200 Years of Experience and Challenges of Today

READER

Learning and Visual Impairment
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Introduction

Pupils and students with visual impairment will be included in their social environment, school and community only when the educational system meets the needs of all children, pupils and students. Visually impaired pupils and students need equal access to core and specialized curricula through appropriate methods and learning materials. This special access will be provided by an adequate professional team, which works with multi-professional principles and consists of teachers, psychologists and different kinds of necessary assistance such as administrative, technical etc.

We the authors are professionals with many decades of experience in schools and universities working in the field of education for people with visual impairment at school and higher education level. Since 2006 we have been working together on developing modules for teaching special education for pupils and students with visual impairment.

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1964-1975 she worked as a special teacher for the visually impaired at the State Boarding School for the Blind in Budapest.
1975-1997 she was lecturer and head of the Department of the Education for the Visually Impaired at the Training College for Special Education “Bárzi Gusztáv” in Budapest.
Since 1997 she has been working as a professor for rehabilitation and education of individuals with visual impairment at the University of Dortmund in Germany. Even though she officially retired from this position in 2007 she has continued lecturing at university level in Germany, Italy, Hungary and Jordan.
Emmy Csocsán was one of the persons at the University of Dortmund who established the virtual resource centre ISaR, i.e. Resource Centre for Inclusive Services for children and young persons with visual impairment in schools. She is still working on this project.

**Solveig Sjöstedt** studied to become a primary school teacher at the Teacher Training College in Ekenäs, Finland 1959-1963.
1964 she completed her special education studies in the field of visual impairment and received her diploma as a teacher for the blind. After this she worked one year as part time teacher at the Swedish School for the Visually Impaired in Helsinki.
1998 she got her masters degree in special needs education at the University of Jyväskylä.
1965-1972 she worked as secretary at Taucher Advertising.
Since the late 70’s she was part time lecturer at the Åbo Akademi university until her retirement in 2000.
1972-2000 she worked as principal for the Swedish School for the Visually Impaired.
2000 she was titled Honorary Counselor of Education.
2003-2005 she worked as senior expert in Kosovo in the project Development of Education Sector in Kosovo.
2006 – 2007 she worked as senior expert in Romania in the project Access to Education for Disadvantaged Groups (PHARE 2004)
She has furthermore lectured at university level in Jordan.

The two authors have written several books and articles on different subjects in education of the visually impaired. The most noteworthy in this connection is Maths ‘seen’ with other Eyes (2002) written in cooperation with Oliv Klingenberg (Norway) and Kajsa-Lena Koskinen (Finland). Since it appeared it has been translated into 7 other languages and can be found in over 60 countries.

This reader is a collection of learning materials on methodology of teaching in order to help teacher training students and colleagues at schools to get information, enhance their knowledge, to get a new approach and to give them skills for the different situations they will meet at school.

We have concentrated on didactical approaches, topics and examples. Students who work with these texts should have previous knowledge in basic pedagogical, medical and psychological issues. We do not deliver recipes but would like to help teachers and students to get ideas and thoughts on how they could modify the given knowledge and knowhow concerning the local economical and cultural surrounding and personal needs of the students.

We represent our countries and use examples from Europe but we are open-minded and would like to initiate the groups of students in the workshops to cooperate and develop new ideas especially suited for your countries.

Unfortunately the collection cannot be complete but we plan to renew it when we get initiatives from our students and of course from our own theory and field of practice.

The reader contains of texts (original and translations) as well as examples from theory (research and teaching) and school practice.

First we give our readers a historic background on the education of pupils with visual impairment (chapter 1) as one may better understand the situation today if one has knowledge about the past.

The specific challenges teachers may meet when having a child with visual impairment in your class are the basis for the second chapter.

The possibilities to adapt methods used in the classroom in the different subjects to suite the whole class including the pupil with visual impairment is illustrated in chapter 3. The core subjects, literacy and mathematics play an important role in this chapter but other subjects where pupils with visual impairment need another approach are included as well.

Today inclusion of children with visual impairment plays an important role in the educational planning in a vast number of countries throughout the world. Chapter 4 gives ideas on how inclusion of these children may be carried out. It is important to understand that inclusion is not just a placement of the child into a regular classroom. For inclusion to function a totally new approach to education is needed. But education of the children and young persons with visual impairment is not only a question of teaching the children. Life long learning for the teachers is important as
well. A method to facilitate the teaching and to ‘grow’ as a teacher is to create a personal teaching portfolio. An idea on how such a portfolio may be used is part of the chapter.

All over the world the number of children with multiple disabilities has increased. Chapter 5 gives some basic considerations as how to teach these children.

The Appendix contains a number of ideas on how you can carry out self experiences and thus better understand the situation a child with visual impairment lives in. You will furthermore get Braille alphabets as handouts in some interesting languages and ideas on how to assess learning outcomes. Handouts on our presentations can also be found among the appendixes.

Our most important goal is to help to develop a personal approach and a way of thinking for the future teachers regarding their work with children and young people with visual impairments. As we pointed out we consider that being a teacher is a lifelong learning process and because of this we have put together useful addresses and sources for you to be able to gain further knowledge and inventions in this field of education.

We ask our students and colleagues who have been working with the texts not to hesitate to contact us and give us feedback and useful remarks concerning the content and ‘learnability’ of our reader/collection.

We wish you a good start and success in your learning.

November 2008

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1.1. History of the education of the Blind

- Introduction

Today we talk about persons with a visual impairment which includes persons with blindness as well as persons with low vision. We use the word blind in the history part of the reader as this was the accepted term during the time we are talking about. Throughout history the situation of the blind has depended on the type of society they have lived in. In ancient times when the main means of survival was hunting and the tribes had to move to where the hunting was good, each member of the tribe had to be physically fit. The old, sick or handicapped where then a burden to the tribe and were often left to die. When a tribe settled down and the agricultural era began, it was easier to share the work so that everyone somehow could take part in the work of the tribe. It gave the handicapped a chance to survive. In the ancient Greek society philosophy, literature and music played an important role. It is not surprising that blind persons had a possibility to excel during that time.

Before the first school was established in Paris several blind persons – among them a surprising number of women – got an excellent education due to the fact that they were born into wealthy families and had parents who understood that a good education is important. The blind persons themselves developed methods to be able to read and write, to do mathematics and to produce music notations. These were the persons who gave the founder of the first school for the blind, Valentin Haüy in the late 18th century, ideas on how it would be possible to teach blind children.

Throughout the development of schools for the blind around the world since 1784, directors and teachers have been traveling abroad to get information on how teaching of the blind is organized in other countries. This is an ongoing trend even today.

The most important development in the education of the blind took place when Louis Braille (1825) developed the Braille notation system. This is today used all over the world.

The establishment of the residential schools for the blind became the only way for most of the blind children to receive an education. It took until the 1950’s before the thought of integration of children with handicaps was taken seriously. Today the terminology has been changed as integration meant that the children were the ‘problem’ and should receive help aimed at them whereas inclusion has a different aim, the school should change and provide good education for all children.

Short History of the Education of People with Blindness

To fully understand the treatment of persons with a handicap we must go far back in time and see how they were treated in primitive societies. During the time when hunting was the main source of survival, persons with a handicap were a burden to society. The tribes had to move from place to place and a person who could neither provide food nor travel without assistance was consider too much of a burden and was, as a rule, killed. In the agricultural societies there was a manifold of duties that
could be carried out by the old and persons with a handicap and thus give them a chance to survive.

During ancient times in Greece blind people could get prominent positions as singers, poets, sight seers and philosophers. Blindness was actually seen as an asset in these positions as sight was considered to distract you from your inner thoughts. The most famous writer of that time was Homer. The vividness, accuracy and visual orientation he described in his books shows, however, that he must have been sighted in his youth. Even the legislation created by Solon (639-599 B.C?) contained a special assistance program for the blind. They received money to cover half of the costs for modest living.

In most other societies at that time the main income for the blind was through begging. During the Middle Ages the first hospitals exclusively for the blind were founded. Syria was the first country to open a hospital of this kind near Cyr in Syria in the fifth century. The most famous one was the Quinze-Vingts in Paris which was built in 1254. It was built for the crusaders that had become blind during the wars.

**They made the difference – Some Educated Blind Persons in the 17th – 19th Centuries**

The beginning of the 17th century was the time when the blind were at last allowed to live, they were protected and were given a chance to lead an acceptable life. There were several persons who were not only able to study but who managed extremely well both in their studies and in their work. Many of them had a wide influence in the establishment of schools for the blind as well as the methods used in these schools. The first person to state that blind people actually ought to earn their living by working and not by begging was the Spanish humanist and social reformer Juan Luis Vives (1492-1540). He stated that some would be able to study, others could perform music, make handicraft or draw the wine-press. In his opinion the only reason they could not work was laziness.

In the 15th century Gutenberg’s invention, the printing press, made quite a difference for the sighted. Not being able to read and write had never been a problem for the blind because most sighted could not read and write either at that time. With Gutenberg’s invention books became more and more common among the middle class people. It did, however, take until the 19th century when Louis Braille created the system for the blind until reading and writing became common among the blind.

Jacob Bernoulli was the first teacher who documented information on the teaching of a blind person. He was the teacher of the very talented Esther Elisabeth Waldkirch. She was born in Geneva in 1660 into a well-to-do family. She became blind very young but her father gave her a good education. At the age of fifteen she knew German, French and Latin. She was also a talented musician playing the violin, the flute and the organ. When Bernoulli became her teacher he wrote an article about his methods in the Journal des Savants. He had cut out all the letters of the alphabet into a tablet where she could follow them with a pencil. He then prepared a writing frame where she could write the letters herself. She was corresponding with people in all her three languages.

The Englishman Nicholas Saunderson (1682-1739) is possibly the most famous blind scientist ever. From the very beginning he was an excellent mathematician. He
created a calculating board which consisted of squares, each of which was divided by two middle lines. Each square contained nine holes where one could put in needles with small or big heads. With this board it was possible to get all the numbers and operators needed even for highly complicated calculations. The board could be used in geometry by either using needles or needles and threads. Saunderson studied at Cambridge and was appointed professor on the recommendation of Isaac Newton. It was said that Saunderson was the only person who fully understood some of Newton’s theories. He was considered to be an excellent lecturer as well.

Another talented woman was Mélanie de Salignac who was born in France in 1741. She became blind due to smallpox when she was two years old. She was taught by her mother and some teachers and learned how to write using a pencil and a ruler as aid. She learnt to read by pinpricking the letters on heavy paper. She corresponded with her friends in this way and they had to pinprick the answers to her in the same way. She was furthermore a good singer, musician and dancer. She studied geography with the help of tactile maps made tactile with different kinds of materials so that she could distinguish the boarders, cities, rivers and mountains. R. Weissenburg was born 1756 in Mannheim in Germany. He too became blind because of smallpox. His teacher Christian Niesen found imaginative ways to teach his student. He used Saunderson’s arithmetic board, which he improved. Weissenburg was very skilled in arithmetics, geometry, trigonometry and algebra. In geometry he used cardboard and wire. In writing he used the same frame as Esther Waldkirch. In geography the maps were made tactile by using different kinds of materials. Weissenburg corresponded with Maria Teresia von Paradis by pinpricking the letters on heavy paper.

A third influential blind woman was Maria Theresia von Paradis who was born in Austria in 1759. She became blind when she was 3 years old. Her godmother was the Empress Maria Theresia of Austria. Von Paradis received an excellent education. She was highly musical and performed in the Viennese churches. Besides music she studied languages, history and geography. In 1784 she made a concert tour to Germany, Switzerland and France. In Paris Marie Antoinette invited her to sing in Versaille and was totally enchanted by her performance. At one of the concerts she met Valentin Haüy who was taken by her ability to read and write pinpricked texts. He discussed with her the ways she had learnt mathematics, geometry, geography as well as reading and writing. He was also told about her cooperation with Weissenburg. Haüy thus got the basic knowledge he needed when he founded the first school for the blind in Paris.

The list of prominent blind persons who have influenced the education is not complete if you do not mention two deaf-blind women in the United States. The first person to receive a successful education was Laura Bridgman, born in 1829. She was the first deaf-blind person who acquired the ability to communicate. To the regret of her teacher she never learned to speak since he did not try to teach her the oral method. Her teacher Samuel Gridley Howe started with single short words like pen and pin. He used the letters of the blind and put a pen beside the word and had her go over and over the word and touching the pen to understand that the word meant pen. Then he introduced the letter i, and wrote the word pin with a pin beside. In this way he introduced letter after letter until she got the idea and the whole alphabet. As the papers became difficult to handle he started placing his fingers in a certain
position in her fist and repeating it until she understood that a certain position meant a certain letter.

It did, however, take over one hundred years before the education of the deaf-blind got a real push forward. The person we have to thank for that is Helen Keller. Helen Keller was born in Alabama in the US in 1880. When she was 19 months old she got an illness which made her deaf and blind. Helen Keller was an unruly and wild child. In 1887 she got a teacher, a blind girl who had regained some sight, Anne Sullivan. Sullivan started to teach her by spelling ‘doll’ in her hand and showing her a doll. She hoped that Helen would connect the letters with the object. Helen learned the letters and could spell correctly but did not understand that she was spelling words and that words are connected with objects. The understanding appeared at the family water pump when Anne Sullivan pumped water on Helen’s hands and spelled w a t e r. After that moment Helen was an insatiable learner and quickly learnt the spelling alphabet as well as raised print for the blind.

In 1890 she wanted to learn oral speech because she had understood that a Norwegian deaf-blind girl could speak. She thus got a speech teacher as well. In 1898 Helen was accepted into Cambridge school for Young Ladies and afterwards she entered Radcliff collage in 1990. Helen Keller was the first deaf-blind person to get a B.A. Helen Keller wrote several books, she traveled all over the world lecturing and received a number of honorary awards.

Denis Diderot (1713 – 1784) was a French philosopher who wrote ‘Lettre sur les Aveugles a l’Usage de qui Voient’, (Letter on the blind for the use of those who see) as well as ‘Addition to the letters on the blind’. The second book was written after he had met with Mélanie de Salignac. The English philosopher William Molineux had created the so-called Molyneux problem, i.e. whether a blind person who has regained his sight with his vision can distinguish between a cube and a sphere which he before only has experienced by touch. To discuss this problem Diderot met with a blind man, Lénotre. Diderot met with Nicholas Saunderson at Cambridge as well. Diderot was interested in the use of symbols. According to him we have symbols for our eyes in the alphabet and for our ears in sounds. He did not, however, think that we have symbols for the sense of touch and of obtaining its responses. ‘For lack of language there is no communication between us and those born blind, deaf and mute. They grow, but they remain in a condition of mental imbecility. Perhaps they would have ideas if we were to communicate with them in a definite and uniform manner from their infancy; for instance if we were to trace on their hands the same letters we trace on paper and associated with the same meaning with them’. This idea was published in 1749 and shows that he was far ahead of his time. Diderot furthermore thought that the accomplishments of the blind are results of practice and interest and not automatic sensory compensation.

In his encounter with Mélanie de Salignac he was amazed by her skills in geometry which she considered to be a science especially suitable for the blind. She was amazingly able to form geometrical concepts. The important point with the letters was that Diderot made clear to the intellectual circles (the general public was hardly interested in this type of books) that a blind person could be highly intelligent, competent and lead a normal life when given a chance.
Valentin Haüy the founder of the first school for the blind

Valentin Haüy founded the first school for the blind in Paris 1784. His first pupil was François Leseur, a 17-year old blind beggar. François was a very intelligent student but as he had to beg to support his family. He begged in the morning and studied in the afternoon.

Haüy understood that the main point in teaching the blind was to find a suitable means of reading and writing. As mentioned above, he got his first ideas from Maria von Paradis and Weissenburg. He started teaching Leseur by carving letters on a thin wooden tablet. In 1786 by chance he was reading the reverse side of a funeral notice and realized he could read the text. From that time on Haüy concentrated on producing embossed letters. The problem was, of course that the blind could not write these letters themselves. One drawback with Haüy’s educational ideas was that he did not accept academic subjects and which were not taught to sighted children even though they had been successfully carried out by Paradis, von Waldkirch, Weissenburg and Salignac. To give the chance to the blind to get a profession with which they could earn their living, Haüy introduced knitting, sewing, basketry, bookbinding and other handicrafts in the school. With this he started an almost 200-year tradition into the schools for the blind combining education and vocational training. Haüy is to be credited with three great accomplishments. He founded the first school, he developed embossed print and he started vocational training in the schools for the blind.

After the first school for the blind had been established in Paris, the idea of residential schools for the blind was spread all over the world. Throughout this time some skilled blind students entered regular schools as well, but this happened without help from official sources. During the last decades some countries where no schools for the blind have been established, or where there are not enough space for them, students have been integrated into regular classes. The dual purpose of residential schools providing education as well as vocational training has been prevalent throughout the centuries.

Louis Braille (1809 – 1852)

Louis Braille was born in Coupvray, a small village 20 miles from Paris. His father was a harness maker. When he was three years old he played in his father's workshop and injured one of his eyes with a saddler’s knife. Soon thereafter he lost his sight totally. He started in the local school and his father made texts for him using embossed letters. He started in the school for the blind when he was ten and remained in the school until he became a teacher there. At the age of 15 he became acquainted with Barbier’s écriture nocturne which he found interesting but realized that the vertical 6-dot (6x2 dots) arrangement could not be felt by the fingertips. He then recreated the system and using only 6 dots (3x2 dots), i.e. 3 dots in a two-row arrangement he produced combinations for the letters of the alphabet, punctuation marks, mathematical signs as well as music signs. He introduced the first version of the system in 1825. By 1834 he had completed the system. His fellow students used his system and as he became a teacher he taught it to his students as well. It took, however, until 1854 before it was totally accepted in the school in Paris. It was later on adapted to other languages but it took a long time until it was internationally accepted, i.e. 1955 by the UNESCO.
New schools emerging
The first country that founded schools after the Paris school was England where three schools opened. In 1791 a school was opened in Liverpool, in 1793 one in Edinburg and in 1799 a school in London. Two of the schools were founded on the initiative of blind people. In the 19th century several schools were founded, e.g. 1804 in Austria by Johann Wilhelm Klein 1806 in Germany by Dr August Zeune 1808 in Holland by Free Masons 1808 in Bohemia by a charitable society 1808 in Sweden by Per Aron Borg 1809 in Russia by Valentin Haüy 1810 in Dublin by protestants 1825 in Hungary by Rafael Beitl 1865 in Finland by Uno Cygnaeus

It may be noted that the first schools in the United States were opened in the 1830s based on experiences from Europe. The first one was what is known as the Perkins school today. The school that is worth a more thorough scrutiny is the school in Vienna, Austria and its founder Johann Wilhelm Klein. Klein is the person whose contribution the education of the blind comes closest to the importance of Haüy and his school developed into an outstanding institution.

Klein also started teaching one intelligent boy with good results. One of Klein’s ideas was that the government should take the responsibility when it came to funding the education for the blind. He furthermore stated that all blind children were entitled to receive education. He was therefore a spokesman for integrating blind children into regular schools. To give the teachers the knowledge they needed he published a book ‘A Textbook on Education of the Blind’ (1819). He published several other books on education of the blind and has been called the Pestalozzi of the education of the blind. His books as well as his educational ideas and activities had a big influence on the education in German speaking countries for a long time.

The road towards integration
In the beginning of integration the idea was to give children equal opportunities to receive education. It was considered that race, religion, physical impairments, social status other circumstances should never be obstacles to proper education. From the beginning one of the ideas of education in the schools for the blind had been that the same subjects should be taught as in the regular schools. This meant that the books used in the regular schools were being copied in the print form used in the special schools. There were, however, some subjects that were considered to be too difficult for the blind pupils such as algebra, physics and chemistry. As more and more blind students wanted to continue into higher education these subjects had to be added. And surprisingly, the students seemed to master them without too many problems. There were as well subjects that were taught in the school for the blind long before they were taught in regular schools, such as touch-typing and later on computer science. The greatest problem was usually that the books needed were not always available in Braille.
One important factor in inclusive education is the family, and today the family is considered to be one of the most important sources of information regarding a child with a visual impairment. This has not, however, always been the case. Today we know that a child who is being rejected by its parents may get severe problems later on in life. Separation from the parents at an early age affects the child in a negative way.

In the early 1900’s the experts in the school for the blind in many countries saw the parents as unfit to take care of their blind children. They were not considered to have the skill or the knowledge needed to give the child a proper upbringing. The sorrow of having given birth to a blind child was seen as an obstacle as well. So, instead of educating the parents, they wanted the children to be put into an institution from the very beginning to give them a proper upbringing. In England they founded so called Sunshine homes for blind infants. This policy was not changed until the 1950’s. It was the Royal National Institute for the Blind that stated that ‘a good home is always the best place for a very young child’. By that time – and in many countries before then – courses were arranged for the parents to give them the help, knowledge and skills they needed.

The next step was to accept blind children into kindergartens and nurseries. This was an important step as young children learn to accept each other early. They learn that there are different kinds of people, they can adjust to them and learn from them. In this way the blind children can get friends before starting school and thus get a smooth start in school.

Another trend that had to be broken down was the idea that many schools did not allow boys and girls to be taught together or being able to mix during school life. If a person is supposed to be able to cope in society and live a regular life the normal interaction between the sexes is of course essential. Today most cultures understand that the living together of boys and girls gives a valuable opportunity in assisting children to grow up in a normal way and to learn in a positive manner about them. Today residential schools too look for opportunities for visually impaired children and sighted peers to carry out activities together.

As mentioned before Johann Wilhelm Klein already in 1810 recommended that regular schools should have a quota of blind children in their classes. He realized that the existing institutions for the blind did not have space enough for all blind children. He also knew that the most important thing was to teach the teachers in the regular schools how to teach blind children in their class. He recommended that the schools for the blind should function as centres to assist these teachers.

It took, however, until 1890 before there was legislation regarding programs that made integration possible. The first legislation was prepared in Scotland stating that blind children up to the age of sixteen years of age must be sent either to the ordinary public schools or to institutions for the blind. It did not, unfortunately, last long before the reality was that all blind children were attending schools for the blind. In the US the first classes for blind children in regular schools opened in 1900. In these first classes a specialist teacher was teaching the subjects that the regular teacher did not master. They were named Braille classes. The children attended as
many classes as possible together with their sighted peers and got special training in the Braille classes. In 1915 ten percent of the blind children attended these classes. It was in the 1950’s that the real changes started. More and more families wanted their children to live at home and attend regular neighborhood schools. The school authorities also began to understand that it was their responsibility to take care of children in their schools. In many countries the association of the blind demanded that the children with visual impairment had the same rights as other children to live at home and attend regular schools. Many of the members in these associations had university degrees and could not understand how it was possible to study at the university but not during the comprehensive school years. During the last decades some important developments have enabled integration / inclusive education in many countries. The effects of globalisation and the development of hardware and software suitable for the visually impaired have had an important positive effect on the possibilities for inclusive education of the visually impaired.

A new form of education
1. Integration without assistance
As we have seen skilled visually impaired students have throughout history attended schools for the sighted without any assistance from specialist schools.

2. Segregation
A period when schools for the blind / partially sighted was the only / the major alternative. During this period methods were developed.

3. Integration
During this period students were/are integrated into ordinary schools and receive assistance from resource centres/special schools. There are different forms of integration: special classes where the students are placed in an ordinary school but in classes of their own; the students may participate in some subjects during the school week. The idea of total integration is carried out when the student is placed in an ordinary class, is given the same curriculum as his classmates and receives assistance from a resource centre / specialist teachers. The main prerequisite for a successful integration is the existence of a functioning resource centre. And I am sorry to say that integration is NOT a way of saving money. It is a new philosophy. To change a special school into a resource centre is an interesting process. You have to convince teachers used to educating small children that teaching adults, i.e. the teachers and staff of the school receiving a visually impaired child is an even grater challenge. But to manage this means that "life long learning" for the teachers of the resource centre is a must. You give away your know-how and knowledge and you must be allowed to renew your know-how at short intervals.

To meet the new challenges the residential schools had to divide their attention between the children still in their school and the children in regular classes who needed assistance. The residential schools either continued these double activities or changed into resource centres. The teaching of teachers became an important role of the resource centres and children were taught in these centres during short periods when they needed special skills to cope with the curriculum. Courses in Braille, computer science, mobility etc were delivered to the children. In many
countries courses in special needs education is nowadays part of the curriculum for teachers at the universities.

The world-wide trend towards equality, inclusion and human rights and for all people as well as the forming of regional and global cooperative institutions has enabled the appearance of so called ‘Soft Law’. Soft law has no legally binding force but it brings forth ethically important matters. Through Soft Law one can spread important policies and practices. One can also put pressure on membership countries to carry out changes based on Soft Law issues. As relevant examples can be mentioned equal access to education for all, declarations on anti-discrimination and the rights of children. In the following we give some examples on relevant declarations on human rights, non-discrimination, rights of children and equal access to education.

The Jomtien World Declaration on Education for All in Thailand in 1990. Jomtien re-stated that education is a basic right for ALL people. It recognised that particular groups were excluded and stated that “An active commitment must be made to removing educational disparities… groups should not suffer any discrimination in access to learning opportunities…”. It stated that “Steps need to be taken to provide equal access to education to every category of disabled persons as an integral part of the education system”. However, it did not clarify what was meant by ‘integral part’, and does not strongly advocate inclusive, as opposed to segregated education. Jomtien also stated that ‘learning begins at birth’, and promoted early childhood education, plus the need to use a variety of delivery systems, and to involve families and communities.

The UN Standard Rules emphasise that the State should take responsibility for disabled persons’ education, and should have a clear policy, a flexible curriculum, and provide quality materials, and ongoing teacher training and support. Inclusion is promoted with some key conditions; it should be properly resourced and of high quality - it should not be a ‘cheap option’. Community based programs are seen as an important support to Inclusive Education. Special education is not, however, ruled out where the mainstream system is inadequate, and for deaf and deaf/blind students.

The Salamanca Statement and Framework for Action on Special Needs Education (1994) is still today the key international document on the principles and practice of Inclusive Education. It outlines several pioneering and fundamental principles of inclusion that have not been discussed in previous documents.

Some particularly core inclusion concepts include:

- Children have a wide diversity of characteristics and needs.
- Difference is normal.
- Schools need to accommodate ALL children.
- Disabled children should attend their neighbourhood school.
- Community participation is essential to inclusion.
- Child-centred pedagogy is central to inclusion.
- Flexible curricula should adapt to children, not vice versa.
- Inclusion needs proper resources and support.
- Inclusion is essential to human dignity and the enjoyment of full human rights.
• Inclusive schools benefit ALL children because they help create an inclusive society.
• Inclusion improves the efficiency and cost effectiveness of the education system.

**Soft Law - non-legal commitment in education**

“Soft Law – rules of conduct which in principle have no legally binding force but which nevertheless may have practical effects.” *(Snyder, F, 1995)*

There are several types of Soft Law such as resolutions, declarations of principles, codes of practices, recommendations, standards and guidelines which states have decided to follow. The explanation as to the effects of soft law is that there are lower costs for negotiations, coming together and learning. You become better equipped to promote cooperation and preserve sovereignty and can cope with diversity in a more flexible way. Soft law is furthermore simpler and with faster results and gives the states better participation possibilities. Soft law can be the first step towards legally binding agreements. So, as it is not legally binding, how can soft law make a difference? Through shaming, i.e. a wish to avoid negative criticism states can feel an obligation to follow a soft law. One can also easily copy coherent policy models from other states, develop a common vocabulary and use indicators developed by other states. Through networking one can develop National Action Plans get input from civil society and facilitate social process of deliberation and learning. The exchange of policy knowledge, promotes common identity through learning and exchange of ideas and beliefs, skills and competencies.

**The technical development**

The first step towards efficient learning for the visually impaired learners was the brailler which made fast writing possible. However efficient the slate and stylus may be, it is a much slower aid than the brailler.

In the 1960s the talking books appeared. Many a teacher thought that this would be the end of Braille reading and writing. Why painstakingly learn to read Braille when there were talking books? The fears were in vain. Listening to a book takes a long time, enhancing the speed makes reading exhausting and the feeling of a ‘personal touch’ to the text is missing. Talking books do, however, give the pupils a chance to get all books needed for their courses. It is less costly and a quicker procedure to get some of the books in the general subjects as talking books.

When the computers became common in many countries in the 1970s, Word Perfect was excellent software for the visually impaired. Speech synthesizers made reading and writing with the computer into a real joy. The Kurzweil reader translating written material into the computer and making it into synthesized speech made all the difference for many students who needed materials that was not available in Braille. And a couple of years later came the first ‘computer’ for the blind, the VersaBraille. At last it was possible to go through a text and correct it without any problems. The first VersaBraille functioned with audio tapes. The next ‘generation’ functioned with discs and were thus much safer to use as the ‘bad tape’ problem of the first ones was eliminated. The first Braille embosser attached to a microcomputer came on the market in the 1980s. After this the market was filled with various types of software.
and hardware making input and output with Braille, large print, synthesized speech possible.

But the world of the sighted is a visual one. This could be realized when Windows hit the market and icons were to be found by a mouse. Fortunately Jaws for Windows appeared in 1987. By that time the visually impaired had large text screen readers, speech synthesizers and Braille lines at their disposal. One big step forward was still to come. The DAISY.

The DAISY Consortium was formed in May, 1996 by talking book libraries to lead the worldwide transition from analog to Digital Talking Books. DAISY denotes the Digital Accessible Information SYstem.

Members of the Consortium actively promote the DAISY standard for Digital Talking Books because it promises to revolutionize the reading experience for people who have reading disabilities. Specifically, the Consortium’s vision is that all published information is available to people with print disabilities, at the same time and at no greater cost, in an accessible, feature-rich, navigable format. The first DAISY Standard was proprietary, originating in Sweden in 1994. The idea was to use digital recording and introduce some document structuring that would allow easy navigation by the user. It has now begun to offer a more flexible and pleasant reading experience for people who are blind or print disabled in a number of countries including Sweden, Japan, the United Kingdom, and the United States.

A DAISY book can be explained as a set of digital files that includes:

- One or more digital audio files containing a human narration of part or all of the source text;
- A marked-up file containing some or all of the text (strictly speaking, this marked-up text file is optional);
- A synchronization file to relate markings in the text file with time points in the audio file; and
- A navigation control file which enables the user to move smoothly between files while synchronization between text and audio is maintained.

The DAISY is only one of the future possibilities. The main point is that persons with a visual impairment should have access to the same information as the general public has but in a format that is suitable for them. The development of new technology to keep up with the sighted world is thus one of the platforms for successful studies for children and young persons with a visual impairment.

Sources:

### 1.2. History Time Span

<table>
<thead>
<tr>
<th>TIME SPAN</th>
<th>GENERAL HISTORY</th>
<th>HISTORY OF THE BLIND</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.C.</td>
<td>3200 Civilization began at Sumer Before 3000 Egyptian hieroglyphs (said to be developed by the God Thot) 3000 Uruk texts 2900 Pictograms changed into cuneiform writing. Sumerians developed phonetic script; used in Anatolia, Armenia 2560 Building of the great pyramid of Cheops at Giza 2000 Chinese script, ready in 1500 in present form 2000 the great Indo-European migration 1500 Abraham (Ibrahim) founds the shrine of Mecca (Kaaba) The Phoenicians developed the alphabet. The Arabic and Latin alphabets the basis for many alphabets. Alphabet was the beginning of democratic knowledge 853 First reference to Arabs in Assyrian inscription 700 the Hebrew script emerged 668-631 First library by Assurbanipal in Nineve, Old Sumerian book Epos of Gilgamesh 776 Ancient Olympics 500 The Roman Empire established 400 The Greek alphabet with 17 consonants and 7 vowels – inventing the use of vowels was a novelty 300 The Romans ‘borrowed’ the Etruscan alphabet to suite Latin 100 The skill to produce parchment made it possible to bind books</td>
<td>1553-1550 Papyrus Ebers described 20 different eye diseases 9th or 8th century Famous Greek blind author Homer, wrote the Iliad and the Odyssey 639 – 599 Solon in Athens created assistance programs for the blind 400 Hippocrates names 30 eye diseases</td>
</tr>
</tbody>
</table>
| 0 - Middle Ages (Appr.) | 350 The Aramaic speaking Nabataeans (Jordan) develops the Arabic script.  
512 The first recorded script in Arabic.  
600 Mohammed united the Arab world under Islam.  
600 Steel invented in Persia.  
655 The text of the Quran / Koran is finalized.  
696 Arabic becomes the official language in the Islamic world.  
751 Arabs require the knowledge of paper from the Chinese. First paper mill was founded in Samarkand.  
800-900 The European monasteries had scriptories were religious books were produced.  
800-1000 Feudal era in Europe.  
825 The first Madrasa, i.e. religious school founded in Baghdad.  
825 Arab mathematician Al Khwarizimi of Baghdad writes a book on Hindu numerals that spreads the use of Arabic numerals.  
840 The first Arabic grammar and dictionary.  
850 Persian mathematician Khwarazami invents algebra.  
1100-1250 The European Crusades to Jerusalem.  
1100 also laymen were allowed to write books; non-religious literature appeared.  
1274 The Persian astronomer Nasir Al-Din Tusi builds the Maragah observatory.  
1439 Johann Gutenberg invented printing press.  
1450-1600 European Renaissance; Prominent cultural personalities: Nicolaus Copernicus, Polish astrologer who found out that the earth rotates around the sun and not the sun around the earth. Leonardo da Vinci, Italian artist and scientist. Michelangelo Buonarroti, Italian sculptor, painter and poet.  

400 the first hospital for the blind established in Syria.  
754 In Japan Gajin Wajo Zo a blind Buddhist monk began preaching Buddhism.  
850 In Japan the emperor Koko gave the blind privileges. Massage and music were professions solely allowed for the blind.  
900 Blind persons were educated at the Eufemia monastery in Constantinople.  
1254 The asylum for the blind, Quinze-Vingts in Paris was established.  
Scandinavia and Iceland: Family members and relatives were to provide help to the blind. Those without relatives were ‘rotated’ among the villagers. Churches and monasteries in Europe took care of the blind. Beggar organizations – especially for blind musicians – were established.  
14th Century Blind Arab professor, Zain-Din al Amidi improvised a method by which he identified his books and made notes.  
1525 Juan Luis Vives, a Spanish social reformer pointed out in a booklet on poverty prevention that the blind can do various kinds of work.
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1475</td>
<td>The world's first coffee shop ‘Kiva Han’ opens in Constantinople / Istanbul</td>
<td>1600-1700</td>
<td>Era of Absolutism</td>
</tr>
<tr>
<td>1492</td>
<td>Christoffer Columbus discovers America</td>
<td>1642</td>
<td>Blaise Pascal invents the first mechanical calculator</td>
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<tr>
<td>1497</td>
<td>Vasco da Gama discovers the sea route to India</td>
<td>1645</td>
<td>The first newspaper</td>
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<tr>
<td>1514</td>
<td>The first book in Arabic is published in Italy</td>
<td>1658</td>
<td>The Taj Mahal was completed</td>
</tr>
<tr>
<td>1517</td>
<td>Martin Luther starts the religious reformation in Europe</td>
<td>1660</td>
<td>Esther Elizabeth von Waldkirch was born. She learned Latin, French and German. She could read and write and play several instruments.</td>
</tr>
<tr>
<td>1519-1522</td>
<td>Magalheas sails around the world</td>
<td>1661</td>
<td>An Academy for blind musicians was established in Palermo, Italy.</td>
</tr>
<tr>
<td>1600-1700</td>
<td>Prominent persons: Galileo Galilei, Italian natural philosopher and the father of Modern Science</td>
<td>1700-1800</td>
<td>Enlightenment era; prominent cultural persons: Denis Diderot, French philosopher and writer</td>
</tr>
<tr>
<td></td>
<td>Isaac Newton, English physicist and mathematician</td>
<td></td>
<td>Voltaire, French philosopher and enlightenment writer</td>
</tr>
<tr>
<td></td>
<td>Rembrandt van Rijn, Dutch painter</td>
<td></td>
<td>Jean-Jacques Rousseau, French philosopher and educationalist</td>
</tr>
<tr>
<td></td>
<td>William Shakespeare, English playwright</td>
<td></td>
<td>1726 Chinese encyclopedia Gujin Tushu Jicheng of over 100 million written Chinese characters, 800,000 pages printed in 60 copies using copper-based Chinese movable type printing</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>1729 The first book ever published in a Muslim country published in the Ottoman empire</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>1707 – 1783 Leonhard Paul Euler, Swiss mathematician and physicist. He made important discoveries in calculus and graph theory</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1741 – 1763 Melanie de Salignac. Had several teachers, used tactile maps, could read and write and created her own system for music notation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1749 Diderot wrote his ‘Lettres sur les Aveugles.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1759 – 1824 Maria Theresia von Paradis. She founded a music institute in Vienna. Valentin Haüy got inspiration from the aids she used.</td>
</tr>
</tbody>
</table>
### Industrial era:

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>1733</td>
<td>Textile industry – Spinning Jenny, a multi-spool spinning wheel was invented</td>
</tr>
<tr>
<td>1764</td>
<td>Textile industry – Spinning Jenny, a multi-spool spinning wheel was invented</td>
</tr>
</tbody>
</table>

1772 Niesen became the teacher of R. Weissenburg (1756-?) who was specially gifted in arithmetic, algebra, geometry and trigonometry

1784 Haüy opens his school for the blind

1786 Haüy publishes an Essay sur l’Education des Aveugles

1791 The first school in England was established

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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</table>

### 1800-1900

**Liberalism, industrialism and nationalism**

- National states emerge
- Freedom of the press
- Freedom of religion
- Freedom of assembly
- Enlightenment and tolerance
- Emerging political trends:
  - Radicalism
  - Socialism
  - Marxism (Marx, Engels)
- New forms of transportation:
  - Channels (Suez and Panama)
  - Railroads
  - Steam ships
  - Telegraph
  - Telephone
  - Post and stamps
  - Cars
  - 1863 Formation of the International Red Cross
  - 1896 The Olympic games revived in Athens

**Significant people:**

- Louis Pasteur, French chemist and microbiologist; he created the first vaccine for rabies
- Wilhelm Röntgen – Invented the X-ray
- David Livingstone, Scottish missionary who explored the inner parts of Africa
- Vincent van Gogh, Dutch painter
- Johann Wolfgang von Goethe, German writer and philosopher
- Emile Zola, French naturalistic writer
- Alexander Graham Bell, American inventor of the phone
- Marie Curie, Polish-French physicist

1804 Johann Wilhelm Klein established a school for the blind in Vienna

1806 Dr August Zeune established a school for the blind in Germany

1808 Free Mansons established a school in Holland

1808 a charitable society established a school in Bohemia

1808 Per Aron Borg established a school in Sweden

1809 Valentin Haüy established a school in Russia

1810 Protestants established a school on Ireland

1810 Klein recommends that regular schools ought to have a quota for blind pupils

1812 Louis Braille became blind at the age of three

1821 Barbier presented his Écriture nocturne at the school for the blind in Paris

1825 Louis Braille creates his literary Braille code based on Barbier’s ideas

1825 Rafael Beitl establishes the first school for the blind in Hungary

1829 New England Institute for the Blind (Perkins) established in the US

1837 Klein opens a museum on Education of the blind

1837 Laura Bridgman, the first deaf-blind to be educated, admitted to Perkins

1847 The Moon type is being introduced
| 1900-2000 | 1852 Louis Braille died  
1865 Uno Cygnaeus established a school in Finland – the school language was Swedish  
1887 Ann Sullivan begins teaching Helen Keller |
|---|---|
| 1901 First radio receiver  
1902 George Claude; invented the neon light  
1903 Wright brothers: Developed the first airplane  
1905 Einstein introduced the theory of relativity  
1910 Thomas Edison: Talking moving pictures  
1919-1946 League of Nations  
1927 Farnsworth: The electronic TV system  
1930 Vannevar Bush: The analog computer  
1934 Joseph Begun: First tape recorder for broadcasting  
1937 Chester F. Carlson: The photocopier  
1938 Ladislo Biro: Ballpoint pen  
1940 Peter Goldmark: Colour television system  
1941 First computer controlled by software  
1945 The United Nations  
1945 UNESCO, United Nations Educational, Scientific and Cultural Organization  
1945 League of Arabic States  
1946 UNICEF, United Nations Children’s Fond  
1947 First mobile phones  
1948 WHO, World Health Organization  
1951 Charles Ginsburg: First videotape recorder  
1953 RCA: First musical synthesizer  
1956 First computer hard-disk  
1957 Sputnik with Laika on board  
1961 Gagarin the first Kosmonaut  
1962 The audio cassette  
1969 The first men on the moon Armstrong and Aldrin | 1904 Helen Keller was the first deaf-blind to get a college degree  
1910 Arthur Sunshine Home and Kindergarten for Blind Babies opened  
1916 Braille officially adopted in US schools  
1920 The first reading machine for the blind, the Optophone, is patented  
1930 Ophthalmologists suggest that vision is not harmed by use  
1930 The Hayes-Binet test for blind children is developed  
1932 AFB starts development of talking books  
1944 Hoover developed long-cane mobility at Valley Forge Army Hospital  
1951 Perkins brailler is produced  
1953 Nemeth Braille mathematics code  
1955 Computerized Braille  
1955 UNESCO declared Braille’s language as the universal written language for the blind  
1974 The first closed-circuit TV  
1974 Compact Braille electronic calculator  
1976 Kurzweil Reader – printed material translated into synthesized speech  
1978 Warnock’s committee established the term integration and its 3 levels: Locational, social and functional  
1978 VersaBraille, first computer for the blind  
1983 First Braille embosser attached to microcomputer  
1987 Jaws for Windows makes icons recognisable for the blind |
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>The laser printer</td>
</tr>
<tr>
<td>1979</td>
<td>The cellular phone</td>
</tr>
<tr>
<td>1984</td>
<td>CD ROM</td>
</tr>
<tr>
<td>1990</td>
<td>The World Wide Web (WWW)</td>
</tr>
<tr>
<td>1993</td>
<td>European Union</td>
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<tr>
<td>1995</td>
<td>DVD</td>
</tr>
<tr>
<td>1990</td>
<td>Entry into force of UN Convention on the Right of the Children</td>
</tr>
<tr>
<td>1990</td>
<td>Jomtien World Declaration on Education for All</td>
</tr>
<tr>
<td>1994</td>
<td>UNESCO: Salamanca Statement and Framework for Action on Special Needs Education</td>
</tr>
<tr>
<td>1996</td>
<td>Daisy (Digital Accessible Information System) Consortium was formed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>2000 WHO International Classification of Functioning, Disability and Health (ICF)</td>
</tr>
<tr>
<td></td>
<td>2000 Booth, Index for Inclusion was published</td>
</tr>
<tr>
<td></td>
<td>2000 Nordic Light Team was formed</td>
</tr>
<tr>
<td>2001</td>
<td>The Internet based Resource Centre FOR Inclusive Services (ISaR) was established / Dortmund University</td>
</tr>
<tr>
<td>2002</td>
<td>Daisy II standards officially adopted</td>
</tr>
</tbody>
</table>

**FUTURE CHALLENGES.**

MDVI – enhance the quality of the education of the children with additional disabilities and brain related visual impairment, CVI. Make an effort to enhance the social inclusion and empowerment of children with visual impairment. Keep the technical developments up-to-date for the VI.

**Sources:**
- [www.about.com/inventors](http://www.about.com/inventors)
2.1. Learning Processes - Pupils with Visual Impairment

Visual impairment – educational implications

Visual impairments can be defined from different aspects. The social care systems of countries use other criteria to classify persons with different visual diseases and impairment than the systems of education and rehabilitation. Each of them uses data and outcomes of medical, ophthalmologic assessments of the different areas of the visual system as a basis for further considerations to their classification.

There are many countries where the classification in the education system is referring to the values of the ophthalmologic assessment. This classification usually regards the visual acuity. The most common one is the Snellen test chart with letters or numbers in rows of different sizes. The idea is that each row of letters can be read by a person with normal vision from a certain distance. If a person with normal vision can see a letter at 60 meter (top line) and the child cannot see the letter at 6 meters then her vision is less than 6/60 and you have to carry out the test at a shorter distance. (Hyvärinen, 1996). About the assessment of visual functioning (visual acuity, peripheral sight, colour vision, contrast vision etc.) visit the home page of Lea Hyvärinen, www.lea-test.fi.

The widely accepted classification is the following World Health Organization (WHO) definition, based on visual acuity (Mason, McCall 1997):

- Normal vision: 6/6 to 6/18
- Low vision: 6/18 to 3/60
- Blindness: less than 3/60

There are countries in which the assessment tests are working with charts used at 5 meter distance. In Hungary a child with low vision has visual acuity between 5/15 and 1/50. The values of visual acuity (Visus) can be transferred into decimal numbers. This way the comparison between countries is easier. For example: 5/50=6/60=0.10= 10%.

Many countries like Finland and Hungary use the value of the visual acuity and the visual field to make categories of visual impairment. Below you can see the classification of “The Finnish register of visual impairment 2006”

<table>
<thead>
<tr>
<th>TABLE 4  CATEGORIES OF VISUAL IMPAIRMENT BY WHO’S DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered visual impairment in Finland in 2006 (total and new registrations)</td>
</tr>
<tr>
<td>1 Moderate low vision</td>
</tr>
<tr>
<td>2 Severe low vision</td>
</tr>
<tr>
<td>3 Profound low vision</td>
</tr>
<tr>
<td>4 Near-total blindness</td>
</tr>
<tr>
<td>5 Total blindness</td>
</tr>
<tr>
<td>9 Unknown (Other)</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>1 - 2 Low vision</td>
</tr>
<tr>
<td>3 - 5 Blindness</td>
</tr>
</tbody>
</table>
From the aspect of education children and youth with visual impairment are those who without special medical, technical and educational help cannot learn efficiently in regular schools. Wherever those children, youth learn (special schools or regular ones) they need:

- appropriate learning surrounding,
- teaching materials,
- support in communication and orientation in the world of persons without visual impairment.

In 1997 the Ministry for schools in Germany made a frame work on basic principles for the educational support to persons with VI.

**This document uses the following descriptions:**

- Children, pupils and students who are blind explore the world and learning in school via their tactile/haptic, acoustic, olfactory and gustatory senses.
- Children, pupils and students with low vision explore the world and learning in school mainly through their visual sense. They compensate their restricted visual functioning by using their tactile/haptic and acoustic senses.
- Children, pupils and students with severe visual functioning problems use blind and low vision techniques in exploring and learning.

Education of pupils with VI today uses the terms: Blindness and low vision. Pupils with blindness do not have any light perception. Pupils with low vision have different kinds of visual functions and use different compensation techniques.

Nowadays we can observe a very positive development in the developed countries. The education system characterizes a person (child) with VI based on the abilities which he or she has and try to avoid negative declarations. This follows the intention of ICF (International Classification and Functioning) of WHO. ICF emphasizes the role of social and material surrounding and how these influence the participation in daily life for the person with visual impairment.

**The classification based on medical assessment doesn’t say too much about how the person is coping with her or his visual impairment in different situations.**

Educational assessment observes the child, pupil in many different daily life activities and evaluates data about his or her visual functioning in many situations. (Hyvärinen 2000)

Visual impairment affects the child’s activity in different ways and thus the child uses different compensatory techniques. The assessment delivers data about the following fields of the activities:

- communication
- orientation and mobility
- daily life activities
- sustained near vision tasks (writing, reading, handicraft)
About a child with low vision in the school the teacher should have information about his or her reading and writing interests and habits at home as well.

**Influences of visual impairment on the learning processes**
Children and pupils with low vision use different techniques and methods in their daily life and in the school. They have individual different impairments which need a range of special techniques and supports which take into account all areas of functioning. Selection of appropriate learning methods requires thorough assessment and understanding of each child’s visual capabilities.

Visual impairment influences the learning processes of the child, pupil or student in an individual different way. To follow the learning processes by the teacher and according to this to check and modify the IEP is essential daily duty of the teachers of the team that is dealing with the child, pupil or student with VI. (See chapter 4.2 IEP)

**Pupils with low vision in school**
Pupils with low vision need a special learning environment to use and enhance their visual skills and to learn to learn independently. Conditions of perception such as light, shadows, blurring influence the outcomes (pictures) may change all the time. Thus some of the pupils have difficulties with adaptation to the given task. The overprotecting social environment can cause delay in developing learning skills.

**Pupil with low vision in schools**
- may have difficulties in concept development (identification forms and colour, classification)
- may lack an overview about their surrounding or small detail's
- have less opportunity to carry out daily life activities on his or her own
- have less opportunity to generalize activities or characteristics of a phenomenon
- may develop fine motor skills and orientation somewhat later than sighted peers
- may need more time to get through the exploration procedure.

**Children with blindness in school**
Blind children mainly use their tactile/haptic and acoustic senses to explore the world around them. Generally they pass the same stages of development as sighted ones but some skills and concepts may develop later. In case blind children get an appropriate early education and have a challenging learning surrounding they will develop the basic competences which they need to succeed in school.

Blind children live and learn in a world made and structured for and by sighted persons. They often have experiences (in touch and hearing) which the sighted do not have, or do not care about. Thus the blind pupils cannot use it for concept development. Also the time needed for exploring is longer then the same through the visual channel. To get an overview about things and to get the awareness of the relationship between objects through the remaining senses could be a difficult task.
for the blind pupils. Later through logical thinking and developing verbal skills these tasks are easier to cope with.

**Blind pupils might have difficulties and delay in**
- concept development (notice differences, classification, generalizing etc.)
- learning proper movements
- developing body awareness and concepts
- developing orientation skills
- understanding words and expressions of the sighted because of lacking the references to the appropriate sensory experiences
- developing social skills and independence.

**References**
- The Finnish Register of Visual Impairment 2006 (Internet)
- Home-page European Agency
- International Classification and Functioning (ICF) (2000) WHO
- ISaR Data bank: www.isar-projekt.de

**2.2. Teaching Pupils with Low Vision**

The text here helps teachers and students to create his or her approach of teaching pupils with low vision in the classroom. The list of the considerations cannot be completed because of the complexity of the effects of low vision on the learning processes. The basic principle should be to get as much information about the pupil as it is possible.

Special needs education supports the low vision child to
1. develop the visual skills/visual awareness
2. learn through all the senses
3. learn by doing
4. memorize and verbalize
5. cope with optical aids and learning materials
6. develop independent learning
7. organize life independently

**As a teacher you must consider that**
- there is no child with the same problems as others,
- the child with low vision needs more time,
- communication is the basis of efficient learning

**Some considerations to teaching culture techniques**
Reading and writing are not the goal but the tools for one’s learning; learning at school, learning for work and for daily life activities. To develop a good functioning reading skill good optical aids and motivation are the most important prerequisites.
Teachers should consider that the learning process to literacy by children with low vision takes much more time than for children without visual impairment.

**Reading**

The teaching of reading for low vision pupils focuses on the development of

- visual skills
- eye-hand coordination
- memory
- orientation in text, in books
- using optical and electronic aids

Optical aids and reading devices must be checked individually. A good device helps the child to concentrate longer and enhances its perseverance in reading.

A problem which low vision readers have in common is that it is difficult or impossible to gain an overview of the text. It is especially the case, when the text is written with letters of different sizes and types. CCTV could be a good solution. (See the Handout to the topic in the Appendix!)

The teacher should use a tape recorder to expose the text to help the child understand the structure of the text.

The teacher should give the child individually prepared working sheets for reading in the beginning. Prepare texts with different sizes and type of letters, background, contrast, etc. (About learning aids you find a collection in the handout to the topic in the Appendix!)

Pupils with severe low vision are often in a “border area”. These pupils often use large print, recorded books or synthetic speech as supplements to print reading, although even Braille is sometimes used as their main reading medium. (Criteria to choose the appropriate reading medium you find in the Appendix!)

**Writing**

The teaching of writing for low vision pupils focuses on the development of

- Fine motor skills
- Eye hand coordination
- Memory
- Orientation on the paper in the text
- Structuring the text
- Using learning and optical aids

A good method is to use the “language experience approach”:

1. Gives the children a vivid experience that provides the content for the story.
2. Encourages oral language from pupils that describes the experience.
3. Transcribes the pupils’ oral language and experience chart.
4. Helps pupils read what was transcribed

**Mathematics**

The low vision pupils are using several techniques and methods (visual and auditory) to compare objects and persons.
One of the appropriate tools for calculation is the calculator with beads. They give a good structure through colour and spatial order.

Mathematical notation may cause difficulties with small chequered paper.

Some of the low vision pupils have difficulties in reading the text on the blackboard thus the teacher or students should read the text loud during writing.

Some of the pupils have problems using measuring instruments as well. Earmarking the tools with colour, well contrasted pen or tactile signs help the pupil use these instruments.

A good solution is to use geo board and modelling kit, paper folding to restrict difficulties in geometrical drawing.

Appropriate learning materials for blind students can help low vision students as well to understand geometrical concepts.

**Disability, functioning and educational implications**
Mason, H. (1997) and colleagues have put together important considerations for teaching pupils with low vision.

For most children refractive errors can be corrected with suitable spectacles or contact lenses. Children and young people are considered as visually impaired only when their best corrected vision falls significantly outside the normal ranges for near or distance visual acuity.

**Myopia (short-sightedness)**
If the eye is too long the light does not focus on the retina at the fovea (the central point of the macula) but is focused between the lens and the macula which gives a blurred distance vision. Minus lenses (concave lenses) can correct this. If the object is brought closer the near vision is good.

*Educational implications:*

- Pupil should wear appropriate glasses.
- The teacher should cheque whether it might be easier to work without spectacles at close range.
- Avoid problems with distance work – (looking at the blackboard without camera or spectacle, etc.).
- The teacher should offer:
  - a book-stand
  - good contrast
  - appropriate size regarding printed material.

**Hypermetropia (long-sightedness)**
In this case the eyeball is too short. Can be corrected by plus lenses (convex lenses). It gives problems if it is associated with other visual conditions, e.g. cataracts.

*Education implications:*

- Concern that there is a difficulty when objects are brought closer to the face.
Teacher should avoid long periods of reading (fatigue, headaches).
Teacher has to train the children to use optical devises.

**Albinism**
- In the severe form the macula is underdeveloped and they may also have nystagmus. They burn quickly in strong sunlight, so photophobia is the main problem.

**Educational implications:**
- The pupil should work in a place in the classroom where there is a lower level of illumination.
- The teacher should offer:
  - a bookstand as the pupil may want a very close working distance
  - low vision aids
  - tinted spectacles, controlled natural lighting in the class, baseball cap when outside.

**Chataracts**
Opaqueness of the lens of the eye. Also if the lens is removed they will have severe problems. (Found in Downs syndrome and rubella).

**Educational implications:**
- Avoid sunny glare.
- Put the light sources behind the child.
- The teacher should offer:
  - good contrasts
  - appropriate print size
  - low vision aids
  - a book stand.

**Glaucoma**
There is an increase in the intra-ocular pressure which can affect the blood supply to the optic nerve head. One type found in children is buphthalmos (“ox eye”) which gives large eye or eyes. This may damage the lens, the retina or the optic nerve. Other types give reduced field of vision and visual difficulties in areas which are dark or dimly lit.

**Educational implications:**
- The eye drops make the eyes photophobic and they have to be given at the correct time!
- Avoid visual fatigue.
- The teacher should offer:
  - good contrasts
  - low vision aids.

**Macular degeneration**
This concerns a group of conditions many of which are progressive and lead to severe visual impairment.

**Educational implications:**
- Use low vision aids.
- Avoid glare.
- The teacher should offer:
  - good illumination
- a line marker when reading
- text books and worksheets with good print-paper contrasts
- thick dark-lined paper and black felt-tip pens.

**Retinitis pigmentosa (RP)**
- Progressive conditions which affect the retina, especially the peripheral area which contain the rods, the cells sensitive to vision in dim light (causes night blindness). A part of Usher’s syndrome (RP + deafness), Leber's amaurosis and other syndromes. Many are photophobic and may have to use tinted glasses. The pupil has difficulties in scanning and tracking (reading); gross motor skills; adapting from bright to dull light.

**Educational implications**:
- Use of smallest print possible to use the remaining field of vision.
- Should learn mobility (especially at night).
- Should be offered braille if the prognosis is total loss of vision.
- The teacher should offer:
  - low vision aids, good contrasts
  - well lit, glare free working environment
  - dark lined papers, black felt-pen

**Individual education Plan**
To plan IEP and appropriate learning environment for pupils with low vision the teachers could think about general aspects and use them individually.

- **Ergonomic aspects**
  - Lighting / special lamps
  - Chairs
  - Tables and desks
  - Reading support
  - Computer work station

- **Optical aspects**
  - Magnifiers
  - Binoculairs

- **Visual status**
  - Visus with optimal correction
  - Close vision = size of text at what distance /optimal magnification
  - Distance vision = which magnification at what distance
  - Visual field
  - Eye movement
  - Glare symptoms
  - Colour vision

**The following must be checked**:
- Suitable placement in the classroom.
- “Better a handout in the hand than a full written blackboard and 10 transparencies on the overhead".
• When using blackboard and overhead, do not forget to comment on text and pictures.
• If possible, give texts both as printed and on tape.
• Avoid visually attractive books; scattered text-blocks take time to find. Coloured texts make reading more difficult (good contrast!!) Texts on pictures are difficult to read. Simple letters without extra “flair” are the best.
• Better to give a shorter but relevant text as home-work than a long one which might tire the student.
• Remember to take breaks and to rest.
• A tape recorder is a good aid.
• For a student with a severe visual impairment it might be a good solution to use large print, Braille and tape.
• It is easier to read a typed text than your own “bad handwriting”. Everyone should, however, learn ordinary handwriting – perhaps in a modified form.
• Avoid glare on the working surface.
• Omit unnecessary information from maps and charts.
• Clear pictures without unnecessary details.

Creating an appropriate learning environment (Naish et al. 2002)

1. Lighting and shade
   1. All areas should be well illuminated using sources of natural and artificial light. Low levels of light suit few people but are appropriate for eye conditions of some children.
   2. It should be possible to control lighting levels and sources of light by some means such as blinds, curtains, awnings, task lights or dimmer switches.
   3. Excessive brightness can cause discomfort and may present particular problems for pupils with certain eye conditions, i.e. cataracts and photophobia. Aim to achieve flexibility in levels of lighting.
   4. Sunlight and some types of artificial light can produce reflected glare which can limit a child’s effective use of vision. Check for this throughout the year at different times of day and different parts of the room.
   5. Any surface without a matt finish may reflect light (natural or artificial) and create confusing visual information for children. Move around the room and sit, stand or lie in the places the children do to assess this.
   6. The effect of areas of shadow and sunlight can complicate the use of vision. For example, to a child with partial vision and learning difficulties an area of shadow on the floor could suggest a step, a hole in the ground or a different floor covering. Be aware of this as you observe areas of the school at different times of day and in different seasons.
   7. Some children find it difficult to adjust their use of vision from light to dark conditions and vice versa. Check this out with parents and carers and with professionals who know the child’s needs well. Try to avoid introducing sudden changes in light levels in the school environment.
   8. Beware of potential dilemma of switching off lights to save energy in areas which are currently not being used, eg corridors, libraries and other spaces. This may significantly limit independent mobility for pupils with visual impairment.
   9. The effect of painting on the window glass can affect the quality of light in a room.
10. Where on-task lighting is used, e.g. an angle-poise lamp or a desk lamp for individual pupils, it may distract other pupils and/or staff. Think carefully about the location of the children and the light source.

11. On-task lighting must comply with health and safety regulations. Have switches checked regularly and avoid trailing lengths of flex. Plan additional power points if needed.

12. All lighting should be silent and not too hot. Any background sound from lights may be distracting for a child. Be aware that any sound from lighting may cause difficulties for children who use personal hearing aids.

2. **Colour and contrast**
   1. High item/background contrast, i.e. black on white, or black on yellow, makes things easier to see. Avoid patterned surfaces and “busy” designs on curtains, carpets and flooring.
   2. In planning a colour scheme, choose colours which contrast clearly with one another and create a pleasing effect. A common vision problem is an inability to distinguish between red and green. This is a hereditary condition which affects nine per cent of males and one per cent of females. It is easy to detect in pupils without learning difficulties but is far more difficult to pick up in children who have additional needs. So avoid using red and green as a contrasting colour scheme.
   3. Tonal contrast: your contrasting colour scheme should also include tonal contrast.
   4. The effects of cortical cerebral visual impairment vary enormously but often the use of clear contrasting colour may be helpful.
   5. In teaching/learning areas choose clear, light, colours such as pale yellow for walls, white for ceilings and go for stronger colours to pick out critical surfaces such as doorways and skirting boards.
   6. Furniture, fixtures and fittings should contrast with their surroundings and it is also important that internal features such as handles and switches contrast with their background too.
   7. Also remember to consider the effects of colour and contrast in all care areas including toilets and bathrooms, corridors and entrance lobbies.
   8. Contrasting colours should be used to differentiate fittings such as handles, hooks, switches and bathroom fittings including taps, levers, bell-pull cords and so on.

3. **Sound in learning activities**
When vision is impaired, children rely heavily on their other senses, particularly on hearing and touch. This highlights the importance of creating good conditions for listening in educational settings.

1. The acoustic properties of a room or space are affected by its size and shape, the items placed within it and the materials of which it is made. High ceilings, those over twelve feet, and some features such as hard plaster walls, ceramic tiled walls and hard tiled, hollow or suspended floors reflect sound, causing it to reverberate, echo and become distorted. This often happens in swimming pools and tiled changing areas.
2. In rooms with lower ceilings, large pinboard display areas on the walls, carpet, curtains or blinds and some soft furnishings some sound will be absorbed. Although the room may not have had specific acoustic treatment, the effect of echo and reverberation will be reduced.

3. Reverberation is the key factor in classroom acoustic. It should be measured in time and technical advice about this can be obtained from teacher of pupils with hearing impairment or an educational audiologist.

4. Classrooms are very noisy environments with many sources of background noise. The level of ambient sound in a room can be increased by items such as ICT equipment, audio/visual aids, the heating and ventilation system and lighting. External sounds from other parts of school, adjacent roads and railways, industry, garden or road maintenance also contribute to the total level of sound within a room. Make sure that doors and/or windows act as barriers to sound as required.

5. Teacher’s voice must be louder than the ambient noise level. The children are less accomplished listener than adults; less able to filter-out background noise.

6. It is very important for adults working with the children to use a clear and natural speaking voice at all times. Speech should not be strained or over-emphasised as this can distort some of the speech sounds and adversely affect speech perception.

7. To use technology which enhances the teacher’s voice in teaching areas for all pupils, e.g. a sound field amplification system, may improve the quality of listening in one specific location. However the location of sound may be difficult for pupils with visual impairments. This could affect orientation and mobility and require the child to develop one range of listening skills for areas where the system is in use and another for situations where it is not available. The effectiveness of sound field systems is to some extent dependent on good room acoustic.

8. Ask an educational audiologist to visit and check out your audit area for existing acoustic treatment, to measure levels of background noise and advice on reverberation.

Facilitating access to learning
A.H. Lueck and colleagues (USA 2005) prepared a recommendation for facilitating the access to learning for students with low vision.

“Students with low vision, including those with multiple disabilities, are entitled to a comprehensive educational program that includes services from professionals in visual impairment. This should encompass a range of individualized techniques and services that enable a child to complete current and future tasks in the school, home, workplace, and community. In particular, students with low vision require appropriate assessment, instruction, and adaptations to facilitate visual efficiency.”

All students require instruction in the full range of visual environmental modifications appropriate to their needs. In addition, all students require assessment and intervention related to the optimization of vision use in functional tasks. Assessment and instruction to improve orientation and mobility performance by students with low vision is also required across all ages. Finally, students of all ages require
systematic evaluation for the use of optical and electronic devices for reading and distance tasks as well as systematic instruction in the use of these devices.

Key Points
All students, regardless of additional disabilities, are entitled to appropriate evaluation and instruction related to their low vision. It is imperative that school districts make a full array of evaluation and intervention services available to low vision students.

1. **Students with low vision in the schools can range in age from birth to 22, and they must receive supportive instruction related to low vision at every age level.**
   Intervention is critical for children birth to 5 whose vision is developing and who are learning to use their available senses. It is also essential to support students in elementary, middle, and high school who must access instructional materials using special techniques and adaptations and who must learn to use their vision in increasingly demanding tasks. Finally, support to students transitioning from school to work or higher education can make the difference between success or failure upon graduation from high school.

2. **Determination of types of instruction related to low vision should be an ongoing process throughout a student’s school years.**
   A student's vision can change or task demands can change. Evaluations must be current and specific for students with low vision, and they should be regularly updated to meet any changes in vision function or schoolwork. It is especially important to monitor the status of students whose visual impairment is progressive and who initially require instruction in sight enhancement techniques and who will ultimately require instruction sight substitution techniques.

3. **Evaluations related to a student’s low vision, which include general eye examinations and low vision evaluations by ophthalmologists or optometrists, functional vision evaluations, environmental analyses, learning media assessments, and assessments pertaining to orientation and mobility should provide comprehensive information about a student’s visual abilities, visual environment, and the visual demands of critical tasks that are functional or meaningful for the student, both academic and non-academic.**
   This includes a determination of:
   - a student’s level of vision functioning in various areas of visual ability,
   - a student’s ability to use vision to complete usual tasks in school, home, pre-vocational/vocational, and community settings,
   - analyses of a student’s typical visual environments to determine visual needs in each setting,
   - the availability and use of a student’s other sensory systems in addition to vision,
   - a student’s need and potential to use non-optical, optical, and electronic techniques and devices,
   - a student’s motivation to use his or her vision and other senses as well as motivation to use adaptive devices to complete specific critical tasks.

4. **Low vision instruction should include the use of techniques to improve the acquisition and use of visual skills and also promote the application of visual and non-visual techniques to facilitate access to information in the environment.**
   Vision is often the most efficient method for accessing information, but it may not be the most efficient way for students to complete all tasks. Instruction related to
low vision can address instruction in the following areas, depending upon each student's assessed needs:

- instruction in visual skills and use, including promoting the development of visual skills or the application of existing visual skills for efficient completion of specific tasks,
- instruction in the selection and use of visual environmental modifications, including altering visual features in a typical environment so that a student can use his or her available vision to complete specific tasks with efficiency in that environment,
- instruction in the selection and use of assistive devices, including facilitating the use of non-optical, optical, and electronic assistive devices to complete specific tasks efficiently,
- instruction in the selection and use of sensory substitutions, including promoting the use of alternative sensory systems, such as audition or touch, when non-visual methods result in more efficient task completion than non-visual methods,
- instruction in methods to integrate information from all sensory systems, including encouraging awareness and coordinated use of all available sensory systems in ways unique to each student,
- instruction in low vision requires the implementation of systematic intervention techniques by the full team of professionals working with a student as well as the student's family so that instruction is reinforced within usual daily activities in school and in the home.

References
ISaR resource center: www.isar-projekt.de

2.3. Teaching Blind Pupils

The fundamental difference between sighted children and children with visual impairment is that they live under quite different sensory conditions. They discover and learn about the world around them in a different way. The intention of the education of children with visual impairment is to find out the qualitative and quantitative characteristics of the learning processes by children with VI and on this basis to work out the methodology of teaching to improve the child's learning procedure individually.

Since 1784 when the first school for the blind was founded in Paris, more then two hundred years ago, the education of the blind collected the methods of instructing and teaching blind pupils well, a genius system for written communication was
worked out by Louis Braille and many sorts of tactile materials have been collected in the schools for the blind all over the world.

In the nineteenth century the education of the blind used the same learning aids and illustrations which were being used in schools for the sighted pupils but instead of visual input the teachers offered tactile pictures and learning aids for the blind children. From the beginning of the twentieth century the psychology for the blind proved that the content of the perception and conceptions of persons with blindness are different from the ones of the sighted persons. Unfortunately these results caused a deficit-oriented approach in the education of VI children.

In the second part of the century due to the movement towards integration of VI children into the school for all it was important to emphasize the similarities instead of the differences between the two groups. And because of this many blind children have difficulties in school. Today we know that there are also big differences among the average talented sighted peers concerning learning abilities. Many of these difficulties come from the differences in the awareness in their sensory experiences.

Perception - awareness - imaginary thinking
There is much empirical data about the functioning of the senses. We also know that when we integrate the different sensory inputs, we develop so-called imaginary pictures. We develop sensory pictures about our house, our living room about our king-size bed etc. These pictures contain many results of our different sensory experiences.

We can group our senses in the following way:
1. Near-Body senses: Tactility, Kinaesthesia, Taste, Smell
2. Remote-body senses: Hearing, Vision

One´s cognitive skills are based on the experiences through the senses. The tactile experiences of children are very different. Especially in mathematics some of the so-called unskilled children in touch were better at arithmetic than others. Many of those children could manage to develop their "number sense" through their auditory experiences.

It is also known, that children with good imaginary thinking were better in problem solving than children who had only good verbal competence without imaginary competence.

There are many children who are unable to follow the instructions of the mobility teacher because they lack a common understanding. In spite of this fact they orientate well in their environment. They had a quite different imagination about space and orientation cues than their teacher. They used other sensory inputs which were individually developed and used them in a different way than the other blind persons.

The teachers of blind children do not study the children’s acoustic/auditory experiences very much because they are very difficult to follow. It is much easier to follow the learning procedure in touch, follow the movement of the fingers and hands of the child.
Alternatives in teaching
Without imaginary thinking it is not possible to be physically active in the world. And without imagination of these physical activities the children have many difficulties in school. Not only in mathematics. The most common difficulty for blind children in mathematics is that the children are not able to translate the problems in the language of mathematics and vice versa. The reason for this problem is the lack of relevant sensory experiences.

The teachers get information about the imaginary thinking of pupils through many observations. The appropriate situation for observing pupils beyond learning situations in class are:
- spontaneous play situation
- role plays
- moving in known and unknown space
- daily life activities
- exploring known and unknown objects
- listening to music
- moving, dancing to music
- rhythmical activities
- talking to the others
- tell stories about their experiences, etc.

Teachers can give help to develop imaginary thinking
- to offer an appropriate learning environment
- to motivate learning by doing and with all senses
- to use well-translated printed books and illustrating materials
- to initiate balanced conversation among sighted and blind pupils

Blind pupils explore the world mainly through their tactile/haptic and acoustic senses.

Developing haptic skills
Developing appropriate haptic skills by blind students is the prerequisite to recognize objects and be able to read and write. Through the sense of touch one gets information about the qualities of phenomena through the sensors and receptors in skin, joints, muscles and tendons (McLinden, McCall 2002). There are various types of receptors with each responding to a particular sort of stimulation. For example, the skin contains some receptors that respond to pressure or vibration and others that detect edges. The joints contain proprioceptive receptors that are activated when one moves and helps him or her to coordinate their movement by informing about the relative position or the body parts. Information from “tactile” receptors is transmitted to the brain through two main pathways. One carries information one obtains through active exploratory touch and includes information about pressure, vibration and proprioception, while the other system is designated to carry basic information that helps “defend” the body by relaying information about pain and temperature.

The sense of touch has a number of functions which can be broadly divided into interactive and non-interactive types of touch. Within these functions, touch can be used to acquire sensory information about people, objects and sensory features through the process of haptic perception.
To support individual learning processes project-orientated teaching is the best teaching system in schools. Project-teaching allows self-determined activities for each of the pupils in the class and offers many opportunities for learning together through all of the senses. McLinden and McCall (2002) consider, the haptic exploratory procedures used by mature explorers and noted important differences in the strategies used by children with less developed haptic abilities.

The education of the blind supports blind pupils to develop effective haptic strategies through appropriate learning surrounding and learning materials. In teaching all school subject it is most important principle to use nature phenomena, original illustration or well directed tactile pictures and figures.

**Developing listening skills (Arter in Mason, McCall 1997)**
Today teachers of pupils with visual impairment are aware that listening skills do not develop naturally but need to be taught through systematic programs of instructions. Enhancing listening skills in blind pupils help them

- to get information about the world around them (qualities of objects, relations among objects, persons, events, personality or a persons, etc.)
- to use these skills in orientation and mobility
- to be able to get additional written information through hearing books and speech outputs of computers.

**Objectives of enhancing listening skills in the early ages:**
- Becoming aware of the sounds;
- Discriminating one sound from other;
- Identifying the source of the sound;
- Attaching meaning to the sound;

**Higher listening skills**
To learn strategies which enable them to:
- discover the main ideas;
- recognize a sequence of events;
- predict outcomes;
- remember details from a complicated text;
- recognize stated or inferred cause and effect;
- evaluate the source of information, etc.

Nowadays learning with computer require from the pupils and students to be able to use speech outputs and combine it with other techniques as well.

**Curriculum adaptation**
In many developing countries blind and low vision pupils have the same core curriculum in schools like their sighted classmates. The recent development of inclusion in the United States and in Europe shows that visually impaired students have different educational needs than sighted students have. The acceptance of the right to be different means the acceptance of an expanded core curriculum that requires additional areas of learning and appropriate teaching methods. The
expanded curriculum contains elements in fields of compensatory of functional academic skills and including communication modes, orientation and mobility, social interaction, independent living skills visual efficiency, recreation and leisure skills. He also writes that “At this time, no single, simple method assures VI students of accessing both traditional and expanded core curricula within the same length of time as their sighted peers. This remains a significant, but attainable challenge”.

In Germany children and pupils with special educational needs get special assistance and support in the given fields in any school setting. The “Recommendation for Special Education in the Schools of the Federal Republic of Germany“(1994) emphasizes the analysis of child and environment. The diagnosis of special educational needs must be a precise definition of individual special needs as well as guiding the decision about the process of education and the place of support. One of these places is the inclusive educational setting. (Csocsán 2004)

Arter (in Mason and McCall 1997) gives a list of special consideration for the teachers working with pupils with blindness and severely low vision in the elementary school:

- realistic targets, allowing a longer amount of time to complete work;
- practical demonstrations to be repeated;
- visits and hands on experience;
- discussion to ensure understanding of the language used and the concept being taught;
- training in use of listening skills;
- training to use touch typing;
- mobility training;
- training to develop full use of residual vision;
- training in the effective use of low vision aids – including CCTV.

References


ISaR resource center: www.isar-projekt.de


2.4. Prerequisite for Independent Learning

The Important Basic Skills

Many visually impaired pupils can become rather good at most of the skills that are needed for them to cope in school. We do, however know, that however good they are as visually impaired, many tasks are more complicated and take longer time for them to manage. There are furthermore simple devices at school that do not belong to the ‘normal’ objects that a child is familiar with before starting school. Some of the important things for successful learning are the responsibility of the visually impaired pupils, others are the responsibility of the peers, the teachers and/or the school.

To learn one needs to find the classroom, ones desk and ones things;
• The students must learn orientation and mobility to be able to move freely in the classroom, the school and the school yard.
• The student must know what kind of things there are and where you can find them in the classroom. In this way you inspire their power of initiative.
• The student should be able to find his books and equipment by himself. Ergo, The right things in the right places.

Because order is essential as not to use all the energy in finding things:
• All books, folders, exercise books etc. should have markings in Braille.
• The student must learn to mark his things himself and work out a system which makes everything simple and easy to find.
• The student ought to have a cupboard, a shelf or a drawer where to keep his things.

The teacher must remember:
• The worst thing is to rearrange things in the classroom all the time.
• Do not leave a lot of things lying around or portable equipment in the “wrong” place. This does, of course, concern the peers and the whole school environment.

Prerequisite for successful studies is that:
• All material the student needs is available and given when needed, like for every other pupil this concerns books, paper, writing equipment etc.
• The student has a good conceptual understanding – check that he really understands the concepts you are using and check that he understands the concepts he is using. Many blind students have an excellent vocabulary but not always a real understanding of the words they use.
• The student understands explanations regarding maps, tables and graphic presentations.
• The student can use his technical aids.
• The student can use dictionaries and encyclopaedias.
• The student can independently make the necessary preparations for the lessons (books, folders, technical aids etc.)

What can / should you as a teacher do:
• Speak slowly if the students ought to take notes during the lesson. Explain difficult words.
Practice writing summaries. It is much quicker when you have to read for a test if you have done a summary during homework.

If the student has spelling difficulties, it might be an idea if you ask him to copy part of the homework directly from the book.

When using pictures and objects to clarify something, use few but relevant pictures or objects. With too many pictures or objects the student loses concentration. All objects and pictures should be examined with both hands. Let the student describe and look for the various details.

Go through letters, numbers, punctuation marks and other marks that are general knowledge if you have a partially sighted student even if the student uses Braille.

In case of extensive homework, give some vital questions for the student to work with. This makes it easier to pick out relevant information from the text.

Collegial co-operation and assistance

Train basic skills before starting new activities, i.e. hold a pen, draw lines by using a ruler, using a pair of compasses to draw a circle etc. These skills could be practised during daily living skills (DLS) sessions or drawing lessons.

Co-ordinate subjects. One can train weighing and measuring, estimate household expenditure in mathematics, physics, chemistry, home economics, DLS, etc. etc.

To give the pupil a chance to show his/her real academic skills in the tests and not unnecessarily lose a lot of time on trying to comprehend graphs and pictures:

Give enough time to study graphic materials, maps etc. before a test starts.

In tests in mathematics (and other subjects were extensive answers are required), it is better to give a few relevant test items than too many which are impossible to carry out during the time given for the test. Reading and working in Braille or large print takes longer than in regular ink-print.

But: The visually impaired students needs more time than his peers in test situations as well.

Sources:
Csocsán, E & Sjöstedt, S. Experience throughout their professional careers.
3.1. Braille Literacy - Reading and Writing

Basic Information relating to Braille
All over the world, persons with visual impairments have used Braille as the primary means to reading information. Also, the concept of Braille has been accepted as a universal approach that works across the boundaries of the world. Different countries of the world have adapted the system of Braille to suit their languages.

Brief introduction to Braille
Standard Braille is an approach to creating documents which could be read through touch. This is accomplished through the concept of a Braille cell consisting of raised dots on thick sheet of paper. The protrusion of the dot is achieved through a process of embossing. A cell consists of six dots arranged in the form of a rectangular grid of two dots horizontally and three dots vertically at a space of approximately 6.1 mm x 3.7 mm. With the six dots arranged this way, one can obtain sixty three different patterns of dots. Strictly, it is sixty four patterns but the last one is a cell without any dots and thus serves the purpose of a space. The dimensions of the Braille cell are standardized but may vary slightly depending on the country. Each arrangement of dots is known as a cell and consists of at least one raised dot and a maximum of six. On a Braille sheet, the dots are created by embossing using a special printer or even a manual machine that simultaneously embosses the dots. Today, we also have Braille printers which may be connected to computers on standard printed interfaces. These are generally known as Braille Embossers. A printed sheet of Braille normally contains upwards of twenty five rows of text with forty cells in each. A sheet of Braille may thus appear to hold information amounting to about a thousand characters (letters of the alphabet).

In standard English Braille for example, many of the sixty three cells will correspond to a letter of the Roman alphabet, or a punctuation mark. A few cells will represent short words or syllables that are frequently encountered in English. This is done so that the number of cells required to show a sentence may be reduced, which helps minimize the space requirements while printing Braille. These special cells are used in specific ways along with regular cells to form sequences which are known as contractions. Contractions are specified for most frequently used syllables and words and there is a standard list of contractions in English Braille. To begin with, one is taught Braille without contractions and this is called Grade-1 Braille. Braille with contractions is known as Grade-2 Braille. In most languages you use contracted Braille. This is done as Braille takes up a lot of space. As an example can be mentioned that World Book Encyclopedia consists of 145 volumes containing a total of 38,000 pages. The problem with contractions is that it makes spelling more difficult. For fast readers it is an asset as the fingers can move quicker over the words. The new technology has made contracted Braille less important as the texts can be written into a computer and saved on a disk or a memory stick.

Challenges in Braille reading
Even though there have been a number of innovations in the education of the visually impaired, Braille is still considered to be the main literacy media for persons with blindness. It does not, however, mean that it is simple and easy to learn.
To begin with there are several types of Braille that is the literary Braille, the mathematical and the musical Braille. The same Braille character can therefore mean different things depending on if it is in a literary or mathematical text or if it is found on a sheet of music. The Braille characters vary when you take into consideration how easy or difficult they are to distinguish between through touch. An a, I or m is rather easy to begin with whereas an n or a q might create problems for the learner. (Fellenius 1999) Some sighted pupils may have difficulties with reversals. There are a number of reversals in Braille; d-f; e-i; h-j; etc. may cause problems. In maths this problem will be accentuated as these letters represent numbers in mathematical Braille, i.e. 4-6; 5-9; 8-0.

The method of teaching Braille reading for learners with blindness varies from country to country. During the time when the pupils attended special schools many teachers started with the simple letters and made words out of them to make learning more interesting. With increased integration/inclusion many children prefer to have the same books as their peers from the very beginning. The solution has been to make space between the letters and the lines and gradually omit first the space between the letters and later between the lines. The greatest difference between the teaching in different countries is not the Braille characters but the differences in orthography and letter characters for the sighted. One uses the alphabet method, others use whole word method, syllable method, letter sounding method etc.

**The characteristics of tactual reading**
All research on visual and tactile reading show that visual reading is far faster than tactile reading. Already Rath and Hudelmayer (1985) have shown that visual reading is between two or three times faster than tactile reading. By visual reading the eyes move in a ‘jump’ from one fixation to another. It is during the short fixation we read a larger or smaller part of the text depending on our reading skills. The visually impaired on the other hand read ‘in motion’, i.e. the fingers move over the letter they are reading at the moment. After this they have to combine the letters into meaningful words and content.

Olson (1981) has found the following connections and differences in visual and tactile reading:

<table>
<thead>
<tr>
<th></th>
<th>Visual reading</th>
<th>Tactile reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pause and movement</td>
<td>Quick eye jumps, short pauses and new movement. During longer pauses longer</td>
<td>Few pauses. When pausing one can only read the letter under the finger. The</td>
</tr>
<tr>
<td></td>
<td>sequences can be comprehended. Pauses 92-98% of the reading time. No reading</td>
<td>fingers read during movement.</td>
</tr>
<tr>
<td></td>
<td>during jumps.</td>
<td></td>
</tr>
<tr>
<td>Number and placement</td>
<td>With good reading skills fewer pauses, more rhythmical reading. Unnecessary</td>
<td>Better reading with fewer up and down and downward movements. Even pressure.</td>
</tr>
<tr>
<td>of pauses</td>
<td>movements should be avoided.</td>
<td>Unnecessary movements should be avoided.</td>
</tr>
<tr>
<td>The function of pauses and movements</td>
<td>Whole short sentences can be understood during the pauses. Large perception units.</td>
<td>All signs appear in succession. Small perception units. Considering this, surprisingly fast reading.</td>
</tr>
<tr>
<td>Methods of perception</td>
<td>The best readers percept the meaning based on words or short sentences.</td>
<td>Letter perception appears through moving the fingers. The perception area is the single Braille cell.</td>
</tr>
<tr>
<td>Dominant and sub-dominant characters</td>
<td>The understanding of the word depends on the connection or the form of the character. The form of the letter can be dominant or sub-dominant regarding the formation of the word.</td>
<td>The system is the same as in visual reading. The normal reader gets ideas from the first letters. They become the dominant letters of the word.</td>
</tr>
<tr>
<td>Good reading</td>
<td>Few, short fixations and no pauses, no regressive movements, well functioning line changes.</td>
<td>Few zigzag and up and down movements, even pressure, coordinated two-hand reading between the lines, good text understanding.</td>
</tr>
<tr>
<td>Return movements and changing lines</td>
<td>Return movements shorter than the lines as the pauses start and end inside the line. Become habitual motor eye movements.</td>
<td>During one hand reading the return movements are longer than the line in order to control that the line has ended and the next line has started. During two-hand reading the left hand searches for the beginning of next line and the right hand follows after having read the former one. Both hand work together to the middle of the line.</td>
</tr>
<tr>
<td>Both eyes, both hands</td>
<td>The eye movements are automatically coordinated. You cannot make your eyes move in different directions.</td>
<td>Both hands can move independently. One hand can check mistakes in the text while the other one continues reading. Each hand can read different matters.</td>
</tr>
</tbody>
</table>

**Braille Reading**

*Pre-Braille skills*

The tactile skills of the children should be trained at an early age. By using toys of different size and material, letting the children feel and distinguish between different kinds of textiles and textures their tactile skills will develop. The teacher can also make a ‘lotto game’ by gluing pairs of small objects onto pieces of cardboard and ask the child to find the pairs. The same game can be done with pairs of small objects in a bag. Ask the child to find the pair of the object you show it. To make small bags of textile and fill them with small items and ask the children to tell what is inside might also be a nice game. To thread pearls on a string is furthermore a good training to enhance the tactile skills of the children with blindness. All these activities may be fun for their sighted peers as well.
A sighted child has been exposed to letters, words and texts long before starting school. The streets are full of signs, the family might have books at home, the parents may read the newspaper and receive letters. The children with blindness seldom have a chance to come into contact with Braille before school. It is therefore important to expose the children to Braille in several forms. To give them stimulation to read and make them understand that reading is for them as well, it is important to have everything written in the classroom and on the school information board in Braille as well. And it would be nice if their name is written on the bench in the classroom, on the locker or shelf where they have their things.

**Some advice as to pre Braille books**

*Goals to achieve:*

1. Motivating the child to deal with tactile pictures and print
   a. Awake his/her interest
   b. Involve her/him in games
   c. Encouragement of telling stories
2. Helping him/her to develop tactile discrimination
   Forms
   Structure (different lines, space between letters, space in letter etc.)
   Letter
3. Giving her/him opportunity to learn the function of symbols
4. Developing verbal skills
5. Enhancing acoustic skills
6. Developing cognitive skills
   a. Memory
   b. Seriation
   c. Classification
7. Tactile orientation
   On the page
   In the text
   On the line
   In the letter
8. Developing the right reading attitude
   Body position
   Arm position
   Role of the hands
   Finger movements

*Concrete advice regarding the tactile pre Braille book*

- Introduce a story which is interesting for the child
- Use 3D object first
- Simplify the object (relief) and fix it on the paper
- Use geometrical forms as symbols
- Use appropriate size
- Use nice tactile qualities
- Don’t put many figures on one page
- Use the principle of “step by step”
- Combine figures with dotted lines or Braille patterns
- Use Braille numbers for the pages (this is for the teacher first of all but it could awake the child’s interest as well)
Initial Learning Strategies

Before starting to teach letters it is, as mentioned above, important to teach reading techniques. This can be done by producing sheets of papers in Braille as follows:

Start by writing longer and shorter lines of dots:
……………………………………………………….
……………………………………………………….
……………………………………………………….

Teach two-hand reading where both hands follow the line. At the end of the line both hands go back to the beginning, the left hand searches the next line and the right hand is placed beside it and the next line is read.

Continue with a new sheet with lines and a full Braille cell (dots 1,2,3,4,5,6) interrupting the line:
……………………………………………………….
……………………………………………………….
……………………………………………………….

To make the training more interesting, make a story together with the child about what kinds of shops or other places of interest the Braille cell represents.

A third one could be dots plus the letter L that can be counted. How many letters L are on the line. –With fantasy it can be trees when walking on a path through a park.
……………………………………………………….
……………………………………………………….
……………………………………………………….

With these exercises the pupil has been able to train two-hand reading which is essential for further efficient reading. Techniques for reading have been trained and changing lines through letting the pupil use both hands together while following the line to the end and then searching for the new line. By pursuing this method the pupil has a chance to become an efficient two-hand reader. When the reading skill is increasing the pupil starts reading a line with both hands. At the middle of the line the right hand reads to the end of the line while the left one searches the next line and reading is continued in a ‘slalom’ type of reading.

N.B. The most important thing is not if the student is a right or left hand reader. The important thing is to be a good two-hand reader. This is even more important if the pupil will receive a computer with a Braille line as they need to change hands when controlling the computer and checking what happens on the Braille line.

Matters to check:

- IS THE TOUCH SMOOTH?
- DOES THE PUPIL REFRAIN FROM UP-AND-DOWN MOTIONS?
- DOES THE PUPIL GO BACK IN THE TEXT?
- HOW MANY FINGERS DOES THE PUPIL USE?
- DOES S/HE MAINLY READ WITH HIS LEFT OR RIGHT HAND?
- IS THE READING FLUENT?
- HOW FAST IS S/HE READING?
Efficient Braille reading strategies:
As we have learned that students with blindness are much slower readers than the sighted ones, it is important to enhance the reading speed as well as find strategies that make reading and handling the reading material more efficient.

To train fast reading it is good to use short, simple texts – preferably funny ones or texts produced by the student. The training has to be carried out through silent reading as reading aloud automatically means slow reading. Check afterwards if the student can make a short summary of the text. The pupil should read the text several times. Make the task more interesting by timing the task.

Train “efficient” reading. If the a person in a book is called Bromwell you can be pretty certain that a sign for capital letter together with Brom will be Bromwell and by “I have read in the newspaper” the pupil most certainly knows by ‘newsp’ the rest of the word. It is important to teach the student to think in main ideas, main characters, summaries etc.

Another way to speed up the efficiency during lectures is to teach the pupil to use the list of content. He/she may also use a mark where the homework starts and ends. Train the alphabet! R comes much later than b and w is at the end of the alphabet. This is important when the students must look for something in a dictionary. Train the student to quickly look up something on a given page in a book. A braille book usually contains 50 pages. Train to look up page 5, 30, 20, 45 etc. Teach the student to consider where approximately the page may be in the book, how thick a sheaf you can turn over to quickly reach the page you look for – and when to start checking one page at a time.

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**MATTERS TO CONSIDER FOR BRAILLE READERS**
- TRAINING FAST READING
- USING READING STRATEGIES
- TRAINING INTELLIGENT READING
- CHECKING THE UNDERSTANDING OF WHAT HAS BEEN READ
- USING THE INDEX – SEARCH ON A PAGE
- FINDING A SPECIFIC PASSAGE IN THE TEXT
- SEARCHING A PAGE IN THE BOOK

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**Braille writing**

*Slate and stylus*
Many teachers find it difficult and time consuming to teach the pupils to use the slate and stylus. To produce a dot at a time and try to teach them the letters as mirror images may feel slow and exhausting. Before the braille systems became common, all children with blindness learned to use this devise. To see one of the students of that time using it one realizes that with training one may become incredibly fast in writing. With the braille systems and the computers arriving into the classes for the visually impaired the slate and stylus was almost forgotten. But in the western world the slate and stylus has become popular among the persons with blindness and it is taught in the schools again. The reason is simple. More and more visually impaired persons need
a simple devise to take notes. They cannot carry your computer or brailler around all the time. But they can carry a slate and stylus in the pocket or handbag. By using a well structured teaching method the children may excel. The rules have to be followed in order to make writing accurate and efficient.

When you start:
- You write from right to left as you press in the dots and read them on the back of the paper.
- The dots 1,2 and 3 are those on the right side of the Braille cell.
- The dots 4,5 and 6 are those on the left side of the Braille cell.
- Keep the stylus in a vertical position.
- Place the slate on the desk with the “windows” of the cells upwards.
- The hinges should be to the left.
- Put the paper into the slate so that the paper lies alongside the hinges.
- Check that the upper rim of the slate and the paper lie alongside each other.
- Press down the upper paper holding studs.
- Close the slate.
- Train this until it works well.
- When you have written all the lines, move the paper upwards so that the holes from the lower paper holding studs will be put onto the upper studs of the slate.
- Check that the holders are in position.
- Check that the paper lies straight along the left side of the slate.
- Close the slate.
- Keep the stylus vertical.
- Train writing by pressing the dots 1,2,3,6,5,4, in that order, i.e. first point 1 up in the right corner, then point 2 under it on the right side etc.
- The left index finger functions as steering help.

<table>
<thead>
<tr>
<th>Some important rules</th>
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</thead>
<tbody>
<tr>
<td><strong>Always start on the right side of the braille cell.</strong></td>
</tr>
<tr>
<td><strong>Always use a corner as starting point (i.e. p. 1 or 3).</strong></td>
</tr>
<tr>
<td><strong>Connect each symbol, do not jump from one side to the other, let the stylus follow the rims in a continuous movement.</strong></td>
</tr>
<tr>
<td><strong>Always write the symbols in the same way, decide on one way and keep to it!</strong></td>
</tr>
<tr>
<td><strong>Follow the outer lines.</strong></td>
</tr>
<tr>
<td><strong>Choose the shortest straight way.</strong></td>
</tr>
<tr>
<td><strong>Never work diagonally.</strong></td>
</tr>
<tr>
<td><strong>Let the left index finger help finding the new line.</strong></td>
</tr>
<tr>
<td><strong>Train one letter symbol so thoroughly that it really “sits in the hand”, i.e. one does not have to think how it is written.</strong></td>
</tr>
<tr>
<td><strong>Don’t press the stylus too hard.</strong></td>
</tr>
</tbody>
</table>
**Brailler**

It is much easier to write Braille on a brailer than it is to read. But reading and writing should go hand in hand. The learner can start by train to ‘write’ on the desk. When starting with the brailer the typing touch shall be firm but not unnecessarily hard as this gives muscle tension. The pupil must use the correct finger placement from the very beginning. The index fingers must be placed on keys 1 and 4, the middle fingers on 2 and 5 and the ring-fingers on keys 3 and 6. The left thumb presses the space bar. With this method the possibility to become a fast writer is enhanced. Start with a smooth but rhythmical tempo. A fast tempo must go together with skill! So please, advance slowly. In the beginning it is good to start with short periods of writing and breaks in between.

Teach the child to write with care as mistakes are difficult or impossible to correct. The teacher should, however, make the child control what has been written only after a whole passage is ready. – It takes some time before the fingers find the right keys again. Jumping between the text and the keyboard is a bad habit which is difficult to get rid of. Teach the child to put the papers into the brailer themselves! There is not always an adult around to take care of that task.

**Computers**

With the computers reading and writing has changed for the students with blindness. They have learnt how to touch-type in countries where typing machines have been available. During that time they could write but they could not read what they had written themselves. Today the computers with Braille displays have made this possible. There is one additional trait as the students have to learn the so called 8 dot computer Braille. The reason for this is that the computer has one key for each letter and punctuation mark whereas Braille has an extra sign e.g. for capital letter or numbers. It is extremely important that the associations for or of the visually impaired cooperate with other countries with the same language in order to use the same computer Braille symbols.

**Sources:**


**Internet:**

http://acharya.iitm.ac.in/disabilities/br_intro.php
3.2. Tactile Pictures as Learning Materials

To the topic ‘tactile graphics’ teachers can find an abundance of reports, articles and practical advice in periodicals, libraries and on Internet. Most of them deal only with one or two aspects of this very complex and important field within the education of pupils with visual impairment. The following article was printed in 1991 but the questions and thoughts are still relevant. Some other sources can be found in the references.

Tactile pictures specifically created for the blind are important learning aids, as are the spoken words and Braille. Natural objects and models as well as tactile pictures supply information of nature, society and technique. They contribute considerably to the knowledge of the blind person.

With these thoughts and recommendations the international conference in Berlin in 1984 was initiated. The theme was a survey of 200 years of history and the present stage of the typhography.

Even though we today (1992) have found solutions in many fields the evaluation of tactile pictures is very different. There are extreme contradictory opinions both from the blind themselves and from the experts. From the point of view of the education of the blind it is a question of how the tactile pictures support the learning process and how they enhance the exploration techniques.

The intention of this article is to assist and refer to the evaluation of the practical necessity and to find different solutions. In the first place we are interested in getting out relevant information through tactile pictures, and we do not deal with their artistic values.

About visual and tactile recognition of forms
The two dimensional reproduction of reality, the pictures, form an organic part of our culture. That is why they play an essential part as a media in learning and teaching. As to their content they may be divided into two big groups:

a) pictures that represent the visual experience of reality, e.g. photos, drawings of nature, pictures etc.

b) figures that contain symbols e.g. maps, graphics etc.

The task to transfer pictures into tactile forms seems relatively simple with the present technical methods. Still, the transformation is not easy. Not even transformation of figures with symbols is easy. A good example is the tourist relief maps. They are very popular for sighted people, as you can feel the surface. These maps do, however, not serve the blind that well. They show too many details and are not suitable for the tactile process. The information delivered by these “visual” tactile drawings is unsatisfactory. The reason lies in the difference between the visual and tactile identification of forms.
In the following part we will only concentrate on active exploration by using both hands. The information transmission through a non-active hand, like with optacon (optical to tactile converter used for reading inkprint) is not considered here.

The analysis as to parallels and differences between visual and tactile perception of forms is a complex field of research. During the visual recognition the stimulus and the organ of perception are easily differentiated. Touching has no specific sensory organ of its own. By active touching the stimuli is transferred through different information of the temperature of the skin, the position of the joints, the movement of the limbs, the condition of the muscles etc. The differentiation between the stimuli and the answer is unclear: the explorer moves his hands and perceives the object simultaneously. (Neisser 1984) He/she feels the fingers and the quality of the object at the same time.

Our knowledge concerning tactile recognition is not sufficient. (Warren 1984) Many researchers were busy researching the difference between passive and active touching (Révész 1938 and 1985, Jungnitsch 1984) Their research showed that recognition of an object or phenomenon is possible only if the explorer is active in the tactile process. One cannot be forced into active touching. (Neisser 1984)

The comparison between visual and tactile recognition is also made difficult because there is no “sterile” system of condition for experimental collecting of data. Generally it is blindfolded sighted people who make up the control group. In their case, however, visualisation is not excluded when it comes to the solution of haptic tasks. (Révész1985/1934, Pálhegyi 1969. Hudelmayer 1970, Jungnitsch 1984). Even though the research as to haptic stimuli does offer many results (Illyés 1971, Sherrick-Craig 1982, Lederman 1982), we still have few points of support to establish the so called haptic intelligence. The teacher of blind children experiences the differences as to the achievements of these children. The differences cannot be explained only by the differences of recognition. Probably the haptic recognition of mosaic pictures requires another kind of learning skills than the visual exploration. Such personal factors as e.g. activity, observation, patience, interest, tolerance or frustration etc play a big part.

The distinction between gestalt and structure is associated with the name Révész (1983/1930). The gestalt or form has its roots in the experience and of a holistic understanding of a whole(or a part of the whole). Structure, on the other hand, originates in the intellectual sphere. It is the functional awareness of the relationship among the parts of the objects, as a whole.

Pálhegyi criticizes Revész in many places.(Pálhegyi 1969) Founded on his experiment he draws the following consequence: The structure of the haptic and visual experience field is not equal. The reason for this is that the dimension of the haptic field is small; the consequence is that one tends to order the process of experience in a temporal way, this is a successive process.

In Pálhegyi’s opinion the tactile drawings for the blind did not offer any direct contact to reality as they do to sighted people. To them it is a “strange” system of symbols that they had to learn with great effort and had no practical value in their lives. His influence decided the special teaching of signs in the schools for the blind and saved
them from the extreme importance of relief pictures that the former Soviet Union may have had on the taphiological practice in the pedagogical field.

The author was lucky to teach drawing/representation in the school for the blind. During this time we already used polyprofile sheets as an aid for drawing, a method used in most western countries. In this way blind people can produce drawings with raised lines themselves.

This rendered it possible for us to have an impressive data collection. (Gyárfás 1977, Eltető 1980, Csocsán 1982) We realized that relief picture of simple objects were easy for some students, for others much more difficult and for some of them impossible. This may explain why both those experts who support this kind of drawing and those who oppose it have found reasons for their opinions.

The reason may be that objects like a horn, a comb, a hammer, a cross a pear, some leaves for instance have a very pregnant form. In these cases one may be successful. The difficulties turn up when the centre of the haptic perception is not the form but another quality, e.g. softness and smoothness of a rose for the sighted person the form of a rose bud is pregnant for the blind person it is not. For the latter the combination of a two-dimensional representation of this object is much more difficult.

A blind person considers the relief picture of an object as a symbol. Therefore an introduction about the symbol is always necessary because in most cases there is no haptic connection between the picture and the real object, such as in the case with visual perception.

What should a specific drawing for the blind be like? The justification of symbolic drawings, maps, graphics etc. is not questioned. We are interested in the criteria that could enhance the content and the technological solution.

The formerly disputed tactile pictures of real objects or phenomena are today common in many educational fields. The opinion that a blind person has to learn to compare his drawings with the reality is gaining ground also among the blind themselves. In this way objects that cannot otherwise be made accessible to the blind because of their size or the danger they pose may be accessible through drawings. Another positive thing is that the ability to differentiate their sense of touch, their attention, their ability to combine, their memory etc. are enhanced when learning to read the symbols of the drawings.

**Drawings made for the blind**
- should not be like photos (Bentzen 1962, Hudelmayer 1983, Seibt 1984)
- should as a whole or in parts follow the rules of haptic recognition
- should be adapted to the anatomic and physiological qualities of the touching hand
- should not be crowded
- should be well structured
- should avoid “covering”
- should not use perspectives
- should support the understanding of the connection of elements
- should assure the finding on the drawing through supporting orientation points
- should use international symbols e.g. on maps and other symbolic reproductions
- should, when technology allows it, use strong contrast colours for visually handicapped (low vision) people
- should be adapted to the content of the subject and should be suitable for the age of the users.

The author worked out the methods of drawing in phases for geometrical constructions. This method can be used in constructing relief pictures as well. The idea is on one hand that such a sequence precedes the complete picture. They give the sequence of the different steps and on the other hand they offer the different parts separately. Thus the orientation of the complete picture is made easier.

**Methods of production of tactile drawings**

1. **Application**
   In this case different materials are used simultaneously. The advantage is that the different quality of touch facilitates the understanding of the picture. The disadvantage is that it is time consuming and only suitable for single examples.

   According to Gill (1984) the first reproductions is connected to Lucas (1517). Haüy (18th century) who also uses relief drawing with his blind students. Generally wood, nails of metal and wire were used. Cseresznyés and Séra used balls of soil – used even today – wood, clay metal and glass. Fischer (1984) produces his fairy tales for the blind using carton, textiles, wool and buttons. The technique of application can be used by the teacher to advance the skill of hands. Thus nice decoration may be produced.

2. **The use of polypropile drawing sheets**
   This thin foil made of synthetic fibres produces, when put on an elastic surface, immediately a positive, touchable line. This makes it suitable for the production of outlines of maps, diagrams, geometrical constructions etc. The drawback is that only one specimen can be produced. As teaching material for the student it is today obligatory.

3. **Examples of other methods**
   a) Wax boards: on the layer of wax one can scratch negative lines with a blunt pen. Unfortunately it is difficult to “read”. The good thing is that it is suitable for different surface formations.
   b) Special pens (window colours): They give a special kind of pulp that gets firm in the air and thus can be touched.

4. **Techniques which are suitable for duplication**
   Vacuum-forming: this is the most widely used method for making plastic copies from a relief master. 1. A master is made. 2. The master is placed on a perforated metal base in a vacuum forming machine. 3. A plastic sheet is placed over the master. 4. The plastic is heated in a close-circuit machine and between the sheet and the master a vacuum is produced. The plastic sheet gets the form of the master. 5. After the cooling you have a stabile copy of the master.
The advantage of this method is that you have a lot of copies without difference in quality. The drawback is that due to the monotony quality of plastic, the touching hand gets numb after a while.

The clichés may be produced in several ways:
- Application: from different firm materials through gluing etc.
- Processing of materials: e.g. etching
- Nylon print technique
- Colour foam method

b) Special “stereo” copying, i.e. using microcapsule paper

5. Relief pictures produced with computers
The greatest challenge today for the technical experts is the ever ongoing development of the graphic of the computer screen for the blind. For the moment two solutions for touching are available:
   a) the Braille printer connected to the computer produces a touchable representation.
   b) a tactile display provided with movable pins forms apparent reproduction and thus makes it available for the blind

Fields of usage
Tactile pictures are widely used in the education of the blind. The tactile maps manifold as to their themes and ways of production. An international commission is already working on unifying the map symbols.

Gill (1982) thinks it is probable that Weissenburg made the first tactile maps out of bean seeds and lines. From this time on the tactile maps are the most common means in teaching geography and history. The maps and sketches are becoming more and more significant when it comes to independent orientation. As to the teaching of maths, physics, chemistry and technique the relief pictures are used to give the contexts (graphics) of certain tendencies and processes.

More often we read about research projects concerning tactile pictures for the use of teaching blind children. The picture book produced by Fromm (1974) and his colleagues contain schemes of pictures of simple objects (e.g. a button, a knife, a bucket, a cup). A methodical guide for teachers and parents was produced. It explains that the sensibility and the ability of touch, the memory and speech of the blind child develop while working with the picture book. The child may also collect experiences when it comes to achieving mathematical concepts.

Ostad (1985, 1989) composed his mathematical development programme between 1977 and 1985. His idea is that this method should stimulate such blind children who are less active when it comes to action and who have little experience with the manipulation with objects. For this purpose he uses relief pictures as well as reachable objects. The optimal solution he found in the technique and the content of the reproduction. He developed a method for teaching reading and drawing and work with relief pictures. He recommends the connection of an object and its relief picture by using the following stages:
   1. A conception of a concrete object,
2. the conception of a so called half relief model of a concrete object made of plaster,
3. a schematic relief conception in the same size as the original object,
4. smaller and smaller schematic reproductions.

In our opinion the adaptation of the OSTAD method the dealing with relief pictures has a positive effect on mathematical thinking because the relief pictures themselves have a comparable physical quality (size, form, etc.). Principally the work with relief pictures helps to understand the idea of “symbol” as the represent signs of objects.

There is one more thing to mention. The embossed drawings and relief pictures may have an emotional effect, even though in a more restricted sense than visual representations are for the sighted. We think for instance of the happiness of a small girl when she has got a picture book just like her sighted sister. And there is active influence of artistic graphics on the blind as well.

Relief pictures have reached beyond the schools and have become an important factor e.g. in further education and professional rehabilitation. With the reproduction and spreading the relief pictures have reached the field of spare time activities (e.g. party games, cards or calendars).

We would like to finish with the wish for more cooperation between the psychologists, pedagogues, technical experts, the students and their parents to develop appropriate theoretical basis for the practical use of tactile drawings.

References
3.3. Map Reading for the Visually Impaired

Maps are abstract and might be difficult to interpret, but it is even more difficult for a person with visual impairment who has never seen a landscape from a mountain or an airplane.

To be able to read a map, concepts like in front of, behind, inside, left, right, north, south, east, west etc. are important to know.

Good spatial understanding means that a person is able to change the body centered spatial awareness into an outside orientation spot. To know that reality can be reduced to a model and from there made into a picture. Good two-hand tactile skills are needed as well.

Before making a model of a landscape, it is useful to start with a model of the classroom in order to work with concepts like enlarging, reducing, scales and the four cardinal points. The real room can then be compared with the model of the room.

When training basic map concepts, e.g. the difference between sea and land, island, peninsula, bay the teacher together with the class can make a real model working with sand and water. It is again important to start with simple models before continuing with a real map. A globe with different materials for the different continents can also be prepared.

Too many details should not be put on a tactile map, it is thus important to have more than one map where countries and main cities may be found on one map, mountains, lakes and rivers on another. The maps need to have a separate “key” paper with the names of the places as only abbreviations can be put on the map. There are usually a physical and a political map of each country. Many producers of maps have theme maps that show population density, different kinds of forests or roads and railroads etc.

How to read a map
It is important that the child gets good tactile reading skills from the beginning, i.e. the teacher should participate with instructions and guidance. It is crucial that the child uses both hands efficiently. This gives a good overview of the map if you use the whole hand. The child should move the hands vertically and horizontally or in circular movements to scan the map at first. The idea is to get a whole picture of the map.

When teaching, start from a point that the child knows, or mark a place of importance of the map. North should be marked in some way on top of the map. Check where
there is land and water. Which is the form of the land? Is it big or small? Which countries are around it?

Use body measures to check differences, i.e. a finger for Jordan and a hand for Australia. Do not work simultaneously with maps in different scales. It may also be good to make a puzzle piece in cardboard with the country you are working with.

**How to detect details**
The symbols must be apart enough to enable detection. The map should not be too big as it makes it difficult to get an overall picture of it. A succession of maps may help.

**Orientation strategies:**
- Start with a general orientation
- Continue with details
- Use an orientation point and put a mark of some kind on e.g. the capital as a starting point to return to along the same line when needed
- When looking for a location the child has one finger on the starting point and uses the other hand to locate the place wanted
- Make the child aware of the location from the starting point
- Make the map reading fun by imaginative trips and meaningful voyages for the child

**References:**

**3.4. Teaching Mathematics – Methodological Principles**
Teaching mathematics on the elementary level means first of all helping children to use and organise their experiences which they gain from actions and interactions with the world around them. The main goal of mathematical education is to develop an awareness of numbers and coping with different relations and dimensions. To follow the principle of "active discovery learning" the teacher’s task and responsibility is to organise the most appropriate learning conditions for the pupils in the class. In order to do this, the knowledge of the way the child thinks is the most important prerequisite. The child’s individual way of developing the parts to whole relation in numbers depends on his or her sensory experiences. Perception is the bases for the individual learning process. Children living with different sensory inputs experience the world differently and develop concepts differently. The content of the concepts might thus be different. Some blind children have difficulties on primary level in experiencing countable and uncountable quantities and the relation of the parts to the whole in numbers through touch. They have limited possibilities of simultaneous comparison. Generally the blind children can memorise longer verbal texts and different facts than sighted children. It may also happen that they have more acoustic experiences, which teachers do not always take into consideration. They do, however, very often lack the personal experience of the number facts linked to actions and expressions.
Maths teaching must offer an *activating learning environment* to allow learning through all the senses. Children develop the number concept by using numbers in different situations and counting is a central activity in the learning process. Small children usually learn to count through touching elements one by one. This method can, however, delay the understanding of the parts to whole in numbers. Children who use a two-hand strategy in contact with discontinuous amounts have a good chance of understanding the structure of numbers through touch. In order to help the children to develop good tactile experiences it is important to teach them *good tactile strategies*. We must inspire the children to use both hands and to use their fingers and hands in many different ways. We can inspire them to get an interest in *what* they feel under their fingers and teach them *how* to organise objects to keep track of them. This should *not* be done in a way where the adult puts the child's hand on the object.

The possibility of getting information about the world through touch alone is necessarily rather limited. The blind child also experiences the world through his other senses. Training to analyze *acoustic patterns and to combine* them with movement and tactile representations can be an efficient way to develop a functional number concept.

The mathematics subject consists of many different topics and as a teacher for the blind one has to think about the best method to use to make each topic understandable for the child. A *good learning material* has two important characteristics:

- It suits the sensory modality the pupil uses.
- It enlightens the mathematical content.

A *good model* promotes the learning and gives the child a chance to be active and find out the relation between a real problem and its illustration by the model. A good learning material or a model ought to support the concept until the abstract symbol can be used to give the same meaning. For blind children it is important that the model is pleasant to handle and that it is easy to get an overview of all parts of the model. Sighted children use their fingers for counting and in schools there are various teaching materials which support the coping with numbers. Blind children seldom use fingers or other physical counting aids as “natural, private models”. They use the strategy counting by hearing in developing number concept. Tactile illustrations do not function in the same way for blind pupils as they do for the sighted. Tactile pictures are static and cannot illustrate changes (for example a bird that flies away = subtraction) or relations (for example objects that are put behind another object). One of the useful models is the own body of the child. Using the so called “*Body mathematics*” is a very appropriate method when introducing different mathematical concepts. In this way you can illustrate numbers, directions, dimensions etc. by using the advantages of the best given model, i.e. the human body, the bodies of the pupils. Language activities should be recommended for both sighted and blind pupils.

**Computation aids – notation techniques**

*Abacus*

Abacus is the best and most reliable calculating aid (not only) for the blind. Using the Abacus, develop awareness in cardinal and ordinal aspects of numbers, grasping
simultaneously a number of discrete elements, experience of parts to the whole in numbers etc. The way to learn and teach using the abacus you will find in the handout to the topic.

**Taylor Frame**
Taylor frame uses metallic square pegs with a bar projection at one end and a “two dot” projection at the other. They are fitted into lines of octagonal insets. Eight different positions are possible so that when both ends are used sixteen different signs could be recorded on the board. The symbol for each number is the bar projection in one of the first eight positions round a star shaped inset.

**Cuberithm Board**
Plastic cubes with dots and symbols (Braille signs) on the sides. It offers the possibility of replacing the Taylor Frame and to enable even the youngest child to record numbers in Braille notation from the beginning.

**Slate and stylus**

**Upward Braille Writer**

**The Methodological Principles**
Offer an activating learning environment to allow learning through all the senses
Perception is the bases for the individual learning process. Children living with different sensory inputs experience the world differently and develop concepts differently. The content of the concepts might thus be different.

Children develop the number concept by using numbers in different situations and counting is a central activity in the learning process. Small children usually learn to count through touching elements one by one. This method can, however, delay the understanding of the parts to whole in numbers. Children who use a two-hand strategy in contact with discontinuous amounts have a good chance of understanding the structure of numbers through touch. In order to help the children to develop good tactile experiences it is important to teach them good tactile strategies. We must inspire the children to use both hands and to use their fingers and hands in many different ways. We can inspire them to get an interest in what they feel under their fingers and teach them how to organize objects to keep track of them. This should not be done in a way where the adult puts the child’s hand on the object.

The possibility of getting information about the world through touch alone is necessarily rather limited. The blind child also experiences the world through his other senses. It is, for example, important to experience a number through both weight and sound. Training to analyze acoustic patterns and to combine them with movement and tactile representations can be an efficient way to develop a functional number concept. We want to point out that acoustic experiences have been used far too little in the teaching process. The reason might be that the sighted to a lesser extent than the blind tend to use acoustic pictures in connection with numbers.

**Follow up the content of understanding**
Many things are not directly available to blind children because of factors such as distance, size or danger. In such cases numbers can be used as models to explain
both objects and events. The numbers are the means of imagining and developing abstractions. If the child has learned how the number range of thousands has been built up, he can imagine how big the arena of a theatre is because of the numbers of seats in a row and the number of rows. But using the structure of natural numbers (the number of chairs and the number of rows) is only useful when the parts to the whole relation of numbers have been already developed.

The awareness of the structure of a set is a prerequisite for reaching an abstraction of numbers. Using a number model is effective when the child has reached a knowledge and an understanding of what the number words represent. This also includes an understanding of the relationship between the operations. The first condition is to develop the parts to whole relationship within the number range 1 to 10. In other words the relationship between parts and the whole is the first operation.

When we say “using known facts” we mean that the child can use “number facts” in problem solving without making specific calculations. The child thus experiences the number as both parts and whole. But even if some children seem to use known number facts this does not mean that they understand the structure of the numbers. Many blind children have a good memory and can learn the number facts parrot fashion. The pupils often master pure symbol exercises as they know the expression \((8 + 6 = ?)\) (“eight plus six is fourteen”), but they cannot cope with more complicated problems \((14 - 6 = ?)\) or the same numbers used in a word problem.

There are some pupils who first use the number facts which they have learned by heart and later develop a sense of the structure of natural numbers. But there are many children who have only “empty numbers” to cope with. It is therefore important to control the content of the pupil’s number facts and not start to use the symbols before the child has an understanding of the content of the numbers.

The number words are a natural part of the social context. The adult asks the child how old he is, how many brothers and sisters he has, his street number, his telephone number etc. The child listens when his parents discuss prices, time aspects (that it is only five minutes before the bus leaves e.g.) etc. In the beginning the child may use the number words without knowledge of the amount aspect. Gradually the content of the number words changes as the child meets them in different situations and through various activities. These are activities where the child has to cope with numbers: sharing something into equal parts, getting one glass for every member in the family, having enough money etc. The task of the school is to make the everyday experiences into systematic and precise concepts to be connected to the formal language of mathematics and mathematical symbols. It is a good basis when the child has many number experiences but school cannot take for granted that the child already has a rich and varied experience of numbers.

**Emphasize the language activities in teaching**

Mathematical concepts are precise and it is the precise content you strive for in teaching mathematics. But the mathematical concepts have not emerged in an isolated manner. They are part of a network of concepts, and a child learns these concept structures in co-operation with other people. In this way we get a content in the concept as social structures and mathematics will thus be meaningful since what has been learnt in one connection can be transferred to another situation.
We can let sighted and blind children describe objects to one another and carry out tasks where they co-operate in finding similarities and differences. We thus create situations where the pupils may use the mathematical language and function as learning models for one another. In this way the sighted children will be aware of the tactile experiences in the world (surfaces: smooth, rough; material qualities: hard, soft) and the blind children can focus on concepts that they cannot begin to do on their own. We here consider form concepts, placement (vertical, horizontal) place (on, over, between) and size.

Another potential that has to be used in teaching is the child’s own explanations and problem formulations. This could be carried out by the teacher using questions like:

- How did you think when you found the answer?
- Is there anyone who thought in another way?
- Is there an advantage to this way or thinking in comparison with any other way?

In descriptions and discussions like these the children may use various mathematical concepts and they become more aware of their own thinking and their way of working. By changing the focus from the correct answer to the process the rules of mathematics become anchored to the understanding of the rules. In the example below we have shown how a traditional task can be changed so that the pupil may become aware of the mathematical operation:

One kilo minced meat costs 69 crowns. Kari buys 3 kg. How much does it cost? Which way of counting is the correct one: 69 x 3? 69 : 3? 3: 69? 3 x 69? 69 – 3? and in what kind of problems is it correct to use the other operations?

**Look for appropriate methods**

The mathematics subject consists of many different topics and as a teacher for the blind one has to think about the best method to use to make each topic understandable for the child. Not every concept can be developed in the same way by both sighted and blind children.

One of the strengths of vision is that you get many simultaneous impressions. You get simultaneous impressions from objects both near and far and which are in connection with one another. This is a good starting point for experiencing similarities between different elements. The children can generalize from many experiences and they learn geometrical concepts through the visual clues they have had from house facades, doors, windows, packets, boxes etc. etc.

The opposite to this inductive way of learning is the deductive method which is the preferred way to teach a blind child. We can use the form concept as an example. The blind child has also met many objects having the form of a block. But it is not always the form that is the most important quality of the object for the blind. The texture, temperature, material or sound made by the object is actually more often in focus. Thus, blind children do not have the same basis for generalizing as their sighted peers.

The deductive method means that the information the pupil gets about a geometrical form of a geometrical brick which is in a proper size and of a good material eventually
can be the starting point for a mental picture of objects in the surrounding (that high
houses may have the form of a brick and that the swimming pool can be the shape of
an oval). We want to emphasize “may” as research has shown that small blind
children have difficulties in understanding the connection between models and real
sizes (Potter 1995). Our experience is that one has to do a thorough piece of work so
that such concepts can be translated into functional mental pictures and thus make
the blind child able to understand the world around him.

Choose learning materials to suite individual needs
A good learning material has two important characteristics:
- It suits the sensory modality the pupil uses.
- It enlightens the mathematical content.

A good model promotes the learning and gives the child a chance to be active and
find out the relation between a real problem and its illustration by the model. A good
learning material or a model ought to support the concept until the abstract symbol
can be used to give the same meaning. There are lots of learning materials which
aim to illustrate the same mathematical content. We know, however, that all models
do not appeal to the students in the same way or are equally motivating and efficient.
For blind children it is important that the model is pleasant to handle and that it is
easy to get an overview of all parts of the model.

According to Piaget six-year old sighted children are in a pre-operational phase in
their mathematical competence. On this level they are able to cope with objects
(mentally as well) to solve problems in their daily life. Based on experiences with
many different objects, they like to create a more general method for calculating.
Sighted children use their fingers for counting and in schools there are various
teaching materials which support the coping with numbers. Blind children seldom use
fingers or other physical counting aids as “natural, private models”. It may therefore
not be correct to introduce the traditional mathematical learning aids for visually
impaired children. What we should do is build up the models the child himself bases
his strategies on.

Many teachers tend to translate methods and learning materials of the sighted to the
blind. In most cases this means changing visual inputs into tactile ones on a one-to-
one correspondence. This solution does not always work because of differences in
visual and tactile perception. Visual perception has a simultaneous character while
the tactual (through touch) primarily has a sequential or successive character.

The understanding of tactile representations is a step towards understanding abstract
symbols (Ostad 1989). Another argument for using pictures is that tasks involving
pictures can be made understandable for many pupils through distribution, which is
timesaving for the teacher. The children may use pictures to group (classify) and
arrange in series (seriation) and as a starting point for discussions about physical
qualities (apples are bigger than cherries and have another form than bananas). One
must, however, be aware of the fact that tactile illustrations do not function in the
same way for blind pupils as they do for the sighted. Tactile pictures are static and
cannot illustrate changes (for example a bird that flies away = subtraction) or
relations (for example objects that are put behind another object).
There are many requirements needed to make the connection between a three-dimensional object and its two-dimensional iconic representation understandable. We will here give you some examples of what has to be considered in the process:

- Attention and awareness concerning differences in texture, temperatures and material qualities. Here we have, among other things, the possibility to distinguish the foreground from the background which is the basis for interpretation of the meaning of lines and areas.
- Attention and awareness concerning the relation parts to whole. Most objects are combined from different parts and with different characteristics. Some of these characteristics may also be prevalent in the tactile illustration. Exercises in describing objects to other pupils (discussed during language activities) help the pupil to pay attention to these characteristics.
- Attention and awareness concerning structure and form. In the two-dimensional picture we realize that it is the form of the object which binds the details into a whole. In order to get a tactile form experience of a two-dimensional picture it is necessary to use both hands in a coordinated manner. It is impossible for one finger to perceive the wholeness whereas many fingers together give an impression of length and regularity in line and form.

The mathematical language has been developed in order to keep track of large amounts and to be able to understand geometrical connections near and far. By formulating our mental pictures we have a basis for understanding underlying ideas of natural science. In these mental pictures we use metaphors which enable us to “see” what cannot be observed.

The metaphors make it possible for us to understand a new idea even if it is not physically available. We learn about chemical reactions, radio waves and the relations between numbers by using well known terminology. When a metaphor has been used long enough, the metaphoric quality will be extinct and we can use the abstract concept in a sensible way. Teaching has concentrated too much on telling the students how to understand and solve a problem instead of focusing on the formulating of thoughts by the children. Language activities should thus be recommended for both sighted and blind pupils.

Allow the pupil enough time

Why do blind pupils need more time? The answer can be found in the learning process as well as in the possibilities to cope with the subject. As blind pupils are able to imitate what others do only to a certain degree, they need instructions for each skill they have to master. Furthermore, each skill has to be practiced so that it can be mastered in any situation. The confidence in mathematics is connected with self confidence which emerges from independence. Another important goal in mathematics is that the child becomes independent and that he can take responsibility for each step in as many activities as possible.

We can imagine a maths lesson and list activities which take much more time if you are visually impaired:
- Finding your desk and finding the books and materials needed is time consuming.
Books in mathematics usually consist of several volumes. Where the sighted child only has one book, the blind child has to keep track of several units.

If the teacher gives the page number of the ink print edition, the blind child has to find out what page that is in the Braille edition.

The fingers are used both for reading and writing. It takes time to move the hands between the exercise and the writing devise and back again.

Reading Braille is a sequential process. Only when the fingers come to the empty cell after the child has read each number one by one including the number sign, does he get the whole number. Before reaching the empty cell it is difficult to know how big the number is. As an example we can have a number sign – you have 3 – you have 4 – you have 2 and then an empty cell. The number is 342.

The written algorithms have to be practiced so that the writing appears as a whole and that writing it becomes automatic.

The pupil cannot write directly in the book.

It takes time to examine objects and tactile representations.

It is difficult to get an overview of a material consisting of several parts, and if one part drops to the floor it is difficult to find it.

The pupil must master the use of drawing equipment and measuring instruments. In these cases it is good if the pupil has a systematic way of placing the measurer, pencil etc. on the desk after each use. If they do not have a given place the pupil has to use his hands every time he needs them to look for them.

In addition to the mathematics work the pupil might be disturbed by sounds inside and outside the classroom since he does not know whether they are relevant or irrelevant for him.

There are, of course, individual differences as to the extra time needed, but as the list shows there are many tasks outside the strictly mathematical field that have to be considered. It shows how important early good working routines are, and that the pupil ought to have a well organized working environment. The issue is that as much time as possible can be directed towards the mathematical content itself.

**Consider the symbol learning as a structured process**

Summarizing this chapter and referring to the knowledge of how man has begun using the symbols (see chapter 3) we want to give you a model for planning the teaching:

*In short the model would be:*

1. The mathematical content
2. The informal mathematical language
3. The formal mathematical language
4. The symbol language
5. Using and training of skills

The starting point is the mathematical content. What should the pupil learn? The next question to reflect upon is how to create a situation the pupil understands and can cope with in an active way and not as a passive listener. The pupil's own comments, descriptions and explanations should be combined with mathematical terms and thereafter with the language of written symbols. As pointed out several times in this book it is important for the pupils to practice using the symbols so that the writing process becomes automatic.
Two examples practicing addition:
Example Number 1:
The mathematical content: Addition.
The informal mathematical language: Families. The pupils tell about their families – how many siblings they have, how many girls and how many boys, how many women and how many men, how many children and how many adults.
The formal mathematical language: After listening the teacher tries to find out what kind of addition tasks can be derived from the facts given. How can you say this using the maths language? (One pupil says for example that there are three girls and one boy in the family – that there are four all in all.)
The symbol language: How can you write that?
Using and training of skills: The pupils work within a number range which they are familiar with (3+2=5; 3+3=6 etc.)

Example number 2:
The mathematical content: Addition.
The informal mathematical language: Guessing game with bricks. One student chooses a “brick-tower” – for example 8 bricks. He breaks the tower into two parts and keeps the parts behind his back. The other students may guess how he has divided the tower. When one pupil makes a correct guess another pupil may come up and choose another tower.
The formal mathematical language: Every time a correct answer has been given and before the next pupil chooses a tower the question is: How do you say this in the mathematical language?
The symbol language: How do you write it?
Using and training of skills: The students work with the addition tasks within the same number range (8 = 4+4; 8 =5+3; etc.)

References

- http://www.tsbvi.edu/Education/brl-resources.htm

3.5. Assessment of Mathematical Competence - First Grade

1. Experience of numbers in daily life situation
Material: none
What is your name?
Where do you live?
When were you born? (Date of your birthday)
Do you have a sister or brother? (How many sisters, brothers do you have?)
Do you go to school?
(Do you attend school?)
Who is your class teacher?
Do you have friends in the class?
Do you know the numbers?
Please tell me some numbers!
When do we need numbers?
Can you tell me what you hear or know about numbers?
(In radio or television? Or somewhere else?)
Do you know what the adults do when they are doing operations? (coping with numbers?)
What do your parents, your mother, father (or sisters, brothers) etc. count?
Why do the children in school learn maths?
Can you also count?
What do you usually count?

2. Counting

*Counting small objects
Material: small toys, articles, marbels, lego-stones, knobs, (fixed and movable)
Please, tell me how many are they? (Etc).

*Orientation in the row of the natural numbers
Material: none
How far can you count?
Can you count backwards?
  In twos
  In threes?
Which number is coming after 99? (after 100?)
Now I start to count. When I stop you go on and tell the three next numbers in the row!

7, 8, 9…
12, 13, 14…
15, 16, 17…
49, 50, 51…
67, 68, 69…
-------
18, 17, 16,
13, 12, 11…
20, 18, 16…
---

Now I tell you a series of numbers. It is possible that I forget a number in the series. Take care and tell me please afterwards which number I had forgotten.
2, 3, 5, 6, 7?
8, 10, 11, 12
19, 18, 17, 15?
2, 4, 8, 10?
16, 14, 10, 8?
---

* Using fingers for counting
How many fingers do you have on one hand? (two hands?)
Do you usually count on your fingers?
Can you count with your fingers?
Did you learn to show the numbers on your fingers? When did you learn that?
Can you show “3” (5, 6, 7, 9) on your fingers, please?
3. Relations between numbers
* Which number is bigger?
  6 or 9?
  19 or 15?
  32 or 32? (etc.)
* Now I tell you three numbers. Please make it in the right order! Begin with the smallest one!
  2, 9, 7?
  11, 8, 13? (etc.)

4. Compare of sets (countable and non countable quantities)
* Countable quantities
Nr.1
Material: Marbles
There some marbles by your left hand and some in your right hand (in bowls). Please tell me which bowl has more marbles?

Nr.2
Materials: fixed small objects on a plate, number range 1-6.
Now you get a plate. There are knobs on it (fixed). Please, tell me how many they are!
(More compares with different sort of elements in a set: homogenous, different, same in size, different in size etc.)

Nr.3
Material: five sticks on the tray. Different in length. (size range: 1-12 cm)
They are sticks. How many? Show me the smallest one, please (the longest) Please put the sticks in the right order.

Nr.4.
Material: (Logical blocks) Circle, half-circle, triangle (of a magnet set) square, also different in size.
Can you tell the name of the block?
Now I make a series from these elements.
Can you do the same under my row?
Can you tell me how did you find out? (Rule of the setting)
Can you make a series of your own? I will copy yours and you will tell me whether I was right or wrong.

* Uncountable Quantities
Material: Can of coca, bun, spoon, milk, rice, etc..
Do you know what we usually match?
Do you know what is longer your arm or your father’s one?
Who is taller you or your sister? (brother?)
What is heavier a can of coca cola or a bun? (a spoon or a plate?)
(The interviewer gives the child daily life objects and asks to compare them concerning their weight, length, volume etc.)

Orientation in time
Material: none
What day is it today?
Can you tell the date?
When is your birthday?

5. Acoustic number experiences
Material: simple music instruments for producing rhythms
* Interests of the child
Do you like music?
Which sort of music?
What can you sing?
Can you make rhythms? How do you do that?
* Copy of a pattern of rhythm
Nr.1
Now I show you a rhythm, I ask you to repeat it?
Do you like to claps or to knock on the table?
oo oo o o oo
oooo o o oooo o
(etc... in number range 1-20).
Nr. 2
Now I show you a rhythm. Afterward you tell how many beats you have heard?
Nr.3
I tell you a number and you try to do a “rhythm” to this number. 8 (10, 12, 15 etc.)

6. Basic operations
Parts to whole relation
Nr. 1 (Guessing game)
(The game starts with 9 coins. We can change the number of set later: 5 or 13 depending of the experiences of the child.
I have some coins for you. How many are there?
I share the 9 coins now. I put some into my left hand and some into my right hand.
You do not know how many they are but you can guess how many coins are in my right hand and how many in my left one.
(after the child answered)
How did you know?
How did you think?
But perhaps it is not so. How else could they be?
(* After the child gave all the variations of decompositions of 9, the interviewer opens his hands and the child checks the given decomposition.
* If the child could decompose the coins in different ways, the interviewer gives the child 13 coins.
* If the child could not solve the task the interviewer gives him 5 coins.)

Nr.2 (Baker)
Do you know what the bakers are doing?
The baker has baked 6 buns. He took them out of the oven to let them cool and went for a walk. But a bun thief was sneaking around and took some buns away. The baker comes back and finds only 3 buns on the plate. How many buns has the thief stolen?
(In this story-context the interviewer gives following tasks:
6 - x =3; 6 - x=2; 8 - x=2; 9 - x =5; x-3=4; 14- x=8; x -7=10; (24- =6)
After the child gives the answer, the interviewer asks the child how she/he found out the result.)

Nr. 3. (Shopping)
If you have 2 apples and I give you 3 more how many apples do you have?
You have 8 candies and you give your friend 3. How many candies do you have left?

(In similar daily live context he following operations:
5-3=x; 2+3=x; 5-x=; 10-7=x; 3+x=7; 13+5=x; 15-7=x; 12+x=19 etc.)

Nr.4 (Fare share)
I bought 20 candies. I have three good friends. I like to share the candies farely. How can I do that? How many will I have? And my friends? And my friend Kati?

6. Observations
In play situation the interviewer observes the child in the fields of:
   Orientation, mobility, using hands
   Understanding and using words relating to space and dimensions
   Using senses exploring and handling toys etc.
   Understanding time relations
   Coping with objects, (series, groups).

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3.6. Teaching Geometry for Children with Visual Impairment

Geometrical concepts are abstractions but their basic understanding is developing from the child’s experiences from the very early age. Blind children develop their concepts in geometry through their tactile and hearing experiences.

Stages of the development of geometrical abstract concepts
- Global awareness in forms, shapes and 3D objects / geometrical bodies
- Analysing geometrical shapes, features and relationships (dimensions, spatial relationship)
- Deduction, conclusion
- Abstract geometry (Axiom)

The principle of “creative” mathematics and “learning by doing” in school enables blind and low vision children to understand basic concepts in Geometry. The aim of the teaching should be to let the blind pupil develop basic geometric abstractions through active learning, coping with real objects and good models.

Activities concerning “discovery approach” in geometry:
1. Daily life activities
   Comparing
   Measuring
   Cut and cover objects
These activities allow the child to get awareness in form and features of an object, to
compare two or more objects, to measure the dimensions (length, weight, depth etc.)
of the objects.

2. Modelling
   With own body (see “body mathematics”)
   With modelling sets (bricks, cubes, geometry board)
The blind pupil has to learn to articulate his experiences with models. The models
help to imagine objects which are too far away, too high up or too dangerous to cope
with.

3. Paper folding
Paper folding is a very good opportunity for development of
   Fine motor skills
   Spatial relations
   Estimating dimensions
The folded paper has creases which are perceptible through touch. Folding papers
pupils experience many geometrical features and understand the following concepts:
   • Point
   • Straight line
   • Plane
   • Angles
   • Spatial relations (vertical, horizontal, perpendicular, perpendicularity, parallel
     lines)
   • Basic shapes (triangle, quadrangle, rectangle, square)
   • Features of/in the triangle (sum of the three angles is 180 grade)
   • Features of/in the rectangle, triangle (side, diagonal, symmetry, axis, axes,
     mirror-axis, area-wide etc.)
   • Features of the circles (chord, diameter, radius, circle segment (minor
     segment, major segment) angles in the semi circle is 90 grades etc.)
Some Examples:
a. Triangle - rhombus
   1. Take a piece of paper and fold it across.
   2. Mark a point on the line.
   3. Fold one of the two half sections on the other part.
   4. Mark a point on one of the folded lines: A
   5. Mark a point on the other folded line: B
   6. Bind the two points by folding.
   7. Open the paper.
The shapes you got are: Two/four triangles, one rhombus. In rhombus the diagonals
are perpendicular. They are at right angle to each other. The diagonals are mirror
axes.

b. Angles
You can easily produce angles through paper folding.
Take a piece of paper and fold it across.
The angles are:
acute angle (1-90 grades),
right angle (90 grades),
obtuse angle (90-180 grades),
straight angle (180 grades),
reflex angle (180-360 grades),
full angle (360 grades).

c. Area of the rectangle (quadrate)
   1. Take a piece of rectangular paper (from your note pad)
   2. Fold it once (bisect) to form exactly two halves. Fold it again and again and again (four times)
   3. Open the paper. You see / feel small rectangles: 4x8
   4. The formula of calculating the area of the rectangle(quadrate) is: a x b

4. Learning by using geometrical figures / tactile materials, through geometric Atlases etc.

5. Learning by doing - Working with
   Geometry board (different sort)
   Graph board (with holes and pegs/pins)
   Geometry kit (drawing rubber pad with plastic folia)

It is a very interesting finding in mathematics that in every circle the proportion between the circumference and diagonal: 3,14 (the “π”) Already the old Greek knew that relationship concerning the circle.
From this fact the formula of the circumference of the circle is: 2rπ

References:


3.7. Daily Living Skills (DLS)

The goal of DLS is to give the child a chance to learn to live an independent and satisfying life, to take care of itself and its needs. Later it should learn to use the technical aids available and to know how to function in the near environment and society. As an adult he/she should learn to manage an independent life, to live on his own, to work and have a worthwhile leisure time.

One should concentrate on DLS long before the child starts school and continue teaching throughout life. Many things that are simple for a sighted child may need long and intensive training for a child with visual impairment. The problem is of course that a blind child cannot imitate other children and adults.

Many parents do not want to give their blind child a systematic training in DLS. One can understand that it is not very pleasant to make every meal into a drill and to start
every day half an hour earlier to teach the sleepy child how to brush its teeth, wash itself and dress. The same goes for the evenings; how to undress, how to place the clothes so that they can be easily found the next morning, etc. The family should be allowed to have pleasant moments at home without giving the child the feeling that every moment is a training session but let the child feel that it can have a nice time together with the family. BUT it is within the family that the main teaching has to take place. It is therefore important to give the parents help and support. One of the main pillars for a visually impaired person to be integrated into society and function as an independent and harmonious person is that he manages the different skills of DLS.

At school DLS should not be separate lectures but integrated into regular activities at school and at home. It should be carried out as realistically as possible with frequent cooperation between the home and the school. Before starting a systematic training of DLS there are, however, many skills that should be mastered. One of the most important things is body awareness. Many blind children have difficulties in knowing left from right, up and down, front and back. In case you do not know these differences dressing might be difficult. Without knowing these concepts and how to place arms, legs and head in connection with the body the child might have the same problems as one boy who was a master at playing the accordion, but had to put his hand on his head when he bowed after the performance.

If the child does not know how a normal posture is supposed to look like it might be difficult to teach it how to sit properly at the dinner table. It is not rare to see a blind child sitting with bent back, head hanging and elbows on the table. It does not look very nice, besides making eating more difficult.

Another important skill is time perception. How long does it take to eat? How long does it take to dress? When are you supposed to wake up so that you have time to wash, dress and have your breakfast before going to school? How long does it take to go to school? At what time should you go to bed to get a good night’s sleep?

To give children the chance to orientate themselves in their environment parents and teachers must train their concepts of space. They have to learn how their close environment looks so that they can move without assistance from one room to another and find what they are looking for. It is important for them to know and find their place at the table, to know where their cupboard and drawers are, where their toys are etc. All these aspects make daily living easier.

The understanding of form and size takes a lot of training as well. One can understand the boy who did not know that he was given a pineapple on the market place. In his country they are usually bought in tins and the slices have a hole in the middle. Potatoes and carrots are different sizes as well…

Many of the skills that are part of DLS training depend on the fine motor skill of the child. The skills to use a zipper, tie your shoe laces, use a pair of scissors or a can opener are not self evident for a blind child. These skills need intense training. Social skills are difficult to learn as blind children have difficulties in using model learning as they cannot see how people around them carry out different tasks and how they behave. One has to tell and show the children how to behave in different situations. It is also important to give feedback and instructions regarding their social behavior. One has to take into consideration their age and their skill to orientate in
time, space and social situations. The importance of DLS can be seen when the child grows up and wants to participate in the same activities as its peers. If it is independent, can move around and has basic social skills it has a better chance to be on the same level as its peers and thus be accepted by them.

**Eating technique**

The importance of good table manners is emphasized by Philip Mangold (1980). He is blind himself and according to him bad eating habits are as grave a handicap as the visual impairment. It takes, however, years of training to learn all the tricks of proper table manners.

One may start by checking if the child's posture is correct when eating. The food shall be brought to the mouth and not the mouth to the food. According to Mangold you may eat elegantly, but if you half lie over the table the end result is abominable. This does not need training, only a reminder. Regarding children with low vision one must accept that they lean over the food to see what is where on the plate, but after that they must sit properly.

To make the beginning as pleasant as possible, use proper cutlery and a good plate. The fork should be broad enough to make the uptake easy and the knife should be sharp enough to make the cutting smooth. It is also easier to eat if the fork and knife are rather short. Especially in the beginning it makes it is easier to ‘find’ the food and putting it into your mouth.

For a low vision child it is good if the brim of the plate has a darker line so that they know where the plate ends. Dark food on white plates and white food on darker plates also indicates where the food is. One may also use a contrasting table mat under the plate to make the orientation easier.

The child might also start eating suitable foodstuff using their fingers – in many countries this is the proper way to eat. Everywhere food like fruits and bread are brought to the mouth by using your hands. Good hygiene before and after the meal must be emphasized.

When starting with proper food it is best to put some food on the middle of the plate to make it easier to eat. Kragsaa (1982) points out how important it is to train holding the cutlery correctly from the beginning. Before using a knife one may use a piece of bread to ‘push’ the food onto the fork.

While training proper eating it is important to make the situation as pleasant as possible. Start with a small amount of food to give the child a feeling of success. When the child gets tired the adult may feed the rest to it.

It might be difficult for a child with visual impairment to learn how to use the knife as one needs strength to cut for example a piece of meat. The adult should start the training by standing behind the child. Together they feel where the meat is with the fork, then move the fork a couple of centimeters onto the meat, place the knife beside the fork and together with some force and sawing movements cut downwards. When they together have almost cut the piece the child finishes the job to get a feeling of success. Slowly the child gets less assistance and finally does the cutting itself.
When one teaches a blind child to pour milk into a glass, let the child put the top of its index finger into the glass and then pour milk until it can feel milk on the fingertip. To pour hot drinks is of course more difficult. One may, however, ask the child to put in milk and sugar first before pouring the hot liquid. The child may also learn to feel the difference in the heat as the liquid fills up the glass. There is on the market a small device that one can hang on the cup and which gives a signal when the cup is suitably full.

When teaching the child to serve itself, start with food that is easy to take onto the plate. Place the bowl with food close to the plate to avoid food spilling on the table. Then teach the child to feel around the brim of the bowl in order to find the servers and teach the child to keep the servers horizontally so that the food does not fall off on the way to the plate.

The above mentioned are the basics. But every person who likes good and varied food and liked to go to restaurants to vary the diet knows that even for sighted it might cause problems to know what cutlery to use for what and with which glass to begin when one has several to choose from. For a sighted person it is of course easy to watch how the others are doing which again is impossible for the visually impaired. Mangold recommends that one starts at home. Most people like good food and it is very nice for the whole family to train and discuss etiquette and good manners. In this way you show your blind youngster that he has given the family a reason to have an excellent meal and not only hard and industrious everyday teaching events for him or her alone.

Even though you know the basics of how to eat you might have problems. Mangold always tries to find out beforehand what is being served to plan his ‘attack’. Through some detective work one may find out what is being served. In case the aroma of the food does not give that information you may get an answer by saying ‘oh, it smells wonderful!’ If you then are informed that there is fried fish on the menu, you may ask the hostess to take out the grates in the kitchen and one eliminates the need to be helped at the table. In this way everyone is happy and the hostess does not have the feeling of having served the ‘wrong’ kind of food.

Another question that Mangold takes up is how to place the food on the plate and in which order it might be best to eat it. By thinking about the plate as a clock it is easy to tell where the food is. For example the meat at six, potatoes at nine and peas at three. It might then be wise to eat the peas while the other food is still on the plate. It is difficult to chase small peas on an empty plate.

Finally one can say that it is much easier to ask for help when one knows what one can do and has the self confidence needed to ask for help. It is also better to ask for help beforehand and receive a portion at the table that one knows one can manage.

**Dressing and undressing**

The most important thing for a person with visual impairment is to have everything in good order. When teaching dressing and undressing this is especially emphasized. To have a given place for all clothes, to have the clothes turned in the right way, to
mark the clothes so that you know front from back with a simple handgrip makes something that can be time consuming and difficult into a fairly quick procedure. For a young child some of the phases of dressing and undressing might be difficult. Buttons, zippers, shoe laces feel almost impossible to master. It might be an idea to use shoes without laces and trousers with a rubber band in the beginning. One can teach the child to tie in a bow and button a shirt before doing it while dressing. One must also consider that the way to total independence is long but the steps are important in themselves. It is also important to let the child do what it can master and provide help only when needed. The child might for example be able to put on the coat but needs help with the buttons. When using a zipper, help is needed in the beginning phase but the child can zip the rest. According to Gertz and Volkmann (1978), the task should be divided into smaller parts. Then one trains the difficult ones and let the child do the rest on its own.

When teaching, it is important to give good oral information and then help to carry out the task with your hands on the child’s hands. One should furthermore start with the easier task, i.e. to undress. To make dressing easier a small child can sit on the floor while an older child can sit on a chair or take support from a wall to keep the balance. And once more about order: a chair for the clothes where all items are put in the right order is essential to make the procedure easier.

**Hygiene**
For a person with visual impairment who cannot see how he looks and who often comes into close contact with other people, good hygiene is important. A sighted person can see when his hands are dirty or if he has a stain on his clothes. For a visually impaired person it is important to have good practices and avoid looking unkempt. The child has to be taught to wash its hands before eating and after having used the toilet. Normal daily washing is an axiom. When it comes to changing clothes, a visually impaired person should do it often enough to be on the safe side. It is as important for a person with visual impairment as for the sighted to look good. The feeling of looking good gives anyone an inner security and a possibility to concentrate on the world around in a positive manner.

To brush one’s teeth, take a shower, bath and wash your hands are of course matters that the child should learn long before starting school. It might, however, be good to check how the children wash themselves. You might realize that a child washes its hands with straight fingers. By washing your own hands and letting the child feel how you do it gives the child a chance to realize how you use the soap efficiently.

A risk moment when taking a shower or bath is that one may scald oneself or may slip in the bathtub. It is wise to use the shower to clean the bathtub before taking a bath in it and always start with cold water and then add hot water to get the right temperature.

Going to the toilet is also something that children usually know before they go to school. They need to know where the toilet is, where the toilet paper and towels are and where and how to wash their hands afterwards. We all know that there are hundreds of different water taps in the world and the children need to know how the ones they need function.
For a visually impaired person the material is often the most important feature. Nanneson et.al. (1988) point out the importance of colours. A blind person needs to know the colours of their clothes, what colours and textures go together. A person with visual impairment usually needs a sighted person to help him when he is buying his clothes. But he should have an idea on what suites him and get a feeling that he is the one to decide what he wants to look like. –And for young people it might be nicer to go together with a good friend than with their mothers who might prefer clothes that are sensible to clothes that are popular among the young… One must also teach what clothes to wear on different occasions. School is one thing and a wedding another.

Sources:
Sjöstedt, S (1997) Sex små punkter – vägen till kunskap. (Six small dots – the way towards knowledge) Editum, Esbo, Finland

3.8. Sports and Gymnastics - One Step at a Time

When a sighted child develops he learns how his body looks, the relations between the body and its parts and the movements he can make. For the children with visual impairment, body perception belongs to the most difficult skills they have to master. Questions like body perception, concept building and training of the most basic physical activities like crawling, standing up, walking and running have to be trained long before school starts. Another important question is to motivate the child to move around. Here the family and the peers play an important role. If the sports education is carefully planned and appropriate (methods, learning environment, equipments, learning strategies etc.) we can avoid a lot of problems and the visually impaired persons can achieve the goals of school education. A good example was a Nordic competition for the visually impaired at the Helsinki Olympic stadium. For the 1500m competition sighted guides from a sports team for the sighted had been asked to participate. Each guide assisted one visually impaired (blind) participant by together with him holding a short rope to keep him on the track.1400m went well, but when the visually impaired runners put on the finish, the sighted could not quite keep up with the best visually impaired ones, so they were dragged over the finishing line by the visually impaired runner.

Teaching gymnastics and sports
Considering the difficulties a blind child has to develop the same skills as his sighted mates you may understand that the child may have motoric and coordination problems, an uncertain balance and weak body perception. The child may also have difficulties with concept formation and all this results in the fact that the other senses may be under developed. Ellerman (1988) makes the following conclusions about the possible consequences:

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- Strained and un-rhythmic movements
- Forward posture
- Uncertain balance
- Poor movement activities
- Poor capacity to do precise and isolated movements
- Poor location and direction perception
- Poor coordination
- Difficulty in understanding verbal instructions

Many physical activities for the sighted are totally meaningless for a blind child. When throwing a ball a blind child has difficulties as he cannot see how other children throw. And as he himself throws the ball just silently disappears as one cannot hear where it goes and one can hardly hear when it hits the ground. The whole procedure seems totally without meaning. It is thus important to give a variety of enjoyable and creative activities and appropriate tools, equipments in sports and gymnastics so that the child finds activities it can thoroughly enjoy.

Everyone who works with people with visual impairment knows that they need strength and a better condition than sighted to cope with the same tasks as a sighted person. A person with visual impairment needs more strength and energy and time to take care of the household, his job and spare time activities than sighted. Sports develop physical competence in the areas of stamina, strength and coordination. Children learn to work independently, with a partner or in a group and can develop skills of cooperation, communication and teamwork. They hopefully learn the pleasure and importance of keeping fit and enjoy a healthy life style.

Motivation to carry out sports is thus very important. In societies with large families, with a great interest in outdoor activities it is much easier than in countries where the child with visual impairment might be the only child in the family and watching TV is the main activity. In these cases the child tends to be far behind his classmates when it comes to physical skills.

Inclusive education has brought one special feature into the lives of children with visual impairment. He has difficulties in competing with his classmates on the same level. The teacher has to know how to adapt the lectures to suite all children in the class. It is furthermore important to add sports that are suited for the child such as goal ball (will be explained later) where all children are on an equal level.

We want to give some ideas for the teacher on how gymnastics and sports can be carried out:

**Gym hall and sports ground**
Go through the physical environment together with the child. Notice the differences in the ground, the place for different apparatus, as well as the places for jumps and throwing. Check possible danger moments. To make the situation easier for a low vision child, use bright coloured tape to ensure that the equipment stands out against the background. Use sound sources and see to it that the classmates ALWAYS are behind the blind child when he is engaged in throwing or shot-put.
The child must be allowed to feel safe during all lectures. Working in pairs might give the child a possibility to get the confidence it needs. It is also important that the teacher works rather close to the child. The child should also be given enough space to work within in order to avoid bouncing into the apparatus in the gym hall. It is important to use the same terminology each time a movement is to be carried out. It might also be a good idea to cooperate with the mobility teacher in order to use the same terminology in movement-related activities. Give proper feedback as the child cannot know if he is doing things right or wrong. Teaching must always be concrete, clear and positive.

Security
Only a professional should have the responsibility to teach sports and they should have basic knowledge and know-how, we only give some hints on how to modify the teaching. The main thing to be considered in all kinds of sports is security. The following examples give only additional information on the modifications needed in sports for the visually impaired. It does not contain the didactics of sports as the teachers are familiar with the general aspects of sports and gymnastics.

Gymnastics:
Music in the gym hall:
Music is very good for accentuating the rhythm during gymnastics. It must not however be too loud.

Motor instruction:
The teacher checks that the child is in the correct position, if necessary leads the arms of the child, he lets the child follow his movements. If the motions are more difficult, the movement should be broken down into smaller steps which will be trained. It might also be wise to teach the child outside the lecture in order not to use too much of the teacher’s time during the lecture. To use a helper who is assisting the teacher when teaching something new might also be an option.

Apparatus gymnastics:
Let the child get familiar with the apparatus before the training starts. Keep the apparatus in the same place each time you work with them and train the different phases one at a time such as running, jump and landing. The apparatus should have a height suitable for the child.

Power sports:
Power sports are suitable and very good for young persons with visual impairment. Apart from the numerous motor and physical qualities which they help to develop they are useful for the blind in the following manner:
Falling: It is essential for a blind person to learn to fall in a suitable manner. Uncertainty of movements often leads to painful falls. By learning secure positions people with blindness can avoid accidents in everyday life.
Balance: This is a fundamental element of e.g. wrestling and judo and an indispensable factor for the visually impaired. It helps to encourage the visually impaired person’s integration in space.
Exercise: The visually impaired person must learn to develop his or her physical capacity. He/she will be able to control the body better. Improved control over the
motor forces such as strength, speed and agility will help combat the consequences of blindness.

**Motivation:** The power sports permits blind people to measure themselves on an equal basis with seeing people. They can attain the same ranks and titles as seeing people. These factors contribute to self-assurance in their physical capacity.

**Wrestling**

Wrestling is a natural play activity for children as kids most of us have ‘wrestled’ one time or another. Children wrestle to have fun and not thinking about it as a sport activity. This sport is as natural, enjoyable and stimulating for a visually impaired child as for any others. The only modification needed is contact. The modification requires constant contact with the opponent. If contact is broken, the official halts the action and places the wrestlers back in contact position.

**Judo**

In judo learning the main elements in small steps is essential. Learning to fall, learning the correct grips and throws take a lot of training. Some grips are not allowed among the visually impaired judokas such as the strangulation grip. Like in wrestling contact is essential throughout the game.

**Weight lifting**

Weight lifting can be carried out in a normal manner. It might, however, be good if two persons on each side of the weights secure that the weights do not fall down. The other pupils should stand well away from the weight lifter.

**In-door ball and throwing games**

Start with slow balls. There are balls in different sizes and different weight with sound sources. Be careful to teach the rules properly before starting the game. Use a ball in contrasting colour for low vision pupils.

**Goal ball:**

A game specially designed for blind persons. The object of the game is to score against the opposition who are defending the width of the court behind them and equally to defend your goal from the opposition. The team consists of 3 players in the two teams. All players have to be blindfolded. They stand on their knees; roll a ball with a sound source along the floor. The rules stipulate that the ball must touch the floor before a certain point when being thrown and ensure that it is skimmed across the surface and not thrown in the air. The other team must catch the ball before it hits the wall. You get a goal if the ball touches the wall. The team who scores the most goals wins.

**Bowls, curling, bowling:**

These games can be carried out with small adaptations. By using a sound beacon the visually impaired pupil can listen to estimate the position of the cones or the ‘jack’. In bowls you use the clock system to inform the pupil about the position of his and other person’s bowls. The ‘jack’ is in the centre of the clock and six o’clock means that the bowl is in front of the ‘jack’ and twelve o’clock that it is behind it. A person (‘marker’) keeps the player informed of all the throws and makes it possible for the visually impaired player to form a ‘mental picture’ of the situation.
**Darts:**
When throwing darts the question of safety is really important. One must always check that the other pupils stand behind the visually impaired thrower. In order to make throwing possible a sound beacon is needed.

**Other activities**

**Folk dance:**
An important social activity among adults is folk dances. It is thus important to teach the visually impaired pupils the most common dances. To teach the steps one may show the steps by holding the pupil’s hands and on a table showing the movements broken down in small parts. After this the child together with the teacher carries out the movements. The dance can then be carried out as line dance, ring dance or pair dance together with the other pupils.

**Skip rope:**
When you teach the child skip rope it is good in the beginning if the teacher skips together with the child.

**Outdoor sports**

**Running:**
For most sports the running skill is essential. An unassisted visually impaired person tends to run with a backward tilt and hands stretched forward in order to ‘avoid possible obstacles appearing out of the blue’. It is therefore important to use some simple methods to give the person the self-confidence needed for proper running style.

In straight short distance running the use of a sound beacon, or a ‘shouter’ can be used. In 100m running it might be good to use two ‘shouters’, one at 50m and the other one at the end of the race. The visually impaired runner can run on lane 3 and the shouters informs him or her on which lane he is running (3-3-2-3-4-3-3 etc.) In this way the runner knows that he does run straight.

In long distance running an accompanying person run together with the visually impaired runner where both are holding to a ring or a rope. It is important to notice that you are not supposed to ‘drag’ the person you are running with but only keep the runner on the right track.

**Long jump:**
In the jumps there are two different options. One may either let the pupil use standing jump running jump. By using standing jump in the beginning the pupil learns the basics of the jump itself. When these skills are mastered you can continue with a one or two-step run before the jump after which a somewhat longer run can be introduced.

Running jump: Always use a broad plank with good contrasting colour for low vision student. As the length of the jump and not the ability to see the plank is essential it is wise to measure the jump from the take-off. You may again use a sound beacon to show direction or use clapping or shouting.
**High jump:**
Here again standing jump should be the first thing to train. You may also start with a rope as it is more pleasant to hit than a bar. It is important to train the landing as well in order to avoid possible injuries. For low vision students it is helpful if you place a yellow ribbon in the middle of the bar.

**Javelin, shot-put and ball throwing**
Safety is again important. The other pupils should always stand well behind the thrower. Together with the pupil you check the equipment you use. Let him/her follow the correct way of throwing – putting by letting him follow your movements in slow motion while you show how to do it. Check that he or she has the correct hold of the javelin or shot before the throw or put. Use a sound beacon to show the direction.

**Orientation and nature walks**
In nature all training should happen in pairs. In this way the visually impaired pupil can safely participate together with his/her classmates. The classmate can also give the visually impaired information on what he/she sees and check possible dangerous spots on the way. There are special compasses with Braille notation as well as tactile maps available in case you have orientation with the children.

**Rowing and cycling**
In all gyms around the world rowing and cycling equipment are available. It is, however, much more rewarding to carry out these sports out in the open. Tandem bicycles make it possible for persons with blindness to carry out this form of sports. Together with a sighted guide a visually impaired person can ride on a bike without any problems. Rowing is another form of sport that can be carried out together with a sighted person without any extra modifications.

**Swimming**
When teaching a child to swim one can start in the way one starts with a sighted child. Begin by showing the correct movements on land. By using a buoyancy aid one lets the child get used to the water and train the correct movements in the water. When the pupil masters swimming he/she can swim without assistance as long as there are ropes between the lanes. One should, however, give a sign when turning.

**Sources:**
Sjöstedt, S (1991) Läroplanen för Svenska skolan för synskadade (School based curriculum for the Swedish school for the Visually Impaired), Helsingfors, Finland
Sjöstedt, S. (1997) Sex små punkter – vägen till kunskap (Six small dots – the way towards knowledge), Editum, Esbo, Finland
http://www.blindsport.org.nz
3.9. Arts and Handicraft

The terminology “art” means different kind of human creativity. In this text we deal with illustrations like drawing, painting and sculpture concerning art education for students with visual impairment. Today Art education belongs to the subjects of core curriculum in almost every country in Europe. In the traditional education for the Blind the subject handicraft played a very important role.

These days the handicraft education is one of the fields in school in which pupils with visual impairment have the possibility to develop their fine motor skills, get knowledge about different materials, forms and tools and enhance their creativity. The main point is not a visually ‘attractive’ result. It is the task itself that is supposed to give the pleasure and the end result to feel satisfactory to the child.

In the advanced level of the art education the students learn about their own culture and traditions and get acquainted with the products of famous painters and sculptures and the history of development of arts in different countries. Pupils with visual impairment have different possibilities in inclusive settings depending on school and country. Art education is normally based on visual experiences. Teachers often have difficulties to find appropriate methods to motivate blind students and involve them in the art class activities. The new ways of art, installations, combined with acoustic and tactile elements help in the communication between blind and sighted students.

Topics and elements of art education:

1. Preparation Phase (in kinder garden, at home):
   - Talk about nice experiences with the children
   - Organise excursions in the nature
   - Collect and sort materials, leaves, seeds, fruits
   - Create decorations, collage from the collected materials
   - Read “two way” (tactile and visual) books

2. Handicraft
   - Beads of different materials, make necklaces etc.
   - Basic elements of
     - Sewing
     - Weaving
     - Knitting,
     - Crochet
     - Cutting
   - Folding papers (Origami)

3. Drawing
   - On plastic sheet
   - On wax table
   - On paper
with crayons,
scratching

4. Painting
With oil or other painting materials which has after drying have a tactile profile

5. Forming/basic skills in sculpture
   Work
   with clay
   with pasta
   with forming mass

6. History of Art

7. Theory of Art
To transfer the knowledge in history and theory of Art the museums play an important role. (See Museum pedagogy!)

Some suggestions to the methods in art education from Shaw (Scholl 1986)
1. The teacher should help the blind child to learn how to use his or her hands and fingers effectively in the given task.

2. In the absence or limitation of sight, the teacher must be aware that extra time may be necessary to understand objects being examined. Further, as the teacher uses the hand over hand technique, accompanying questions will help clarify what is being examined. The child may need to explore objects several times before a clear understanding of it takes place.

3. Use generative questions in order to provoke the spirit of inquiry and stimulate imagination. Ask the child questions that will elicit from the child his thoughts and ideas. For example, as a pupil examines an objects, ask him to describe it, tell whether it looks like anything else he or she has seen, to tell whether or not he or she likes it, and why, etc. Avoid questions which result in a yes-no type of response.

4. Use vocabulary that is rich in descriptive terminology and that describe qualities. Be conscious of using words which relate to the sound, smell, touch and, if appropriate, taste of an object. These sensory experiences have a real and rich meaning for the blind and will enhance creative ability. For children with low vision, use of visual words is appropriate, if consideration is given to the child’s specific visual needs, that is, the degree of description necessary will reflect the child’s field of vision, near and distance vision, colour vision, overall blur, etc.

5. Understand the importance of first hand experiences with all objects used in daily life as well as basic geometric forms and their names so that one has the basis for describing newly experienced objects. The importance of interacting with objects cannot be minimized; the child must feel and actively handle,
listen, smell, and taste (if appropriate) in order to know. Building up a rich
descriptive vocabulary provides the child with the verbal tools he will need to
incorporate new and complex objects into his or her repertoire of experiences.

6. Be aware that many things that sighted people know, blind people can only
come to know by the skilful use of analogy (e.g. sky, shadow). There are many
experiences which totally blind children cannot enjoy by virtue of their lack of
sight. Rather than avoid the words totally (i.e. sky) the teacher should try to
convey the concept to the child in terms of what already exists in his world.

Some examples from the class practice
It usually takes some preparations from the part of the teacher in order for the child to
get a good result. To sew, glue, cut and thread pearls on a string gives good training
and might result in a nice product.

One may let the child sew on a cardboard where the teacher has punched holes
through after which the child may do the sewing. A good idea is to rip paper that you
can wrinkle into flowers which can be glued to paper. To avoid a mess you can put
the glue on a saucer and just dip the paper in it.

When cutting with a pair of scissors the teacher can hold the scissors together with
the child to give the child an idea of how the scissors functions.
To thread pearls in different sizes and different colours on a string does not only give
a nice result but gives a good fine motor skills training as well. In all schools there are
materials that may be used – and nature is a rich source of materials for nice pieces
of art.

With the new drawing kits blind children can produce drawings which they can check
with their fingers. They can also fill the drawings with colours between the tactile lines
and in this way produce a nice drawing. Using finger colours and bright colours gives
a nice art activity for children with low vision.

Blind children like to make collage art because they may use different kinds of
materials with pleasant textures. You may also use clay and teach the proportions of
the human body or different animals. It is usually the lack of imagination from the part
of the teacher that puts the limits to teaching arts.

The tactile sense is the best aid for a visually impaired child to get written information.
It is in reading that the sensitive fingertips are of utmost importance. The same goes
for checking different objects. If a visually impaired person has not held an object in
his hand he does not know what it looks like.

There are details that are important in mobility as well. Here we can mention the
ability to identify different objects (a table, a chair, a door knob etc.) with a touch of
the hand, to be able to feel different materials and forms, to follow a wall and detect
objects and thus to decide positions. Furthermore the capability of reading an
embossed map and reading written route descriptions are important and may be
improved through good fine motor skills.
You can start training the tactile capacity of a child at a very early age by using toys in different materials and in different sizes. You can let the child feel different types of cloth, use a lotto game where they have to feel and pair two items of the same kind tactically. In this way you teach the child different modes of exploring the environment. You can sew small objects into small bags of cloth and ask them to find out what the objects are through touch. Pedagogic toys, geometric forms etc. give the child fingertip sensitivity which is needed for studies, work and leisure time activities.

**Museum pedagogy**

Museum pedagogy is an integral part of the methodology pool of the art pedagogy. The interactive approach in museums provides the visitors, students and professionals with an active participation and creative cooperation with the museum educators.

Since 1987 a project started lead by E.S. Axel. The Art Education for the Blind worked out methods for students with visual impairment to get access to the visual art. ([http://www.artagogo.com/commentary/artforblind/artforblind.htm](http://www.artagogo.com/commentary/artforblind/artforblind.htm)) The project created an art-history training program for the blind and visually impaired students.

The program uses multi-sensory methods; tactile diagrams, in-depth narratives, and atmospheric sound compositions to explain many examples of art works; both painting and sculpture are included in the series.

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Michelangelo's "Creation of Adam," left, and AEB's tactile representation, right
Image Courtesy of AEB, Inc.

Some works of art are especially complex and therefore these examples must incorporate several different types of raised patterns in order to fully describe compositional and stylistic details.

**Contents of the AEB Series**

The planned 22-volume series will cover a wide range of art: from prehistoric to contemporary. The examples include painting, sculpture, architecture, mosaic, manuscript illumination, and textiles.
In September 1999, three of the first volumes of "Art History through Touch and Sound" were released: "Building Blocks of Art," "European Modernism: 1900-1940" and "The Art of Ancient Egypt."

Perhaps the most intriguing aspect of this program is how sound is used to express visual concepts such as perspective, space, and emotion. Sound artist Lou Gisante has created sensitive compositions to convey these challenging concepts to blind and visually impaired individuals.

A similar project in Birmingham, England called "Sound and Touch" has collaborated with "Art History through Touch and Sound" by donating their original recordings made to explain the space and environment of selected English cathedrals.

This series is available to anyone who wishes to purchase it. The AEB is working closely with organizations such as The National Federation for the Blind, the American Council for the Blind, and several museums in order to make the program available to a wider audience.
If you are interested in making art more available to the blind and visually impaired, urge your local museum to acquire this extremely worthwhile series. Only then will the visual arts truly be accessible to everyone, regardless of their ability to see.

To receive more information or to donate to the AEB, please contact:

Art Education for the Blind, Inc.

About drawing made by blind children
There are a few books available about drawing activities among blind children. The Book I Know Where I Am by Elke Zollitsch (2003) has a wide collection of plastic pictures made by two of her pupils in a school in Germany. Susanna and Julia learnt together with their sighted peers in the classroom for three years. She took part in all activities together and many interesting drawings emerged from their experiences. The teacher introduces their pictures to the theme “Sound waves” in the following way:

“The thought of not being able to hear anything is confusing for all pupils, but above all for the blind, inconceivable. Susanne and Julia drew pictures of our attempts to reconstruct sound waves: Having covered one end of a huge roll of paper with a thin sheet of cellophane, (representing an eardrum), we then sprinkled some sand over it. One of the pupils lies down and the teacher holds the paper tube over his mouth. The pupil then creeps into the tube so that the amplified sound of the grains of sand jumping up and down on the cellophane can be heard, en effect clearly conveyed by Susanne in her drawing. Julia draws very accurately (and much larger) how the sound trickles on her body. Both sighted and blind children are impressed and amazed at how the sound waves work. It is no wonder that loud, startling noises cause people to jump with fright. In a second attempt both girls manage to portray the complicated sequence of the experiment in their drawing.”

The example shows that drawings by blind children as well have an other dimension of communication and give much information about the way of exploring and understanding the world around them.
About art education with blind children you can find other examples in the handout “Learning together is fun” as well as in ISaR/Didactic pool/English.

On this address [http://www.tsbvi.edu/recc/art.htm](http://www.tsbvi.edu/recc/art.htm) of “A Center for Educational Services for All Blind and Visually Impaired Students” in Texas you can find teaching materials for different activities in art education with pupils and students with visual impairment.

References:
Sjöstedt, S (1997) Sex små punkter – vägen till kunskap. (Six small dots – the way towards knowledge) Editum, Esbo, Finland
www.tsbvi.edu
www.isar-projekt.de
3.10 Some Considerations in Sex Education

Sex education plays a very important role in learning social skills and behaviour. The holistic concept of sexuality means that it is a function of the entire personality and has intellectual, mental, emotional, social and psychical aspects. It is a communication process which includes conversation, shared interests, the expression of feelings, as well as engagement in sexual behaviours and activities.

If sexuality is conceptualized holistically, parents, general educators, sex education and special education teachers, family members, the clergy, peers, acquaintances, friends, and sexual partners will all affect students’ sexual development to some degree.

When planning a sex educational program for students with visual impairments the following factors should have been concerned:

- personality
- visual impairment
- temperament
- attitudes
- education,
- intellectual abilities
- additional impairment
- social environment
- cultural and ethnic influences
- age etc.

Innate visual impaired children may grow up with a poor self-image and a lack of sexual identity if appropriate steps are not taken. By the age of three, sighted children may have compared the anatomical features of grown-up’s bodies, their own, and those of siblings and peers. These experiences and others such as seeing peers in locker rooms and baths, adults on beaches, in magazines, movies and even pornographic publications are not accessible to blind students and may be inadequately visible to low vision students.

Visually impaired students know their own bodies if they are allowed to explore them freely. They may have experience with the bodies of peers, usually of their own sex, through play but they often know little about the bodies of the opposite sex, or of adults of either sex. Touching or exploring other bodies, except in the most private and intimate situations, is not considered socially acceptable in our culture. Students with visual impairment often create not-realistic theories concerning the anatomy and functions of sex due to a lack of information and experience.

Goals of curricula of sex education with students with visual impairments

1. promote informed and rational decision-making with regard to sexuality
2. increase knowledge about reproduction
3. facilitate a positive and satisfying sexuality
4. reduce unwanted teenage pregnancy
5. reduce sexual activity among teenagers
Some advice to the methods

1. Develop sex educational programs for students with visual impairment which are appropriate for the sexual culture in which they live.
2. Experiences should include tactual exploration of their own body; playing with anatomically correct dolls representing both sexes.
3. Reading literature and other forms of mass media material.
4. Learning about structure and function of sexual organs should take place at an early age in consultation with their parents.
5. Establishing a solid gender identity and healthy self-image through direct information about differences in men and women’s clothing, body stature, stances, and movements.
6. Parents and teachers must be sensitive to visually impaired students’ need for privacy, to discuss feelings openly, to understand dating behaviours, customs and sexuality.

Social aspects

Sighted young persons are constantly exposed to manifestations of sexual behaviours. They observe physical manifestations of affection at home, see kissing, petting, sexually arousing behaviour and language or see films. Youngsters with visual impairment do not have these opportunities. They must be advised by teachers and parents that certain activities are acceptable, normal, and pleasurable in private, at certain time, and with certain individuals. They must learn how to protect themselves from inappropriate sexual advances.

Students must be given the opportunities to discuss their feelings, disappointments, and joys related to their sexuality and the expressions of it. Some of the visual impairments are hereditary, so each student should be informed about genetic counselling.

Sexuality is an important part of the personality and a very important part of the social life. To find good friends, an appropriate partner, set a family etc. needs good decisions. Making good decisions need a well developed self-image, awareness of feelings and behaviours and responsibility. Professionally planned sexual education helps students, youngsters with visual impairment to make good and responsible decisions concerning sexuality and planning a family life.


3.11. Assessment of Learning

European Agency for Development in Special Needs Education has carried out a large survey on assessment of students with visual impairment and other special needs (2005). The result of the survey has led to some conclusions and recommendations which we present here.
The specific aims were:
- To develop a knowledge base of information on assessment policies and practice in the participating countries;
- To examine innovative examples of effective assessment policy and practice and highlight recommendations and guidelines for assessment in inclusive settings.

There are different actors involved in assessment. Teachers, other school staff, external support staff, but parents and also pupils themselves can potentially be involved in assessment procedures. All actors can use assessment information in different ways. Assessment information is not only concerned with the pupil, but also the learning environment (and sometimes even the home environment).

Clear differences can be seen in the way individual countries approach the following key questions relating to assessment:
- Why are pupils assessed?
- Who uses the assessment information?
- Who carries out the assessment and who else is involved?
- What is assessed?
- How are pupils assessed?
- Against what are the assessment results compared?

Assessment to inform teaching and learning
In one form or another, all countries have on-going, formative assessment approaches that are usually linked to teaching and learning programmes.

Within inclusive settings, on-going assessment:
- Is directly linked to programmes of learning that all pupils (those with and without VI) follow;
- Is mainly non-comparative with the focus being on information that helps teachers plan next steps for individual pupil’s learning (formative assessment);
- May or may not have some summative elements linked to strategic points in teaching programmes.

In relation to assessing the learning of pupils with VI:
- The need for the findings of initial assessment of VI to be linked to curriculum goals;
- Linking curriculum goals and assessment schedules to a pupil’s IEP or other target settings tools or approaches;
- Modifying or adapting the assessment methods used in the mainstream classroom to meet the needs of pupils with specific needs and difficulties.

Assessment to compare pupils’ achievements
Summative assessment summarises pupil achievements across a range of activities usually over a period of time - for example a school year. The purpose of summative assessment is to either compare a pupil’s current achievements with previous achievements, or often compare an individual pupil’s achievements with the achievements of their peers.

Comparing information on the achievement of a group of pupils can give insights into the relative progress of individual pupils, but can also be used for wider evaluation
purposes such as the success or otherwise of a particular teaching programme. This form and purpose of assessment is often the one parents - along with the majority of the general community - are most familiar with.

Summative assessment identifies successes and weaknesses in relation to specific goals, but it does not always provide formative feedback that can be used to direct future teaching and learning programmes.

Linking summative assessment requirements to the goals of a pupil’s IEP is one issue for teachers in inclusive settings. A further consideration is how summative assessment marking or grading schemes can be modified to accommodate the needs of pupils with specific needs and difficulties.

**Using initial identification of visual impairment assessment to inform teaching and learning**

All countries are facing the challenge of ensuring the assessment procedures they have for initial identification of VI provides information that can be used to inform teaching and learning. Essentially, this involves a move away from a deficit focussed, medical model of ‘diagnosis’ of VI, to an educational, learning needs based approach where the mainstream teacher is more responsible for initial and then on-going assessment.

In all countries, multi-disciplinary teams of specialists from different disciplines (health, social and/or psychological) are involved in the initial identification and diagnosis of pupils’ needs and for some countries this still leads to decisions about resources and placement.

*Teachers are seen as educational experts, parents as ‘hands-on’ experts and pupils are also seen as important partners in needs-based assessment. In all stages of assessment they provide important information and can thus function as co-assessors.*

*… formal assessment of development by physicians and psychologists is important, but it is important to more effectively bridge the existing gap between assessment findings and practice in teaching and other school work.*

**The principles underpinning inclusive assessment**

- All assessment procedures should be used to inform and promote learning for all pupils;
- All pupils should be entitled to be part of all assessment procedures;
- The needs of pupils with VI should be considered and accounted for within all general as well as VI specific assessment policies;
- All assessment procedures should be complementary and inform each other;
- All assessment procedures should aim to ‘celebrate’ diversity by identifying and valuing all pupils’ individual learning progress and achievements;
- Inclusive assessment explicitly aims to prevent segregation by avoiding - as far as possible - forms of labelling and by focussing on learning and teaching practice that promotes inclusion in a mainstream setting.

**The focus of inclusive assessment**
- The purpose of inclusive assessment should be to improve learning for all pupils in mainstream settings;
- All assessment procedures, methods and tools should inform teaching and learning and support teachers in their work;
- Inclusive assessment may include a range of assessment procedures that fulfil other purposes in addition to informing teaching and learning. These purposes may be related to summative assessment, initial identification of SEN, or monitoring of educational standards. All these procedures should aim to inform learning, but the procedures should also be ‘fit for purpose’. That is the methods and procedures should only be used for the reason they were designed for and not used for others purposes.

**The methods used in inclusive assessment**
- Inclusive assessment involves a range of possible methods and strategies to assessing pupils. The key point about all these possible approaches is that they all work to gather clear evidence about pupils’ learning;
- Inclusive assessment methods report on the product or outcomes of learning, but also provide teachers with information on how to develop and improve the process of learning for an individual pupil or groups of pupils in the future;
- Decision-making based upon inclusive assessment draws upon a range of sources that are action based and presents evidence of learning collected over a period of time (and not snapshot, one off assessment information);
- A wide range of assessment methods are necessary in inclusive assessment in order to make sure that there is a wide coverage of areas (non-academic as well as academic subjects) assessed;
- Assessment methods should aim to provide ‘value added information’ on pupil’s learning progress and development, not just snapshot information;
- Any assessment information should be contextualised and the educational environment as well as any home-based or environmental factors that influence a pupil’s learning should be taken into account;
- Inclusive assessment should extend to assessing the factors that support inclusion for an individual pupil in order that wider school, class management and support decisions can be effectively made.

**The people involved in inclusive assessment**
- Inclusive assessment involves the active involvement of class teachers, pupils, parents, class peers and others as potential assessors, or participants in the assessment process;
- The procedures used in inclusive assessment should be developed based upon shared concepts and values for assessment and inclusion as well as the principles of participation and collaboration between the different stakeholders in assessment;
- Any assessment should aim to be empowering for the pupil concerned by providing them with insights into their own learning as well as a source of motivation to encourage their future learning;
- All pupils are entitled to be part of inclusive assessment - pupils with SEN as well as their classmates and peers.
Pupil assessment - an example from Finland

According to the Basic Education Act, pupil assessment aims to guide and encourage study and to develop pupils' self-assessment skills.

Assessment should support and guide pupils in a positive manner, in line with basic school assignments. In addition to pupils' learning outcomes, the targets of assessment include their schoolwork and the entire learning process, as well as their conduct. The Finnish National Board of Education issues national criteria for pupil assessment.

Pupil assessment has two different roles. The first is the above-mentioned educational guidance and encouragement. This is known as continuous assessment. It is based on each pupil's own learning and growth process, its starting points and objectives.

The second task of pupil assessment is the final assessment of basic education, on the basis of which pupils will be selected for further studies when they leave comprehensive school. This assessment must be nationally comparable and it must treat pupils equally. The final assessment is based on the objectives of basic education. For the purposes of the final assessment of basic education, recommended assessment criteria have been prepared for the grade "good" (8) in all common subjects.

Pupils are given reports at the end of each school year; in addition, pupils may be given one or more intermediate reports.

In the first seven forms of comprehensive school, assessment may be either verbal or numerical. Later the assessment must be numerical, but it may be complemented with a verbal assessment.

Elective subjects may be assessed verbally, numerically or with a pass/fail mark, or in some other way as determined in the curriculum.

The scale of grades used in assessment is 4–10, where 5 is adequate, 6 moderate, 7 satisfactory, 8 good, 9 very good and 10 shows excellent knowledge and skills. Grade 4 is for failed performances. The verbal assessment provides pupils with feedback on their schoolwork and the progress they have made. The assessment is carried out by the relevant subject teacher. Conduct and schoolwork are assessed by the class teacher, or, where a pupil has several teachers, jointly by these teachers.

The new national core curriculum aims at standardising pupil assessment. There are recommended assessment criteria for the grade "good" (8) in all subjects. These are, together with the criteria for the final assessment meant for teachers as a tool and support.

Progression of pupils

A pupil whose performance has been accepted in all the assessed subjects moves on to the next form. Promotion and, finally, the award of the school-leaving certificate are decided by the principal in co-operation with the pupil's teachers.
Where a decision concerning a pupil’s grades or promotion is obviously flawed, the Provincial State Office may either request that the teacher or teachers carry out a new assessment or decide on the actual grade to be given or on the promotion of the pupil.

PROBLEM: If a student with VI does not show measurable progress, the school may be identified as being ineffectual.

Country wide assessment should assess subgroups as well as analyze the outcomes accordingly. Three important things to consider

1. Must be assessed with respect to their mastery of the same curriculum aims as the other.
2. The nature of the assessment accommodation that can and should be used when testing children with VI
3. How high to set the educational expectations

**Accommodation:**

To eliminate or reduce the effect of the disability. This has to take place during the education process and not only during assessment. Accommodation should not fundamentally change the nature of the skills or knowledge.

**Accommodation categories:**

Presentation accommodation: Access information through other means than reading: auditory, multi-sensory, tactile and visual

Response accommodation: Allow students to solve or organize problems using types of assistive device or organizers.

Setting accommodation: Change location or conditions of assessment setting.

Timing and scheduling accommodation: Increase the length of time or change the way time is organized.

When selecting accommodation:

- Do make accommodation decisions based on individual needs
- Do select accommodations that reduce the effect of the disability to access instruction and demonstrate learning
- Do be certain to document instructional and assessment accommodations on the IEP
- Do be familiar with the types of accommodations that can be used as both instructional and assessment accommodations
- Do be specific about the ‘Where, When, Who, and How’ of providing accommodations
- Do evaluate accommodations used by the student
- Do get input about accommodations from teachers, parents, and students, and use it to make decisions at IEP planning meetings
- Do provide accommodation for assessments routinely used for classroom instruction
- Do select accommodations based on specific individual needs in each content area
Assessment bias: How to banish it
Skills and knowledge are covert and cannot be seen. We rely on the students’ overt performance in educational tests. Tests can be the main point in educational assessment and indicate the best ways to teach a student. The validity of the tests is all-important if we want to give the students first-rate instruction. Assessment bias diminishes the validity of the test-based inference about students. Assessment bias is present whenever one or more items on a test offend or unfairly penalize a student because of personal characteristics such as impairment, ethnic background, gender, socio-economic status or religion.

Offensiveness e.g. degrading remarks on impairment or gender. Student cannot perform in an optimal manner. You should omit from using negative remarks on any subject. You never know how a student feels on that particular subject. The items containing content that unjustly prevents on or more subgroups of students from performing well because of personal characteristics is unfair.

Some religions do not accept some of the things learned in biology. The students may know the answer the teacher wants as they have been taught but they may not accept it.

The reason for failure in a test may of course also be the result of inadequate instruction from the side of the teacher or that the student has not done his homework properly.

Portfolio assessment and performance testing
Portfolio assessment: An assessment approach centred on the systematic appraisal of a student’s work samples collected over time.

Working portfolio: Ongoing collections of a student’s work samples focussed on the over-time improvement of a student’s self-evaluation skill.

Showcase portfolio: Collection of student’s best work, typically used to celebrate a student’s demonstrated mastering of skills.

A working portfolio will ideally document a student’s progress in mastering an important skill.
- Can be a result of group-work or individual work. Using simple instructions on how to proceed, they can learn to access the samples themselves. Teacher has a 10 minute portfolio conference with each student from time to time.
- Gives a chance to assess a wider range of students’ performance, not only a single test.
- Students learn self-evaluation

How to assess portfolios:
1. Identify the skills to be promoted and measured
2. Ensure student’s portfolio ownership
3. Determine what work samples to collect
4. Assemble and store work samples
5. Choose evaluative criteria by which to judge the work samples
6. Oblige students to frequently monitor their work samples
7. Carry out individual portfolio conferences
8. Make the students’ parents active partners in the portfolio assessment process

**Performance assessment**
Performance test. An assessment of a student’s skill in which the skills determining tasks closely approximate the real world tasks in which the skill is required.

Performance test task. The piece of work that must be completed by the student during the performance test.

Quality of performance test tasks:
1. Authenticity – for life, not only for school
2. Teachability – can it be improved and learnt through teaching
3. Fairness – no bias
4. Feasibility – can it be implemented
5. Scorability – well evaluated
6. Generalizability – generalized to comparable tasks

*Sources:
4.1. Inclusive Education

Inclusion is not a new concept in education. Related terms with a longer history include mainstreaming, integration, normalization, least restrictive environment, deinstitutionalization, and regular education initiative. Some use several of these terms interchangeably; others make distinctions. Admittedly, much of the confusion over the issue of inclusion stems from the lax usage of several of these related terms when important differences in meaning exist, especially among the most common—mainstreaming, integration, inclusion, and full inclusion.

Integration is a carry-over from the civil rights/racial desegregation legislation of the 1960s and before. Consequently, integration is primarily a legal term. It brings a greater implication than simply the physical blending of different ethnicities on a bus, at a workplace, or in a classroom. For schools this has meant not only accepting children for appropriate ethnic balance demographically, but also seeking ways of fostering social and academic interactions. Just as in racial desegregation, the term "integration," as used by special educators, conveys the idea that students from disadvantaged groups ought to be desegregated from "pull-out" programs, self-contained classrooms, special schools, or institutions, and integrated into the realm of regular classrooms. Further, this change is meant to be not only in terms of physical proximity, but of academic and social integration as well.

Inclusion refers to the commitment to educate each child, to the maximum extent appropriate, in the school and classroom he or she would otherwise attend. It involves bringing the support services to the child ... and requires only that the child will benefit from being in the class (rather than having to keep up with the other students).

Warnock’s committee from 1978 was influential in establishing the term integration and this could operate at three different levels:

• **Locational integration**, where provision for children from disadvantaged groups was to be made on the same site as their mainstream peers

• **Social integration**, where children shared social spaces, in the playground or in extra-curricular activities

• **Functional integration** (the most advanced form) where all children irrespective of ethnicity, socio-economical background or special needs were to be educated together in a mainstream setting, pursuing the same set of curriculum goals and activities

‘Inclusive education is about responding to diversity; it is about listening to unfamiliar voices, being open, empowering all members and about celebrating ‘difference’ in dignified ways. From this perspective, the goal is not to leave anyone out of school’.

**Key aspects of inclusive practice**

Inclusive practice is community based, where the school reflects the community as a whole. It is barrier free and is accessible to all both physically and in terms of
curricula, support systems and methods of communication. Inclusive practice furthermore promotes collaboration, where an inclusive school works with rather than competitively against other schools. It promotes equality, and inclusive school is a democracy where all members have rights and responsibilities.

**Integration versus inclusion**

<table>
<thead>
<tr>
<th>Integration</th>
<th>Inclusion</th>
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<tbody>
<tr>
<td>Emphasizes Needs of ‘special students’</td>
<td>Emphasizes Rights of all students</td>
</tr>
<tr>
<td>Changing, remedying the subject</td>
<td>Changing the school</td>
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<tr>
<td>Benefits to the students with special needs of being integrated</td>
<td>Benefits to all students, i.e. including all</td>
</tr>
<tr>
<td>Professionals, specialist expertise and formal support</td>
<td>Informal support and the expertise of mainstream teachers</td>
</tr>
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<td></td>
<td>Good teaching for all</td>
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(Warren, 1994)

**Inclusion: The pros and cons**

Few issues in education generate more discussion, confusion, or apprehension than the topic of inclusion. For many, the concept of inclusion remains somewhat vague. What does inclusion actually mean? What does it look like? Is it the same as full inclusion or mainstreaming?

The educational efforts should be accomplished in the child's neighborhood school- "in the school and classroom he or she would otherwise attend." This means a commitment to move needed services and resources to the child rather than to place the child in a more removed or segregated setting where services and resources are located. An inclusive education program allows daily and/or weekly time in the school schedule for internal and external collaboration. It seeks to expand the capacity of regular educators to be able to teach a wider array of children. The primary responsibility for the education of each student in an inclusive environment rests with the regular classroom teacher rather than the special education teacher or other professionals. This does not, however, mean that these have no direct involvement in the education of the students. It simply means that the ultimate responsibility for the education of all students in a classroom resides with the classroom teacher in charge.

For inclusion to work, educational practices must be child-centred. This means that teachers must discover where each of their students are academically, socially, and culturally to determine how best to facilitate learning. Indeed, child-centred teachers view their role more as being facilitators of learning rather than simply transmitters of knowledge. Therefore, skills in curriculum-based assessment, team teaching,
mastery learning, assessing learning styles (and modifying instruction to adapt to students' learning styles), other individualized and adaptive learning approaches, cooperative learning strategies, facilitating peer tutoring and "peer buddies," or social skills training are important for teachers to develop and use in inclusive classrooms. These are not just good special education practices, but are good practices for all teachers.

**Underlying assumptions surrounding greater versus lesser inclusion**

Perhaps the strongest argument for greater inclusion, even full inclusion, comes from its philosophical/moral/ethical base. Countries today strive towards ideals of freedom and equality of opportunity. Though they have not been fully achieved, movement toward their fuller realization continues.

In many countries the parents demand inclusive education for their children. They want to have the main responsibility for the upbringing of their children. As more and more children and young persons with visual impairment have successfully graduated from high school and universities, the parents understand that their children can manage school in an integrated setting.

The professionals, teachers and administrators, who favour greater inclusion, think that labeling and segregation of students from disadvantaged areas is bad. They furthermore do not view those with disabilities as distinctly different from others, but rather limited in certain abilities (everyone simply has strengths and weaknesses that vary from person to person). According to these inclusion proponents, segregation, marginalization and segregated special education services are too expensive, disjoint, and inefficient. They believe that children from disadvantaged groups are being segregated without any valid reason and many who have been identified as being disabled are actually not disabled at all. They also believe that all those students can be best served in mainstream classes because: teachers who have only low-ability students have lower expectations;

- segregated programs tend to have “watered-down” programs;
- students in segregated programs tend not to have individualized programs;
- students in segregated programs tend to stay in segregated programs;
- most regular education teachers are willing and able to teach students with disabilities; and
- the law supports inclusive practices.

**School management: methods to enhance inclusiveness in education within the school**

The first objective should be to improve learning opportunities for all students and create an inclusive culture in the school. This includes creating a secure, accepting, collaborating, stimulating community in which everyone is valued, as the foundation for the highest achievements of all students. The inclusive values should be shared between all staff, students, governors and parents and conveyed to all new members of the school. The inclusive principles guide the decisions about policies and moment to moment practice so that the learning of all is supported through a continuous process of school development.

Students with special education needs include learners with disabilities, learning difficulties, communication or behaviour difficulties, sensory or physical impairments.
Special education is achieved through providing these students with the support they need to access learning – whether it is therapy, transport, changes to the learning program or environment, specific teaching strategies, and / or specialized equipment or materials.

The inclusiveness may be enhanced through:

**Building community:**
- Everyone is made to feel welcome
- Students help each other
- Staff collaborate with each other
- Staff and students treat each other with respect
- There is a partnership between staff and parents
- Staff and governors work well together
- All local communities are involved in the school

**Establishing inclusive values**
- There are high expectations for *all students*
- Staff, governors, students and parents share a philosophy of inclusion
- Students are equally valued
- Staff seek to remove all barriers to learning and participation in school
- The school strives to minimize discriminatory practices

**We can build inclusive policies by developing a school for all, i.e.:**
- Staff appointments and promotions are fair
- All new staff are helped to settle into the school
- The school seeks to admit all students from its locality
- The school makes its buildings physically accessible to all people
- All students are helped to feel settled
- The school arranges teaching groups so that all students are valued

**Organizing support for diversity**
- All forms of support are coordinated
- Staff development activities help staff to respond to student diversity
- “Special needs” policies are inclusion policies
- Barriers to attendance are reduced
- School resources are distributed fairly to support inclusion
- Community resources are known and drawn upon
- Staff expertise is fully utilized
- Student difference is used as a resource for teaching and learning
- Staff develop resources to support learning and participation

To mobilize the resources you need to consider the following questions:
- Is the staff encouraged to draw on and share all their skills and knowledge to support learning, not only those given by their job designation?
- Is staff encouraged to develop their knowledge and skills? (Not only the specialist teachers!)
- Do teachers with particular skills and knowledge offer their help to others?
- Are the differences in culture and background of staff drawn upon in curriculum development and teaching?
➢ Are there formal as well as informal opportunities for staff to resolve concerns about students by drawing on each other’s expertise?
➢ Does staff challenge each other’s assumptions about the origin of students’ difficulties?
➢ Does staff offer alternative perspectives on concerns about students?
➢ Does staff in the school learn from instructive practice and experience of staff in other schools?
➢ Is local special school staff involved in sharing their expertise with mainstream staff?

As directors and teachers we very often forget one important teaching resource we have in our schools, i.e. the other students. In an inclusive (and a segregated) setting an important resource are the peers of the students with an impairment. We must therefore consider the following questions in order to build an inclusive school:
➢ Are the students encouraged to pool their knowledge, for example, of different regions (country side, village, cities) or about family histories?
➢ Are students taught about what they can learn from others of different background and experience?
➢ Do students with more knowledge and skills in an area sometimes tutor those with less?
➢ Are there opportunities for students of different ages to support each other?
➢ Are a wide variety of students chosen to tutor others?
➢ Is everyone seen as having important lessons to teach by virtue of their individuality, irrespective of attainment or impairment?
➢ Are the variety of languages spoken by the students used as an integral part of the curriculum and as a rich linguistic resource for language work?
➢ Do students who have overcome a particular problem pass on the benefit of their experience?
➢ Are the barriers to learning and participation of some students, for example in gaining physical access to a part of then building or to an aspect of the curriculum, used as a problem solving task or projects?

(Extract from Booth 2006, Index for Inclusion)

Support teachers and resource centers
In many countries an increasing number of children with visual impairment are integrated / included into mainstream schools. This has changed the role of the special schools as well as the role of the teachers. As special needs education has not been part of the university curriculum for regular teachers they feel lost and not able at coping with children with special needs. Another big issue is lack of appropriate materials for children with special needs. For children with severe visual impairment books and reading material in Braille are of utmost importance for them to manage education in a mainstream setting.

To cope with this problem the schools for the visually impaired have been transformed into resource centers as well. They help the teachers to get the materials needed and provide courses for teachers in mainstream. A large part of their work is thus adult education as they have courses for teachers, assistants, parents and other persons involved in the teaching or rehabilitation of the children. They also have
special courses for the children in Braille reading and writing, mobility, the use of technical aids and other important issues.

The teachers may work like itinerant teachers, helping the class teachers to draw up an individual education plan, they provide the teacher with suitable materials and check the school environment to help the school make it as suitable as possible for the child.

Multi-disciplinary work is very important. They thus establish networks that will work together so that both educational and rehabilitation provisions are taken care of.

The main idea is that children with visual impairment or other special education needs are allowed to live at home and attend the closest school together with their friends.

**Important factors for resource centers (RC)**
- **Lifelong learning for the teachers is a MUST**
  
  *Mixed model a long time*

  The special schools for the visually impaired in most countries still function as regular special schools for children who for some reason (sever multi-impairment, social reasons) may have difficulties in coping in a regular school. They have, however, been changed into resource centers as well. There are also special classes in regular schools where the children get all or part of their education together with a special teacher. Many children have been included into the school system with assistance from a resource center.

**Class and course teachers**

Teachers in today's special schools for the visually impaired thus teach some classes in the school but also teach short term children, i.e. children attending regular schools but who need instructions in special skills and subjects. A new and additional task is adult teaching as they have to teach the teachers of the children in the inclusive system. And it is not only the teachers who need new skills but all persons around the child including the parents.

**Itinerant teachers**

Former teachers for the visually impaired in the special schools have become itinerant teachers. They have a new role to help teachers to develop the IEP in cooperation with the class teacher and the other persons involved in this task. They also help the class teacher to overcome possible problems and plan and implement courses the teacher and the visually impaired student need. For this purpose they assess schools and classes and give hints on how to plan the education and make the school environment suited for the visually impaired child. They function as a bridge between counterparts as well; school – family – resource center – specialists.

It is also important for the itinerant teachers to give information to the other children in the class about visual impairment and how they may help the new classmate to fit into the group.
Main important issues for the itinerant teacher
The idea of inclusive education is for the children to be able to keep their family ties and friends. By attending the local school they can live at home and get a normal upbringing surrounded by their families and have a chance to make friends in their normal environment. The idea is that the adults travel and seldom the children. The task of the itinerant teacher is thus to pool the knowledge about the child, to concentrate and coordinate additional services (therapists, psychologists etc). This makes in-service training, projects, overall planning and visions easier to carry out.

The use of the individual education plan (IEP) within the resource center
The IEP is absolutely necessary for all planning within the resource center. It gives information about the resources needed; human resources, materials as well as funding. It also makes planning possible for courses and individual guidance needed. As courses are being carried out within the center, the need for accommodation and use of available teachers form part of the planning. For the itinerant teacher the number of traveling days and the planning of his/her own work are made possible through the IEP.

Special classes — special teacher
The idea of special classes should be to function as a bridge between the special class and the regular classes in the school. Children from the special classes should be integrated into the regular classes as much as possible. The special class teachers should then be resources for the regular class teachers in order to help them in their work. Special class teachers should also get assistance from the resource centers, they do know their children best and have skills and knowledge when it comes to teach children with impairments, but: No teacher can be an expert on all educational implications on all levels in all subjects.

The role of the itinerant teachers in a resource centre (RC)
(An example)

1. Distribution of information
   - About education of children with visual impairment
   - About their school / RC

2. In-service training
   - The learner
   - The parents and home of the learner
   - The peers of the learner
   - The whole community around the learner

   It is given through:
   - Visiting the schools
   - Visiting the homes
   - Over the phone
   - Through letters
   - Assistance periods for the learners in the RC
Lectures in the RC or in the municipalities: pedagogical questions; social situation; education possibilities; question on services for the learner; medical questions

3. Discussions and contacts regarding the learner
   - School authorities
   - Social authorities
   - Medical authorities

4. Learning / teaching materials
   - Needs assessment
   - Teaching the use of special equipment
   - If necessary, participating in planning and preparing materials
   - If needed, helping with tests

5. Technical aids
   - Information about possibilities
   - Assessment of needs and suitability in the education situation
   - Help in obtaining technical aids and learning materials

6. Organization of travels to and from the RC
   - Travel arrangements
   - Boarding if needed
   - Food

7. Co-operation with other professionals
   - Within the RC
   - In the school (municipality) of the learner

8. Organize courses for the students at the RC
   - Compile background material
   - Organize the co-operation of the people participating in the teaching / observation / assessment within the RC
   - Prepare an individual plan for each participant in the course
   - Participate together with the other educators / experts in implementing the course
   - Participate in transition planning of the learner
   - Participate in the vocational planning for the learner
   - Prepare assessment and other information reports to the regular school and the parents
   - Participate in development of the education

9. Organize information to teachers through:
   - Information material
   - Producing distance education materials
   - Visits to the RC
   - Course planning and carrying out courses in cooperation with the teachers in charge of the course activities, i.e. adult education

10. Written work
    - Learner information
Observation sheet
Writing statements and articles if asked
Articles on issues regarding education of children with visual impairment

11. Co-operation
- Families
- Special schools, other RCs and NGOs
- School administrators
- Providers of aids and other services
- Hospitals

12. Participation in further education locally, nationally and internationally

13. Other activities
- Participate as specialist in courses and conferences
- Participate in other activities within the field

Networking and interdisciplinary approach
Effective partnership between boards of trustees, school personnel, specialists, special organizations and particularly parents and families will provide a strong platform for meeting special education needs and for readily solving any issues as they arise.

One should acknowledge and promote that parents and families are given the opportunity to be involved with the development, review and implementation of learning program and strategies related to their child. One should also promote the elements and short and long-term benefits of building and maintaining successful partnerships. It is important to encourage open consultation and communication with and between staff, specialists, parents and agencies in the community as well as create an environment where everyone listens to and respect others' point of view. To ask questions and seek information from other schools and expertise is a good means to find solutions to problems.

Network Tasks:
- Placement of expertise / impaired outside schools of today
- Placement of assessment pools of experts / assessment
- Co-ordination of in-service training
- Avoiding overlapping of activities
- Coordinating active IEP monitoring
- Material production
- Development of teaching / learning methods
- Seminars / training
- Information / awareness
- Projects
- Extracurricular activities
- Research
- Quality control
- Further networks
- Pressure group
- Information distribution
Networking is not only a means to enhance the cooperation to enable inclusive education in the school. At its best it is a means to use one of the best educational settings for all children, the community around the child. This gives all children a possibility not only to learn "for school" but to learn "for life".

It is a challenge for the school to find all the cooperation partners there are and to build a fruitful way of using them as "classrooms for life- long learning". Through these activities all children get information on what to do once school is over. The list can be very long and varies depending on whether the school is situated in the countryside, in a village or in a town. The list might include: Museums, art galleries, local religious centers, town, city and county councils, police service, fire service, voluntary bodies, sports centers and facilities, parks, lakes and rivers, libraries, rural farms, bus stations, airports, etc.

School director's tasks:
- Do members of the local communities contribute to the curriculum in school?
- Are parents and other community members used as a source of support in the classrooms?
- Are disabled adults involved in supporting students in the school?
- Do people working in the area act as mentors to support students experiencing difficulties?

When we talk about networking we should not only consider the networking outside the school. Internal networking is equally important. The aim of the internal networking is to use all the open and hidden specialties that can be found in the staff. (In one school the cleaning woman was an expert in pottery making and an extremely good cook, i.e. she was given lectures as well as club activities together with the teachers.) In this way you can give the students a model for collaboration. It is also important to pool the knowledge and know-how of the teachers in joint problem solving when the progress of a student group is a cause for concern. The staff must work in partnership and share the responsibility for ensuring that all students participate in the school work as well as ensuring that all students are given opportunities to take part in activities which support and benefit the local communities. The staff should meet regularly and review the use of delegated resources so that they can be used flexibly to respond to the changing needs of all students.

Challenges and the way forward
The major challenges facing the development of more inclusive education systems at all levels are related to the following:
- Despite the adopted policies on inclusive education, all countries struggle with the management and implementation of an education system that truly caters for diversity. Experience from many countries show that the development of inclusion policies should be based on a consensus of a philosophy of inclusion. It should be linked to broader developments, such as a reform of the education system, a reform of the status of disadvantaged children and young persons, or more general democratic changes.
- Funding mechanisms seem to be the key predictor to the set-up for the provision targeted to address the diversity of learning needs. The
mechanisms of financing can explain discrepancies between general policies on inclusive education and the practical organization of inclusion.

- Curricula should be relevant to the needs of the context and the community and foster the development of the “whole learner”. Curricula should be flexible enough to accommodate the diversity of learning styles and pace, as well as to provide possibilities for social and emotional development.
- Support services are necessary to ensure that ALL learners can learn according to their potential. Instead of only focusing on individuals, support should be given teachers, learners and their families. As support services are generally costly, many countries have opted to work in collaboration with other sectors, such as health and social institutions.
- As inclusive education systems require new skills and knowledge from the teachers, teacher education should be revisited and designed to support inclusion. This might involve improving the teaching practices, developing collaborative working and teaching methods, redefining teachers’ roles, etc.
- The importance of community and parental involvement in education is recognized although a lot needs to be done in order to make their participation real. A particular issue in promoting parental involvement is that the parents of marginalized learners themselves often experience marginalization. Like their children, they may live in poverty, or in isolated communities, or be members of ethnic and linguistic minorities. In such situations, the encouragement of parental groups seems to be doubly important, since the group offers individual parents the support, confidence and personal development they may need.
- If the countries are to develop the education systems to be more inclusive, multi-sectoral collaboration becomes crucial. As many reasons for school failure, drop-out, developmental delays, etc. are else than educational, collaboration between and across sectors is needed. Structures or procedures to facilitate multi-sectoral collaboration need to be developed.
- Attitudes are the greatest barrier, or the greatest asset, to the development of inclusion in education. They influence to our perceptions of challenges, strategies to be chosen and goals to the achieved. If Education for All is to be achieved, it has to start with the change in attitudes to make Education for All mean ALL, without any exceptions.

Sources:
Booth & Ainscow & Kingston (2006) Index for Inclusion

Internet:
Richard Tompkins & Pat Deloney: Issues on Change: Research Associates, Services for School Improvement, SEDL.
Sai Väyrynen, Challenges and the Way Forward,
4.2. Individual Education Plan (IEP)

General curriculum framework
The individual education plan is the central instrument for teaching children with visual impairment. The preparation of the IEP is done after an individual assessment and evaluation procedure has been carried out. The IEP is a document which should be developed by the itinerant teacher in cooperation with the support teacher, the class teachers, the parents and with all persons involved in the (re)habilitation of the pupil such as the ophthalmologist, optician, with specialists for therapies needed etc. When the IEP is prepared for an older pupil he/she should also be involved. It must be a daily working document and be updated at short intervals.

The content of the IEP should show the cognitive, emotional, physical and social developments according to the potential of the pupil. The IEP is a **contract**, i.e. what the pupil is expected and willing to learn over a period of time.

The IEP is composed of two major parts

**General Part:**
- Basic information (child, family)
- Information of former kindergarten / school
- Results of medical, psychological etc. examinations and tests (attached or short references)
- Choice of school (reasons)
- Information of the teacher(s) as well as of the class
- Information of teaching materials and technical aids
- Need for therapies or other external provisions
- Information about need for an assistant
- Co-operation partners
- Information of participants in drawing up the IEP
- Information of distribution of work and responsibilities
- Decision on transferal to SNE if such a decision has been taken

**Pedagogical Part:**
- Overall pedagogical assessment
- Assessment of strong and weak points of the child
- Long and short term goals (main focus on the current year)
- Learning strategies (suitable for this child)
- Social interaction (description, how it can be supported)
- School subjects (main, extra curricular)
- Educational arrangements (how to guarantee learning for the child)
- Assessment (what kind, how often)
- Follow-up (by whom and when)

The structure of an IEP could be as follows:
**Domains of intervention:**
- Language and communication
- Cognitive
- Emotional
- Behavioral
Psycho-motorical

Decisions as to the objectives (aims)
Decisions as to the methods to realize the objectives (how to realize?)
Decision as to the time span (short term, middle term, long term) of the intervention (when, how long?)
Minimum criteria for evaluating of the progress (what do we evaluate?)
Methods and instruments for evaluation (how do we evaluate?)

Intervention domains might be:
- Visual training
- Orientation and mobility
- Behavior
- Social skills
- Psycho-motoric skills (spatial and temporal orientation, body perception, laterality etc.)
- Emotion (self-control)
- Cognitive capabilities (level of knowledge and know-how)
- Language / communication

Examples of long-term objectives:
- Skill to write an imaginary story
- Skill to operate within the number range of 0-100 without concrete support

Example of short term objectives:
- Mastering the alphabet
- Can copy a text
- Can resolve a simple mathematical problem

Example of didactical methods:
- Writing exercise, ability to write a text after dictation
- Ability to carry out a drawing task measuring 5 cm, 10 cm and 20 cm using a ruler with Braille notation
- Ability to carry out the same task using body parts

Example of evaluation methods:
- Oral evaluation
- Written tests
- Combination of oral and written test
- Observation
- Minimum criteria for success

The IEP has far reaching consequences and suitable information must thus be distributed to the following persons / administration levels: School director for administrative planning and the person in charge of economy in case additional costs will arise. This furthermore means that a summary of economic consequences have to be sent to the inspectorate and Ministry, monitoring IEP on all levels. They need information on the economic consequences of the inclusion, statistics are needed for further planning, there will be need for teacher training and special materials and equipment might have to be obtained.
The itinerant teacher from the resource centre will need a copy of the IEP to establish and put forward the need for assessment, the need for counseling, the need for teacher training in the resource centre, courses for the children and other persons around the child such as family counseling etc.

**Curriculum, IEP and schedule planning**
The IEP lays the foundation for schedule and lecture planning. You may consider group variations, group work, the need for individual trainings and flexibility in daily activities. Another possibility is to let the children do interdisciplinary thematic work and thus create optimal use of staff. One of the main points is to together with other teachers and staff find integrative solutions and assure social integration for the child. In activities where the whole school is involved (meetings, cooperative planning and excursions) one should always be alert and see to it that activities also include the visually impaired pupils. Another important factor is the use of network partners. The teacher should never be left alone with her challenges.

**The IEP is thus:**
- An assessment instrument
- A placement instrument
- An education instrument
- A needs instrument
- A co-operation instrument
- An economic instrument
- An overall planning and briefing instrument between parents - school - resource centre – municipality - county - Ministry

**Sources:**
Sjöstedt, Solveig: (1997) Sex små punkter - vägen till kunskap. Editum, Finland

### 4.3. Classroom management

Children with visual impairment may show very different behaviour in the classroom. Like sighted children most of them have no problems whatsoever and feel like an asset to the teacher. Some children with blindness might, however, be very timid and hardly ‘visible’. As they cannot imitate the behaviour of the other children they might refrain from raising their hand when the teacher asks the class a question. They may also be afraid of disturbing as they do not always know or understand what is happening. Some tend to ‘speak out of turn’ as they do not know when it is their turn. The children with low vision might on the other hand feel disruptive as they need to see what is going on around them. They turn in their benches and they may go closer to the blackboard and ‘disturb’ the teacher and peers with a lot of questions. This behaviour is sometimes regarded by the teachers as utterly irritating and disruptive. Children with this kind of behaviour are often removed from the class or moved into special needs education classes / schools even if their cognitive performance might be on a normal level. We want to give you some techniques on how to manage class and to make it a nice environment for all children including the child with visual impairment in the classroom.
Efficient classroom management
Teaching in today's classrooms can be a demanding experience. The responsibilities of teachers seem to be increasing whereas resources for education do not seem to increase to the same extent. Teachers are increasingly expected to deal with a wide range of problems, i.e. from pupils with severe academic deficiencies, to pupils whose first language is not the school language, to pupils from disadvantaged socio-economic groups and who are suffering the effects of lack of parental help. Furthermore the current trend toward inclusion of all children, i.e. placing special-education pupils in regular classes, educators often find themselves teaching pupils with problems they feel they have little preparation for dealing with.

Another point is that modern teaching methods can produce chaos in a disruptive classroom. Grouping tables and pupils in different ways, group work versus individual work, work outside the classroom etc. All these activities call for a well structured classroom management and pupils that can take responsibility for their own work.

Throughout the history of the school, heterogeneity has been the daily condition of the teaching. Legislation as well as schools and teachers have used different kinds of methods to cope with this.

When talking about heterogeneity in the classroom we are concerned with the following kinds of heterogeneity:

*Cognitive skills and learning strategies of the pupils*
Every teacher knows that each class composes of successful and not so successful learners. Some of them master all the subjects whereas others may excel in one or two subjects and lag behind the class in others. The reason for this may be the intellectual capacity of the pupil but it may also be a question of the teaching style of the teacher not going hand in hand with the learning style of the pupil. During the era of theoretical frontal teaching many pupils who needed a more active and practical approach did not reach the optimal potential in their studies.

*Heterogeneity in the language competences of the pupils*
The home environment plays an important role when it comes to language abilities. Children from academic homes tend to start school with totally different language knowledge than children from homes with low socio-economic status. As parents and the family foster the children, listening to the parents and participating in discussions at home has an important impact on the language abilities of the children. A home where books and newspapers are being read, where the parents discuss daily events with the children, the children get a varied and useful language skill.

*Social skills*
The fundament of social skills is usually learnt at home as well. Families where good upbringing is considered to be important mostly foster well-behaved children. They may, however, act out outside the family in case they do not approve of the methods used at home. Most of the visually impaired children are good at acting together with grown-ups. To cope with their peers children need to participate in groups with other children in order to learn how to behave in a group. Children from over-protective one child homes might find it difficult to cope as they use to be the centre of attention.
Differences in interests, aptitudes and motivation
All of us have different interests. Some like athletics others reading or writing, some are good at arts and like to paint and do handicrafts etc. School has not always been able to skillfully use the interests of its pupils to give them a wider palette of learning methods. We are usually interested in the things that we are good at. This gives us motivation to go further within our fields of interest. By using creativity and allowing pupils to approach new subjects using their previous skills and interests you may motivate them to work on subjects they otherwise might find dull and/or difficult.

Differences in physical and health conditions
Many visually impaired children have had few opportunities to exercise before starting school. But this is the fact for many other children as well. Children with a heart condition or other types of illnesses may have a weak physical condition. Today many children are over-weight and thus in bad physical shape. Other children may be very fit, active and in perfect shape.

Differences in age
The difference in age has an effect on school as well. Small children usually come to school with a great curiosity and eager to learn. During adolescence many pupils seem totally bored with school work. Most of their interests are outside the school walls. It takes a lot from the teacher to motivate them. Numbers drop and many formerly talented pupils thus loose the possibility for further studies.

Every country has had different groups of people town-country; rich-poor; religious-atheists etc. What has been a tradition in some homes have not been considered in others. Today when most countries have received immigrants from war zones the differences may be ever more accentuated. A teacher might have children with totally different languages, religions, experiences (war-peace) and backgrounds in her class.

Gender differences
At least in the western world girls more often excel at school. The reason for this is that they tend to behave better in class, they often like reading and to make their homework properly. Boys on the other hand tend to be more active and thus prefer sports and practical activities. Many boys, of course, are good at school as well even though research has shown that the way schools teach is more suitable for girls than for boys. Because of this the boys feel more disturbing than girls and they get more attention than girls at school.

Difference in learning conditions, i.e. visual impairment
For children with visual impairment the learning conditions differ from those of the rest of the class. They need special equipments, books have to be in Braille or as talking books, maps have to be tactile etc. The teacher furthermore needs to learn new skills in order to be able to teach the children. The child needs instructions in orientation and mobility etc.
Laying the foundation

Classroom agreements

The classroom agreement should be carried out from grade one. The first step to take is to agree upon the rules in the classroom. This should be done in co-operation with the pupils and be age appropriate. In the first grades questions like raising your hand before answering or asking permission to do something, not to disturb your neighbour when he/she is working may be part of the rules. The rules should not be too many, but such that they can be easily remembered and that all pupils know the rules as well as the consequences if they act against the rules. *Never make any rules that you are not willing to enforce every time.* The pupils like to check if the teacher really means business. They try the boundaries and see how far they can go without the adult reacting. So, consistent means every time. Not just now and then. That means inconsistent. The pupils may feel that you are unfair in case you react when one pupil does something to contradict the agreement and gets no reminder whereas another pupil is punished for the same misdemeanour. This also goes for visually impaired pupils – or any other pupil with impairment. To make him/her one of the group means that the rules should apply to everyone! It is also important to inform the parents about the classroom rules as the support of the parents might be important.

There may be consequences

You should also agree upon the consequences beforehand. If the pupils do not comply with the rules it is better if the consequences are such that the pupil will not be allowed to participate in something nice the class does rather than for example placing the pupil outside the class (where he certainly will not learn anything). For really bad behaviour, the parents should always be informed.

How avoid the need of consequences?

Connect with the pupil. Try to gain the pupil's trust by listening attentively to what he says and showing respect for his thoughts and concerns. Find a few minutes every so often to talk with him about his interests and hobbies. Help him start the day out on a positive note by making an upbeat comment when he walks in the door. The pupil will feel more comfortable in your classroom, and make better choices, if he feels supported, self confident and accepted by you.

You give the child confidence by
- giving it support and encouragement
- praising it when it follows the rules agreed on
- helping the child to understand its strong and weak points
- teaching the child to believe in itself
- helping the child to avoid failures
- helping the child to feel good and secure
- helping the child to find activities where it can show its ability
- praise works that the child is proud of

Catch the pupil being good.
The most basic application of behaviour modification principles is to praise pupils when they are displaying appropriate behaviour. Pupils who frequently experience frustration and failure in school have a particular need for a pat on the back. Your challenge with this kind of pupil, especially if you have a large class, is to identify areas of deficiency, catch him when he is performing well in those areas, and praise him immediately and genuinely.
Positive experiences
You encourage the child by
- being positive – even when reproving
- appreciating good behavior
- teaching the child to reward itself when doing well
- helping the child to thinking positively of itself
- praise when the task is completed
- acknowledging when the child has done its best

Develop a signalling system to help keep the pupils on task.
If a pupil has difficulty staying on task, you might want to find some way to signal him that he needs to pay attention or get back to work. That might be as simple as walking by his desk, put a hand on his shoulder or pausing while you are speaking. In this way you need not ‘nag’ or point out to the whole class and interrupt them in their task just because the one pupil does not work properly.

Seek parental support.
Invite the pupil's parents in for a meeting to apprise them of his progress and obtain their perspective. Find out what strategies they have found successful with their child and what suggestions they have for dealing with him in class. That also is a good opportunity to develop a daily or weekly communication system so you can inform parents of their child's performance, and so they can keep you posted about any concerns. Remember to give positive feedback – parents who have a child with impairment are all too used to receiving negative feedback.

Make the classroom nice – but do it together!
Every teacher knows that a safe, clean, comfortable and attractive classroom can stimulate learning and help build a classroom community. But for many teachers, setting up the physical environment of their classrooms can be quite daunting, especially when faced with older buildings, crowded classrooms and insufficient storage space. You can make the most of your classroom environment by carefully considering your needs and the needs of your pupils.

In most cases it does not take very much – neither effort nor money – to make a classroom look like a place were everyone feels comfortable and inspired to work.

Classroom decor: Facing the blank canvas
Encourage pupils to make the classroom space their own. Welcome their contributions to its decoration, and urge them to take responsibility for its maintenance. Here are some easy, low-cost ways to make your classroom into an inviting, effective space for all:

Dress up the walls
- Interesting and attractive tactile and visual aids, such as bulletin boards and posters, are key components of an effective classroom. With a visually impaired child in the classroom, all information should be in Braille or large print as well. Wall decorations should be colourful, appealing and relevant to current class work. They should be rotated and refreshed frequently.
• Be sure to think about the cultural backgrounds of your pupils when dressing the walls. Try to represent your pupils' diversity on posters or bulletin boards.
• Set aside a section of the bulletin board to be your designated "Pupil Work Museum" and post children's drawings, written work and other projects there. Make sure that each pupil's work is displayed often.

Post daily schedules in a place where pupils can read them easily. And again, both in Braille and large print. This accessibility of the classroom schedule can help pupils grow comfortable with class and school routines. For younger pupils, make a daily schedule that includes pictures or icons. As a teacher, you want to create the environment in your classroom that is most conducive to maximizing learning.

The outlook
Questions you may consider are:
1. Is it attractive?
2. Is it functional?
3. Is it stimulating?
4. Is it motivational?
5. Does it create pride and self esteem?

Attractive materials are neat, colourful, and pleasing to the eye or to the touch. These materials may be self-made, purchased, or textbook resource materials. Functional materials, in addition to being attractive, teach or reinforce a concept or skill. Calendars and current event notices are functional materials. Stimulating materials would be thought-provoking and questioning in nature. Motivational materials are often in the area of morals and values, with the goal of raising viewers' awareness and offering hope and encouragement. Materials which create pride and boost self esteem may be pupil work or posters celebrating pupils' accomplishments or birthdays.

The sounds
For a child with visual impairment the sounds around them are much more important than for the sighted. In many situations they have to rely on their hearing for orientation. Most of their information they gather through their hearing as well. If a student is expected to listen for a long time and finds it difficult to concentrate he will have enormous difficulties in a noisy surrounding. Many of them get their impression about people around them from the sound of their voices. The acoustic situation in the classroom is important as well. The acoustic properties of a room or space are affected by its size and shape, the items placed in it and the materials of which it is made. We all know that priests and imams talking in a church or mosque speak rather slowly. If you talk quickly in a big room the echo effect makes it almost impossible to hear what you are saying. Items in the classroom have an influence on the acoustic. We all know that the echo in an empty room may make conversation more difficult as the words echo from the walls. Curtains and other kinds of drapes change the acoustic in a positive way. One should measure the reverberation in the classroom and preferably use an expert on hearing impairment to do it.

The most disturbing noise in the school environment is that which the students produce themselves and a bad acoustic environment is the greatest impediment for the visually impaired student when it comes to concentration and learning. As mentioned above the easiest thing is to sanitize the classroom, i.e. make the acoustic
as good as possible. Acoustic plates (cork preferably to avoid allergic reactions) curtains, pieces of felt under the legs of chairs and desks and desktops will eliminate a great deal of noise. One might also screen off parts of the classroom. One should also make sure that doors and windows act as barriers to sound.

There is a substantial amount of research in support of relaxation being an important ingredient in improving and/or accelerating learning. Such research further supports the idea that instrumental music by such composers as Mozart and Bach are calming and actually help to raise pupil test scores. Test music from your own country to seek optimal effect. Soft music can be played as pupils enter class, during the introductory activity while roll is being taken, during class work times, as well as during testing, to help set a calm, relaxed pace and tone for the class.

The classroom should be as far away the music room and the gym as possible and preferably where there is not much running in the corridors or heavy traffic in the street. One should also consider that corridors, dining-halls and gyms cause the visually impaired students most trouble because the noise is often so loud that they have difficulties in orientation and in hearing what the teacher is saying.

The temperature
Temperature is another important element in the environment. If you are in a classroom without air conditioning it is important that you do all you can, especially in warm weather, to get the best air flow to help keep pupils comfortable and alert. Research suggests that we are most alert in rooms that are on the cool side – around 20 degrees. A well ventilated room is better than a close, stuffy one. Try to open as many windows and doors as necessary to create a good cross-ventilation. The use of a fan may help create a comforting air movement on warmer days. In many schools in winter the problem is the opposite. The classrooms are much too cold during winter for anyone in them to work properly. This should not be allowed. Although you do not have control over some of these elements, try to make or suggest improvements as necessary.

Feelings
Creating an environment conducive to concentration, study, and learning is more than having attractive, stimulating sights, relaxing sounds, and good ventilation. It is creating a place where all feel comfortable and at ease, a place where the surroundings are neat and orderly. For the visually impaired this is essential as they otherwise have difficulties in orientation and mobility within the classroom. It is a place where there is mutual respect in a friendly, non-threatening atmosphere, a place where everyone can bloom and do their best.

Creating an effective physical classroom environment
The floor plan: Assessing your needs
Once you have checked the basic elements in your classroom, think about your floor plan. It should maximize classroom space and reflect your individual teaching style.

Your floor plan will also depend on the grade you are teaching. For the lower grades, your classroom setup may include many different learning areas, such as a reading area, an art centre and a technology centre. The placement of these areas will
depend upon the layout of your classroom. However, when setting up these areas, you will want to keep the following points in mind:

- Room dividers should be low so that all areas are visible to you.
- Areas that invite group work should not be next to quiet areas where pupils read or study independently.
- Art or other messy areas are best located near a sink.
- You should always be able to see what all pupils are doing.

Many of these guidelines hold true for the middle and upper grades, too. However, older pupils often spend more time seated in one area. Take your teaching style and lesson plans into consideration as you consider the different types of seating arrangements you might employ.

The following list has suggestions for working with the pupils

Provide pupils with adequate space on and around their desks. A visually impaired child needs more space than others because of large books and special equipment.

1. Keep all items not in immediate use in cabinets or closets and be sure that the visually impaired child knows where they are kept when he needs them.
2. Closely supervise art and cooking activities. The visually impaired pupil might need extra support especially in cooking activities as knives are sharp and cookers are hot.
3. If necessary, arrange furniture to provide pupils with visual barriers during independent work times.
4. Make areas of the room activity specific. For example, desks are for work; the rug is for play; the large table is for group discussion; and the time-out corner is for cooling off and thinking. This helps the pupils develop constructive classroom behaviour habits, help orientation and reduces confusion over what behaviour is expected at a given place and time.
5. Check activity-specific areas for appropriate space, lighting, storage, and furniture needs.
6. Remove everything from the room that is not absolutely necessary.
7. Make furniture and materials accessible to pupils in order to increase productivity and decrease anger and frustration.

Seating arrangements

When setting up a floor plan for pupils, consider your teaching style and lesson plans and make seating arrangements accordingly. Here are a few options:

Half-circle or circle arrangement

Desks or tables in a circle or half-circle promote community and encourage all pupils to participate. Everyone sits in the front row! This also helps pupils with low vision to connect to his/her peers.

Group seating

Desks or tables in small groups work especially well for classes that include collaborative activities. This arrangement also allows the teacher to group together pupils with similar needs, which makes individualized instruction easier.

Traditional rows

With a small number of rows, this arrangement can be very effective for teachers who frequently use boards or overhead projectors.

Special needs

Try to arrange seating to accommodate any pupils with special needs. For example,
a pupil with low vision should probably sit at the front of the classroom where you also consider the lighting. Remember that children with visual impairment need more space than the others. Do your best to place a pupil with special needs in a seat that does not isolate him or her.

Sources:

4.4. Portfolio in Your Studies and Profession

A portfolio is a purposeful collection of student work that exhibits the student's efforts, progress, and achievements in one or more areas of the curriculum. It should represent a collection of students’ essential works and efforts, student-selected samples of work experiences related to outcomes being assessed, and documents according growth and development toward mastering identified outcomes.

The rationale of a portfolio is that it
- supports instructional goals
- reflects change and growth over a period of time
- encourages student, teacher, and parent reflection, and
- provides for continuity in education from one year to the next,
- eases in reflecting on your goals as a student,
- helps in assessing your professional strengths and areas which need improvement,
- gives a way of documenting your progress as a student,
- eases in generating ideas for future course development,
- helps in identifying your personal working style,
- gives possibilities in using elements of the portfolio to promote dialogue with fellow colleagues,
- helps you consider new ways of gathering feedback,
- assists you in gathering detailed data to support your goals, and
- assists you in collecting multiple sources of evidence that document the implementation of your teaching goals and their success.

Some characteristics of an effective portfolio

The format of a portfolio varies considerably. An effective portfolio should be well documented and organized. In general a learning portfolio should be structured, representative, and selective.

Structured
A structured portfolio should be organized, complete, and creative in its presentation. Some questions for you to think about might be: Is my portfolio neat? Are the contents displayed in an organized fashion? Is the content representative for the purpose that it is intended?

Representative
In addition to attending to structure, a portfolio should also be comprehensive. The documentation should represent the scope of one’s work. It should be representative across courses and time. Some questions for you think about might be: Does my portfolio portray the
types and levels of courses that I have taught? Does my portfolio display a cross-section of my work in teaching?

Selective
The natural tendency for anyone preparing a portfolio is to want to document everything. However, if a portfolio is being used either for summative or formative purposes, careful attention should be given to conciseness and selectivity in order to appropriately document one's work. You should limit the contents of your portfolio to what is required by the reviewer while also keeping the purpose in mind.

What goes into a portfolio?
The portfolio describes and documents the abilities of a unique individual, and therefore, no two student’s and professional development portfolios look alike. A portfolio can include a number of different types of documents, and which you choose to include will depend on the type of activities you have done, your academic discipline, the purpose for creating one, and the intended audience.

A short list of documents below describes some materials suitable to folder:
• statement of learning and professional philosophies,
• description of learning tasks, and gathered experience (responsibilities),
• course planning artefacts: sample course syllabi, lesson plans, assignments, exams,
• evidence of learning effectiveness: summary of feedback, course evaluations etc,
• course awards and recognitions,
• professional development efforts and results.

A table of contents is an important tool in organizing the various sections of your portfolio.

Some of the sections above, such as the statement on my own learning and professional philosophies, are strictly narrative (reflective). Other sections consist of a set of materials as well as a narrative or rationale that explains what they are. The narrative component should answer the following questions:
• Why did you include it in the portfolio?
• How did you use it in the classroom and in your work?
• How do you know that it was effective, i.e. that you learned something?
• How has your learning style and professional working changed as a result?
• What have you learned about yourself as a teacher?

The portfolio is not, however, simply a binder with all of the teaching documents inserted with random pages of reflection. It includes documents and materials which collectively suggest the scope and quality of your performance. The portfolio is not an exhaustive compilation of all of the documents and materials that bear on teaching performance. Instead, it presents selected information on your activities and solid evidence of their use and effectiveness.

How to get started?
The following is a list of some general strategies on developing a teaching portfolio:
• Start as early as possible.
• Plan well and systematically collect data.
• Develop a good filing system.
• Regularly sort through, organize, and update information.
• Involve others as consultants and contributors.
5. Blind and Low Vision Children and Young Persons with Additional Disabilities (MDVI)

MDVI refers to a broad range of children and pupils who have a significant visual impairment that seriously impairs their access to visual information, together with other severe disabilities including learning difficulties.

Population
The children in that group show more diversity than in common.
Survey by the Royal National Institute for the Blind (Walker et al. 1992) showed that 56 per cent of the children with a visual impairment have another permanent illness or disability. 27 per cent have three or more additional impairments.

The pupil can have the following difficulties:
- Severe, profound or complex learning difficulties
- Physical impairment and visual impairment
- Communication impairment and visual impairment
- Deafblindness
- Moderate or specific learning difficulties

Multi-sensory impairment (deafblindness) has the lowest incidence of any recognised disability. Estimation suggests a figure around 0.018 % in the UK. (Murdock)

Until the 1980s, most learners of school age and above identified as having multi-sensory impairment were disabled by congenital rubella syndrome. Although they were not a homogenous group, there was some common ground within the population. Many of the learners shared similar multiple disabilities (notably visual impairment, hearing impairment and cardiac problems), and similar patterns of hearing loss and types of visual impairments (notably congenital cataracts). Common behaviour patterns such as light-gazing, feeding problems, unusual sleep patterns and tactile defensiveness have also been identified.

The impact of additional disabilities on learning
- Impairment of tactile sensation, for example hypersensitive skin, which may serve as a barrier to the child’s participation in, and enjoyment of, different tactile experiences;
- Limited proprioceptive feedback may serve as a barrier to children’s ability to monitor where their limbs are in relation to the rest of their body;
- Impaired hearing may serve as a barrier to the location of sound in the environment.
- Medication
- Impaired ability to communicate
- Restricted movement
Considerations about communication as a basis of learning
All children with MDVI require an appropriate communication system and the opportunity to develop these skills as an integral part of their learning in school and at home.

Teaching styles do not always provide children with the chance to communicate. It is important to create a communicative environment in the classroom, share staff is responsible to pupil behaviours and interpret them as potentially meaningful, actively seeking to understand what meaning the child may be trying to convey.

It is important to consider the particular learning needs associated with different visual conditions. Children who are totally blind or have only light perception must rely primarily on auditory and tactile input to develop an understanding of their world.

Without vision, other sensory information will be fragmented and meaningless, unless someone intervenes and mediates experiences to the child to aid understanding and attach meaning to sounds and tactile experiences.

Adult mediation must be appropriate and relevant to the situation.

Children with MDVI need time to make sense of what is happening; time to process information and to deliver a response. Too often the adults interrupt before the child has responded to their remark.

Children with CVI (cortical visual impairment) have functional vision although their visual attention may be fleeting and their skills change from one moment to the next. They require different approaches to children with ocular defects. By looking away from the object they may show improved participation in the activity. This attention can be further enhanced by reducing sensory distraction and avoiding bombardment with multi sensory experiences. Colour objects (red, yellow) often appear to be particularly attractive for these children. Object identification can be encouraged by touch, auditory cues and the use of colour.

Children with low vision must be given every opportunity to make optimum use of the vision they have. Focus on helping the child with MDVI receive a more accurate visual image and understanding visual information.

For children with cerebral palsy finding a balance between motor and visual needs is extremely important. Care should be given as to how the child is positioned, how stimuli are presented and how use of residual vision can be promoted.

Principles of the education of children with (MDVI) multi-sensory impairment
- The child is an active participant if the signs are understood
- Personal interaction is the great motivator and educator
- Behaviour has meaning
- Communication precedes language and is multi-modal
- Natural surroundings and activities are the best environments and have their own effect.
- Structure and routine establish the security and knowledge base from which to explore
• Experience must be given and is used for learning
• There is development over time
• Consistency and attention to detail is vital
• Maximum use must be made of available sensory perception
• Gradual transfer of control to the child is essential
• Emotional security is a crucial factor.

**Communication - suggestions for parents**

When you share no common language, “communication is a journey without a map. You learn it when you go and look back to find the path”.

**Take time,**
Introduce your presence, be inviting in your behaviour!
When the world is difficult to grasp, you need someone to help you understand a situation.
Who takes time for you and who can wait and see when you are ready.

**Attuning.** Acknowledge a mood.
When you cannot actually tell others how you feel, in what mood you are, you need someone who is willing to pick up the signals that you give without words.
who makes you feel that he or she understands you.
Who can help you overcome your fears or distress
With whom you can share your joy.

Multi-handicapped children stay dependent of others for many aspects of their daily life. They are often confronted with parents or other adults who involve them in necessary activities that they may not be in the mood for or that they simply dislike.

**Be clear!**
When it is sometimes hard for you to understand what is required of you in a certain situation, you need clear indications to go by.
Creating rituals – make situations predictable

MDVI children expect the most difficult things that one can give:
  Time
  Patience and
  Love

**Reference:**

• Aitken, S., McDevitt, A. (1995) Using it to support visually impaired learners Visual Impairment and Multiple DisabilityThe University of Birmingham
• (1998) Improving provision for children with multiple disabilities and visual impairments. RNIB London