This can be achieved through the implementation of proper toys and games which employ key features in order to address the needs of a visually impaired child while still maintaining the interest level of the other children. Not only do the toys themselves encourage interaction but the environment in which they are implemented has an effect on their usefulness. The attitudes of parents, teachers, and specialists also have an important role in the function of these toys in order to better promote interaction. We recommend that the focus of facilitators who aid children during social interaction should be to enhance natural peer-to-peer interaction. Dependence on an aid should be discouraged.

The play environment should be made as navigable and accessible as possible to promote a sense of independence on the part of visually impaired children. This can be done through the use of classroom adaptations such as tactile pictures on the wall to distinguish between different rooms. Landmarks and orientation and mobility training can be used to help children navigate on their own, while clutter and obstacles should be minimized. Lastly, toys and games should be kept in a place that is consistent and accessible to visually impaired children.

We also recommend that children and adults within the play environment be provided with information relative to visual handicaps. Sighted playmates should understand the behavior of their visually impaired friends, and educators should be made aware of special needs or additional considerations which may be present in the play environment. Awareness may be promoted through a consultant or classroom aid, who works within the play environment.

The guidebook, which follows this report, contains very specific recommendations and conclusions which are meant to be read by parents and persons concerned with the support of a visually impaired child. This resource is to be a stand alone, independent document that can be read and understood by the local community. Included in the guidebook is a brief introduction regarding background information and a concise abridgment of our conclusions. We then progress into specific detail as to the characteristics and features of toys and games. Following this section are several explicit toys and games which we have discovered and confirmed to work well for children with a visual handicap. Some of these will be of our original ideas from our research and conclusions. A final section on further research possibilities and links will aid
anyone who wished to continue supplementary research covering the recommendations we produce.

The following paragraphs highlight key suggestions regarding the promotion of interaction between children of different sight capabilities through toys and games. Based on our research, we can recommend several elements of toys and games which will encourage interaction of sighted and visually impaired children. When searching for a game, whether in a store or of independent design, it is important to address the handicap a visual impairment when children play. It is not always simple but we recommend taking away or limit the advantage of sight so the game will keep all children on a similar level. The games which best do this focus use on the other major senses. Use of sounds, smell, and textures is a great way to implement the variety of other senses in games. We recommend that an ideal approach to developing toys and games promoting interaction between sighted and visually impaired children is to design play resources specifically for visually impaired children. However, adaptations to existing, sight-oriented games can also be very effective. Many ideas and adaptations strategies are discussed below in detail.

The use of sounds and audio in toys and games provide an array of advantages for a visually impaired child. Application of audio stimuli is best used to give a visually impaired child immediate feedback as to actions and moves in a game. For every action there is a sound or noise which tells the child how successful they were. We also recommend games which use sounds and even music as a key component to toys. Children like noise and developing a game which produces music or sounds is attractive to many children.

The sense of smell is often overlooked when thinking about toys and games; however, children enjoy using this ability to identify different interesting fragrances especially in the context of a game. Scented scratch and sniff paper can be found in local craft stores and provide a diverse variety of interesting odors and smells. Using household items, such as extracts, can also be incorporated into a game. A variety of toys on the market use odor and the sense of smell to attract children. One must be cautious implementing these games because many lack in other areas making them unsuitable for blind children.

The tactile scanning abilities of children can be promoted through incorporating textures and different materials into a game. Children often take pleasure in exploring their environment through touching and feeling the things around them. Many easily attainable objects, materials,
and papers can be found at local craft or hardware stores and provide infinite possibilities for applying unique textures to a toy or game. Interest is habitually found in objects which are stimulating to the touch and provide a kind of curiosity when held and these aspects keep interest in the game high.

Use of color is also very advantageous, however, only if implemented appropriately. Visually impaired children often can find bright contrasting color interesting and this can be used to identify objects and provide appeal to a toy or game. A good way in which color is used in games is in conjunction with other senses. For example, games which have pieces that can be identified through both color and shape work well. This feature also makes the game more attractive to sighted children, while those which a visual handicap can still participate.

All these ideas work when incorporated into games and toys to turn the focus of play away from sight and towards the other senses. It must be noted the interaction will only occur if all players are attracted to the game. Color and visual stimuli cannot be completely eliminated from games for many children will choose to play with more desirable and alluring toys. Instead one should make visual necessity only in the sense of achieving interest in the toy and not a critical portion of game play. In addition to the specific characteristics, the games themselves must be analyzed as to whether they are suitable for the visually impaired.

A simple way to create accessible games to children who are blind is ensuring their stability and defining a boundary. Visually impaired children will use tactile scanning methods to envision the arrangement of a game board or toy and can often knock over and move pieces unintentionally. We recommend using a variety of methods to stabilize the game including magnets, Velcro or a peg and groove system. It is important to make sure the pieces, as well as the playing area itself, are as stable as possible. This can also be achieved by having a defined game boundary. This can be accomplished by having pieces attached or connected to the game. One can even use several techniques to adapt many games through use of textures. Raising the boarders on a game board through colored craft glue or plastics can allow a child to feel where they can play their piece; this also makes the game more interesting for sighted children as well. All these recommendation make the games accessible to those children who have a visually impairment and at the same time keep the interest level in the game high and preserve equality among the players, no matter the competence of their sight.
While there are infinite possibilities to invent and adapt games to satisfy the needs of a visually impaired child, many of the current toys on the market are some of the most efficient at promoting valuable interaction. Popular children’s games and toys are also some of the favorites for visually impaired children of the same age. Often the handicapped child wishes to feel as though they can play along with their peers and therefore desires to play with the same toys. These toys often possess particular features which unintentionally work with a child’s sight disability. Building blocks, whether they are part of a game or as stand alone construction, often provide great opportunities for children to interact. Legos are another popular activity which provides stabilization, bright colors, and interesting textures which are attractive to a visually impaired child. They also are extremely well liked by children of similar ages and allow the children to interact and create through communication and imagination.

Cars, trains, army men and dolls are all great toys which promote interaction between children. Train sets long with their tracks provide great entertainment for children because they provide auditory, visual and texture stimuli. The tracks also allow the child to play with the toys in a defined space which is advantageous for a visually impaired child. Similarly, large carpet maps with roads and houses on them provide good means of interaction. They specifically work well with children who only possess a visually impairment. Contrasting colors along the carpet provide guidelines for which many children who have some sight can play on.

A doll house is a very good way for children to communicate with each other and play. We suggest that doll houses which use a variety of the techniques previously described to securely fasten the pieces to the toy. Magnets and Velcro work well for this purpose and allow children some flexibility to tacitly explore when playing with the toys. Current toys should not be overlooked when addressing the problem of facilitating interaction between visually impaired and sighted children. Even simple adaptations to the games provide the needed assistance for the child. However, with a little imagination and with guidance from the conclusions and recommendations made here and in the guidebook, parents, educators, and others interested can find or produce toys and games so their visually impaired child can have multiple outlets by which they are able to interact with sighted children on a level playing field.

All children are individual, each with their own set of personality traits which are separate from the fact that they may have a common disability. Children are born with their own individual personality and the amount of interaction which takes place depends on the individual
situation. It is not possible to create one ideal environment where all children feel comfortable or to create a game which all children enjoy playing. Relying on our research, we have developed a guidebook which we intend for use by anyone who needs the suggestions or to gather information on facilitating interaction between visually impaired children and sighted children. Every recommendation put forth is not going to be suitable for every child. Therefore, everyone should try their own ideas and adjustments when attending to games and toys to facilitate interaction for a visually impaired child.

The situation is still case by case, but there are common characteristics of games and interaction which are particularly successful in facilitating interaction between visually impaired children and sighted children. The individuality of children with visual impairments dictates that a wide variety of toys and games are necessary to address the specific needs and unique interests of each child. It is important to remember that while many of the strategies and characteristics used to adapt and create play resources for the visually impaired are the same, the toys and games themselves should reflect a variety as diverse as the children for whom they are designed.
7.0 Bibliography


17 Feb. 2006


Hughes, Margaret, Dote-Kwan, Jamie, and Dolendo, Janet. “A close look at the cognitive play of preschoolers with visual impairments in the home.” Exceptional Children 64 (1998): 451-463.


### Appendix A: Institutions Visited

<table>
<thead>
<tr>
<th>Institution Name</th>
<th>Date</th>
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<tbody>
<tr>
<td>Videncenter for Synshandicap</td>
<td>March 20, 2006</td>
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<tr>
<td>The Visual Impairment Knowledge Center located in Hellerup, Denmark provides vast resources with their up-to-date library and publications. Our sponsors, Dorte Silver and Bente Jensen also supply knowledge and information concerning topics on our project.</td>
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<tr>
<th>Institutet for Blinde og Svagsynede</th>
<th>March 23, 2006</th>
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<tr>
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<tr>
<td>The institution located in Hellerup, Denmark serves as a house for several organizations including the Videncenter for Synshandicap. Their facilities are specialized to cater to the needs of visually impaired persons and also in assisting and running programs intended for their welfare. Several workshops and rooms at the center are designated to producing items by and for the visually impaired. Also, there are several rooms and even a store in which one can look at toys and games for the blind.</td>
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<tr>
<th>Besøge Syværkstedet</th>
<th>March 28, 2006</th>
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<tr>
<td></td>
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<tr>
<td>Located in Kalundborg, Denmark; this institution produces simple toys and games for children with visual impairments and other related disabilities. These toys are unique to the institution and one would not be able to find them on the current toy market. They are designed for children who have visual impairments accompanied by other serious disabilities.</td>
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<tr>
<th>Synscenter Refsnaes</th>
<th>March 28, 2006</th>
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<tr>
<td>An enormous center located in Kalundborg, Denmark which houses and educates handicapped children and adults. Their handicaps are not limited to only visual impairment but many of those enrolled possess some additional form of impairment. Their staff is rather large and consists of teachers, designers, consultants and others whose job is to assist those in the institution and in Denmark. In their institution they have many classrooms and workshops which have numerous games and toys which have been uniquely developed at Refsnaes. The toys and games are not only found at Refsnaes, but also in homes and classrooms all over Denmark.</td>
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Appendix B: Classrooms Observed

<table>
<thead>
<tr>
<th>Location</th>
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<tbody>
<tr>
<td>Synscenter Refsnaes: Kindergarten</td>
<td>March 28, 2006</td>
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<tr>
<td>A small kindergarten class at the Synscenter Refsnaes, in which several students of varying sight impairments were in attendance.</td>
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<tr>
<td>Synscenter Refsnaes: After School Program</td>
<td>March 28, 2006</td>
</tr>
<tr>
<td>Located in the same classroom as the kindergarten at the Synscenter Refsnaes, with two visually impaired students playing several games with the teachers. We participated in the play of a number of the games.</td>
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</tr>
<tr>
<td>Roskilde: Kindergarten</td>
<td>April 5, 2006</td>
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<tr>
<td>An integrated kindergarten in which we were able to observe one three year old, partially sighted, girl as she interacted and played with her sighted peers.</td>
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<tr>
<td>Roskilde: Daycare</td>
<td>April 5, 2006</td>
</tr>
<tr>
<td>After school we were able to visit with a completely blind six year old girl who was playing in a day care program with several sighted children.</td>
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<tr>
<td>Ishoj Kindergarten</td>
<td>April 19, 2006</td>
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<tr>
<td>An integrated kindergarten, which had one partially sighted five year old boy in the classroom</td>
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<tr>
<td>Hellerup: Kindergarten</td>
<td>April 24, 2006</td>
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<tr>
<td>An integrated part time kindergarten program in which one completely blind six year old girl is enrolled. We observed her play a game with a sighted peer.</td>
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</table>
### Appendix C: Interviews

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
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<tbody>
<tr>
<td>Annette Anderson</td>
<td>March 22, 2006</td>
</tr>
<tr>
<td>Consultant in the Copenhagen area for visually impaired school age children</td>
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<tr>
<td>Jette Hasselstrom</td>
<td>March 22, 2006</td>
</tr>
<tr>
<td>Consultant in the Copenhagen area for visually impaired pre-school age children</td>
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<tr>
<td>Lykke Jensen</td>
<td>March 23, 2006</td>
</tr>
<tr>
<td>Spokesperson at the Institute for the Blind and Partially Sighted</td>
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<tr>
<td>Lone Juul</td>
<td>March 28, 2006</td>
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<tr>
<td>Director of the Besøge Syværkstedet</td>
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<tr>
<td>Karin Lykke Madsen</td>
<td>March 28, 2006</td>
</tr>
<tr>
<td>Teacher of visually impaired students at the Synscenter Refsnaes</td>
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<tr>
<td>Merete Bottger, Svend Thougard</td>
<td>March 28, 2006</td>
</tr>
<tr>
<td>Game directors at the Synscenter Refsnaes</td>
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</tr>
<tr>
<td>Nick Jorgenson</td>
<td>March 28, 2006</td>
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<tr>
<td>Music teacher at the Synscenter Refsnaes</td>
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<tr>
<td>Mogens Bangs</td>
<td>April 4, 2006</td>
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<tr>
<td>Curator for the Blind history Museum at the Institute for the Blind and Partially Sighted</td>
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<tr>
<td>Birgit Moller</td>
<td>April 5, 2006</td>
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<tr>
<td>Classroom aid in the Roskilde area for one four-year-old and one six-year-old visually impaired student</td>
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<tr>
<td>Liff Liesel</td>
<td>April 19, 2006</td>
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<tr>
<td>Consultant outside the Copenhagen area for one five year old visually impaired student</td>
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</tbody>
</table>
**Appendix D: Related Cultural Activities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Date</th>
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<tbody>
<tr>
<td>Blind History Museum</td>
<td>April 8, 2006</td>
</tr>
<tr>
<td>Located in the Videncenter for Synshandicap, the museum provided information on how Denmark has dealt with the issue of visually impairment through the years.</td>
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<tr>
<td>Dialog in the Dark</td>
<td>April 27, 2006</td>
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<tr>
<td>Located in the Experimentarium in Hellerup, Denmark, gives its visitors the opportunity to explore a variety of environments in the absolute dark. Intended to give sighted people the chance to experience what it was like to be blind.</td>
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</tbody>
</table>
Appendix E: Parent Workshop

Date: April 8, 2006
Location: Exploratorium
    Hellerup, Denmark

Scheduling the parent focus group three weeks into our project in Denmark allowed us to utilize it as an information gathering resource in addition to testing any initial ideas or theories. We held the workshop at the Experimentarium located in Hellerup, only a short walk from the Videncenter for Synshandicap. A large conference room was reserved to hold the event. The tables in the conference room were arranged in a manner which established a play area where children could play with toys we brought as well as the toys they brought from home. Dorte Silver helped us advertised the event to local consultants through email. The consultants then made contact with several families with visually impaired children. A formal invitation was made and sent to kindergartens and families. Six families were in attendance at the workshop: 12 adults and 12 children. In addition to the visually impaired children and their families, two consultants and one design student participated in the focus group. The design student is working on developing a game for visually impaired children and showed extreme interest in our project.

Discussions with parents, observations of play behavior and analysis of the features of toys and games were our major goals from the onset of the workshop. This event began at eleven o’clock in the morning and concluded at two o’clock in the afternoon. The decision was made to leave the focus group relatively unstructured in such a manner that we could adjust time and focus depending on the information being received. A lose agenda would also allow us to observe the most natural play behaviors possible. All three project partners split up and began to talk with the parents, families, designers, consultants and children.

Discussion with parents revealed what they had to do on a daily basis to meet the needs of their children. Information was gathered on how they went about solving problems associated with their visually impaired children. The families attending the workshop were not only the parents and visually impaired children, but step parents, sighted peers and siblings and grandparents were also in attendance and encouraged to provide their unique perspectives. Each
family was different and provided methods and beliefs which allowed us to gain various perspectives on the subject of toys and games.

Observing the children gave us the opportunity to examine the play behavior of many different children, both visually impaired and sighted. We watched the children as they played with the toys. Consideration was taken of toys that all children played with and which were the most popular. We observed as much interaction was we could which included interaction between children and between children with adults.

Children and their families were encouraged to bring toys and games which were favored by the children. Lego game, pianos, board games with blocks, playing cards and puzzles were among the games. The focus group was concluded with lunch. A general discussion took place during lunch between the adults.
Facilitating Social Interaction for Visually Impaired Children Through Toys and Games

Developed by:

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Ryan Lizewski
Elizabeth McCoskrie

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This guidebook has been developed by a team of three university students from Worcester Polytechnic Institute in Worcester, Massachusetts, in collaboration with the Videncenter for Synshandicap. The guidebook represents a portion of an academic research project dealing with toys and games which promote social interaction between sighted and visually impaired children. Guidebook content has been collected via extensive research, including literature reviews, classroom observations, and interviews with parents, consultants and educators.
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Introduction

Playing and social interaction are crucial to healthy childhood development. It is during playtime interactions that children acquire valuable social and problem solving abilities which follow them into the classroom and beyond. There are many advantages to promoting play interaction between sighted and visually impaired children. Through this communication, children are provided with the opportunity to make new friends, and share similar interests while gaining insight into the different experiences and orientations of others.

When designing play resources which promote social interaction, it is important to identify skills and abilities which are fully accessible to all children. This enables the designer to select toys and games which provide equal challenges for all players, and allow all children to exercise similar problem solving strategies. Many toys and games which are sight-dependent have subsequently been adapted for the visually impaired. However, the recommendations in this guidebook also reflect an approach whereby toys and games are designed for visually impaired children. Non-visual play strategies including the use of tactile, listening and verbal skills have been incorporated such that the same types of non-visual challenges are presented to all players.

(Continued . . . )
Introduction

It is important to keep in mind that providing children with toys and games is merely one aspect of promoting social interaction. The structure of the play environment, the nature of adult facilitation, and the children themselves all play a large role in creating a social atmosphere in which toys and games can be successfully implemented. Toys and games alone cannot create social interaction; however, in conjunction with the proper play environment, they can be a very powerful tool. This guidebook reflects an understanding that the play environment, as well as toys and games themselves, plays a vital role in promoting social interaction.

The individuality of children dictates that a range of toys and games are necessary to address the specific needs and unique interests of each child. While many of the strategies used in the adaptation and design of play resources for visually impaired children are the same, the toys and games themselves reflect a variety as diverse as the children for whom they are designed. The recommendations put forth in this guidebook are intended to serve as a basic starting point for developing individualized toys and games. All guidebook users are strongly encouraged to make use of guidebook material in order to develop their own creative ideas and adaptations to suit the specific needs of their children.
Toy and Game Features
Play Environment
Things to Remember…

The following is a list of things to remember about creating a play environment that is suitable for encouraging social interaction between blind and sighted children.

Address Children by Name
  Encouraging children to address each other by name helps visually impaired children to better follow conversation and interaction

Avoid Obstacles and Clutter
  Visually impaired children may feel more comfortable navigating the play area independently if they feel that there are few obstacles in the way

Encourage Respectful Behavior
  Maintaining an atmosphere of respect is beneficial for all, and encourages children to feel more comfortable freely expressing themselves

Establish a Context for Free Play
  Toys such as dollhouses, train sets, Lego’s, etc. provide a context for children to interact creatively and imaginatively

Explain What to Expect
  Establishing the rules, and explaining ahead of time what to expect during playtime activities minimizes confusion, and helps children to become more involved

Identify Landmarks
  Landmarks such as tables, walls and shelves can help visually impaired children to feel more comfortable navigating the play environment on their own

Minimize Noise and Distractions
  Since visually impaired children often rely heavily on sounds to provide information about their surroundings, it is especially important to minimize unnecessary noise and distractions

Provide Structure
  Incorporating structure in the daily activities and playtime of visually impaired children can often provide a beneficial context

Store Toys and Games in an Accessible Place
  Consistently keeping play materials in an area that is easy to access encourages children to explore and select new and familiar games independently

One-on-One Playing
  Playing one-on-one with other children is often beneficial because it allows visually impaired children to engage in verbal communication which keeps them involved in play activities
Toy and Game Features

Audio

Play resources which incorporate sound and noise tend to be popular among children of all ages. Audio features are beneficial in that they provide immediate feedback relative to the status of the game.

There are several different ways to replace visual aspects of games with audio adaptations. Audio rewards are incorporated to help children determine the results of their actions. Specific sounds inform children when they come close to a solution, while other sounds announce a wrong move.

Audio clues can also be used as a substitute for the common form of turn taking in games. Instead of dice, spinners or drawing cards, chance outcomes can be recorded onto audio tracks and cued at random. In this way, information is ascertained through hearing rather than visually. For some board games, play instructions, normally read from cards, may also be recorded onto Compact Disc tracks.
Creating a Sound Effect Library

Sound effect games which require children to identify common noises are also fun and accessible. Sound effects can easily be compiled on CD's or computer play lists. The internet is a vast resource for free sounds effects, which can be downloaded directly to a computer and then burned onto a CD. A simple search on the web yields hundreds of sites from which sound clips may be downloaded.

Some free online sites:

Absolute Sound Effect Archive: http://www.grsites.com/sounds/
Partners in Rhyme: http://www.partnersinrhyme.com/pir/PIRsfx.html

Group sound effects by category:

- Animals
- Instruments
- Urban or Rural
- Ocean
- Household
- Bird songs
Toy and Game Features

Making Games Tactile

Shapes

Adding fun shapes to a toy or game make it more interesting to see with your hands. Varying shapes can be used to represent each player’s individual game pieces as well as make a playing field more interesting and navigable. Any shape imaginable can be used. In order to make deciphering their shape easier for players try to make the shapes as different as possible.

Here are a few shapely suggestions:

- Triangle
- Pyramid
- Cone
- Circle
- Sphere
- Cylinder
- Polygons
- Square
- Rectangle
- Cube
- Star
- Points
- Bumps

Materials

Different types of materials can also create differentiation between play pieces and areas on a game board. Varying materials is an excellent way to make colors tactile. Colors, being such a visual feature, can also be represented by different texture. Homes, offices, craft stores are all filled with different types of materials. Below is a list of suggested materials:

- Nylon
- Smooth
- Velcro
- Foam
- Rough
- Plywood
- PVC Pipe
- Feathers
- Non-Skid Bumps
- Fabric
- Paper
- Sand Paper
- Fuzzy
- Plastic
- Metal
- Furry
- Odds and Ends
- Cardboard
Since tactile scanning is such a key component to play for a blind child, it is important to create a game environment that is stable. When objects are loose and free to travel out of the range they can be easily lost. Also, when a player cannot clearly see the game board it is important for them to be able to remember where their pieces are. Objects need to reliably be where they were left and not easily knocked out of place.

Here are a few suggestions for stabilizing a game environment:

**Magnets** can be fastened to pieces that need to stick to another piece or the game board. For example, if the game pieces of a game are magnetic they can be moved between spaces which are either magnetic or metal. The magnetic field gives the pieces an extra pull to their appropriate places but they are also easily moved when the movement is intentional.

**Velcro** can be used in the same manner as magnets, but it is important to recognize that the more Velcro is used, the more it becomes warn and does not stick as strongly. Velcro is very good for pieces that will generally stay either on or off a game for the entire time of play. For example, an addition to a game that can be added for younger children but should not be there for older children can be added and removed using a Velcro binding.
Making Games Stable

**Indentations for game pieces** can be created to make a game stable. Raising and receding game spaces makes them easily located. Receded game spaces also create walls which will keep pieces from sliding horizontally around the board.

**Surrounding the perimeter** provides a very specific area in which the game is played. A perimeter may also create a boundary to keep pieces from traveling too far and therefore out of reach of the player. The boundary may be as simple as a tabletop or a square of carpet.

**Rope or string** is useful in tying game pieces to a board so that they are movable, but do not go too far. For example an object such as a ball that you shoot can be tied to the game board with a string. The rope will allow the ball to be shot repeatedly in any direction and can then be easily retrieved by tugging on the string.

**Bowls or containers** can be used to house a collection of small pieces. If there is a pool of objects players are to grab from, putting them in a bowl or cup will keep the objects all together in one recognizable location.

**Outlining pictures** or game squares is easy to do with tacky craft glue or by sprinkling sand onto regular glue. This makes it possible for children to navigate a game surface which would otherwise be smooth.

**Suction Cups** are also very valuable for securing portions of the game to a surface. They are more difficult to move and repeatedly place back which makes them efficient for pieces which do not need to be moved often.
There are many methods for creating chance in a game. The challenge is to make it so that all children can receive information at the same time. Here are a few suggestions of ways to create chance in a game:

**Dice** with tactile features such as raised dots. Shaking the dice in a cup allows for adequate shaking and a smooth, controlled pour. Covering the dice after a roll allows the roller to feel what they have rolled first and then to share with the rest of the group.

**Tracks on CD or MP3 Player** can be recorded of all the possible options for the game (e.g. 1,2,3… or right-hand red, left-hand blue…). When the CD or MP3 player is placed on random, the options will be said in an unpredictable manner so all players can hear at the same time.

**Tactile game cards** can be drawn upon a player’s turn. Braille can be used on the cards to indicate a number or position in addition to the normal card face. The player can then follow the directions presented on the card. The cards could also have different textures which correspond to spaces on the board and upon drawing a certain texture they are to move to a space with that texture.

**Spinners** can be used which incorporate tactile features, such as shapes and varying textures.
There are many games that exist on the toy market which were intended for use by sighted children. In some cases these games can be adapted so that both visually impaired and sighted children can play with them.

On these games there are often flat images recognizable only through vision and not through using tactile scanning. For blind children these images can become differentiable from the rest of the board if they are raised. One way to do this is to outline the shapes with craft glue or by gluing down sand around the general boarders of the images. Solid wood or plastic shapes secured on top of the flat shapes can also make them recognizable through touch.

In the same way, Braille can be used to represent words which appear flat on the page. By placing clear Braille words over or near the written words, the written words become readable for the blind children as well as remain readable for sighted children who cannot read Braille.
Some of the qualities and characteristics discussed in the guidebook represent simple features or modifications which are easily incorporated into toy and game design. However, the simplicity of adaptations and integration strategies can sometimes lead to simplistic thinking when approaching toy and game design. This can prove to be detrimental if adaptations to sight-oriented games prevent game designers from considering toys and games which are accessible from the beginning, and require no modification. Adaptations should be thought of in a positive light. They are not a means of compensating for something that is lacking, but rather, they promote the use of skills and sensory perceptions which are fully accessible to visually impaired children.

It is just as important to remember that there is not a single game out there that every child enjoys playing. If a child does not take to a particular adapted game, it does not necessarily mean that the adapting was a failure. Don’t be afraid to be creative and consider new games based on the interests and skills of each unique child.
Toy and Game Catalog
Memory and Matching Games

There are a variety of fun ways to play Memory games. Using different smells, sounds and textures allows children to develop different senses while having fun!

General Instructions:

- Children take turns selecting pieces two at a time in order to find a matched pair.
- The player who identifies a matched pair may take an additional turn.
- Play continues to the left.
- The game ends when each piece is matched.
- The player with the most matches wins!

Shaking Memory Game

_Description:_ Matching game played using opaque containers (e.g.: black film containers) tightly sealed, and filled with different contents.

Suggested contents:
- Rice
- Marbles
- Sand
- Small beads
- Small seashells
- Coins
- Paper clips
- Rubber erasers
- Plastic buttons
Toy and Game Catalog

Fragrance Memory Game

*Description:* Matching opaque containers (e.g.: black film containers), easily opened, and filled with differently scented contents in pairs. Adaptations using scented oils, candles and air fresheners may also be an option.

*Suggested contents:*
- Cinnamon sticks
- Pine needles
- Crayons/wax
- Soap
- Various cooking spices (curry, ginger, rosemary, etc.)
- Citrus
- Vanilla
- Coffee

Objects Memory Game

*Description:* Hidden containers or sealed cloth bags containing small, easily distinguished objects in pairs. Bags can be spread out on a flat surface or arranged on a Velcro board.

*Suggested contents:*
- Coins
- Rings
- Marbles
- Buttons
- Pompoms
- Plastic shapes
- Pasta
- Keys
- Seashells
Musical Instruments

Incorporating instruments in the play environment can provide an interactive means of self expression.

Children's microphones and keyboards which have different sound options, demo songs and fun sound effects can all provide fun, non-visual entertainment.

Rhythm ensembles require simple facilitation, and are a fun way for groups of children to participate in musical self expression. Simple rhythm instruments distributed to each child can be played along to familiar tunes.

Challenge teams of children to create their own original radio program using simple tape recorders and cassette tapes. Children are given a brief amount of time to evenly distribute speaking roles. They are allowed a span of two or three minutes to record their own radio broadcast which may include commercials, news, and weather reports, etc. The recording is rewound and played back to the children, giving them the opportunity to enjoy listening to their voices on tape!
Toy and Game Catalog:

Texture Twister®

*Description:* This game is played in the same way as the original Twister® game, except that textured materials are used in combination with differently colored circles. Textured circles are affixed to the mat, with same textures placed over same colored circles. The spinner may be similarly adapted by covering colored circles with textured material.

![Texture Twister®](image)

Dominos

*Description:* Dominos is a well known game with many variations. The use of color, numbers, shapes and other characteristics make them well suited for interaction between children.

![Dominoes](image)
Checkers and Chess

*Description:* Checkers, Chinese Checkers and chess boards can be easily adapted to include visually impaired children in the play. Having pegs or recessed playing areas allow the visually impaired child to know where to play their piece and keep the piece from moving around the board too easily. The opponents pieces many be of different texture or shape in addition to color to allow both children to identify their pieces with ease.

Basketball

*Description:* This game has the ball attached to the board to prevent it from going too far and had a variety of surfaces for the ball to hit. This auditory discrimination allows a child to identify where the ball has landed and this information can be used to properly adjust their next shot.

Bowling

*Description:* All the pieces are attached to the board and the pins are easily reset by pulling on a string to bring them upright again. The color appeals to sighted children and the auditory feedback allows a child to determine how well they have struck the pins.

1 Pictures taken at Perkins School for the Blind
Othello®

*Description:* One simple way to adapt this classic game is differentiating either side through contrasting textures. For some partially sighted children, Othello may be accessible without any adaptations at all, since distinction between only two colors is required.

Apple Game (Æblespil)²

*Description:* Specially designed for the visually impaired, this simple game is appealing for sighted children too. Young children have the opportunity to practice counting as they add and remove apples to the tree. A tactile die is used to determine the number of apples to be placed on the tree. Interactive modifications may include racing to see how many turns it takes each player to fill the tree. Players may also divide themselves into “adders” and “removers” and take turns rolling dice to fill or empty the tree.

Connect Four®

*Description:* Like Othello, this game can be adapted through varying textures which differentiate black and red pieces. This game also can be played by some visually impaired children without adaptations.

² Pictures taken at Synscenter Refsnaes
Legos and Building Blocks

Several common childhood toys work well without modification to encourage interaction between children. Building blocks and Legos provide good opportunities for children to work together and play.

Magnetic Building Pieces

*Description:* These small magnetic balls and rods allow children to build many objects and the magnetic attraction permits the pieces to stay fairly well attached.
Card Games

Description: Card games are very adapted to allow participation of visually impaired children. Braille and enlarged faced cards can be purchased and used for any conventional card game.

Textured Uno

Description: Played in the traditional manner the cards have been modified so that a texture and a color represent each card. Braille is also added to represent words and numbers.

Balls

Description: For visually impaired children, adding bells, holes, and varying textures to balls can make them easier to play with and more interesting. The holes and textures make them more interesting to touch and the bells make them easier to follow and locate. Balls can be incorporated in a number of interactive games and sports.

1 Pictures taken at Perkins School for the Blind
3 Besøge Syværktedet
Role Playing

*Description:* Role playing games provide a means to encourage children to interact through imaginary play; many visually impaired children love to inter-mingle through dress up and role playing activities. However, it is most beneficial when a small group children play together, for often the visually impaired child may be left out of the play.

Story Boards²

*Description:* A story board is an easily constructed game which possess many possibilities for adaptations that can be adjusted to keep interest in the game for a variety of children. The use of Velcro, felt or even magnets are some of the ways in which one can produce a story board that can be used in either structured or free play activities. The items to be attached on the board should be easily identifiable to the visually impaired but still fun looking and interesting for sighted children.

Figurines and Play Sets

*Description:* Dolls and doll houses allow children to interact in small groups and verbally communicate. Many times, the children will play verbally by explaining their actions aloud. Utilization of a variety of stabilization techniques can be employed such as magnets or Velcro. Many other games posses the same characteristics; for example, army men, cars and street rugs and even train sets.

² Pictures taken at Synscenter Refsnaes
Marbles!

2 to 4 Players

The object of the game is to get rid of all your marbles by depositing them into the numbered and unnumbered containers on the game board.

Materials

- Cardboard or wooden game board
- Five matching containers
- Plenty of marbles of matching sizes
- Raised Die and Rolling Cup
- Glue

Assembly

Secure containers in a row on the game board, leaving room at the ends of the rows. This may be done either by gluing them directly to the board, or by constructing a raised outline in which the container can rest securely.

Assign a number (1-5) to each container by gluing the correct number of marbles next to the cookie cutter. Arrange marbles as they would be on the face of a die. In the end, there should be a single marble next to the first container and five marbles next to the last.

At the end of the rows secure another container, large enough to hold up to about 20 marbles.

Instructions

1. Ten marbles are distributed to each player
2. The first player is determined according to highest roll of the die
3. Each player begins their turn by rolling the die, and then placing one of their marbles in the cookie cutter whose number matches that on the die
   - If the container already contains three marbles, the player must collect all marbles from the container and add them to their own pile.
   - If the number six is rolled, the player may deposit three marbles in the containers on the end, regardless of whether or not they are already full.
4. Play continues to the left in this manner until one player has successfully gotten rid of all their marbles
Objects Guessing Game

4-6 players, in teams of 2

Various easily distinguished objects are placed inside matching opaque bags and placed in a central location.

- Toy car
- Seashell
- Cookie cutter
- Sunglasses

- Players congregate around the central pile, with partners sitting opposite each other.

- Play starts when one player selects a single bag from the central pile. The player must silently identify the object using tactile perception. The player then has limited time to describe the object to their partner, without actually naming the object.

- If the teammate correctly identifies the object by name, the team is allowed to keep the object, and play moves to the left. On the other hand, if the teammate cannot correctly identify the object within one minute, the object is placed in a separate discard pile, and play moves to the left.

- The team with the most objects at the end of the game wins!
Audio Story Game

- The game begins with players gathered in a circle.
- A sound effect is played and the first player begins a story incorporating the sound.
- Play continues to the next player and they must build upon the story incorporating the next sound they hear.

The game might sound something like the following:

First child: Five children from Copenhagen decided to set off on a sea adventure. They bought a large boat and filled it with enough food to last a whole week.

Sound effect: Dog barking
Next child: “Fortunately, there was a big friendly dog on board to keep them company”

Sound effect: Thunder
Next child: A terrible thunderstorm suddenly started rocking the ship

- The story is continued in this manner until a certain predetermined number of sound effects have been played.
Game Board

Game boards are easy to construct and can be adapted to accommodate a variety of different games.

**Game Board:** Wooden, magnetic or substantial cardboard. Magnetic dry erase boards work well.

**Game Squares:** Squares should be outlined or framed with craft glue, sand, wooden strips, pipe cleaners, etc. for easy tactile differentiation. Contact glue may have to be used when attaching pieces to some materials.

**Game Pieces:** Game pieces should be substantial enough to stay fairly securely in place on the game board. They must be easily to differentiate tactiley.

**Objects:** Fun objects which are tactilely distinguishable may be glued around the perimeter of the board to denote specially marked squares. When landed on, these squares indicate that players must perform some special action.

**Tactile Die:** A die may be used to indicate how many spaces are to be moved.
**Fruit Basket Game**

This game is fun and easy to make! The instructions can be used in conjunction with the homemade game board described on page 29. Although this game involves collecting pieces of fruit, a variety of different objects may be incorporated according to the interests of the children for whom the game is made. Some examples are: pizza toppings, different 3-D shapes, animal figurines, etc.

**Instructions**

**Object:** To collect four matching pieces of fruit from the basket and from other players. (2-4 players)

1) Every player starts with their game piece in the center of the board. The player who rolls the highest goes first.
2) Players take turns rolling the die and moving clockwise the number of spaces indicated by the die. Play moves to the left.
3) If a player’s game piece lands on a specially marked square, the player must perform the action indicated by the square. Directions* may be either assigned to the differently marked squares recorded onto CD tracks, which are played each time a player lands on a specially marked square.
4) If a player’s game piece lands on that of another player, the other player must move back to the center of the board and must select one piece of fruit to return to the fruit basket.
5) The first player to have ONLY four matching pieces of fruit in their possession is the winner!

*Suggestions for directions:
- Collect one piece of fruit from the basket
- Put one piece of fruit back in the basket
- Collect one piece of fruit from the player on your right/left
- Player on your right/left may collect one piece of fruit from you
Go Fish Bags

This game is similar to Go Fish and includes a fun tactile variation!

Instructions

Object: To collect the most sets of four matching objects from the center and from players. (2-4 players)

1) Each player is dealt four Go Fish bags.
2) Players take turns being the “fisherman” by asking the player on their right if they have an object which matches one of their own.
   - If the player on the right has one or more matching Go Fish bags, he or she must give them all to the fisherman. The fisherman may then request another match in the same fashion.
   - If the player on the right does not have any matching bags, the fisherman must “go fish” by selecting one piece at random from the center pile. If the selected piece is a match, the player may go again. Otherwise, play moves to the left. If there are no Go Fish bags left in the center pile, the fisherman may continue asking players to the right until one of them can provide a match.

Make the Game on Your Own!

Object bags are easily constructed out of pieces of fabric. Bags should be just large enough to accommodate the size of all objects. It is important that the bags look similar, so that they cannot be differentiated by sight. Therefore, objects should all be relatively similar sizes. The material should allow for easy tactile perception of contents. Twenty-eight bags (seven different kinds of objects) were used for this game. More bags can be used depending on the number of players.
Further Resources
Further Resources of Information

Development

“What Social Skills Enhance Integration”
Dr. Sharon Sacks
http://www.tsbvi.edu//Education/social-skills.htm
This link is a bulleted list of characteristics which enhance social integration.

“Orientation And Mobility (O&M): The Early Years Of Infancy Through Preschool”
Tanni L. Anthony, Ed.S.
http://www.tsbvi.edu//Education/early-years.html
This article describes some developmental challenges commonly associated with visual impairment in young children. The author discusses the fact that development in visually impaired children is, in fact, often different from that of sighted children.

Toys and Games

“Creating Educational Toys And Activities For Children Who Are Blind Or Visually Impaired”
Jennifer Urosevic, Lee-Anne Cross
http://www.tsbvi.edu//Education/activities.htm
This website from TSB is written by professional O&M instructors, and provides insight and background into toy development for visually impaired children. It also talks about the Montessori approach to learning and mentions the work of Lili Nielsen. The toy and game suggestions at the end are specially designed to aid the orientation and motor skill development of young children.

“Preschool Children with Visual Impairments”
Virginia E. Bishop, Ph.D. (1991)
http://www.tsbvi.edu//Education/preschool.htm
This is an excellent, comprehensive resource which provides technical, social and educational information relative to childhood blindness. The article discusses the implications of blindness in the learning environment, how visual impairment affects early development, and ideas for activities which are non-exclusive for the visually impaired student.

“Orientation and Mobility: Preschool Style”
Cecelia Quintana, COMS
http://www.tsbvi.edu//Education/preschool-om.htm
This article contains descriptions of games which teach O&M skills. The games are specifically directed toward visually impaired children. Many of the games are designed for multiple players, but tend to require involved set up and facilitation. Adaptations can be made to many of the games such that less facilitation is required, and games are suitable for sighted children as well.
Further Resources of Information

Published Catalogs

http://www.afb.org/Section.asp?SectionID=62
The Toy Industry Foundation along with the Alliance for Technology Access and the American Foundation for the Blind public an annual catalog consisting a variety of toys and games which meet the needs of handicapped children including those with a visual impairment

American Printing House for the Blind Catalogs
http://sun1.aph.org/catalogs/index.html
The site provides several catalogs produced by the American Printing House for the Blind with a list of a range of aids, supplies, and tools to assist those with a visual impairment in a variety of settings.

Exceptional Teaching Inc.
http://store.exceptionalteaching.net/edgaandto.html
This online store provides many options for current games which may be able to work for those with a visual impairment

“Able to Play: Play products for children with special needs”
http://www.abletoplay.org
Assists both parents and professionals in finding the best toys suited for children with special needs.
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