Empowering spatial thinking of students with visual impairment

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1. Visually impaired population in Europe

The European Blind Union (EBU) estimates that there are over 30 million blind and partially sighted persons in continental Europe[1]. This translates into that almost 3.5% of Europeans experience some kind of sight loss. EBU also states the following facts:

- Women are more exposed to risk of visual impairment (VI) than men are.
- Sight loss is age-related. 90 % of visually impaired persons are over the age of 65. Thus, age-related eye conditions are the most common cause of sight loss in Europe.

On the other hand, the World Health Organization (WHO)[2] estimates, in figures dating from 2010, that in Europe there are: 2,550,000 blind people and 23,800,000 low vision people, resulting to 26,350,000 visually impaired individuals.

1.1 What is Visual Impairment (VI)

European countries have different criteria of what constitutes blindness and partial sight. The term “visual impairment' indicates blind plus partially sighted people together. The World Health Organization proposes a classification in several categories based on visual acuity. Visual acuity is calculated as the quotient of the distance from which a specific person sees an object and the distance at which the same object is seen by a person without visual impairment. For example, an acuity of 6/60 means that the object perceived at 60 meters distance by a person with normal vision must be at 6 meters distance from the visually impaired person to be perceived in the same way. Additionally the visual field can be taken into account. The visual field is the total area in which an object can be detected while the eye is focused on a central point. The normal field spreads 60 degrees nasally, 100 degrees outwards, 60 degrees above and 75 degrees below the horizontal meridian. A person is also defined as blind when the visual field is no greater than 10° around the central fixation point (even if acuity may be better than level 3). Moreover, criteria used by ophthalmologists constitute the following[3]:

- A person is classified blind if they can only read the top letter of the optician's eye chart from three meters or less.
- A person can register as partially sighted if they can only read the top letter of the chart from six meters or less.

[1] http://www.euroblind.org/resources/information/
[2] http://www.who.int/en/
[3] These definitions are approved and used by the WHO.

Sight loss can affect any kind of people regardless of background, education and social status. People experience this impairment in a unique way; however, support, rehabilitation, prevention mechanisms, social benefit system and above all **education** can make dealing with sight loss easier.

There is commonality in the impact that vision loss has on the ability of a child to participate within the educational environment. Vision is a distance receptor allowing children to access visual information beyond arms' length. Without this information, children are not able to organize their environment or develop concepts that are important in understanding how things are connected in their world. Students who are blind or visually impaired need to access this information through direct experiences and hands-on, tactile exploration provided by a qualified professional who understands the significance of and strategies for addressing these unique needs.

Accessing the mandatory curriculum that is presented to all students in a public school classroom is problematic for students with visual impairment (VI) or blindness. In order to participate fully within this educational environment, students who are blind or visually impaired require instruction in disability-specific or compensatory skills such as Braille literacy skills, assistive technology skills, use of low vision devices, career and life management skills, social interaction skills, independent living and personal management skills and orientation and mobility skills. This disability-specific curriculum for children and youth who are blind or visually impaired is known as the Expanded Core Curriculum[4,5].

[4] Hatlen, P.H. ,1996, Core curriculum for blind and visually impaired children and youths, including those with additional impairments. Austin, TX: Texas School for the Blind and Visually Impaired.
[5] Koenig, A. J., & Holbrook, M. C., 2000, Foundations of education: Instructional strategies for teaching children and youth with visual impairments. (2nd ed.). New York: American Foundation for the Blind

2. Education of students with VI in Europe and worldwide

The trend in Europe, regarding education of children with VI, over the last 30 years, has indicated a shift from special schools towards inclusive education in mainstream schools, with many European countries showing success in this endeavor of adopting and promoting inclusive educational approaches[6].

For UNESCO, inclusion is a human right. It is *"*a dynamic approach of responding positively to pupil diversity and of seeing individual differences not as problems, but as opportunities for enriching learning"…"All children and young people of the world, with their individual strengths and weaknesses, with their hopes and expectations, have the right to education. It is not our education systems that have a right to certain types of children. Therefore, it is the school system of a country that must be adjusted to meet the needs of all children"[7].

The premise behind inclusion is that students with any kind of VI have the same academic and developmental goals as sighted ones. Nonetheless, their education differs in the following:

- Students with VI may require materials in an alternative format, such as Braille or enlarged print, and adaptive equipment, such as a talking computer or a magnification device.
- In addition to the subjects in the regular curriculum, students with VI master specialized skills, such as Braille reading and reading of tactile images, c using a white cane for travelling (orientation and mobility or O&M), and the use of adaptive technology[8].

Furthermore, the European Disability Forum (EDF)[9] declares that persons with disabilities have the right to receive education of the same quality as any other person, in an environment that takes into account their needs. To this end, many European countries started to consider reforms in education, rehabilitation and social services provided for students with VI towards inclusion.

To change the system and ensure inclusion in mainstream schools, the EU started to implement strategies for changing the status of educational systems of the member countries. The Salamanca Declaration and the framework for action adopted in 1994 provided a good starting point by stating that "inclusive education means that the school must and can provide a good education to all pupils irrespective of their varying abilities, the school is also the opportunity to educate all

[6] P. Rodney, Does inclusion of visually impaired students work? http://www.icevi-europe.org/enletter/issue48-07.pdf
[7] UNESCO, 1994, The Salamanca Statement On Principles, Policy And Practice In Special Needs Education, http://www.ecdgroup.com/download/gn1ssfai.pdf
[8] C. Castellano, A Brief Look At The Education Of Blind Children, *Future Reflections*, Spring/Summer 2004, https://nfb.org/Images/nfb/Publications/fr/fr13/fr04ss07.htm
[9] http://www.edf-feph.org/

children on human rights and respect for all". According to it, "regular schools with inclusive orientation are the most effective means of combating discrimination, creating welcoming communities, building an inclusive society and achieving education for all[10]."

The European Commission's European Disability Strategy 2010-2020[11], adopted in 2010, builds on the UN Convention on the Rights of Persons with Disabilities (UNCRPD)[12] and takes into account the experience of the Disability Action Plan (2004-2010)[13].

The European Disability Strategy recognizes eight priority areas: accessibility, participation, equality, employment, **education and training**, social protection, health, and external action. Regarding education, the objective of the Strategy is to promote inclusive education and lifelong learning for students and pupils with disabilities based on the argument that equal access to quality education and lifelong learning enable disabled people to participate fully in society and improve their quality of life. To this end, the European Commission has launched several educational initiatives for disabled people, such as the European Agency for Special Needs and Inclusive Education, as well as a specific study group on disability and lifelong learning.

2.1 Inclusive Education

Inclusion is not the same as integration. Integration implies adaptation in order to fit without changes of the environment, pedagogy and organization. Inclusion however, constitutes a progressive change and constant adaptation of the educational system, of the curriculum, of the methods, of the resources etc, so that all students meet their needs and gain in attainment. Thus, inclusion is a process of addressing the diversity and responding to the needs of all learners through increasing participation in learning and reducing exclusion within and from education[14].

Integrated education is a process of placing students with special educational needs (SEN) in ordinary or so-called "mainstream" schools. While also featuring the inclusion of SEN students in ordinary schools, inclusive education is "an approach that looks into how to transform education systems in order to remove the barriers that prevent pupils from participating fully in education[15]". In other words, integrated education focuses on fitting SEN students into the existing school arrangement and inclusive education emphasizes equipping the school environment to fit the needs of SEN students.

[10] UNESCO, 1994, The Salamanca Statement…, Art. 2.
[11] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52010DC0636&from=EN
[12] http://www.un.org/disabilities/convention/conventionfull.shtml
[13] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=URISERV%3Ac11414
[14] UNESCO, 2006, Guidelines for Inclusion: Ensuring Access to Education for All, http://unesdoc.unesco.org/images/0014/001402/140224e.pdf
[15] Ibid.

Every school has to be prepared to fulfill the needs and particularities of every visually impaired child. Similar to the targets set by the American Foundation for the Blind, education systems in Europe must prepare specific strategies to[16]:

- Support a full array of options to ensure appropriate placement for all students. These options must include residential and special schools, as well as special classes, resource rooms, and itinerant teaching services in regular education classes.
- Provide sufficient funding to prepare an adequate number of teachers in all educational settings who are qualified to provide the specialized communication, literacy, academic, mobility, daily living, social, and career education skills that visually impaired children need.
- Provide access to the latest technology so every blind or visually impaired student benefits from computer-based educational programs, such as those delivered via the Internet or multimedia educational software.
- Ensure that parents and families of children who are blind or visually impaired are provided with the information they need to determine the best educational option(s) for their child.

Inclusive education involves changes and modifications in resources' content, approaches, structures and strategies, based on the conviction that it is the responsibility of the regular system to educate all children. The development of inclusive education is a process, which requires that enabling conditions are established and that specific requirements of blind and partially sighted pupils and students are identified.

There is a remarkable consistency in worldwide perceptions of what is needed to provide children with VI the opportunity to succeed in their local school. A range of needs is identified repeatedly:

- access to the appropriate learning resources and equipment;
- support from well trained teachers;
- a coordinated administrative system that works across education and health at national, regional and local levels to ensure the identification and assessment of children and the efficient distribution of resources;
- local schools that welcome children with VI and recognize their right to the same quality of education as their classmates.

In most of these countries, the educational opportunities for children with VI still reside predominantly in residential special schools and resource bases, but these specialist settings have a key role in promoting and facilitating the changes that

[16] American Foundation for the Blind, Specialized Education Services for Students with Vision Loss, http://www.afb.org/info/programs-and-services/public-policy-center/specialized-services/specialized-education-services-for-students-with-vision-loss/1235

inclusive practice requires. Ironically, special schools are key players in promoting the inclusion of children with visual impairment in local schools, and releasing their expertise is their great challenge.

2.2 Europe

In 2011, the EU ratified the UN Convention on the Rights of Persons with Disabilities (UNCRPD). This addresses disability as a human rights issue – not from a medical or charity perspective. It covers civil, political, economic, social and cultural rights, and a wide range of policy fields: from justice to transport, employment to information technology, and so on. Article 9 of the Convention contains the obligations for State Parties on accessibility to ensure to persons with disabilities access on an equal basis with others.

All Member States have signed the Convention and 25 have ratified it. Finland, Ireland and the Netherlands are preparing for ratification. This means that the EU, as well as those Member States that are parties to it, are committed to uphold and protect the rights of persons with disabilities as enshrined in the UN Convention, within their respective competences.

In what follows, we provide details concerning the situation of educational practices, services, and approaches regarding children with VI in several European countries.

2.2.1 Albania

Education of students with VI in Albania has been successful compared to the education of students with other disabilities, even though their education still encounters major difficulties. The Institute of Blind Students "Ramazan Kabashi" in Tirana is under the Ministry of Education and Sports. Thus, Tuition, accommodation, clothing and food for students are covered by the state. It treats children who are visually impaired (blind and partially sighted). Students' work program starts from 9 years old. The Institute, which is the only one in the country, is boarding students from other districts, provides a quality of teaching staff, professionally qualified and able to teach students with VI. Students are trained for the continuation of any school or vocational course. Since2007, the Institute had a complete set of school textbooks in Braille and this led to better attainment in schools[17].

2.2.2 Armenia

The system of education in the Republic of Armenia includes pre-school, general secondary, special secondary, vocational (professional-technical), higher, and post-graduate education. In 2009, the Armenian Ministry of Education launched an inclusive education pilot program conducted in 30 pre-school institutions and 31 secondary schools. In addition, in one special educational complex and in one

[17] Z. Muça, Issues concerning the education and integration of blind students in Albania. Educational Alternatives, Journal of International Scientific Publications ISSN 1314-7277, Volume 12, 2014, https://www.scientific-publications.net/get/1000008/1409888766264113.pdf

college, an initial vocational educational program is implemented free of charge. Education is free in colleges for disabled persons; however, the highest possible inclusion of people with disabilities is impeded by the lack of accessible school buildings and transportation.

2.2.3 Andorra

In 2002, the Act Guaranteeing the Rights of Persons with Disabilities was promulgated. Dealing with the issue of education, the Act specifically recognizes equality of access to education for children, young people and adults with disabilities. In particular, it recognizes, and makes mandatory and free of charge, schooling for children with a disability between the ages of 6 and 16, or between the ages of 3 and 18 upon parents' request. Children with a disability are integrated into the mainstream system, unless the degree of their disability precludes this. Specialist education takes the form of educational support within mainstream teaching. The aims of education for children with disabilities are the same as those laid down in respect of other pupils. However, children with a disability have the right to personalized teaching programmes, which are prepared by teachers in the mainstream system. These pupils' participation in the various teaching and educational activities is thus guaranteed. Finally, all educational establishments in the mainstream system must have specialist human resources and equipment capable of providing high-quality education. Those rules apply to all education systems in Andorra and also to day-care facilities, but with some necessary modifications. The Act provides for financing and assistance measures to enable all minors with a disability to access these services, without discrimination based on their financial and/or family circumstances. Finally, all services and establishments assisting persons with a disability must guarantee the right to "equal treatment and non-discrimination"[18].

In Andorra, there in one special school; Escola Especialitzada Nostra Senyora de Meritxell, whose primary mission is to contribute to improving the quality of life of people with disabilities. In this sense, it provides the services and amenities necessary to provide comprehensive care in the context of a model centered on the person. The school is responsible for setting up specialist programmes of assistance for children, young people and adults with any kind of disability. The aim is to respond to their educational needs and foster their social and professional integration. The country is witnessing very positive developments in this area, especially related to the education of children with a disability in mainstream schools. Currently, children and adolescents with a disability are enrolled in mainstream establishments to complete their schooling and not in Nostra Senyora

[18] United Nations, Convention on the Rights of the Child Committee on the Rights of the Child, Consideration of the reports submitted by States parties under article 44 of the Convention Second periodic reports of States parties due in 2003 Andorra, 2009, http://www2.ohchr.org/english/bodies/crc/docs/AdvanceVersions/CRC-C-AND-2_en.pdf

de Meritxell School. Only a limited number of children with very severe disabilities are enrolled in the latter[19].

2.2.4 Austria[20]

In the 1980s, a parents' movement sought the inclusion of children with disabilities and severe learning difficulties into mainstream schools. As a result, a number of education models for children and adolescents with and without disabilities were tested in pilot projects. In 1993, the School gave parents the opportunity to decide whether their child attends a primary mainstream school or a special school. Since 1997/98, pupils with SEN have been entitled to attend lower-secondary schools and the lower grades of general secondary education.

During the time when children with special educational needs were explicitly educated in special schools, the regions supported them via mobility support provisions for children with disabilities, such as behavioral or speech disorders. When inclusion was legally provisioned, Special Education Centres were also established, which to date are responsible for implementing the provisions of regional special educational support.

Inclusive education for pupils with SEN is currently legally regulated in primary, lower-secondary school, and in the lower grades of schools in general secondary education with the following models:

- Inclusive classes: pupils with and without SEN are instructed in all lessons by a team of teachers.
- Classes with support teachers: mainstream classes where one or two pupils with SEN receive extra support from a special schoolteacher for a few hours per week.
- Co-operation classes: primary, lower secondary and pre-vocational school classes are generally separate from special school classes in terms of organization. The teachers involved agree upon a plan according to which pupils are taught together, either some of the time or all the time.

2.2.5 Azerbaijan

Based on a recent study[21], a serious lack of special services to meet the needs of children with disabilities is observed in Azerbaijan. This is strongly associated with

[19] International Disability Alliance, IDA recommendations for Concluding Observations, CRC 60th Session, Recommendations on Andorra, https://www.google.gr/search?q=Nostra+Senyora+de+Meritxell+Special+School&oq=Nostra+Senyora+de+Meritxell+Special+School&aqs=chrome..69i57.1363j0j7&sourceid=chrome&ie=UTF-8#

[20] Austria - Special needs education within the education system, The European Agency for Special Needs and Inclusive Education, https://www.european-agency.org/country-information/austria/national-overview/complete-national-overview

[21] U. Mikailova, A. Ismayilova, Y. Karimova, U. Isazade, R. Behbudov, Y. Agayev, N. Aliyeva, Education of Children with Disabilities in Azerbaijan: Barriers and Opportunities, http://www.hurights.or.jp/archives/pdf/education12/hreas-12-11-azerbaijan.pdf

the outdated medical approach to the issue of disability of the Soviet era and with segregative policies of the past education system. Additionally, higher education institutions of Azerbaijan have limited programs to prepare personnel to fill the gaps. Education professionals lack training for the implementation, supervision, and monitoring of inclusive education.

The following steps might lead to achieving progress toward inclusive education in Azerbaijan:

- Development of the national concept of special and inclusive education, outline of a general model for it, and develop the strategy to implement it.
- Special and inclusive education reform must become part of the general education reform.
- Education reform in the field of special education should meet the increasing needs of children with special needs across the country.
- Design and implementation of a comprehensive pre-service and in-service teacher and specialist preparation program.
- Accessibility should become one of the key priorities.
- Development of a system of special service provisions in achieving quality education for children with disabilities.
- Revising the roles, functions, and responsibilities of the Medical-Pedagogical-Psychological Commissions.
- Research in the field of education for children with disabilities should be encouraged.
- Undertake public awareness campaigns to keep the society informed about the matter of inclusion[22].

2.2.6 Belarus[23]

The idea of integration of pupils with special educational needs has been actively in practice since the late 90s, supported by the Ministry of Education, the Research Institute of education, and the Parents Association of visually impaired children.

The legislation sets the base for the family to choose any form of education for visually impaired children (special schools, special classes in mainstream schools or general classes in mainstream schools). This legislative base has allowed structural and organization reforms in the visual impairment educational system. All parts of this system (a pre-school, a primary school, a secondary school, a vocational school) give a good possibility to receive education both in the special establishments and in the mainstream establishments.

[22] Ibid.

[23] S. Gaidukevich, Country Report – Belarus, 3rd Workshop on Training of Teachers of the Visually Impaired in Europe, Warsaw, Poland, 3 - 6 April 2002, http://www.icevi-europe.org/tt/ttw3/reports/belarus.html

There are three main forms of integration for pupils with special educational needs:

- the special class in the mainstream school (only visually impaired children with a special teacher study in this class);
- the integration class in the mainstream school (all children study in this class together, two teachers work in this class together too, one is the classroom teacher, the other the support teacher);
- the consultation (visually impaired children study in mainstream school, they work with a classroom teacher. They receive special support from specialists outside the school).

In most cases, the first two forms are used for blind and multi-disabled visually impaired children, while the third for partially sighted children. Even so, there are not many special and integration classes where visually impaired pupils can study, since families prefer to have them trained in the special establishments.

2.2.7 Belgium[24]

Belgium's approach to special needs education is one of inclusion and equality. There is a strong commitment to giving every child the right to an education, which maximizes their potential. Each language community has the responsibility for implementing government policy, thus the Ministries of Education may have different approaches on how to implement inclusion.

Full-time education is compulsory from six to sixteen years, and at least part-time education is compulsory until the year that the child reaches the age of eighteen. Inclusion of a child with SEN in mainstream education is not always possible though. Alternatively, perhaps due to illness or repeated periods of hospitalization, a child may be taught at home.

However, in many cases, education is provided by specialist schools. In some cases, they operate as specialist units attached to mainstream schools. Special education is available to children from two and a half to twenty-one years of age. Enrolment in a special school is at the request of the family and can take place at any point in the school year. School day and school term in special schools follows that of mainstream schools very closely. In the French speaking community, education is organized not by age and cycles as in mainstream schools, but by four levels of maturity/competence. A child moves from one level to another when certain skills have been acquired and this may happen at any point in the academic year, while in the Dutch and German communities the approach is much closer to the cycles adopted by mainstream schools.

[24] Belgium – Special Needs Education, https://www.angloinfo.com/how-to/belgium/family/schooling-education/special-needs-education

Children are taught by qualified teaching staff and have personalized study plans. Where required, teaching staff is supported by medical professionals, social workers and psychologists. Children may follow an adapted programme of secondary education if they are capable of doing so, culminating in the same diplomas as pupils in mainstream schools. Pupils are observed and evaluated continuously and children may return to mainstream education at any time if this is thought to be in their best interests. Parents may request or oppose such a move.

In certain cases, children may divide their time between a special school and a normal school. Funding is provided to allow specialist staff to accompany them to the mainstream school if necessary. Special schools may require some additional travelling. Transport to the nearest appropriate school is usually provided free of charge either by school or by private vehicle, specially adapted if necessary.

Many children with SEN can be catered for in mainstream schools. Some schools have a permanent member of staff who is a special needs expert. Schools can apply for funding to pay for additional staff, special equipment or teaching materials, which will allow them to accommodate children with special needs.

2.2.8 Bulgaria[25]

Lately, the process of integration in the country has been intensified. However, the majority of mainstream schools are not appropriate and accessible environments for children with special educational needs, and there are not enough appropriately trained teachers and other staff.

In 2003, the government adopted the National Strategy for Protection and Social Integration of Disabled Children, which aims to change the model of looking after these children. Currently, children with light disabilities are mostly integrated into mainstream schools. Children with special educational needs are educated at special schools when all possibilities to educate them at mainstream schools have been exhausted.

To date, there are two schools for visually challenged children in Bulgaria. These schools had (2005-2006 data) 300 pupils, from 1st to 12th grade, and 88 teaching staff. They have gathered considerable experience and established traditions but their educational practice is somewhat specific, closed and isolated. The two schools for children with VI, located in Sofia and Varna, provide training in the following: Braille, computer, guidance and mobility, daily-living skills. These schools are designed only for children with a high degree of disability, which prevents them from coping with the requirements of the mainstream school. An increasingly persistent tendency of integration of these students into the mainstream schools and kindergartens has been observed recently.

[25] Bulgaria, EBU, http://www.euroblind.org/convention/article-24--education/nr/97

In Bulgaria, several senior schools offer modules for the training of teachers of children with visual impairment. Those modules are also open to blind students wanting to become teachers.

2.2.9 Croatia[26]

The national education system is officially accessible to blind students, but in reality, there are limitations to its accessibility. Mainstream primary and secondary education is the general rule. Blind students have professional assistance and support; schoolbooks are adapted and printed in large print or Braille. In secondary education, through the health insurance system, students can obtain an electronic Braille notebook, speech software and a Braille writing machine.

In special primary and secondary schools, there are mostly students with visual impairment and additional disabilities. They have total support through the work of professionals in the school, fully adapted literature, and all necessary equipment.

2.2.10 Cyprus[27]

During the 1990s, the Ministry of Education made a very serious attempt to include of children with special needs, into mainstream schools. Therefore, there was provision for children with SEN, supported by special staff working in mainstream schools. Otherwise, children were placed in special units, attached to kindergartens and primary schools with part-time attendance in the mainstream class programme. The implementation of inclusion revealed the inability of the mainstream schools to meet the pupils' special educational needs. Most problems were related to lack of appropriate educational programmes, means, support services, administrative arrangements, the inability to apply individual educational programmes and the over-weighted curriculum.

Because of the Law of 1999, that guaranteed that children with special needs have the same right to education as any other child and should be provided with all the opportunities for an equivalent education, training, guidance and rehabilitation to improve their abilities to the maximum, since 2000, there has been a balance between mainstream and special schools.

The majority of children with special needs attend mainstream schools and follow the mainstream curriculum, which may be adjusted to suit their needs. Usually a special educator and the classroom regular teacher collaborate in developing and delivering an individualized education programme for the child. On the other hand, there are six regional special schools, one of which is for children with visual impairments and is integrated into a mainstream school. Special educators are also provided to non-governmental institutions for distinct groups of

[26] Croatia, EBU, http://www.euroblind.org/convention/article-24--education/nr/99

[27] Cyprus - Special needs education within the education system, The European Agency for Special Needs and Inclusive Education, https://www.european-agency.org/country-information/cyprus/national-overview/special-needs-education-within-the-education-system

children, e.g. those with multiple or severe physical disabilities. The curriculum that children attending special schools follow includes self-help and independence skills, social and emotional skills development, recreational skills, communication skills and vocational training. For children with VI, specific training and therapeutic interventions are part of the curriculum. Special schools usually function with classes of no more than six children, with much individual work. The school for children with VI has a wide network of co-operation and support for children integrated into mainstream schools and most special schools have developed contacts and joint activities with local mainstream schools.

2.2.11 Czech Republic[28]

At the beginning of the 1990s, the Czech Republic started to integrate students with VI into ordinary schools. This proved not very successful due to unpreparedness of schools and teachers for children with specific needs at the time; hence, some children had to enroll back to special schools. Nowadays, the main difficulty is the overpopulation of ordinary classes that requires the help of additional personnel but no financial resources are adequate for that sort of special assistance.

Ordinary schools collaborate with special schools and special pedagogical centres that are usually formed by special schools for student with VI. These centres focus on the VI students by providing educational assistance with individual educational plans. The staff of these centers visits students with VI both at schools and in their homes.

In special basic schools (for children between six and fifteen years old), pupils learn the basic curriculum which is the same as in ordinary schools and are taught the skills needed for their everyday life such as spatial orientation and walking with a white cane, reading and writing Braille, etc. Most of the children of that age, however, attend ordinary basic schools and they have an assistant who helps with the basic curriculum. These integrated pupils enjoy the assistance of the above-mentioned special pedagogical centres for counseling purposes mostly. The topic of integrating children with VI into the group of their schoolmates is still open to date.

Regarding secondary schools, students with VI are usually integrated into the ordinary schools. The goal is for them to be educated with other students without special demands on their teachers. Difficulties arise with school subjects where students have to watch a board. To eliminate these, teachers use individual consultations for children with VI, they also ask special pedagogical centres for help.

2.2.12 Denmark[29]

[28] Sound in European e-learning, SEEL Project, Erasmus+, O1- A1 Research-Visual Impaired- Czech: The situation of visually impaired people in the Czech Republic, http://seel.eduproject.eu/wp-content/uploads/IO1-A1-Research-Visual-Impaired-Czech.docx

[29] Denmark - Special needs education within the education system, The European Agency for Special Needs and Inclusive Education,https://www.european-agency.org/country-information/denmark/national-overview/special-needs-education-within-the-education-system

Since 1993, public schools in Denmark, have been obliged to differentiate education according to students' needs in general and not by transferring students to special needs education. However, the intention of developing public schools to become more inclusive and deliver quality education to all students has not been realized. The number of students in special needs education in special classes and special schools has been increasing and schools are no more inclusive than before. In 2012, new legislation pointed out the aims of a more inclusive school by giving realistic and concrete directions on how to meet educational challenges and how to organize differentiated and individual education. The Ministry of Education has supported municipalities and schools to implement the new legislation and to improve the level of inclusive education. At the same time, special needs education is restricted to those students who have a need for extensive support in a major part of their teaching.

Mainstream schools still have access to external specialized advice from pedagogical and psychological services. On the other hand, special schools are, to some degree, used as advice givers. Teachers from special schools can be used for coaching and supervision, together with educational experts from educational-psychological services. The tendency is that schools try to attract specialists to work within the schools themselves.

In Denmark, enrollment can be organized in different ways:

- The pupil remains in a mainstream school class and receives special education as a supplement to general teaching.
- The pupil is taught in a special class, either in mainstream or special school settings.
- The pupil may attend either a mainstream school class or a special class and be taught in both types of classes.

Special classes exist for pupils with, for example, intellectual disabilities, dyslexia, visual impairment, hearing impairment, and physical disabilities.

2.2.13 Estonia[30]

Estonia envisions enrolling children with special educational needs into mainstream schools. Children with more serious problems however, will be going to special schools. Thus, people with special needs have the right for inclusive education assured by the state. The teaching of students with special needs is an integral part of national education planning, creation of curricula and organization of schools.

In 2007- 2008, 39 children with visual impairment were educated in mainstream classes in mainstream schools, and 21 students were educated in special classes within mainstream schools. In basic schools and upper secondary schools, the national curriculum is valid for students with special needs as a framework of

[30] Estonia, EBU, http://www.euroblind.org/convention/article-24--education/nr/102

learning objectives and content. In addition, a simplified national curriculum and a national curriculum for students with moderate and severe disabilities have been adopted by the regulation of the Ministry of Education and Research. An individual curriculum may be compiled for students with special needs according to their abilities. In 2008 - 2009, 8.5 % of pupils who attended basic schools studied according to individual study programs in one or several subjects.

Instruction in mainstream schools requires the existence of several support services and equipment, which meet the needs of students with special needs. Students with visual impairments are supplied with books in the Braille system and with other study materials.

Concerning special education, in 2007- 2008 39 children with VI were educated in special schools, with the average duration of basic studies being 10 years. In Estonia there exists only one special school exclusively for students with visual impairments. Finally, a mix of children with disabilities and other children may form adaptation groups in childcare institutions.

2.2.14 Finland[31]

One of the basic principles of Finnish education is that all people must have equal access to high-quality education and training. The same opportunities to education should be available to all citizens irrespective of their ethnic origin, age, wealth or where they live. Public authorities must secure equal opportunities for every resident in Finland to get education also after compulsory schooling and develop themselves, irrespective of their financial standing. The key words in Finnish education policy are quality, efficiency, equity and internationalization. Geared to promote the competitiveness of Finnish welfare society, education is also seen as an end in itself.

In Finland, there is an inclusive educational policy for all pupils. The nationwide VALTERI Centre for Learning and Consulting[32] offers consulting for municipalities and professionals when organizing and implementing education for all. VALTERI supports the implementation of inclusive education by offering a comprehensive range of services in the fields of general, intensified and special support. These services can target the needs of individual children and young people, or the needs of an entire working community, municipality or region. VALTERI has units specialized in visual impairment. The multidisciplinary staff works with a wide diversity of children and young persons with visual challenges and with or without multiple needs.

2.2.15 France

The schooling and rehabilitation of visually impaired children in France has been undertaken for a long time by specialized institutions, often in the form of boarding

[31] http://www.minedu.fi/OPM/Koulutus/koulutuspolitiikka/?lang=en
[32] https://www.valteri.fi/EN/

schools. In the last few decades, there has been a shift towards the ordinary system of schooling so that children enroll in mainstream schools.

The law of February 11, 2005, "for equal rights and opportunities, for the participation and the citizenship of people with disabilities" gave responsibility for the schooling of all disabled children to the services of the Ministry of National Education. The underlying principle was that any child or adolescent with disability must be able to attend the school nearest to their place of residence. If special organization is needed, which does not exist in the vicinity, the pupil can be registered in another school, whether mainstream or special.

As a result, a single institution was established: the departmental house for disabled people (Maison Départementale des Personnes Handicapées –MDPH) which offers centralized access to the rights and services planned for disabled people and has 100 centres all over France. For children with VI, the plan of compensation is discussed within the MDPH and with the family of the child. Thus, the parents play an important part in the development of the personal plan of compensation and in the choice of the institution or service which will help them.

The schooling of visually impaired children

When children are 3 years old, they can enroll in the nursery school. To meet the particular needs of disabled pupils, a personal project of schooling is developed, with measures of support decided by the Commission for Rights and Autonomy (C.D.A.), such as, support from a specialist service, assistance from a school auxiliary etc.

When in elementary school (at 6 years of age), school integration can be individual or collective:

- Individual schooling consists of providing education for disabled pupils in an ordinary class. At all levels of teaching, individual schooling is the first requirement.
- Collective schooling: consists of including in an ordinary school a special class with a limited number (in general 10 to 12) of visually impaired pupils, who receive adapted teaching and share some activities with the other pupils.

At the secondary level, when the requirements of an individual schooling are too large, pupils with a disability can be provided with schooling in an UPI (Unité Pédagogique d'Intégration). This system is provided for children from 12 to 16 years who are not able to profit from ordinary teaching. Taught by a specialist teacher, they can receive adapted teaching, which implements the objectives of the personal project of schooling, including as much as possible participation in the activities of the class to which the child would have belonged. However, these collective classes do not exist in all French regions (départements). In such cases, the choice of a specialist institution is the only one available. Thus, the specialist institutions propose adapted schooling for the children or teenagers who cannot continue their schooling in the ordinary system.

Institutions and Services

In France, many institutions are spread out over the whole of the territory which in cases, can accommodate children or teenagers, can also provide schooling services in boarding or semi-boarding establishments, with initial or vocational training, for children with multiple disabilities.

In the majority of the French regions (départements), local services have been created to support the children and their families in their schooling and their everyday life such as SAFEP (Service d'Accompagnement Familial et d'Education Précoce) for children from 0 to 3 years old and SAAAIS (Service d'Aide à l'Acquisition de l'Autonomie et à l'Integration Scolaire) from 6 to 20 years.

Each institution or service defines its own means of action depending on the population it serves, its age, its needs and the regional resources. Support includes among others:

- pedagogical aid in the school, teaching support
- low vision rehabilitation
- family support, psychological support
- rehabilitation in activities of daily living (ADL) and orientation and mobility
- data processing, training for using adapted materials
- adaptation and transcription of pedagogical documents and all documents.

Training for specialized staff

Training for people who work with VI children is ensured by different organizations:

- Specialist teachers working for the Ministry of Education have a certificate of professional competency for specialist support, adapted teaching and the schooling of the pupils with disabilities (CAPA-SH), undertaken with the INSHEA (Institut National Supérieur de formation et de recherche pour l'éducation des jeunes Handicapés et les Enseignements Adaptés)
- Specialist teachers working for the Ministry of Health and Solidarity prepare for the Certificat d'Aptitude à l'Enseignement Général des Aveugles et Déficients Visuels (CAEGADV) with the Centre National de Formation des Enseignants intervenant auprès des jeunes Déficients Sensoriels (CNFEDS)
- Rehabilitation workers in ADL have a diploma delivered by the Université Paris 13 and the FISAF (an organization for continuous training which proposes formation and training courses.
- Specialists in orientation and mobility have a diploma delivered by the APAM (Association pour les Personnes Aveugles ou Malvoyantes).

2.2.16 Germany[33]

The Federal Republic of Germany ensures by Law that every person should have access to education. Furthermore, in Germany each person with impairments should be educated in an individual way. Hence, the country has developed a network of educational institutions that have the mission to teach blind and partially sighted people in a suitable way. The institutions and schools should promote the skills and competences in a way that allows students with VI to fully participate in society. In Germany, blind and visual impaired students can enroll to regular schools or to schools for students with special needs.

- Education in the general school system: inclusive education. However, in reality, a relatively small number of students with VI attend "mainstream" schools. In such schools, special education teachers are employed to support other teachers. In a class of 25 students up to 5 could be the ones with a disability (1/5 ratio). Classes of the kind, have the same curriculum and therefore the same goals. If there are more severe special needs, the pupils will be educated in a specific way with a special curriculum.
- Education in focus schools: supporting a group of students with a certain disability. These schools work together with the general ones to foster the idea of inclusion. For a student to enroll in such a school it requires the parents wish or/and the assignment by the school authorities. At these schools, there are differences in the educational programs and areas of work. Subjects and teaching content according to the elementary and secondary school policies and educational programs are issued; however, the priorities are set by the schools themselves.

There is a lot of criticism against the latter for undermining inclusion since the "official" trend is that pupils with VI attend regular schools.

2.2.17 Hungary[34]

The Hungarian National Core Curriculum specifies the requirements of school-based education of pupils with special educational needs.

Education for children with special educational needs may take place in therapeutic educational institutions, conductive education institutions as well as school classes with differentiated curriculum or inclusively, in the class as their other peers. In the 2008-2009 school year, about 55 % of children with special needs were educated inclusively, while 45 % of them in special classes or groups.

Special schools for children with VI are to date 2-3 in whole the country. These provide students with the basic knowledge and techniques that enable them to

[33] Sound in European e-learning, SEEL Project, Erasmus+, O1- A1 Research-Visual Impaired- Germany: Visually impaired in Germany, http://seel.eduproject.eu/wp-content/uploads/IO1-A1-Research-Visual-impaired-Germany.pdf

[34] Hungary, EBU, http://www.euroblind.org/convention/article-24--education/nr/107

continue their studies in upper secondary education on an integrated basis. Students with VI are also given the possibility of oral examinations instead of written examinations. In cases of written exams, the use of special equipment is guaranteed.

2.2.18 Iceland[35]

The national education system operates under the principle of what it refers to as "Inclusive education – Education for All". This means that children have equal opportunities to attend inclusive education, but the needs of specific students are addressed on a case-by-case basis, often at the local level. It is often not clear as to what exactly disabled students have the right to in terms of services and support.

For the blind, visually impaired and deafblind there is a special legislation aimed to increase their possibilities of participation in all spheres of society on an equal basis with others, emphasizing support to education, independent living, and active recreational and work participation.

Mainstream Education is divided into four levels: pre-school up to 6 years of age, compulsory (primary and lower secondary) 6–16 years of age, upper secondary 16–20 years of age and higher education level from 20 years of age. While assertions are made that students will be supported and every effort is to be made regarding accessibility, the laws are quite vague about the exact support that is to be made available. However, special legislation for the blind, visually impaired, and deafblind states more clearly the support available. The Service and Information Center for the Blind, Visually impaired, and the Deafblind[36] provides education and counseling to the preschool staff and other service providers, families and to other students. The Center provides training in all age groups for Braille, computer use, daily living skills, mobility and orientation.

Primary School is generally inclusive between the ages of 6 to 16. The Regulation for Special Education specifies, "Pupils have the right to have their special needs met regarding studies in compulsory school, without discrimination and regardless of their physical or mental attainment."

Inclusive education is the goal of the Ministry of Education and that holds for Upper Secondary School as well; "pupils with special needs shall study side by side with other pupils whenever possible" and "any individual who has completed compulsory education, has had equivalent basic education or has reached the age of 16 is entitled to enroll in upper secondary school". Concerning the education of students with disabilities in Upper-Secondary School, the state requests each school principal to apply for additional funding for each disabled student in attendance.

Regarding special education, in 2002, there were seven special learning institutions in Iceland and this number has dropped to three in 2010, all of which are

[35] IIceland, EBU, http://www.euroblind.org/convention/article-24--education/nr/108
[36] National Institute for the Blind, Visually Impaired, and Deafblind, http://midstod.is/english

primary schools. This is suggestive of the overall trend of the movement away from segregated to inclusive education. There are no special learning institutions within the upper-secondary school system. Students with disabilities take classes either on their own or with the assistance of a support worker within mainstream schools. However, depending upon the individual's learning needs, students may follow the general curriculum or a special segregated study programme that can also be taught within the general student population, within a mix of mainstream and special groups, or within a special unit within a mainstream school. There are no specific rules concerning certificates for pupils with special educational needs. Pupils in special units at upper secondary schools are evaluated according to their individual curriculum. They are given statements, which certify how well they have fulfilled the requirements set forth in their individual educational plan. They have the right to attend a four-year course adapted to their personal and educational needs. The schools are provided with assistance from teachers' advisors from the Center for the Blind, Visually impaired and the Deafblind.

2.2.19 Ireland

The Irish Department of Education and Skills is responsible for the education of children with special education needs. In 2004, the Act of the Education for Persons with Special Educational Needs (EPSEN) states that: "A child with special educational needs shall be educated in an inclusive environment with children who do not have such needs unless the nature or degree of those needs of the child is such that to do so would be inconsistent with:

- The best interests of the child as determined in accordance with any assessment carried out under this Act
- The effective provision of education for children with whom the child is to be educated."[37]

Children with special needs receive schooling in the following forms:

- In special schools;
- In special classes in ordinary schools;
- In integrated settings in mainstream classes.

Students with more severe levels of disability may fit mostly to the first two forms dedicated to a particular disability group and operating with limited number of pupils.

The official policy is to achieve the maximum possible integration of children with special needs into ordinary mainstream schools. However, children with disabilities have access to a range of special support services, such as a visiting teacher service. The service is commonly referred to as the VTHVI service. It consists of qualified

[37]Special Needs Education, Irish Department of Education and Skills, http://www.education.ie/en/The-Education-System/Special-Education/

teachers with particular expertise on the development and education of children with varying degrees of hearing and visual impairment. The service offers longitudinal support to children, their families and schools until the end of post-primary education.[38]

2.2.20 Italy[39]

In 1976, a specific law gave the possibility for blind students to attend ordinary schools, while a year later another law recognized this right for all disabled people attending compulsory education and in 1988; the Constitutional Court extended this right to the High school level. Special schools were not abolished, but most of them were closed down since the number of students was fundamentally decreased by the inclusion measures.

In classes where a child with disability is enrolled, the Ministry of Education, University and Research assigns an additional specialized teacher. Furthermore, the teachers in collaboration with neuropsychiatry services and the family draft an Individualized Educational Plan for each child with disability. Educational assistance during school hours is available for 34.5 % of pupils/students with a visual disability while assistance at home is provided to 46 % of these.

During the 2000's, teachers were given the opportunity to attend 400-hour university-specialized multi-purpose courses, in particular primary school teachers, while secondary school ones could attend courses at the SSIS (Schools of Specialization for Secondary School Teaching). Since 2010, a further decree has provided for a specific university training curriculum for qualified support teachers. However, an overall critique and a week point of the inclusion policy, is that for students with VI, no specific specialist training of support teachers is established related to blindness-specific matters. Nevertheless, the overall evaluation of the inclusion process is positive. Attainment of students with VI is similar to the average of fully sighted people. Moreover, the percentage of persons with only a visual disability who graduate is high.

2.2.21 Kazakhstan[40]

Children with VI in Kazakhstan currently have the following options:

- 27 inclusive schools that offer a two-level support model based on the student's needs.
- 3 special schools.

[38] Visiting Teacher Service, Irish Department of Education and Skills, http://www.education.ie/en/Parents/Services/Visiting-Teacher-Service/

[39] Inclusive Education in Italy, EBU Newsletter, http://www.euroblind.org/newsletter/2014/may-june/newsletter/online/en/newsletter/feature/

[40] S. Aubakirova, A Comparative Analysis of Inclusive Education Systems in Ireland and Kazakhstan, Dublin Institute of Technology, Issue 14, 2016, http://level3.dit.ie/html/Issue14/Aubakirova/aubakirova.pdf

- 1,219 special classes at regular schools; students in them do not get any additional support in the form of tutors.
- General education in regular schools open to children without severe disabilities, with no additional support however.
- Home-based education when a child cannot attend school for a long time for health reasons.

Inclusive education in Kazakhstan is at a very early stage. Children with special needs can get additional support only in inclusive schools. Depending on the needs, two tutors can be allocated per child: one as a care assistant and one for specific activities (e.g. a visual impairment specialist). Children with special needs who attend special classes and general education in mainstream schools lack any additional support. Finally, the existing teacher training programmes have no special course for preparing future teachers for working with various categories of children with special needs.

2.2.22 Latvia[41]

Until 1996, education for blind and partially sighted children was concentrated in the school and kindergartens for visually impaired in Riga and in some special groups in mainstream kindergartens in other cities of Latvia. In 1991, when Latvia became independent, some quite negative changes happened:

- the system of registering visually impaired children was destroyed;
- the system of providing special teaching aids for special educational establishments was changed;
- the number of school age visually impaired children who are not receiving any education increased because the amount of disadvantageous families increased also.

Since 1997, Strazdumuiza Boarding School has been transformed into Training Center for the Blind and Visually Impaired Children by decision of Ministry of Education and Science of Latvia. It became the link between all stages of education of visually impaired children. Changes were made to its functions that were expanded to give the right and possibility for parents to choose the place and forms of the education for their child.

Today the educational system of visually impaired children consists of the following parts:

- preschool education;
- school education;
- rehabilitation education in the Center of Rehabilitation of the Society of the Blind;

[41] L. Geida Country Report – Latvia, 3rd Workshop on Training of Teachers of the Visually Impaired in Europe, Warsaw, Poland, 3 - 6 April 2002, http://www.icevi-europe.org/tt/ttw3/reports/latvia.html

- professional education;
- higher education.

Contacts have been established between the training center and mainstream schools. As a result, in 2002, 195 pupils had been studying in the boarding school, while 198 school-age children with severe VI studied in mainstream schools the year after that.

Today, Strazdumuiza Boarding School - Training Centre for Blind and Partially Sighted Children is the central specialized educational establishment in Latvia and also the basis for training of specialists for work in the field of education of the blind and visually impaired.

On the subject of integration, Latvia is in the very beginning. Nevertheless, the educational policy is more and more turning in the direction of integration of all special needs children in mainstream educational establishments.

2.2.23 Lithuania[42,43]

In 1993, the Act of Special Educational Provision for Children with Special Educational Needs in Mainstream Educational Institutions, states that learners with SEN may be educated:

- in a mainstream group or class, following the mainstream curriculum, but with special methods applied;
- in a mainstream group or class, following a modified mainstream curriculum;
- in a mainstream group or class, following an alternative curriculum for those learners who cannot cope with a modified curriculum;
- in a mainstream group or class, following an individual curriculum which is specifically designed according to the learners' needs;
- partly in a mainstream group or class, partly in a special group or class; or
- in a special group or class.

From that year onwards, Lithuania has been improving its legislation, gradually working towards inclusion. The State Educational Strategy for 2003–2012 in the special needs education field aimed to:

- implement the ideas of 'A School for All' into real Lithuanian school practice;
- ensure accessibility of all school types, introducing formal and non-formal educational programmes for people with SEN;

[42] Lithuania - Special needs education within the education system, The European Agency for Special Needs and Inclusive Education, https://www.european-agency.org/country-information/lithuania/national-overview/special-needs-education-within-the-education-system

[43] T. Aidukiene, V. Purlys, E. Elijošius Country Report – Lithuania, 3rd Workshop on Training of Teachers of the Visually Impaired in Europe, Warsaw, Poland, 3 - 6 April 2002, http://www.icevi-europe.org/tt/ttw3/reports/lithuania.html

- provide an opportunity for people with SEN to learn in an environment that meets their needs; and
- gradually decrease the number of special (boarding) schools and, along with this, facilitate the creation of resource centres: the most advanced special (boarding) schools are to be transformed into resource centres.

As a result, during the 2010–2011 academic year, there were 41,600 pupils with special educational needs attending mainstream schools, which accounted for 10.1% of secondary school students, while there were 62 special schools educating 3,860 students, or 9.2% of all learners with special needs.

Children with VI from the age of around six- to the age of around eighteen to twenty-one can be educated in mainstream schools' ordinary classes with support of special teachers or at Kaunas special school for visually impaired. There is a special school for the blind and low vision children in Vilnius, the capital of Lithuania as well. The latter is a part of the Lithuanian Training Centre for the Blind and Visually Impaired. These above-mentioned institutions are run by the State.

Secondary education in special school lasts for 13 years: 5 years of primary school, 6 years of basic education and 2 years of secondary education. Education is based on mainstream programmes, with special lessons: orientation and mobility, training of functional vision, daily living skills. Those students who have a multiple disability and are visually impaired are trained according to individualized educational programmes.

There is also a number of blind and low vision students who are educated at their homes according the special rules of two ministries: Health Care and Education and Science.

2.2.24 Luxemburg[44]

In Luxembourg, unlike in other European countries, specialized centres for teaching the visually impaired do not exist. These children are integrated in regular schools on the national territory. The “Institut pour defectives visuels” is responsible for coordinating the inclusion of these children in different schools in Luxembourg. The other schools (European School, French schools, etc...) adopt at their discretion special programs for the inclusion of visually impaired children in their classes. The institute now supports 66 visually impaired children, adolescents and young adults (with or without associated handicaps). The children all live in the family home and are integrated into nurseries, drop-in centers and local schools.

2.2.25 Malta

[44] D. Maniscalco, National Report On Services About Visually Impaired People In Luxembourg, V.I.S.I.ON : Visual Impairment Social Inclusion ON, Erasmus+, 2014, http://vision-erasmusplus.eu/telecharger/Luxemburgnationalreport.pdf

The aim is to integrate students with VI in mainstream schools so that they become full members of society. To this end, special teachers, the Peripatetic Teachers for students with Visual Impairment have the mission to educate students with VI, so that they can access the curriculum and develop their abilities.

In Malta, the state, through this special group of educational experts, seeks to, among others[45]:

- Raise awareness by giving information regarding VI, how it affects schooling, highlighting the provisions and adaptations needed in the classroom etc.
- Establish pre-school and kindergarten programmes involving learning through play to help the child develop in a holistic way.
- Provide in-class support by making lesson adaptations to suit individual needs, such as, enlarging handouts and reading/text/workbooks etc.
- Develop literacy programmes by providing suitable print books and give support to students to read in both Maltese and English.

2.2.26 Netherlands[46]

During the 1990's, the Dutch Government, taking into account inclusive practices mostly from Scandinavia, formulated a number of Acts and Law towards inclusion. Special primary schools for students with VI that existed until then were transformed into centres of expertise and then finally were merged with similar special schools to obtain a certain size of scale. They were given a regional function for providing special education for students who would not attend mainstream schools, supporting mainstream schools with the integration of students with SEN, and raising awareness regarding the education of students with SEN. The overall aims of these centres were to:

- Admit and to integrate more students with these specific impairments in regular primary, secondary and senior secondary vocational schools.
- Support regular schools to educate these students through the deployment of peripatetic teachers, special in-service courses and specialist research and advice.
- Motivate parental choice for mainstream or special educational provision by giving these students a personal budget when they go to a mainstream school.

In particular, special schools for students with VI had much experience of moving students back to mainstream schools with the assistance of peripatetic teachers.

[45] Services for Visual Impaired Students, Ministry for Education and Employment of Malta, https://education.gov.mt/en/education/student-services/Pages/Inclusive_Education/Services-for-Visual%20Impaired-Students.aspx

[46] H. Schuman, Education in the Netherlands, recent developments and the debate on integration and inclusion, Special education in the Netherlands - ICEVI-Europe, Issue 48-06, 2011, http://www.icevi-europe.org/enletter/issue48-06.pdf

Nowadays, most of the students with VI, with no additional special educational needs, are in regular schools (about 65%).

2.2.27 Norway

Norway fully implements inclusive education; all visually impaired pupils are integrated into mainstream education. In 1991, the reorganization of special education resulted in that the two schools for students with VI (together with other special schools) became resource centers. Both centers offer pedagogical support to pupils in mainstream education, to teachers, parents, rehabilitation workers, staff from local agencies, school administrators and produce educational materials and textbooks in Braille whilst serving as rehabilitation centers.

The National Service for Special Needs Education, Statped, is a national agency under the Norwegian Directorate for Education and Training, which is the executive agency for the Ministry of Education and Research. It enables children, young people and adults with special educational needs, to be given the opportunity to become active participants within education, work and society.

Huseby National Resource Centre for Special Education of the visually impaired (Huseby kompetansesenter) is part of the Norwegian Support System for Special Education, the governmental system offering support for people with various kinds of disabilities. Among other things, it has the responsibility for the production of educational books, mainly for students of secondary education. In Norway, students with VI use the same books as their peers since they are integrated in mainstream schools. They do, however, get special support, and their books are converted into a suitable medium; Braille, electronic or audio.

2.2.28 Poland[47]

The Act on Education of 1991 brought the concept of inclusive education in the spotlight, since it obliged education authorities to create more favorable conditions for the child's development and it granted the parents the right to choose an educational setting for their child.

Normally, children with VI are educated in special schools of all educational levels; they are also educated in regular schools, including such forms as special classrooms, integrated classrooms, regular classrooms, and home teaching. It is quite common that blind and visually impaired children start their education at a regular school, but later their parents change schools or decide to put their child in a special residential school.

Special schools have also the role of resource and consulting centres. Their staff supports regular schools' teachers who work with a visually impaired child. The latter

[47]J. Kuczynska-Kwapisz, G. Walczak, J. Witczak, Country Report – Poland, 3rd Workshop on Training of Teachers of the visually Impaired in Europe, Warsaw, Poland, 2002, http://www.icevi-europe.org/tt/ttw3/reports/poland.html

are usually not prepared to work with a blind or visually impaired child, thus it makes sense for them to take advantage of support provided by a specialized consultant/itinerant teacher.

Over the recent years, there has been more and more interest in educating those children in integrated classrooms established in regular schools. Such classrooms have between 15 to 20 students, including 3 to 5 students with disabilities. A special educator is employed as supportive teacher. In 2000 in Poland, 3,192 students were educated in regular schools whereas 1,088 students were educated in special schools.

2.2.29 Portugal[48]

In 1973 the Ministry of Education set up a department of special education to map compulsory education levels of students with SEN. However, nowadays, almost all pupils attend mainstream schools.

Centro Helen Keller is a comprehensive school for the visually impaired, whose methodologies are advocated by the Modern School Movement that encourages rigor in academic practice and promotion of potentiating social skills of a full and conscious citizenship. Helen Keller Centre has the special mission of promoting the integration of students with visual problems and other educational needs. For this, it has a multidisciplinary pedagogical team, able to respond to the demands of students. It integrates children from the nursery until the 9th year of their studies and aims to promote social and academic coexistence among all students.

2.2.30 Russia[49]

The Constitution of the Russian Federation (Federal Law on Education dated 10 July 1992) states that everyone in Russia has equal rights and equal access to education. The Russian law provides children with disabilities and their parents with the choice to study:

- in a mainstream school,
- a specialized school for children with disabilities,
- or at home, through distance learning programs or visits from teachers.

In practice, however, children with disabilities often attend specialized schools because mainstream schools do not have the accommodations that the children need, such as ramps, assistive technology, or teachers' aids. Parents also feel forced to send children to specialized schools because officials recommended this type of school, or because mainstream school deny children admission. Infrastructural

[48] Portugal - Preprimary & Primary Education
http://education.stateuniversity.com/pages/1223/Portugal-PREPRIMARY-PRIMARY-EDUCATION.html
[49] Left Out? Obstacles to Education for People with Disabilities in Russia, Human Rights Watch, 2015
https://www.hrw.org/report/2015/09/01/left-out/obstacles-education-people-disabilities-russia

barriers prevent some children from attending schools in their communities, including a lack of accessible transportation or ramps and elevators.

The Russian education system includes many specialized schools designated for children with disabilities. These are preferred to mainstream schools because they tend to have more teachers and other staff with specialized training to work with children with disabilities and more accommodations to meet specific educational needs. Specialized schools are often located far from children's communities. As a result, many children with disabilities board either part-time or full-time at these specialized schools.

The Russian government has taken a number of important steps recently to ensure that all children with disabilities receive education and expand inclusive education across the country. To this end, some mainstream and specialized schools in Russia have implemented accommodations to make the schools more accessible for children with disabilities. Moreover, the government has begun to implement new standards for primary education for children with disabilities, in more than 120 schools across Russia. Every child with a disability will have an individual educational program based on the particular learning needs of each student.

In 2015, the Minister of Education reported that the number of children in inclusive education has gone up over 15% in the last three years. The Ministry of Education is creating "base inclusive schools" all over Russia, so that each region has 20% of its schools inclusive by the end of 2015.

2.2.31 Serbia[50]

In 2006, the Law on the Prevention of Discrimination of Disabled Persons marked a significant step toward improving the position of disabled people. Moreover, the Law on the Basic system of Education states that the curriculum for elementary and high school education provides for ways of adjusting the curriculum to the education of children with development delay.

This assertion implies that children with VI can attend mainstream or special schools, since mainstream schools have been equipped to offer special or adjusted existing programs to the needs of such pupils. However, now, VI children are most frequently educated in special boarding schools while still a small number of children attend inclusive education.

This suggests that actual implementation of regulations in practice requires special materials, human resources and organizational conditions that will allow the inclusion of visually impaired children to mainstream schools. The Law on the Social Protection and Social Security regulates the issue of material requirements. In addition, children with disabilities in special schools receive certain benefits

[50] A. Grbovic, B. Jablan, Position of the Visually Impaired people in Serbia and Possibilities for Inclusive Education, 2009, http://www.icevi-europe.org/dublin2009/ICEVI2009_Paper_84.doc

regulated by republic laws or general regulations. The State or local institutions provide accommodation and textbooks free of charge for children attending special boarding schools. Children have either free or reduced school bus transportation. In addition, local institutions also provide aid depending on fund availability, to children with disabilities attending mainstream schools.

2.2.32 Slovakia[51]

The Educational Act of 2008 supports equal access to the national education system. In mainstream primary and secondary educational settings, students with VI get education adapted to their needs, use special textbooks, education and compensation aids and they are entitled to an education assistant, who helps the teacher and ensures equal opportunities. The Act also allows the creation of special schools for different disability groups. In Slovakia, there are two special residential primary schools for pupils with VI. Furthermore, special secondary schools provide education equivalent to the one received in other secondary schools. There are also special technical secondary schools and vocational apprentice centres that provide education and training in selected fields of education or trades.

Training of teachers of the visually impaired is provided by universities (master degree). Furthermore, the Slovak Blind and Partially Sighted Union and the Rehabilitation Centre provide certified courses for instructors for special skills for the visually impaired.

2.2.33 Slovenia[52]

Inclusion gradually progresses in Slovenia, especially during the first decade of the new millennium. The main types of programme for children with special needs are:

- programmes with “equal educational standards”, in which children with special needs are taught using the same curricula as other children, in a mainstream school;
- programmes with an “adapted implementation”, in which additional support is provided for children with special needs, such as a support teacher or special equipment; and
- “adapted programmes”, which are taught in special schools or special units of mainstream schools.

Children with visual and hearing impairments are most often sent to ordinary schools but within a special institution for the blind (there is one for deaf and one for blind in the country).

[51] Slovakia, EBU, http://www.euroblind.org/convention/article-24--education/nr/117

[52] D. Zaviršek and K.Gorenc, ANED country report on equality of educational and training opportunities for young disabled people Country: Slovenia, 2010, http://www.disability-europe.net/content/aned/media/Report%20on%20equality%20of%20educational%20and%20training%20opportunities%20for%20young%20disabled%20people%20-%20Slovenia.pdf

There are 67 pedagogical units on the primary school level that educate children with special needs across the country. Out of these 67 pedagogical units, there are 28 special schools. The rest are special schools that belong to a larger ordinary school, special schools, which are part of kindergartens and those, which are placed within public care institutions. In the last ten years, since the processes of inclusion have been taking place in the country, no special schools have been closed, but new educational programmes for children with special needs were built.

Special elementary schools intended for children with sight impairments are organized as institutions and children can live there during the week. They offer an equal educational level to regular schools but have an adapted educational programme. At the end of the school year 2007-2008, there was one school for the blind and partially sighted with 27 children.

2.2.34 Spain[53]

In Spain, inclusive education has gained ground since 1985, when decisive steps began towards this direction. To date, 98% of students with VI are educated in local mainstream schools. The National Organization of the Spanish Blind (ONCE), which currently supports 7,500 students at various education stages, has played a significant role in the success of inclusion

Even though the numbers are impressive, ONCE still recognizes that students with VI often do not have equal opportunities in their local education system. There is a lack of understanding and support that does not allow them to lead an independent life thus contributes to their sense of exclusion.

In 2015, ONCE launched a practice to support students with disabilities to remain in their social environment (family, community, etc.) and in mainstream classrooms. Every participant of the programme goes through a process of reception and assessment, from which an individualized plan is generated. The plan is directed and coordinated by a professional. In the case of education, the coordinator is a teacher. These teachers detect the students´ needs and refer them to the appropriate specialists. In order to respond to all the needs of an individual, several intervention areas are addressed by a team of professionals, including early intervention from birth to the age of six; visual stimulation and specific techniques to improve visual performance; and basic instrumental techniques such as essential skills in reading, writing, and calculation, both in sighted formats and in Braille. Other services address educative orientation, free-time activities that are offered, and an appropriate adaption of the school curriculum.

2.2.35 Sweden[54]

[53] Spain -Teaching blind students in regular school classes, Zero Project, http://zeroproject.org/wp-content/uploads/2016/01/121-ESP_ONCE_Education-for-the-blind_PRA.pdf
[54] Sweden, EBU, http://www.euroblind.org/convention/article-24--education/nr/119

Pupils who are blind or have visual impairments, but no other impairments, have been educated in general classes since 1988. Support is provided via resource centres. The National Agency for Special Needs Education and Schools adapts the teaching materials used in their classes to their needs, while the regional counties adapt technical equipment.

In primary schools, children with visual impairment have the right to special support. The support consists of one assistant or a second teacher during classes, adapted textbooks and tests, technical devices and adaptation in the environment. Students with visual impairment can attend one extra year at a national boarding school in order to complete their basic education and to train in daily living skills. There are about 5 students every year who follow this education.

Almost all pupils continue from compulsory school to upper secondary school. Students with VI have access to special support: for example, adapted materials (textbooks, tests etc), personal assistance and technological equipment. Support from regional advisors at the National Agency for Special Needs Education and Schools is available free of charge for teachers.

Special needs schools are available for VI children with intellectual disabilities. The compulsory special needs school consists of nine grades. Children with minor intellectual disabilities go to primary and secondary special needs schools. They can either be included in an ordinary group or form a special group that is often placed in the ordinary school. Training schools are for students who are so intellectually disabled that they are unable to benefit from education at special needs schools at primary and lower secondary level. Students at special needs schools are entitled to a tenth school year.

2.2.36 Switzerland[55]

Integration of children and adolescents with SEN into mainstream school has gained ground in Switzerland. Most cantons and many communities have developed concepts, regulations and guidelines and now offer corresponding provisions. On the Federal level, the Law on Equal Rights for People with Disabilities recommends that the cantons promote integration.

Specialized education is provided for children with SEN attending special schools and special classes linked to mainstream schools. There is also integrated schooling with support from a special school. The provision of special needs education is linked to mainstream schooling. The classes are in the same building as mainstream classes and under the same administration.

[55] Switzerland - Special needs education within the education system, The European Agency for Special Needs and Inclusive Education, https://www.european-agency.org/country-information/switzerland/national-overview/special-needs-education-within-the-education-system

Children and young people with SEN who are integrated into mainstream schooling may be supervised by a support teacher, involved in the class for a certain number of hours, depending on a pupil's needs.

2.2.37 Turkey

The General Directorate for Special Education, Guidance and Counseling Services of the Ministry of National Education is responsible for special education. Special education is currently being provided to 25,238 students across 517 schools. There are special classes and mainstream education for students with special needs. New regulations provide a more effective service for children with visual impairments, who can now attend schools in three cities in Turkey. The Directorate's aim is to extend this education to other schools by providing guidance and meeting schools' needs to enable them to cater for visually impaired children. Studies are also being carried out into increasing the quality of mainstream education for those with visual impairments. In addition, there are 15 boarding schools for the blind in Turkey.

2.2.38 Ukraine[56]

For many years, children with disabilities have remained at the margins of the education system or have been totally excluded from it. These children were educated by a special school system consisting of independent institutions, many of them operating as boarding schools.

The Ministry of Education and Science of Ukraine supervises both general schools and some special schools. According to its statistics2006), there are:

- 396 special secondary schools with 54,100 children,
- 40 educational rehabilitation centers for children with disabilities,
- 142 special preschool institutions and
- 1,200 special education groups in mainstream preschools with 45,000 preschoolers.

Although new standards have been adopted, special education remains primarily segregated from general education in contrast to western trends. During the last years, Ukraine makes efforts to conform to European disabilities law; however, the mechanisms to implement and enforce this law are largely ineffective.

2.2.39 United Kingdom

In the UK, in 2013, there were 1,545,610 students with special educational needs, 94% of which were attending ordinary school. The UK has set out a comprehensive legal framework for the education of students with SEN. In particular, UK emphasizes elimination of discrimination, early identification/intervention and appropriate education for students with SEN. In

[56] T. Bondar, Ukraine: Current Tendencies in Inclusion, 2013, http://pubs.sciepub.com/education/2/12B/5/

addition, it recognizes parents' rights in the whole process and the importance of devising an individual education plan ("IEP") for each SEN student.

The Children and Families Act 2014 provided an integrated Education, Health and Care plan ("EHC plan") that replaced the previous SEN declaration. Children and young people with EHC plans must be educated in ordinary schools unless the arrangement is incompatible with:

- the wishes of their parents; or
- the provision of efficient education for other students.

Schools should identify a staff member to act as the Special Educational Needs Coordinator ("SENCO") responsible for:

- overseeing the day-to-day operation of the school's SEN policy;
- coordinating provision for students with SEN;
- liaising with teachers, parents and other professionals in respect of students with SEN;
- advising and supporting fellow teachers and staff; and
- overseeing the records of all students with SEN.

Schools must not treat disabled students less favorably than others. They must make "reasonable adjustments" to ensure that disabled students are not at a substantial disadvantage. Schools must also prepare accessibility strategies and plans for (a) increasing the extent to which disabled students can participate in the schools' curriculums, (b) improving the physical environment of the schools for the purpose of increasing the extent to which disabled students are able to take advantage of education and associated services provided by the schools, and (c) improving the delivery to disabled students of information which is provided in writing for students who are not disabled. The Equality Act 2010 extends the "duty to make adjustments" to include the requirement for schools to provide auxiliary aids and services to disabled students.

Parents of students with SEN have the rights to:

- have their child educated in accordance with their wishes;
- ask for assessment, re-assessment or review of their child's educational needs;
- be given notice when a local authority decides to make an assessment;
- appeal against the decision of the local authority;
- be involved in the development of their child's statement of SEN (or EHC plan); and
- be provided with advice and information about matters relating to the educational needs of their child.

2.3 Worldwide

2.3.1 Africa

The African Union of the Blind (AFUB)[57] is an umbrella organization of 60 member organizations of and for blind and partially sighted persons in 53 African countries (Fig. 1). AFUB aims "to strengthen member organizations and create unity of purpose among them, through capacity building and advocacy, in partnership with governments, international agencies and other stakeholders".

There are an estimated number of 300,000 blind children in Africa but only 2% have access to education. Of those who do, the majority have to live in boarding schools for the blind. In 2007, the World Blind Union and AFUB in partnership with the International Council for the Education of people with Visual Impairment (ICEVI) launched the Education for All Visually Impaired (EFA VI) campaign in Africa to increase the number of children who can access schools. Since 2009, that campaign has focused on Ethiopia, Mozambique, and Burkina Faso with the aim to add more focus countries in the years to come.

Furthermore, in 2009, an inclusive education project was funded by the Canadian government through the World Braille Foundation and implemented jointly by AFUB and ICEVI with the aim to enroll at least 80 children in two focus countries (Niger and Swaziland) during the project's two-year life cycle. To this end, an ICEVI team of experts developed and piloted an in-service course-training curriculum for special needs teachers. Similarly, a training curriculum for teaching assistants has been developed and piloted. The project has been successful, therefore, its follow up started in 2011, and more countries have been targeted: Mali, Burkina Faso, Lesotho and Liberia. Project results (2013) indicate that 31, 38, 27, 30 students, from the above-mentioned countries respectively, have been enrolled in schools and there are other identified to enroll in the following academic year (2014). In total, 157 blind and visually impaired students are now enrolled in the resource centres or are already integrated into the regular classroom as an outcome of this project[58].

[57] http://www.afub-uafa.org/

[58] B. J. Marjeram, Equitable Access to Education for Blind and Visually Impaired Girls and Boys in Burkina Faso, Mali, Liberia and Lesotho, 2013, http://www.afub-uafa.org/sites/default/files/Brief%20on%20Inclusive%20Education%20Project%20August%202013.pdf

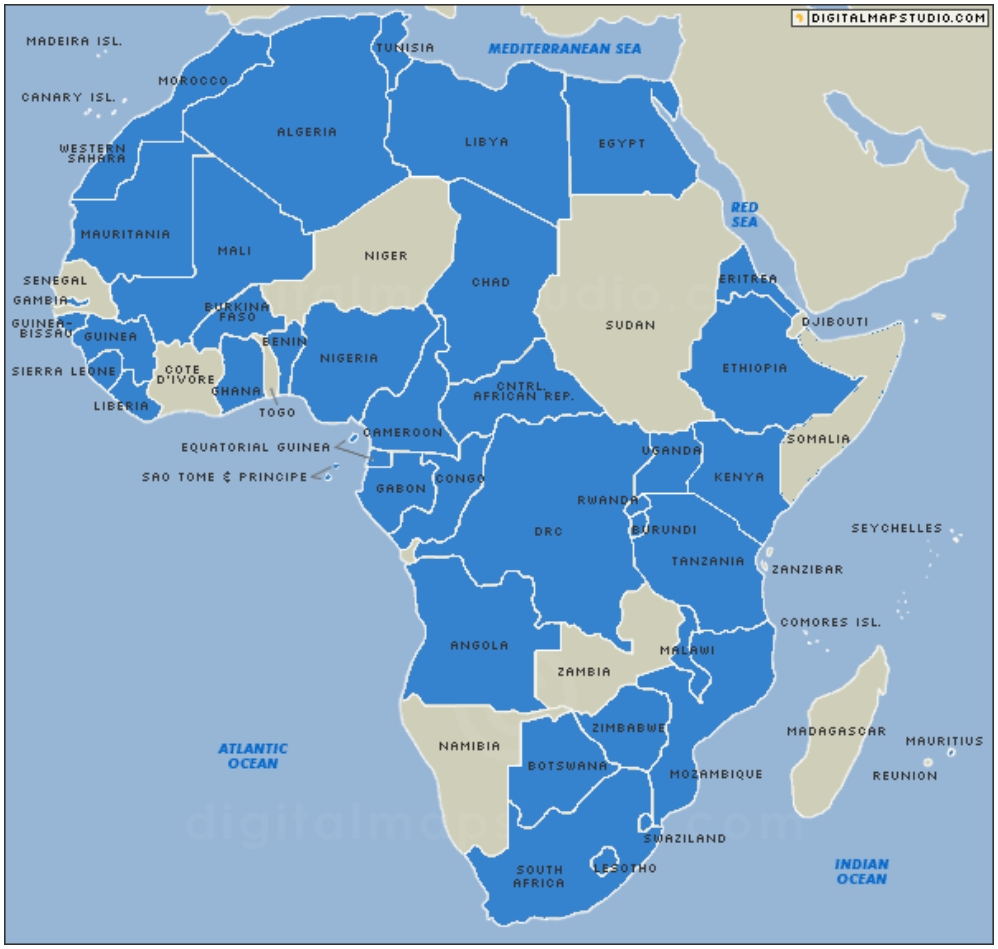

Fig 1. African member states of the AFBU (source: http://www.afub-uafa.org/where-we-work**)**

Burkina Faso

The Burkina Faso Association for the Advancement of Blind and VI People (ABPAM) aims to help blind and VI people integrate into their communities as independent individuals. To achieve this, ABPAM provides vocational and skills training in areas such as market gardening, arts and crafts, finance and savings schemes. They also provide specialized education at schools in Ouagadougou and Bobo-Dioulasso. There is one special class for adults who have become blind later in life[59].

Kenya[60]

Kenya Integrated Education Programme (KIEP) launched by the Ministry of Education, Science and Technology (MoEST) and implemented by the Kenya Society for the Blind with financial support from NGO donors seeks to identify VI learners and integrate them into the Kenyan public school system. The program currently supports 3,000 children across 541 schools in Kenya. A key goal of the program is to

[59] Mitra S., Posarac A., & Vick B. (2011). Disability and Poverty in Developing Countries: A snapshot from the World Health Survey. World Bank SP Discussion paper No 1109

[60] Kenya Integrated Education Programme, Center for Education Innovations, http://www.educationinnovations.org/program/kenya-integrated-education-programme-kiep

improve the quality of education for pupils with VI. Thus, KIEP works with local schools to create an inclusive learning environment where children with VI can learn alongside their peers. KIEP makes provisions, among others, in the area of teachers' training; Teachers attend a national training session for four months. During this training, teachers are equipped with Braille and low vision skills to facilitate assessment, teaching and support of learners with VI in their schools.

The program was initiated in Nairobi where VI children were identified and provisions were made to their local special school. In 2003, the program took on a more integrated approach and provisions were made to mainstream public schools to enhance the integration of VI learners. The program continued to support an increasing number of VI learners across Kenya until 2005 when beneficiaries were restrained at 2,500 due to resource constraints. Since the program started, the provisions to schools have evolved, particularly with improvements in technology.

An external evaluation of the programme in 2013 revealed that at primary school level just under half of the children with VI achieve average or above average scores in national examinations in spite of existing inequities in the examination system. 27% of children in secondary education achieved scores that meet the requirement for transition to tertiary education but the number of children in secondary education is still very low. Moreover, children with VI report generally good social experiences in mainstream schools and in their communities and there is evidence of understanding of their needs by their sighted peers and their teachers.

Malawi[61]

There is no legislation specific to students with special educational needs. The Ministry of Education administers special education. There is a policy of encouraging integration. Currently, there are 800 pupils (0.3% of the school age population) attending special schools.

In Malawi, formal education for children with VI started in 1950 with the establishment of two special schools. Additionally, formal courses for specialist teachers of children with VI started in the mid-60s and a resource base for children with visual impairment was established in a mainstream school. Afterwards, the Ministry of Education established resource centres for learners with VI in 13 primary and 15 secondary schools respectively across the country, which continue to play an important function in the education of children with VI.

The Government later on responded to the practice of enrolling children with VI to special schools by increasing the number of children with VI at local mainstream schools. In the 1980s, the Malawi Integrated Education Programme (MIEP) was

[61] P. Lynch and S. McCall, Impact of Educational Inclusion on Children with Visual Impairment in Malawi, The Educator, Vol. XXII, Issue 2, 2010, http://icevi.org/publications/educator/pdf/January_2010/The_Educator-2010_January-Inclusive_Education-Vol_XXII-Issue_2.pdf

established to promote the 'integration' of children with VI into local primary schools and to reduce the over-crowding in special schools and resource centres. The main rationale behind MIEP was to provide specialist teaching and support to children attending local mainstream schools. MIEP currently operates in nine education districts and is administered by the Ministry of Education, Science and Technology (MOEST).

Itinerant Teachers (ITs) or visiting teachers employed by the Ministry mostly do training of students attending mainstream schools. ITs are trained class teachers who receive a further one year of intensive training in the education of children with VI. They are also expected to complete a course in Braille as part of their training. Furthermore, at mainstream schools level, all primary class teachers receive some basic awareness training on special needs education as part of a pre-service training course but they rely on the IT to give guidance in reading and writing to children with VI.

Mali

In Mali, the educational policy objective is to provide education for students with VI either in special schools and units or in regular schools supported by visiting teachers and/or classroom assistants, since regulations covering general education are deemed to apply to children and young people with special educational needs. In fact, there is no particular legislation on special education. In a few cases, children with very severe disabilities do not participate in the public education system. It also happens that some children are excluded from education because of the lack of necessary materials; this applies particularly to those with physical disabilities.

The Ministry of Education is responsible for special education but certain responsibilities are shared with the Ministry of Health and the Ministry of Social Welfare. In practice, special education is provided by voluntary agencies. These agencies receive Government support in terms of personnel but very little financial support. This applies particularly to children with VI and physical disabilities. The main forms of support available to regular schools are additional pedagogical support and access to visiting specialists. There are some links between special schools and regular schools.

Rwanda[62]

In Rwanda, the Ministry of Education states that learners with VI are likely to need education in special schools/centres. However, Rwanda has some experience of successfully including blind learners with VI in mainstream secondary school, and university.

[62] E Karangwa, 2003, Challenging the exclusion of blind students in Rwanda, Enabling Education, issue 7, Enabling Education Network: Manchester
http://www.eenet.org.uk/resources/eenet_newsletter/news7/page4.php

GS Gahini is a regular rural secondary school that started admitting students with VI in 1997, following negotiations between the head teacher, the Rwanda Blind Union and the Ministry. The school initially enrolled eight students with VI and, following awareness raising work with parents, formed a parent fundraising committee, which raised money for a resource and reading room for the students, and accommodation for support volunteers; as a result, the numbers of students with VI increased.

Despite not having enough teachers who read Braille and there not always being enough support from fellow students and teachers, the school–with little external/government support –achieved much in terms of attitude change. While this example still involves a small number of students, it shows what can be achieved and perhaps indicates that Rwanda's education policies are not being bold and ambitious enough in their analysis of the potential for students with VI to be educated outside special schools.

South Africa

The UN's Convention on the Right of Persons with Disabilities (CRPD)[63] affords all persons with disabilities the right to education. Since South Africa has ratified the CRPD without reservations it is bound by its provisions. Moreover, the country's Constitution affords the right to basic education to "everyone". The reference to everyone includes children with disabilities thus; it explicitly prohibits discrimination on such grounds. In accordance with its constitutional obligations, in 1999, South Africa has enacted the Schools Act, which makes education compulsory for children between the ages of 7 and 15 and requires that relevant government officials make special needs education available for all children with disabilities.

In 2013[64] there were 2,495 partially sighted and 1,307 blind children receiving education in 22 special schools in South Africa. In 2014-2015, a project was conducted that revealed the weaknesses of the South African special education to meet the children's special needs[65]:

- Limited availability to textbooks, workbooks and teachers' guides in accessible formats. To date, no textbooks are available to the majority of special schools.
- Many of the teachers at the schools for learners with VI are not Braille literate. In addition, most provincial departments of education provide no training for teachers.

[63] http://www.un.org/disabilities/convention/conventionfull.shtml
[64] Inclusive Education: progress report; DBE on its 1st Quarter 2014 performance, 2014, https://pmg.org.za/committee-meeting/17501/
[65] S. Khumalo and T. F. Hodgson, 2015, The Right to Education for Children with Disabilities in South Africa: SECTION27's action from national research and litigation strategies to international advocacy, http://www.right-to-education.org/blog/right-education-children-disabilities-south-africa-section27-s-action-national-research-and

- There is severe staff shortage with respect to both teaching and essential non-teaching staff such as class assistants.
- Learners with VI at many schools do not have access to orientation and mobility training.
- Some schools do not have access to basic equipment such as brailing machines and computers with appropriate software for use by persons with VI. Many special schools also report that compulsory exam papers arrive late and/or in print. The result is that either visually impaired learners do not write certain standardized assessments, or they write exams in non-ideal circumstances.

The South African National Council for the Blind[66], through a network of over 100 member organizations, serves, supports and facilitates the prevention of blindness, rehabilitation, community development, training and education of South Africans with visual impairments. The Education and Training Division of the Council currently supports 21 schools by conducting workshops for educators and lobbying with government on the challenges, which these schools face. The Education and Training team provides consulting services on issues, which relate to curriculum adaptation, assistive devices and technology, accessible learning support materials and many other areas of interest to the educators, learners and their families.

2.3.2 Asia

In Asia, although many countries have agreed to implement inclusive education in accordance with the "Education for All" framework, government legislation and policies vary widely. In addition, there is a lack of effective oversight to ensure implementation. Hence, it is necessary to strengthen policies and legislation for inclusive education, improve coordination between the government and schools for implementation, and increase effective monitoring and evaluation.

Japan[67]

In Japan, a system emerges where special schools are key players in promoting inclusive practice through partnerships with schools in their locality. There are five types of education for children with visual impairment:

- special schools for the blind
- special schools for other disabilities
- special classes attached to mainstream schools
- itinerant teaching support for children in mainstream schools
- mainstream schools with no specialist provision.

[66] http://www.sancb.org.za/

[67] H. Miyauchi, Education of children with visual Impairments in Japan: Current conditions and issues, The Educator, Vol. XXII, Issue 2, 2010, http://icevi.org/publications/educator/pdf/January_2010/The_Educator-2010_January-Inclusive_Education-Vol_XXII-Issue_2.pdf

According to the Ministry of Education, Culture, Sports, Science & Technology (2009), there are 70 schools for the blind, 280 special classes set in mainstream schools, and itinerant teaching support is provided in 17 prefectures. The number of special schools for children with VI in Japan ensures that most children and their families have a variety of educational options.

The School Education Act defines the purpose of education for all children with disabilities. It states that schools must provide equal access to the curriculum. In addition, schools must provide independence and life skills. To make this possible, all national curriculum textbooks are available in large print and Braille for children who are visually impaired.

All 47 special schools for the blind are boarding schools, but in 1990, about 70 pupils with VI started receiving education in mainstream schools located close to their homes. However, since the Japanese government's view was that children with VI are best educated at special schools, they did not support such transfer of these children to mainstream settings. Nonetheless, many of the special schools have adopted themselves an 'outreach' role in transferring children with VI to mainstream schools, which increased the number of pupils in mainstream settings from 292 in 2002 1,353 by 2007.

As a result, from that year, Japan moved from a system of formal 'special education' to "special support education" which aims to strengthen the support given in the mainstream schools. With this change, the government requires existing special schools to be actively involved in expanding and enhancing their outreach services.

Pakistan[68]

In Pakistan, there are an estimated 45,000 children with severe visual impairment but only 10% of these children attend special schools, for the rest it is either the local school or no school. Special education of children with visual impairment is provided through a network of 63 schools for the visually impaired

There are now a range of initiatives to promote the inclusion of children in local schools, for example the government, in collaboration with international partners, has launched a pilot inclusive education programme in 16 schools in Islamabad capital territory. However, these inclusion initiatives are currently limited to the major cities and the private sector.

Sri Lanka[69]

[68] S. Yasmin, H. Minto, N. U. Khan, F. Sunil, Policy and Practice in the Educational Inclusion of Children and Young People with Visual Impairment in Sri Lanka and Pakistan, The Educator, Vol. XXII, Issue 2, 2010, http://icevi.org/publications/educator/pdf/January_2010/The_Educator-2010_January-Inclusive_Education-Vol_XXII-Issue_2.pdf

[69] Ibid.

In Sri Lanka, while literacy and primary school enrolment rates are among the highest in the developing world, inclusion is still in its infancy. Currently, there are three approaches available for education of children with disabilities i.e. special schools, special education units and mainstream schools. While some children with VI receive their education in local schools, it is often the result of personal efforts of administrators and teachers rather than concerted inclusion policies. The 13 residential schools–with 500 pupils and 101 teachers–in the country remain the main providers of educational opportunities.

Special schools are generally better equipped with necessary teaching and learning materials than mainstream schools. The majority of schools have tactile material including Braille books, slates etc. However, the availability is inadequate and often there is a delay in getting the curriculum available in Braille.

Thailand[70]

In Thailand, as part of its commitment to 'Education for All', the Ministry of Education has established 2,000 mainstream schools as models of inclusive practice and the majority of children with VI receive their secondary education in mainstream schools. The project initiated in 2004 with 390 model inclusive schools nationwide. Prior to this, students with VI had little choice of school apart from schools for the blind.

Vietnam[71]

Recently, the education of children with VI in Vietnam has increased thanks to educational legislation. There are more than 1 million disabled children; 150,000 of these have VI. About 40% of children with VI were enrolled in school in 2008-2009. However, most children who have VI and an additional disability do not go to school. The dropout rate of children with visual impairment is high at around 33%. In Vietnam, because of 'Education for All'-VI initiatives, the number of children with visual impairment attending school has increased but the enrolment rates for children with multiple needs are still very low.

2.3.3 Australia

In reference to the variety of settings for students with disability in Australia, which include primary, secondary, and senior secondary schools, mainstream schools, special schools, and specialist units in mainstream schools, there are broad similarities in the provision of support services for students with disability across states and territories. All jurisdictions must comply with the Disability Standards for

[70] I. Sirirungruang and S. Ratanasakorn, The education of students with visual impairment in Thailand, The Educator, Vol. XXII, Issue 2, 2010,http://icevi.org/publications/educator/pdf/January_2010/The_Educator-2010_January-Inclusive_Education-Vol_XXII-Issue_2.pdf

[71] N. Duc Minh, Vietnam : The education of people with visual impairment (2007-2015), The Educator, Vol. XXII, Issue 2, 2010, http://icevi.org/publications/educator/pdf/January_2010/The_Educator-2010_January-Inclusive_Education-Vol_XXII-Issue_2.pdf

Education of 2005[72] that clarify to education providers their responsibilities under the Disability Discrimination Act. Each education system (that is, government, Catholic, and independent), though, has its own approach to providing services and different nomenclature used to describe these services[73].

Each state and territory has different approaches to assessment and reporting for students with disability. This lack of consistency makes it difficult to determine whether students with varying levels of disability make appropriate progress, what outcomes are achieved, and the levels at which outcomes are attained. Students with disability are currently under-represented in national and state testing and accountability measures. In most jurisdictions, students with significant disabilities have access to alternative or adapted curricula. The reporting of outcomes from such alternative curricula, however, is inconsistent and does not necessarily reflect the 'value' that students may have gained from their schooling.

Based on the identified international literature on good inclusive practices, it would seem that a range of these approaches is being recommended by all Australian education systems. The key approaches in Australia focus on two levels of whole-school practice and in-class support. At a whole-school level, good practices include adjustments to cultures, policies, and practices, development of support structures, regimes of funding support, and the provision of and access to equitable learning opportunities. At an in-class level, good practices include differentiating or introducing alternative curricula, the application of universal design, and the use of technologies, individual planning through the Individualized Education Plan (IEP), and a focus on quality teaching for all students. Nonetheless, there is a lack of evidence-based data on the impact of these practices on changes in learning outcomes for students with disability.

The inclusion of students with disabilities is emphasized through regional and national policies in Australia. Despite the rhetoric supporting inclusion, as a concept and in practice, however, there are challenges in the enactment of inclusive education in Australia. One of the major challenges is the lack of consistent data across all jurisdictions on students with disabilities. To ensure that inclusive education policies address the needs of learners and that implementation of ideas through policy development is manageable and practicable, a proactive systemic approach is needed that is supplemented by local input and involvement.

Inclusion policy needs to be firmly embedded and informed by local research that addresses the specific needs of a region by considering urban and rural situations, fiscal constraints, support structures, and the capabilities of those who are to implement it. To enact an inclusive approach requires appropriate preparation

[72] Commonwealth of Australia, 2006, Disability standards for education 2005, http://foi.deewr.gov.au/documents/disability-standards-education-2005.

[73] I. Dempsey, 2011, Trends in the proportion of students with a disability in Australian schools, 2000–2009. Journal of Intellectual & Developmental Disability, 36(2), 144–145.

of all stakeholders. This particularly applies to the training of staff at all levels from the system to the classroom. Policies also need to respond to social inclusion issues. Issues surrounding choice and equity; increased pressure to demonstrate improvement in academic outcomes; acceptance of social and political changes in the school community; aligning teacher education programs with inclusive education policy; initial teacher education and teacher education as professional learning, all need further review and clarification.

2.3.4 The Americas

Canada

The population of students who are blind or visually impaired across Canada is hugely diverse. Differences lie in the degree of vision loss, prognosis of further vision loss, presence of other disabilities, and age of onset of vision loss. Because visual impairment or blindness is a low incidence disability, a child with vision loss is frequently the only child with this disability in their school or community.

In Canada, more than two decades of inclusive education practice have significantly impacted various others countries. However, no consistent national policy exists due to federated education systems. A noteworthy system-wide approach to inclusive education exists in the province of New Brunswick and in Ontario. Inclusive education became official policy in New Brunswick as early as 1968, and was reinforced in 1985 by the Act to Amend the Schools, known as Bill 85. Every school in the province is required to provide inclusive education. In New Brunswick, virtually all students are educated in ordinary classrooms, with specialized support as needed based on a student's Individualized Education Plan. Key features of best practice in New Brunswick schools include:

- the belief that all children can learn if they are given appropriate learning opportunities,
- planning individualized learning,
- developing support teams,
- promoting social skills and responsibilities among the children,
- assessing children's performance,
- planning for transition from one stage of education to the next,
- working in partnership with parents and other members of the community,
- implementing staff development plans, and
- being accountable (New Brunswick Department of Education 1994).

One district in New Brunswick ranked highest in standardized English and Math examinations for the years reported and had one of the highest graduation rates in Canada[74]. External factors reported to contribute significantly to sustained success in New Brunswick Schools included:

[74] OECD 1999. Inclusive Education at Work: Students with Disabilities in Mainstream Schools. Paris: OECD. http://www.oecd-ilibrary.org/education/inclusive-education-at-work_9789264180383-en

- contribution by the district support services team to the education of children generally, not just to that of children with special needs;
- provision by the district students support services team of continuing in-service training on a regular basis for the methods and resource teachers employed as special education consultants in the schools, enabling them to develop and sustain the expertise and credibility required;
- regular in-service training for class teachers and teachers' assistants in the teaching methods needed;
- involvement by the school principals and resource teachers in regular discussion concerning issues of school management generally, not just in relation to special needs;
- parent involvement as active participants in the education process, not just as its clients.

Latin America[75]

There are no trustworthy figures for Latin America concerning the population with visual impairment. Data vary a lot due to the differences in the methodology used throughout different countries. Likewise, there are no trustworthy numbers on access to education, ICT usage, nor mobile education for students with disabilities.

A survey was conducted in 2014 regarding inclusive education for students with VI in Latin America. Only 14 countries answered the questionnaire: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Peru and Uruguay. In what follows, some of the results are revealed:

- Access to education as a constitutional right: Constitutions of the 14 countries guarantee the right to education and they guarantee rights in favor of persons with disabilities, except for Uruguay. However, Argentina, Costa Rica, El Salvador, Guatemala and Uruguay do not guarantee the right to education for persons with disabilities. Only Brazil, Chile, and Dominican Republic specifically guarantee the education to blind and visually impaired persons. In Mexico, there is a rule that denies or limits access to education to the blind or visually impaired.
- Existence of a General Law of Education: all 14 countries have one. In El Salvador, this Law explicitly includes the educational inclusion of persons with disabilities. Moreover, in Argentina, Brazil, Chile, Colombia, Costa Rica and Dominican Republic, the General Law of Education includes the educational inclusion of the blind and visually impaired.

[75] D. Lermen González, 2014, Report on the educational inclusion of visually impaired children and young persons in Latin America, http://repositoriocdpd.net:8080/bitstream/handle/123456789/1378/Inf_LermenGonzalezD_ReportEducationalInclusion_2014.pdf?sequence=1

- Existence of at least one institution that focuses on the education of the blind and visually impaired: there is such an institution in all countries, except for Bolivia, Ecuador and Peru. In Ecuador, such institution assists all persons with disabilities, while in Peru the National Direction of Basic Special Education within the Ministry of Education is charged with assisting all persons with disabilities.
- Educational institutions for the blind (special schools): exist in all countries, except Colombia, Costa Rica, El Salvador, Honduras and Peru..
- Within the educational sectors of all the countries, there are specialization and updating courses for teachers. In Bolivia, Colombia, Costa Rica, Ecuador and Uruguay, however, these courses do not cover topics like daily living skills for the blind, assistive technology for the blind and visually impaired, low vision, etc.
- Supply of schoolbooks, books and educational material in formats accessible for blind and visually impaired students: not in Bolivia, Ecuador, El Salvador, Honduras and Peru. In addition, in Bolivia, Costa Rica, Ecuador, El Salvador, Guatemala and Honduras there is no supply of school supplies for blind and visually impaired students. Meanwhile, in Argentina, Brazil, Colombia, Mexico, Dominican Republic and Uruguay there is also supply of screen readers, Braille displays, specialized reading devices and screen magnifiers, among other assistive devices.

From the above, it is obvious that there is a gap between the intended inclusive education and what goes on in reality. The states intend to comply with the UN Convention on the Rights of Persons with Disabilities; however, there are obstacles and deficiencies that prevent the transition from theory to practice. For this reason, it is of the utmost importance to create strategies that actually implement the existing legislations. The word “disability” entails many qualities so particular needs are most of the times actually put aside. Obtaining detailed information about each type of disability is one important means to make progress into the inclusion of persons with disabilities in the educational system. Moreover, the establishment of both qualitative and quantitative indicators is essential to monitor the current state of inclusive education and to quantitatively measure the progress made. In fact, the lack of indicators proves that the policies have not been implemented through any strategic plans to prevent exclusion of students with VI in Latin America.

United States of America

In the United States, there were 6,573,975 special educational needs (SEN) students in fall 2012, 94% of which were attending ordinary schools. According to the 2014 Annual Report from the American Printing House for the Blind, there were approximately 60,393 U.S. children in educational settings (elementary and high school) who are legally blind and eligible to receive free reading matter in Braille, large print, or audio format. Approximately 9% (5,133) were registered at residential schools for the blind, 83% (50,205) were registered at state departments of education, 6% (3,661) were registered at rehabilitation programs, and 2% (1,394) were registered at multiple disability programs.

Children referred to as blind range in age from 0 to 21 years and only include those children with vision loss that are legally blind. Legal blindness is a level of vision loss that has been defined by law to determine eligibility for benefits. It refers explicitly to those who have a central visual acuity of 20/200 or less in the better eye with the best possible correction, or a visual field of 20 degrees or less.

The US apply inclusive education instead of implementing integrated education, in line with some European countries. Under the inclusive education policy, schools in the US all assume the statutory responsibility to actively seek to remove the barriers to learning and participation that can hinder or exclude students with SEN. As such, they have made adjustments with respect to areas such as physical facilities and pedagogic adaptation to cater for the needs of students with SEN.

The US have set out a comprehensive legal framework for the education of students with SEN. In particular, the US emphasize elimination of discrimination, early identification/intervention and appropriate education for students with SEN. Also, the US recognize parents' rights in the whole process and the importance of devising individual education plan for each SEN student. Furthermore, appeal and monitoring mechanisms are also set out in its legislative regime. The relevant legislation even imposes statutory requirements governing the qualifications of special education teachers and funding arrangements for special education.

The combination of litigation, state legislation and pressure from advocacy groups culminated in the Education for all Handicapped Children Act of 1975 (Public Law 94-142). In 1995, the US Department of Education issued a document on the Policy Guidance for educating students with vision impairment and blindness[76] . The policy was in support of appropriate assessment performed by professionals with knowledge of vision impairment; literacy instruction, especially in Braille reading and writing, and instruction in orientation and mobility by qualified professionals. The Individuals with Disabilities Education Act (IDEA - Public Law 101-476) in 1990, amended in 1997 (Public Law 105-17) ensures a free and appropriate education in the least restrictive environment for children with disabilities. The IDEA amendments of 1997 define children with vision impairment as having an impairment that even with correction adversely affects their educational performance. The most recent reauthorization of the IDEA, promotes three major requirements that reflect the areas of recurring concern from cases in the field. These requirements include:

- Strengthening parental participation in the educational process by protecting the rights of parents through the implementation of procedural due process hearings or mediation services in all states;

[76] Heuman & Heir, 1995, as cited in Pugh, G.S., & Erin, J. (eds) (1999). Blind and visually impaired students: Educational service guidelines. Watertown, MA: Perkins School for the Blind.

- Increasing the accountability for students' participation and success in the general education curriculum through the mastery of individualized education plan (IEP) goals/objectives and the inclusion of the general education teacher in the IEP team;
- Implementing specific remediation and disciplinary procedures that protect the rights of students with disabilities who have behavioral difficulties and maintain the safety and security of all students in schools.

In 2001, the No Child Left Behind Act (Public Law 107-110) reauthorized a number of federal programs that aimed to improve the performance of primary and secondary school students by increasing the standards of accountability for states, school districts and schools, as well as providing parents more flexibility in choosing which schools their children will attend.

Apart from the above-mentioned acts, the US also have the CFR Title 34 – Education that is one of fifty titles comprising the United States Code of Federal Regulations (CFR). Title 34 is the principal set of rules and regulations issued by federal agencies of the United States regarding education. The regulatory entity which is responsible for the education of children with special educational needs is the Office of Special Education and Rehabilitative Services (OSERS). Its official mission is "to provide leadership to achieve full integration and participation in society of people with disabilities by ensuring equal opportunity and access to, and excellence in education, employment and community living"[77] .

Over the past 15 years, there has been greater focus on providing high-quality instruction for students in Braille literacy programs. A significant number of authorities have expressed concerns about the low level of literacy skills with Braille using students, including the assessment and instructional practices used to teach Braille literacy skills.

Generally, to the maximum appropriate extent, students with disabilities, including those in public or private institutions or other care facilities, are educated with other students who are not disabled. Special classes, separate schooling, or other removal of students with disabilities from the regular educational environment occurs only when the nature or severity of the disability of a student is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily. There are no specific requirements regarding the designated unit or the personnel for the inclusive education. Support services may include positive behavioral interventions and supports, and supplementary aids and services. All children with disabilities are included in the general state and district-wide assessment programmes with appropriate accommodations and alternate assessments where necessary and as indicated in their respective IEP.

[77] OSERS Mission Statement, U.S. Department of Education. 19 September 2014, http://www2.ed.gov/about/offices/list/osers/mission.html

Each person employed as a special education teacher in elementary school, middle school, or secondary school should be highly qualified, which means they are appropriately and adequately prepared, trained, and equipped with the knowledge and skills to serve children with disabilities. IDEA requires that parents of students with SEN participate in each step of the special education process with the right to:

- receive notice of assessment and placement for their child;
- give informed consent before conducting any evaluation and provision of special education and related services to their child; and
- participate in all meetings concerning their child's special education.

Federal funding is provided to each state under the "Grants to States" programme to help them finance the additional costs of providing special education and related services to SEN students. The level of funding allocated to a particular state is based on the number of children with disabilities identified as residents of that state. A state may receive up to 40% of the average per pupil expenditure in public elementary schools and secondary schools. In order to be eligible for federal funding, each state is required to submit an annual plan to the Secretary of Education, which contains a set of assurance stating that it has policies and procedures in place as required by IDEA.

Although inclusive education is widely implemented in the States, schools for the blind still exist in several states. These residential or day schools are specifically geared to serve children with VI from kindergarten to grade 12. They can be state schools or privately run. In addition to educational services, these schools may also provide a variety of related counseling, rehabilitation, health, low vision, outreach, and other services. For a list of these across states, the reader may refer to the Texas School for the Blind and Visually Impaired website[78].

[78] Schools for the Blind in the United States, Texas School for the Blind and Visually Impaired, http://www.tsbvi.edu/instructional-resources/2785-schools-for-the-blind-in-the-united-states

2.4 Education of students with VI in Greece: Trends and prospects

2.4.1 Introduction

Educational perspectives in Greece regarding the education of students with visual impairments (those who are blind and those with low vision) show an upward tendency for inclusion. There two models adopted for the inclusion of Greek blind students in primary and secondary regular schools. The first model refers to the usage of resource rooms, which are located/ included in mainstream schools, while a special education teacher is responsible for the students with special needs who are enrolled in the resource rooms. The second one describes a setting, which consists of two teachers in the same classroom: the general teacher and the special education teacher who is normally qualified in issues pertinent to special education. The theoretical perspectives of the latter model are underpinned by the notion of co-teaching or team-teaching, a teaching model that occurs when two or more professionals collaborate to plan, decide, and deliver instruction to a certain number of students in the same physical place. This model is also called "parallel support"[79] model and has become dominant among the current educational reformations regarding the education of students with visual impairment in Greece. Therefore, special education practices are moving from special schools into the regular/ ordinary ones through an approach known as "mainstreaming", "integration", "inclusion", or "co-education".

Schools and local educational authorities have to undertake responsibilities in order to establish well-accepted educational settings for all students with principles such as "the chance to be equal and the right to be different". Essentially, the main challenge for inclusive education is that in order to achieve its goals, it must be accompanied by changes regarding school and class management, curriculum and teaching strategies.

2.4.2 Educational Overviews – Trends and Contemporary educational issues

Inclusion for students with visual impairment in Greece is the result of much effort over the last twenty years. This relatively new educational situation was implemented by European programs such as "Helios" I & II[80] with the support of pioneer teachers and today it is expanding progressively in every place of Greece where students with partial or total loss of sight live.

The number of special schools, which up to now constituted the pillar of special education, is progressively decreasing (Fig. 2). The students who are enrolled in the special educational settings are persons with multiple disabilities.

[79] With the notion "Parallel support" we mean two teachers in one class; one for the student with special educational needs and one for the other students.

[80] The action programme to assist disable people, "Helios II" covered the period of 1993 -1996, with the general aim of promoting equal opportunities for and integration of disabled people.

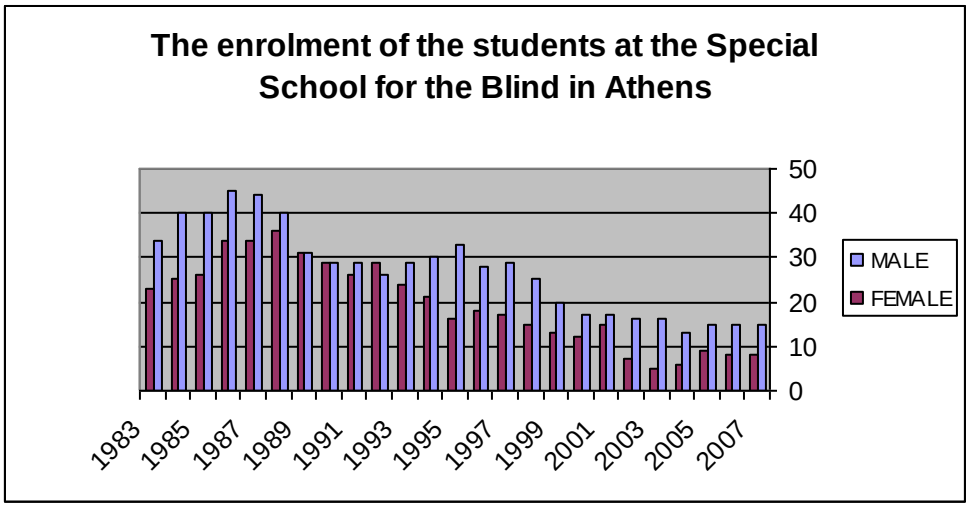

Fig.2. Trends in the Elementary school for the Blind in Athens Greece

Education in Greece is compulsory for all children from 6 to 15 years old; namely, it comprises Primary and Lower Secondary Education. The school life of students, however, can start optionally from the age of 2.5 years or earlier (pre-school education) in infant schools/ crèches (private and public). Children are usually enrolled in Primary Education at the age of 6. Apart from the regular kindergartens and Primary schools, there are also, all-day primary schools, which have an extended timetable and an enriched Curriculum[81]. Post-compulsory Secondary Education, according to the reform of 1997, consists of two school types: Unified Upper Secondary Schools (Lyceum) and the Technical Vocational Educational Schools (TVES). Along with the mainstream schools of Primary and Secondary Education, Special kindergartens, Primary, High school, Lyceum and upper secondary classes are in operation, which admit students with special educational needs. Data from the Ministry of Education (Table 1) show that despite the fact that the number of special schools for students with sensory disabilities is progressively decreasing, year by year more children with disabilities, who were not able to attend school in the past, are now studying in one of the existent special educational frameworks.

Table 1. Foundation of special schools in Greece

	SPECIAL SCHOOLS					
YEARS	KINDERGARTEN	PRIMARY	EEEEK	TEE	HIGHSCHOOL	LYCEUM
BEFORE 2004	-	-	22	-	-	-
2005	14	27	22	9	1	1
2006	8	9	38	3	-	-

In many mainstream schools, as mentioned in the introduction, there are resource rooms located in the general schools. They operate as tutorial classes for students with special learning difficulties and mental disabilities. These students

[81] Information from the official web page of the Greek Ministry of National Education and Religious Affairs www.ypepth.gr

attend a corpus of courses in these resource rooms and other courses in the regular classrooms.

Table 2. Inclusion classes in Greece during the last years

	INCLUSION CLASSES		
YEARS	KINDERGARTEN	PRIMARY	SECONDARY
BEFORE 2004	113	768	104
2005	80	642	186
2006	75	130	109

Recently, the co-teaching model (or the 'parallel support model') is gaining ground. A co-teaching model allows general and special education teachers to share their skills and knowledge, to face difficulties and solve problems together, enabling them in such a way to respond more effectively to the diverse needs of their students, facilitate their access to learning[82,83] and as such promote "inclusive thinking".

Table 3. Students that had parallel support by a specialized teacher during the last years

YEARS	'PARALLEL SUPPORT MODEL'
BEFORE 2004	5
2005	113
2006	207
2007	330

Table 4 provides information about the students who cannot attend courses in a school because of serious health problems. They are given the possibility to have a tutor in their home[84].

Table 4. Students who received instruction by a tutor during the last years

YEARS	STUDENTS WITH TUTOR
BEFORE 2004	No available data
2005	145
2006	235
2007	248

In total, there are five special primary schools for students who have visual impairment, spreading across the country in relatively big cities. As a result, the students who live in these cities have the opportunity to attend a mainstream setting or a special school whereas, for students that live in other parts of Greece,

[82] Argyropoulos, V. & Stamouli, M. (2006). A Collaborative action research project in an inclusive setting: assisting a blind student. *The British Journal of Visual Impairment*, 24 (3), 128-134.
[83] Jiménez-Sánchez, C. & Antia, S. (1999). Team-teaching in an integrated classroom: Perceptions of deaf and hearing teachers. *Journal of Deaf Studies and Deaf Education*, 4, 3, 215-224.
[84] Greek Law 2817/2000: "Ekpedefsi ton atomon me idikes ekpedeftikes anages ke alles diataxis" ["Education of individuals with special educational needs and other provisions"].

inclusion is the only way for their education. The two special schools, which are located in Athens and Thessalonica, are also boarding schools and some students live there during the school term. However, this is not the case for those who live in province. When the conditions of inclusion are poor, families and children themselves become very frustrated, and in the end, they decide to move in the two cities to attend the special school.

What follows is an account of the main characteristics of the two educational settings within which the children with visual impairment attend school in Greece.

2.4.3 Special School Environment vs. Inclusive Environment

The conceptual frameworks of the two educational settings based on distinct theoretical underpinnings. Specifically, the framework of a special school is focused on the individual who has the disability, whereas the framework of an inclusive setting is focused mainly on the environment and the interactions between the individual and their environment[85].

The interpretations of educational issues differ because they depend on different theoretical perspectives. For the special school, problems may have roots in the individual's characteristics, while from an "inclusive perspective", the roots of the problems are most likely embedded in the environment.

The factors that influence students' cognitive and psychological development in both educational settings are:

- The Curriculum
- The teacher
  - Instructive environment
  - Teaching methods
  - Social interaction
  - Instructive – teaching aids
- The learning environment

The Curriculum

The curriculum in an inclusive environment for a student who is blind or partially sighted is the same as that for sighted students without any adaptation. In special schools for the blind and visually impaired, an expanded curriculum is applied with significant support provided by psychologists and special auxiliary personnel, which includes the following extra subjects:

- The Education of Mobility of Orientation and everyday living skills
- Occupational therapy
- Physiotherapy

[85] UNESCO (2005) Guidelines for Inclusion: Ensuring Access to Education for All. PARIS

- Specifically adapted gymnastic
- Health Education.

The teacher

Pre-primary and primary school teachers are degree holders from a four-year university-level course, primarily from Pedagogic Schools. Lower and upper secondary education teachers hold university degrees in their specialist subject and take an introductory teacher-naming course upon appointment.

In special schools, both teachers and special educational personnel are usually qualified or highly experienced. According to the law N. 3699/2008 it is a prerequisite for someone to know the Braille code in order to teach.

In regular schools, when there is no vacancy for specialized staff, supply teachers are usually appointed. For example, when a special education teacher is placed in a school in order to support students with learning or sensory disabilities, this does not presuppose that he has experience in teaching Braille code. Thus, if there is a need to support a blind pupil, the teacher is not efficient. The same holds for all the other specialties such as English music, or sports.

With regard to Secondary education, the situation is worse, unpleasant and unsatisfactory, making students and their educators very frustrated. Not until recently, a small number of specialized teachers have been appointed to Secondary Education but the needs are numerous.

From 2000 onwards, in every educational region in Greece, Diagnosis-Evaluation-Support Centres (KEDDY) for students with SEN have been established. These are responsible for screening students and recommending the most appropriate program for them. The teachers and counsellors of these Centres must also provide a range of specialized support services for the students and the school units. However, the great need for responding to the current demands of the population of the students with special needs has resulted in hampering the Centers' operation because of the large number of applications for evaluation of special learning difficulties.

The learning environment

One of the most important advantages of an inclusive educational setting is the social interaction between blind students and sighted ones, which would entail:

- Mutual acceptance.
- For sighted students, an understanding of the restrictions that visual disability imposes on the students and an acknowledgment of the educational chances that the blind or visually impaired students have in the school environment.
- An understanding of the notions of equity and differentiation in the school environment.

The Special Elementary School for the Blind in Athens collaborates with two neighboring regular schools, by suggesting to some students to attend classes in regular schools with the support of a special education teacher (model of "parallel support"). The experience has shown that the achievement of the aims of inclusion depends on how severe the visual problem is and on the idiosyncrasy of the person as well. Most visually impaired students who are included in regular schools are usually socially isolated. For example, during breaks in school, students who are visually impaired are usually alone without participating in activities such as football, basketball, hide-and-seek and so on. This situation however, does not happen only in primary schools, it also happens in secondary schools and this is one of the reasons that students with visual impairments request the establishment of a special High school and Lyceum for the blind.

With regard to teaching aids and assistive technology, special schools have better assistive equipment since it is used on a regular basis. On the contrary, students who are visually impaired and are enrolled in regular schools do not often use assistive technology. This has been used as an excuse to impose restrictions of government funds regarding the equipment that a regular school needs to support a student with visual impairment.

Another important issue that influences significantly the education of the Greek blind students is the lack of Braille textbooks. Recently, all the textbooks of primary and secondary education have been changed. However, not all of them have yet been transcribed into the Braille code. The problem is bigger for the students who study in an inclusive educational setting than for the ones in special schools who can still use their old books until the new ones are transcribed into the Braille code.

2.4.4 Conclusions

Taking into consideration the above-mentioned aspects, one can argue that a blind or visually impaired student, who is studying in an inclusive educational setting, acquires the same academic knowledge with a student of a special school, but the former may be deprived of the opportunity to acquire basic dexterities through a developmental and complementary curriculum.

In contrast, students who attend a special school acquire a big range of skills apart from the academic skills such as:

- Learning of orientation, mobility and everyday living skills that will render them independent in their life.
- Rehabilitation and acquisition of various dexterities of haptic and acoustic perception via intentional activities, which help the student in the school and in social adaptation.
- Improvement of the gross and subtle mobility.
- Exploitation of functional vision.
- Sensitization of touch and

- Dexterities that concern the use of specialized assistive technology.

The achievement of all these needs is accomplished with the guidance of specialized educational personnel that works in special schools. On the other hand, teachers who work in an inclusive framework do not usually know the Braille code and they are deprived of training and experience. Students also do not have the support of specialized educational personnel and an interdisciplinary approach in sectors that are too important for them.

The instructional methods that are applied today in regular schools, as well as the teaching aids which are used, do not allow the satisfaction of particular educational needs, which are determined by the nature of the students' disability.

To sum up, on one hand, there are special schools in Greece, which constitute a well-organized infrastructure that corresponds satisfactorily, so far, to the particular educational needs of the students who are visually impaired. On the other hand, inclusive educational settings are functioning, within which student and teacher are facing a great number of difficulties; that is, no adapted curriculum, lack of supporting means and special teaching aids, insufficient training, absence of interdisciplinary teams and in most cases, isolation from social/ recreational activities.

2.5 Education of students with VI in Romania[86]

In Romania, children with visual impairments receive educational services from residential and special schools specifically designed for children who are blind, partially sighted or multiply disabled, as well as, special classes, resource rooms, and itinerant teaching services in regular education classrooms within the child's community.

Based on the individual needs of the child as well as input from parents and educators, specialized schools or classes are appropriate educational options for certain students. Specialized schools also frequently provide outreach support and technical assistance to public schools in their respective areas.

Furthermore, the perception still exists that residential and special schools for blind and visually impaired students are too costly, or worse, unnecessary. This fallacy persists despite that education experts who work with VI students and with Multiple Disabilities and VI (MDVI) students agree that special schools are the best environment for some children who are not able to face the core curriculum, or cannot adapt to regular classes, and that not all mainstream schools are ready to fulfill all the VI or MDVI child's needs or particularities.

Whereas a child's neighborhood school may be the most integrated, mainstream environment, frequently such schools cannot or will not provide the full array of services and skills training that the child with VI needs. A mainstream school in Romania does not have enough specialists to work with the students with visual impairment. Lack of specialists is worsened by the lack of services and the minimum of materials, tools and instruments used to cover VI students' needs. Moreover, resources for VI students in an inclusive education system are limited. That is the situation in big and developed cities. In small cities in the country, services for VI students in the inclusive education system are missing. That is why specialized schools for children with vision loss may be the best choice at the moment for a child to both receive all necessary educational services, and to interact regularly with student peers on terms of genuine equality.

The education process in Romania started to change over the last 15 years. The Romanian Government and local authorities were forced to assure the necessary conditions for the education of all children. In the last years, reforms in education took into account children with disabilities and/ or those who are at risk. For these children, the Ministry of Education and Scientific Research developed and realized projects/ programs on their education. Such programs are "Second Chance", "Access to education for disadvantaged groups", "Along the same school", "National Strategy Community Action".

[86] Synthesis Report of Chapter 8; Romania, in Education Policies for Students at Risk and those with Disabilities in South Eastern Europe: Bosnia Herzegovina, Bulgaria, Croatia, Kosovo, FYR of Macedonia, Moldova, Montenegro, Romania and Serbia - https://www.oecd.org/edu/school/38614298.pdf

Access involves much more than providing ramps. Access is also the key element of inclusion, which involves much more than placement in a particular setting. The relationship of access and inclusion may not be obvious to individuals who are not familiar with the educational and social impact of vision loss. Placing a student with a visual impairment in a regular classroom does not, necessarily, provide access and the student is not, necessarily, included. A student with a visual impairment, who does not have access to social and physical information because of the impairment, is not included, regardless of the physical setting. Students with visual impairments will not be included unless specially trained personnel in appropriate environments address their unique educational needs for access and unless these students are provided with equal access to core and specialized curricula through appropriate specialized books, materials and equipment.

The EU promotes active inclusion and full participation of disabled people in society, in line with the EU human rights approach to disability issues[87]. Disability is a rights' issue and not a matter of discretion. This approach is also at the core of the UN Convention on the Rights of People with Disabilities (UNCRPD), to which the EU is a signatory.

The education system for visually impaired students has started to change once with the national policy of integration and stimulation of the inclusion process according to the European Commission's European Disability Strategy 2010-2020. This Act was built on the UNCRPD and adopted in 2010, taking into account the experience of the Disability Action Plan (2004-2010)[88].

The United Nations Convention on the Rights of Persons with Disabilities document was ratified by the Romanian Parliament in 2010, and recognizes the right of persons with disabilities to live independently in the community and obliges States Parties to take measures to ensure that those persons living conditions are equal with those of others. Under the Convention, the country is obliged to recognize the equal right of all persons with disabilities to live in the community on an equal footing with the others. The National Authority for People with Disabilities (Autoritatea Naţională pentru Persoanele cu Dizabilităţi[89]) was the invested mechanism for coordinating the implementation of the Convention on the Rights of Persons with Disabilities.

The Romanian Government adopted, in September 2016, the National Strategy ''A society without barriers for people with disabilities'' and Operational Plan for the period 2016-2020 that addressed to over 752 000 people with disabilities. According to the strategy, the Romanian Government will stimulate active participation of

[87] Persons with disabilities, http://ec.europa.eu/social/main.jsp?catId=1137&langId=en
[88] Equal opportunities for people with disabilities: a European action plan (2004-2010), http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=URISERV%3Ac11414
[89] http://anpd.gov.ro/web/

people with disabilities in the community through increased accessibility to the physical environment, information and communications, the quality of social services and through better monitoring of respect for their rights.

Also, in 2016, the Romanian Government approved the program of national interest in protecting and promoting the rights of persons with disabilities by "establishment of type social services day care centers, respite/ crisis centers and protected dwellings to deinstitutionalization of people with disabilities in institutions and prevent institutionalization of people with disabilities in the community". The program aims to develop network-based service, day centers, rescues centers and protected housing for adults with disabilities to achieve institutional transition from the current system of social protection, to one based on services included in the community.

Currently, in Romania, the institutional system of social protection is still predominant and approximately 2.5% of all people with disabilities live in a public residential institution of the social system care for people with disabilities. To this end, there are a total of 260 centers for adults and 90 classic or modulated foster homes for children with disabilities. Social services that will be newly created shall be located so as to allow user access to all resources and facilities of health, education, employment, culture, leisure, and social relationships. Regarding the inclusive education system in Romania, there is a constant preoccupation for the development of services and methods so that the school offers adequate educational scenarios and learning settings and teachers use the best practices for students with visual impairment to develop spatial thinking abilities.

2.5.1 Software used by students with VI in Romania

To compensate for the lack of hardware devices such as Braille printers and Braille displays, equipment, which is not affordable because of the high prices, combined with the lack of a governmental program targeted at the acquisition of assistive technologies, students use a wide area of software programs.

The desktop environment

People with VI use two major types of software that enable them to efficiently operate a computer. First, there is a special software program called screen-reader that transforms textual information from the computer screen into voice or Braille. A screen reader can read the menus, the document text or the links from a webpage and send it to the user as audio output or in Braille. In order to transform the information into Braille the user's computer needs to have attached a special device called a Braille display, which can output the text as Braille characters by means of some very fine electromagnetic cells. Nonetheless, such a device is very expensive; few people in Romania can afford it, most of them get hold of it through different sources of funding. The other, more common way in which a screen reader can send information to a blind user is auditory output, by means of a special program called a software synthesizer or software synthetic voice. Most of these synthesizers are

large databases of sounds associated with syllables or word fragments. Thus, the computer can read aloud the textual information presented on the screen.

The wide majority of students with VI in Romania use Microsoft Windows as an operating system and Jaws (Freedom Scientific) as a screen reader for the desktop/ laptop environment. In this way, they can perform day-to-day tasks such as reading emails, writing Word documents, listening to music or searching for information online. In special schools such as the High School for Visually impaired in Cluj, students are taught to use the keyboard and to perform small tasks with a computer running Jaws screen reader software.

The first computers that used Jaws in Romania, around 2000, were equipped with a software synthesizer called WinTalker Voice, which included a robotic Romanian voice that was widely used until around 2008, being the only Romanian synthetic voice available in the market at the time. Since 2008, more companies tried to build Romanian synthetic voices, not especially for VI users but also for other talking software such as GPS apps and devices. Nowadays, only Ioana[90] is available on all the major platforms and devices.

Another screen reader software developed by the open source community and available free of charge to desktop users is Non Visual Desktop Access[91] (NVDA) which provides a good alternative to Jaws. One major advantage of this screen reader, alongside NVDA being free of charge and Jaws being quite expensive, consists in the fact that it uses less computer resources and it is able to run very well on slower computers. Being a free screen reader NVDA includes voices from the eSpeak synthesizer, which are rather robotic, but compensates this by a high accuracy of speech. Users can also purchase the Ioana voice synthesizer and add it to NVDA.

Mobile devices

The fast development of smart mobile devices in the latest years turned out to be a real advantage for users with VI.

The first mobile operating system that used a screen reader was Symbian OS used on smartphones produced by Nokia. At that time (the first decade of the 21st century), for the first time, blind users could experience the full features of a mobile phone assisted by voice. They could add or edit phonebook numbers, use a music player and even browse the web on a mobile device. The screen reading software used on Symbian called Talks was powerful, giving access to all the phone's features. Talks did not come free of charge and there was no Romanian voice available at that time.

[90] http://harposoftware.com/en/romanian/241-Ioana-Nuance-Voice.html
[91] http://www.nvaccess.org/

To date, the most powerful and accessible smartphone for blind users is now the iPhone which has a built-in powerful screen reader called Voice Over. The main advantage is that it comes with voices preinstalled for all major languages, including Romanian, so it is very easy for a VI user to enable accessibility features on any iPhone without the need for installing additional software. Almost all iPhone apps are accessible for VI users who benefit from the ease of use and full accessibility of its operating system. A small drawback for Romanian users is the fact that Siri, the voice assistant on Apple devices does not have the Romanian language included yet but there are more and more rumors that Romanian will be added to Siri in future versions of the iOS operating system. In addition, the price issue comes into discussion when talking about iPhones, which are highly priced, compared to other smartphones. Not all blind people in Romania can afford them but the ones who use them are very pleased in general. Other products from Apple that use the same operating system are also accessible for blind users: the iMac – the Apple computer series - the iPod, the iPad and even iWatch has a screen reader included with the same characteristics.

On the other hand, Android phones are a good alternative to iPhone when it comes to accessibility for blind users. Although Android was not very accessible until the 4.1 version, in the latest editions of its operating system, Google fixed a lot of things and the screen reader from Android phones is more and more powerful. Talkback, the Android screen reader comes with voices for all the major languages. The Romanian voice Ioana is not available by default but it can be purchased for a small fee. Many of the apps on Android phones are accessible for blind users via talkback. Android phones have decent prices starting at 50€; but usually a blind person needs a good Android phone because the screen reading software uses a quota of extra resources. A major advantage of the Android phones is the fact that users can widely customize them. They can even install alternative variants of the operating system for more experienced users, and a wide variety of applications are available in the play store.

The development of mobile devices encouraged students with VI to use them in a wide area of orientation and mobility related tasks, like GPS navigation, space orientation and identifying addresses on the street, the availability of bus schedules, and so on. There are blind people that even have the courage to listen to a book read by the phone while walking on the street, especially on well-known areas of the town.

Online services

Because of the development of accessible computer technologies users with VI are more and more oriented towards using online services, like Facebook, YouTube, and Skype but also services dedicated to their special needs like GPS apps and online libraries.

The Romanian Association of the Blind [92] has made an audio book library, which was recorded first on audio tape and then digitized in mp3 format, available online for its members. Users can download their favorite audio book and listen to it on their preferred device (mp3 audio or computer).

A NGO from Romania, the Pontes association[93] developed an online library of scanned books that are available to blind users in electronic document formats. Users can search and download books and can even contribute their own books to the library. A volunteer keeps everything in place and organizes the books on various sections. There are also labels regarding the content of the book and the scan quality. Now there are over 23.000 books available for download organized in three major sections based on their language: Romanian, English and French. Any blind person can apply for an account to this library by proving that he/she has a sight problem. Similar to the library, the same NGO has an online collection of theatre plays recorded mainly from the national radio station by volunteers and available online for listening and downloading by blind users.

The development of mobile devices encouraged students with VI to use them in a wide area of orientation and mobility related tasks, like GPS navigation, space orientation and identifying addresses on the street, the availability of bus schedules, and so on. There are blind people that even have the courage to listen to a book read by the phone while walking on the street, especially on well-known areas of the town.

Another interesting initiative is the Tandem Navigator project implemented by the Tandem Association, a small NGO from Bucharest, which has made a GPS-based orientation and mobility app guiding blind users on the street from a mobile phone running Android or iOS operating systems. This application allows users to create and share their own routes and points of interest with other users, thus encouraging other users to find addresses or go from one point to the other in the city.

The development of an accessible software environment for the blind enables users to have access to information in a similar way as their sighted peers. It can be advocated that for the visually-impaired community, the invention of the screen reader is the second major revolution after the invention of the Braille alphabet.

[92] http://www.anvr.ro/
[93] http://pontes.ro/en/index.php

3. Education of students with visual impairment regarding spatial thinking and inclusion

When we relate spatial thinking and education strategies to enhance spatial thinking of VI students, it is important to consider that spatial thinking is developed within regular classes: Math, Literacy, Geography, Science, History, Biology, but also through specialized services or therapies for VI students like Orientation and Mobility therapy.

Through spatial thinking, students will be able to acquire knowledge that is necessary in deciphering real or abstract problems in school activities, and everyday life in general. Spatial thinking is a multi-dimensional, transversal ability that cross-cuts several subjects and grade levels and can be cultivated through formal education with substantial results. Spatial thinking is not a single ability; it is a blending of knowledge and skills, it supports people in identifying, interpreting, and visualizing location, distance, relationships, movement, change, patterns, and trends through space.

How VI students move every day, the way they interact with the environment, how they adapt and solve everyday problems, depends mostly on spatial thinking. The way in which spatial thinking of VI students is developed and stimulated depends on the activities taking place in the family, and especially in schools, in educational activities or extracurricular activities. General competences that are pursued in primary and secondary classes related to learning competencies that can develop spatial learning of VI students are:

- Using numbers in elementary computations;
- Highlighting the geometrical properties of objects located in the surrounding area;
- Identification of phenomena, relationships, regular structures, patterns in the immediate environment;
- Generation of simple explanations by using logic elements;
- Solving problems from sorting and representation of data;
- Use of conventional standards for measurements and estimates;
- Orientation and movement in space relative to benchmarks or directions specified using phrases such as: in, on, over, under, beside, in front, behind, above, below, left, right, horizontal, vertical, oblique;
- Locating objects by setting coordinates in relation to a given reference system using phrases;
- Identification of plane geometric shapes (square, triangle, rectangle, circle) and some geometric solids (cube, cuboid, sphere) in children and manipulated objects in the environment;
- Recognition of geometric figures and objects in the immediate environment and flat representations (including drawings, reproductions of art, schematic);

- Highlighting some specific features of simple geometric forms and planar geometric bodies identified in different contexts;
- Exploring the characteristics of objects, phenomena and processes, environment investigation using specific tools and processes;
- Solving everyday purchases capitalizing on their bodies and the environment;
- Presentation of observable reality, using general and specific terminology;
- Use of the significant elements of mathematics, natural sciences and social disciplines in understanding the surrounding reality;
- Setting-up the surrounding reality with its cartographic representation;
- Developing interest in knowing the local horizon, country, and contemporary world.

3.1 Specific educational activities for enhancing spatial thinking of VI students – regular activities according to the core curriculum

The following activities help VI students to understand, conceptualize, and develop the concepts of space such as:

- Space, space-time, object/ field, place;
- Primitives of identity: [object, container, boundary, shape, texture];
- Primitive spatial relations: static [location (distance, direction, distribution); connection]; dynamic [motion, flow, force, intersection/collision].

3.1.1 Orientation and mobility training (O&M)[94]

Movement is a building block for learning. As a child explores their world and has physical contact with it, learning takes place. Developing O&M skills should begin in infancy starting with basic body awareness and movement. O&M has frequently been described as "knowing where you are, knowing where you want to go, and knowing how to get there"[95].

Orientation and mobility training (O&M) helps children with VI know where they are in space and where they want to go (orientation). It also enables them to carry out a plan to get there (mobility). O&M training encourages students with VI to develop essential skills, build confidence in their ability to travel, and take responsibility for their decisions. O&M training began after World War II to help veterans who had lost sight. In the 1960s, universities started training programs for O&M Specialists. In the 1980s, the benefit of providing O&M services to preschool-aged children was recognized. Nowadays, O&M specialists have developed strategies and approaches so that O&M training may begin in infancy. When planning an O&M program for children, the focus of training may include such things as:

[94] C. Martinez, Orientation and Mobility Training: The Way to Go, Texas School for the Blind and Visually Impaired, See/ Hear, Fall 1998 ,Volume 3, Number 4, http://www.tsbvi.edu/seehear/fall98/waytogo.htm

[95] Teaching Students with visual impairments, http://www.teachingvisuallyimpaired.com/orientation--mobility-specialist.html

- sensory awareness: gaining information about the world through hearing, smell, touch and proprioception[96]
- spatial concepts: realizing that objects exist even if not heard or felt, and understanding the relationships between objects in the environment
- searching skills
- independent movement
- sighted guide
- protective techniques: specific skills which provide additional protection in unfamiliar areas
- cane skills: use of various cane techniques to clear one's path or to locate objects along the way.

The development of these skills allows students with VI to participate more fully in the life of the school and the community. Most O&M skills are taught within the school setting, with the ultimate goal being the ability to travel independently in all environments. O&M training has to be a part of the Individual Education Plan (I.E.P.) for every student with VI, including those with multiple disabilities.

3.1.2 Sensory awareness

When vision is anyhow impaired, children must learn use their other senses more effectively. Systematic instruction is needed to develop the other senses so that they can be used for O&M purposes. Sensory stimuli (sounds, smells, and textures) may be permanent or temporary. Children with VI need to learn to differentiate between the two and use the former as permanent markers (landmarks) and the latter as clues.

Sounds can be very confusing when clear visual information is absent. Sighted people assume that sounds which get louder and louder are coming towards them because of their visual knowledge of the world. A child with a VI may not make the same assumption. Moreover, the ringing of the telephone may mean different things to a sighted person that to a person with VI. Persons with VI need help in learning to use their hearing to interpret the world around them. If their hearing is impaired even to a small degree, that task becomes much more difficult. Children need to learn to localize sounds and use sound clues for orientation, straight-line travel, and safety.

Though people may not be aware of it, much of the world is conceived through touch. However, touch alone may not be helpful in identifying an object if the whole object cannot be touched at once. Developing the tactual sense will help children with VI to resolve different situations, such as finding a toy dropped on the floor or feeling the difference between the curb and the street with their cane.

[96] Meaning "one's own", "individual", to take or grasp, is the sense of the relative position of neighboring parts of the body and strength of effort being employed in movement. https://en.wikipedia.org/wiki/Proprioception

Normally people do not pay much attention to smells unless they are extremely pleasant or offensive, but they might use that kind of information to help us know exactly where we are in certain environments. Smells can also serve as landmarks and clues for environmental awareness. Sighted people generally do not use smell, especially combined with other clues and landmarks, to help them know where they are.

Joints and muscles give people feedback about where their own body parts are positioned. This constitutes the proprioceptive sense. Proprioceptors located in the muscles and joints tell us if we are bending or standing up straight, if our fingers are bent or extended, etc. The proprioceptive system and vision work closely together. Therefore, in case of any kind of VI, proprioception is also impacted. Children with VI generally need help to learn where their bodies are in space, and in relation to things in the environment. The physical and occupational therapists, along with the O&M specialist, can work directly with the child, and they may suggest specific activities for the family, so that children with VI develop the proprioceptive sense.

3.1.3 Independent movement

A primary goal of O&M training is to help each child with visual impairments achieve independent movement as much as possible. Most children with VI are capable of learning routes in familiar environments. They learn to use landmarks and clues to help them know where they are along a particular route. Independent movement is tied to progress in other areas, such as communication and socialization.

3.1.4 Spatial Concept Development

Establishing a foundation of basic concepts is fundamental to O&M. The necessary basic concepts related to mobility are called body concepts. Concepts necessary for orientation are spatial, such as position, relation, shape, measurement, action etc, and environmental such as topography, texture, temperature etc.

Body concepts include body image (a person's subjective experience of their own body), body schema (unconscious knowledge of the body), and body awareness (the knowledge the person has of their body). Body concepts can be divided into five components: identification of body parts**,** body movement**,** body planes**,** laterality**,** and directionality. For children with VI, it is particularly important to learn how body parts are positioned and how they relate to one another so that the concepts can be transferred to the external environment.

The knowledge of objects in space and their relationships to each other are essential for maintaining or regaining orientation. Once students with VI understand the body and body parts by developing a clear body image, they are then better prepared to explore the objects in the space around them. Other spatial concepts relate to shape, measurement, actions, and movements.

3.1.5 Human echolocation

Human echolocation is the ability of humans to detect objects in their environment by sensing echoes from those objects. This ability is used by some people with VI to navigate within their environments. They create sounds themselves, either by tapping their canes, by stomping their feet or by clicking their tongues. By interpreting the sound waves reflected by nearby objects, a person trained to navigate by echolocation can accurately identify the location and sometimes size of nearby objects and not only use this information to steer around obstacles and travel from place to place, but also detect small movements relative to objects.

Many people with VI use echolocation unintentionally. The only thing that echolocation requires is some sort of sound. Many people with VI claim to receive information about their surroundings by tapping their cane on the ground. This tapping sound is something they become very familiar with and can be a very effective sound for echolocation.

The reason echolocation is taught using mouth clicks is simply because the sound emitted from mouth is very close to the ears, which means that the sound is basically travelling in a straight line out from the head and directly back to it. This helps to control the signal better and eliminate various sound reflections that may occur when the sound is emitted from other places, like snapping fingers or the tip of a cane.

3.1.6 Tactile maps

Persons with VI have the potential to acquire representations of space, and tactile maps can be an effective means of providing spatial information. Tactile maps can give a greater spatial understanding than a direct experience of moving through the environment or one supplemented with verbal explanation. Furthermore, they may form an essential component of O&M instruction[97]. Relevant information is presented clearly with relative simultaneity, and without other difficulties associated with travel in the real environment[98].

The earliest known tactile diagrams were published in the early 19th century, approximately at the same time when schools for blind children were established. The development of tactile teaching material offered these children a comparable curriculum to sighted people. Technically the pictures must be simple and the basic image must be designed for tactile exploring[99].

[97] Ungar, S., Simpson, A., & Blades, M. (2012). Strategies for organizing information while learning a map by blind and sighted people. In M. Heller & S. Ballasteros (Eds.), Touch, Blindness and Neuroscience. Madrid: Universidad Nacional de Educacion a Distancia.

[98] Papadopoulos K., 2006: On the theoretical basis of tactile cartography for the haptic transformation of historic maps, e-Perimetron, Vol 1(1), 81-87

[99] Gardiner, A., & Perkins, P. (2009). 'It's a sort of echo...': Sensory perception of the environment as an aid to tactile map design. The British Journal of Visually Impairment, 23(2), 84–91.

Desirable characteristics of tactile maps are durability, sharpness of borderlines, surface texture, recognizable symbols, and availability. Maps should endure abrasive use, chemical exposure and adverse weather conditions. At the same time, they should be pleasant to touch, consistent in symbol representation and they should have distinguishable lines to trace. One of the important issues is whether tactile maps should attempt to reproduce visual maps in a tactile format, or whether they should seek to represent the environment in ways that are more compatible with the visually impaired user's sense of spatial awareness. It would be sensible to produce maps readable by both VI and blind users[100].

A tactile map cannot be a mere translation of visual information into tactile form. The production guidelines that are important in visual maps are not necessarily appropriate in tactile maps. How the map feels is a more important aspect in a tactile map than how the map looks. The important aspects to be considered when preparing tactile maps are: "the ability to discriminate lines, textures, size, labeling, and use of color"[101]. Tactile maps typically use technology consisting of raised lines, shapes, textures and symbols. Recent developments in the production of tactile maps include different sensory forms, such the visual, auditory and tactile senses[102]. Tactile maps are produced using a number of different technologies, and it is important to reduce information complexity, to emphasize the meaning of point and line symbols, and to choose textures and colors carefully in order to distinguish them from the background.

Unfortunately, tactile maps are not sufficiently available. There is a lack of producers and skillful tactile map-readers, with the result that there is minor demand for maps of good quality and not enough instruction in map reading skills. It would be essential to create coherent guidelines and specifications for tactile map design. The guidelines should take into account the differences in age, vision and other abilities of the potential users. The design should include the map size and format, the choice of symbols and the scale[103]. If this were achieved, it would be possible to have globally standardized maps.

Types of tactile maps

The earliest versions (Fig. 3) of tactile maps were collage maps made of built-up displays of string and handicraft materials glued on a substrate to create a variety of heights, textures, and shapes.

[100] Ibid.
[101] Ibid.
[102] H. Hirn, 2009, Pre-Maps: An Educational Programme for Reading Tactile Maps, Academic Dissertation, Helsinki.
[103] Ungar et al, 2012.

Fig.3 Collage Map

Thermoform maps (Fig. 4) are two-and-a-half dimensional maps; they are widely used for educational purposes. A thermoform map requires a master or a model, and a thin plastic sheet that is placed over the master and vacuum shaped into a tactile map. Thermoform plastic is available in a variety of thicknesses, which makes it possible to produce varying heights. It can be pre-printed with color to allow use by partially sighted persons or to enable sighted assistants to help the person with VI use the product. Thermoform maps do not usually have visual aspects, which are important for the readers with low vision. In any case, thermoform maps are an option in public places because they are durable and easy to clean.

Fig.4 Thermoform Map

Microcapsule or swell paper maps (Fig. 5) are either hand-drawn or printed figures, which are copied onto heat-sensitive microcapsule paper: when the paper runs through a tactile image enhancer, the marks on the paper covered by black ink raise above the paper surface, creating a raised-line drawing. The swell paper drawing can be achieved by a combination of computer drawing programs and Braille fonts, or by simply drawing a figure on a piece of white paper[104]. The pictures are two-dimensional and all marks are of equal height. Tactile pictures and maps made of microcapsule paper are top-rated among users, although they are not as

[104] H. Hirn, 2009.

crisp as Thermoform maps[105]. On the other hand, they lose precision if they are used a lot.

Fig. 5 Microcapsule or swell paper map (source: http://www.johngilltech.com/guidelines/tactile_maps.htm)

German film or Ritmuff-sheet is a semi-transparent plastic sheet, which is placed on a rubber mat. Figures can be drawn using a stylus or an ordinary pen that leaves a raised line on the sheet. The main advantage of this method is that it can be used interactively to create a graphic, which children can feel at different stages of the production. They can also make their own drawings. The main disadvantage of this method is that there is little variation in line height, and graphics get worn quickly as the film is a delicate and fragile material[106].

New inkjet technology (Fig. 6) produces raised tactile print using a printer that produces raised ink surfaces on a variety of substrates by laying down a polymer via an adapted jet head, which is then cured under ultra violet light. This process makes it possible to produce symbols of different elevations, textures and profiles[107]. Thus, it allows maximizing haptic contrast by printing maps directly from electronic copies and to create different tactile maps for a variety of personal needs. The inkjet process can offer advantages and possibilities when producing tactile maps and graphics. Users also benefit from the new technology, which offers easier use and more alternatives with more details in the graphics[108]. Inkjet technology, however, is not yet available for wider production.

Fig. 6 Multiple layers of black UV-cured ink (source: https://www.fespa.com/news/features/how-to-print-3d-with-a-uv-digital-inkjet.html)

[105] Ungar et al., 2012
[106] Ungar et al., 2012
[107] H. Hirn, 2009
[108] Ungar et al., 2012

Embossed maps are created from patterns of raised dots, using a computer-controlled Braille printer. The images can also be pressed on a paperboard or metal foil by using inexpensive tools. This is not an efficient type of tactile map, though it is a cheap method[109]. One development in tactile maps has been the use of the spur-wheel to create drawings on Braille paper. Computer graphics embossed by Braille printers use Braille graphics software programs with Braille graphics printers to achieve a master of printed dots. The master can be thermoformed for multiple copy production or the Braille graphics file can be embossed multiple times for paper versions. In some cases, small scale models can be more realistic tools than maps or verbal explanations for introducing spatial concepts to students who have difficulty with abstractions. The quality of the substrate, such as the roughness of the paper, is significant for the reader in terms of sensitivity and reading rate. However, embossed maps are nothing new; the Atlas of the United States Printed for the Use of the Blind of 1837 is an excellent example of embossed map created without any ink (Fig. 7).

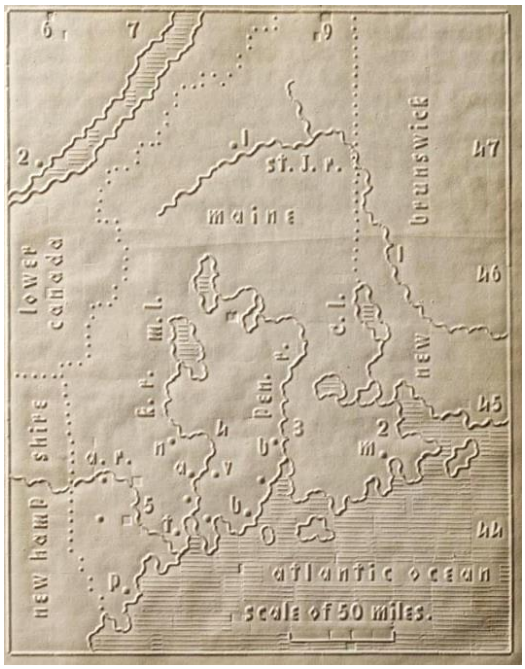

Fig. 7 Embossed paper map of Maine (source: http://socks-studio.com/2012/07/05/atlas-for-the-blind-1837/)

3d-priters are the latest progress. They present a cost-effective way for conveying visual information in tactile form and for various areas where visually-impaired need assistance such as navigation, representation of image and map content, exploration of inaccessible, huge (e.g. planets), or really small objects (molecular structures), and by all means education by incorporation 3d printed models in educational software for visually-impaired students[110].

3.1.7 Mathematics and Geometry for students with VI

[109] H. Hirn, 2009

[110] R. Jafri and S. A. Ali, 2015, Utilizing 3D Printing to Assist the Blind. International Conference on Health Informatics and Medical Systems (HIMS'15), At Las Vegas, Nevada, USA, http:worldcomp-proceedings.com/proc/p2015/HIM6044.pdf

Spatial thinking is also important for mathematics. For instance it has been shown that there is a strong link between spatial cognition and mental rotation capabilities[111]. In what follows, some examples on how to develop math skills of elementary school students with VI, in comparison with practices used for sighted students, are presented.

Number Sense, Numeration and Arithmetic

The number line (Fig. 9a) can be an effective tool in fostering students' number sense since it provides a useful spatial representation of quantities and relationships among them. For students with VI, the number line in Braille (Fig. 9b) is used for the same purpose.

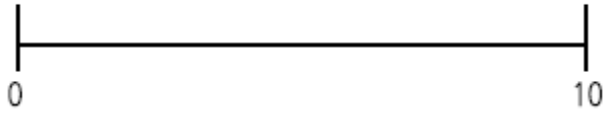

Fig 9a The number line

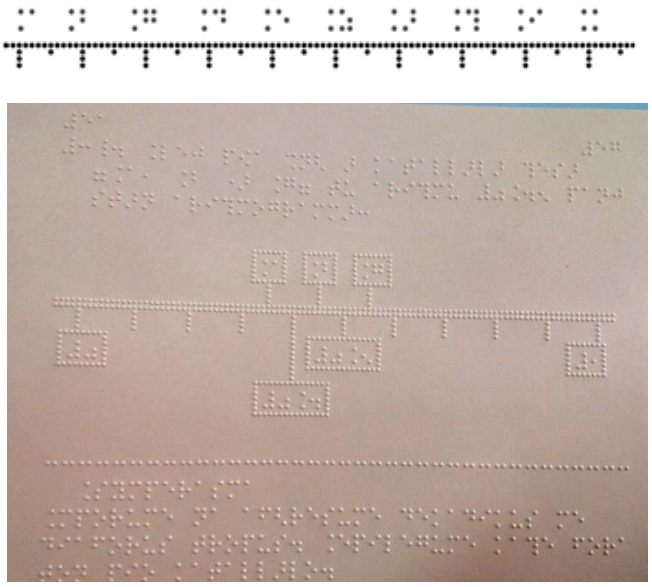

Fig 9b The number line in Braille

Furthermore, appropriate Pre-Braille materials can be used (Fig. 10) to answer questions such as the following: How many butterflies must fly from the first to the second flower, so that the two flowers have the same number of butterflies?

[111] Cattaneo, Z., & Vecchi, T. (2011). Blind vision: the neuroscience of visual impairment. Rehabilitation. MIT Press.

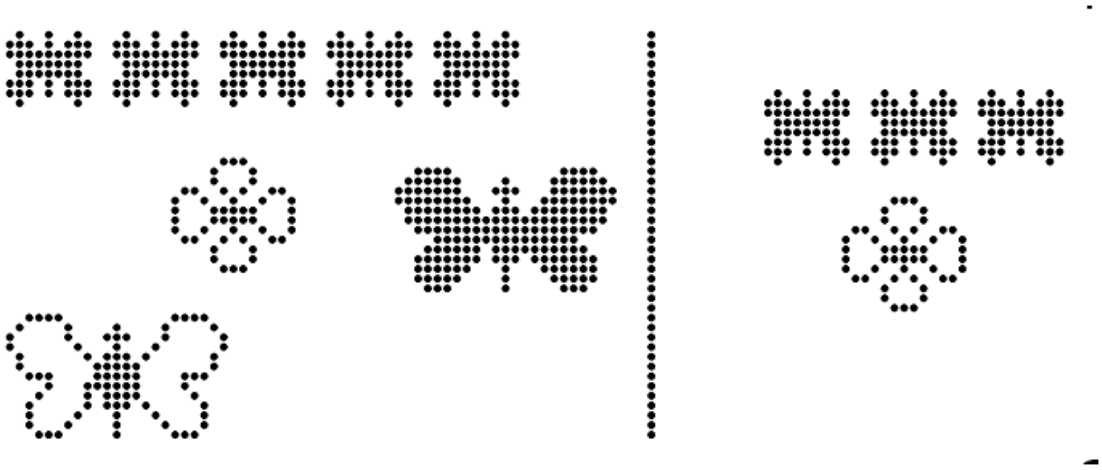

Fig 10 The Pre-Braille materials to teach simple arithmetic

Geometry and Spatial Sense

Geometry and spatial sense can be enhanced through puzzles and games. Tangrams and pentominoes[112] can be used to develop skills, such as composing or decomposing shapes, getting acquainted with transformational geometry (flips, transformations, and rotations), visualization and congruence. For students with VI, pre-Braille or tactile tangrams (Fig. 11) can be used for the same purposes.

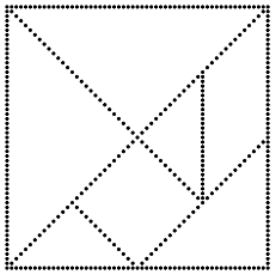

Fig 11 Pre-Braille tangrams

Furthermore, pre-Braille shapes (Fig 12) can be used for teaching the concept of symmetry.

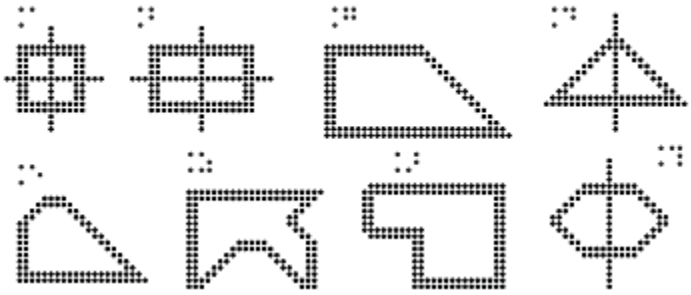

Fig 12 Pre-Braille shapes

[112] A pentomino is a plane geometric figure formed by joining five equal squares edge to edge. There are twelve pentominoes, not counting rotations and reflections as distinct. They are used chiefly in recreational mathematics for puzzles and problems.

Patterning and Algebra

Early patterning experiences require both visual-spatial and numerical reasoning, either to identify a simple pattern or a mixed pattern. Pre-Braille materials (Fig. 13) are used for the same endeavor.

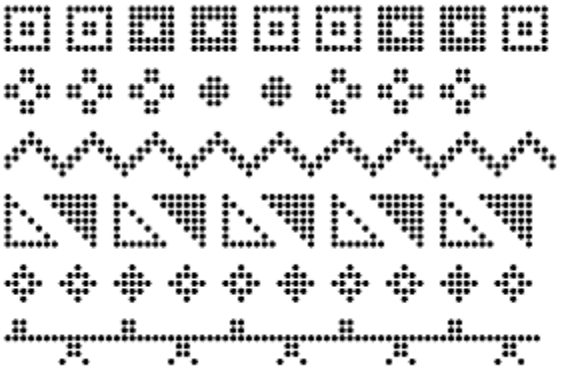

Fig 13 Teaching patterns with Pre-Braille materials

Graphing

Graphs allow creating visual displays of data; students with VI use graphs in Braille to understand data (Fig 14).

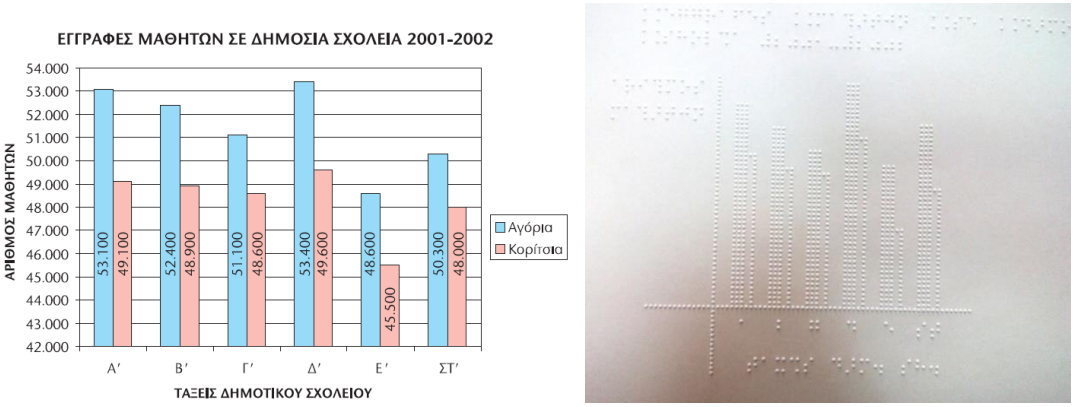

Fig 14 A graph and its Braille equivalent

Tables

Tasks regarding the use of tables include observing the grid, or finding the positions of icons located therein (Fig 15).

Fig 15 A table and its Pre-Braille and Braille equivalents

Operations

The Nemeth Code for Mathematics and Science is the standard code for representing mathematical and scientific expressions in Braille. A thorough understanding of the Nemeth Braille Code by students is essential for success in mathematics. The operation of addition in spatial arrangement is presented in Fig 16.

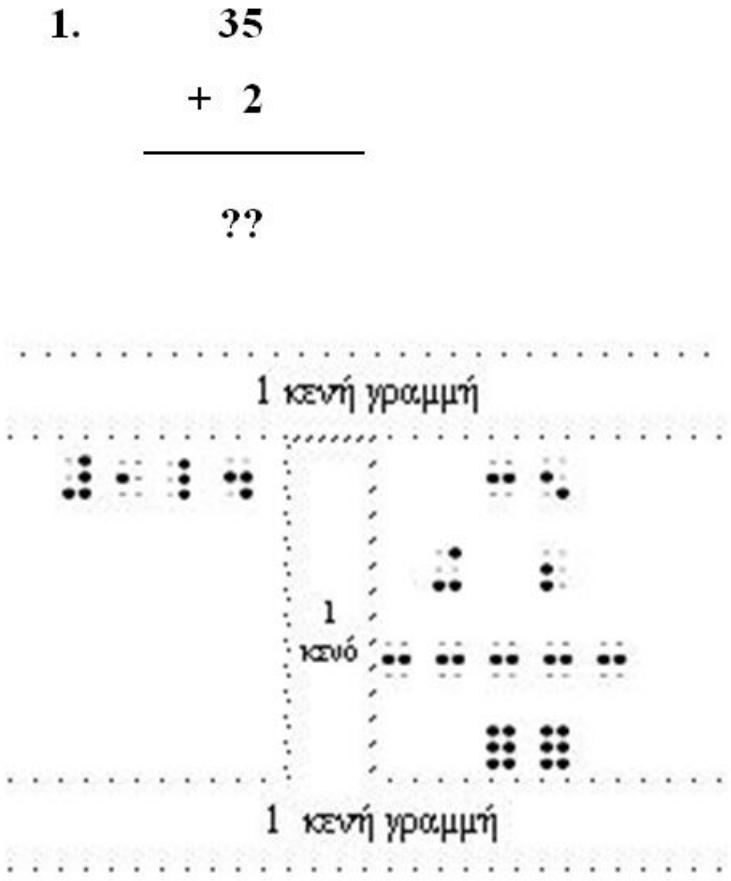

Fig 16 Addition in Nemeth Braille Code

Geometry

A Braille Protractor (Fig. 17) can be used to measure an angle in a Braille Mathematics Textbook.

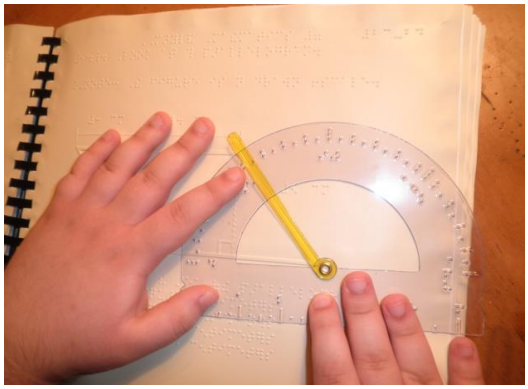

Fig 17 The Braille protractor

3.2 Additional curriculum materials and auxiliaries developed/used by teachers from Liceul Special pentru Deficienti de Vedere, Cluj-Napoca, to enhance spatial thinking of VI students

3.2.1 Tactile world maps/Tactile graphics

Tactile graphics are a way of conveying visual information/ or information that can be obtained only by the sense of vision, for the people who are blind or visually impaired. So blind people "see" with their hands, what others see with their eyes. This way of representation may include tactile representations of pictures, maps, graphs, diagrams, and other images. A person with a VI can feel these raised lines and surfaces in order to obtain the same information that people who are sighted get through looking at pictures or other visual images.

Tactile maps and diagrams (Fig. 18) represent a system based upon touch that conveys information relative to spatial relations. Tactile cues are used so that students with visual impairment develop cognitive maps and understand new concepts. Usually, these kinds of materials are used when the blind person cannot have access to the real objects, or the educational learning content needs abstract concepts and unfamiliar phenomena.

Fig. 18 Tactile map (left) and diagram (right)

3.2.2 Botanical atlas with tactile diagrams for VI students

Botanical Atlases (Fig. 19) are auxiliary books used by teachers in classes along with other materials to teach VI students concepts of Biology and Science. These tactile diagrams help VI students make a cognitive map and a clear representation of the new and intangible concepts, since they substitute the image of the object or phenomena that cannot be touched, or understood without a structure's model and thus allow the process of cognitive learning based on logical and clear/accurate representation, not on mechanical learning.

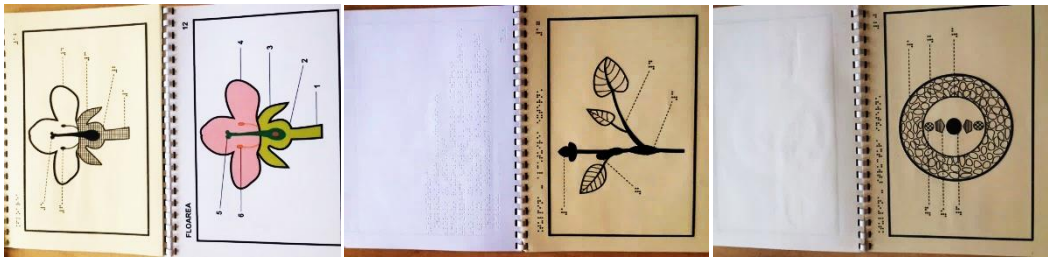

Fig. 19 Botanical Atlas with tactile diagrams

3.2.3 Tactile album with geometry forms/ Mathematics

These tactile albums with geometry forms are used to develop spatial thinking of students with VI, which is necessary in the process of understanding abstract concepts like geometry forms, the position in space, angles and shapes, areas of measurement, etc.

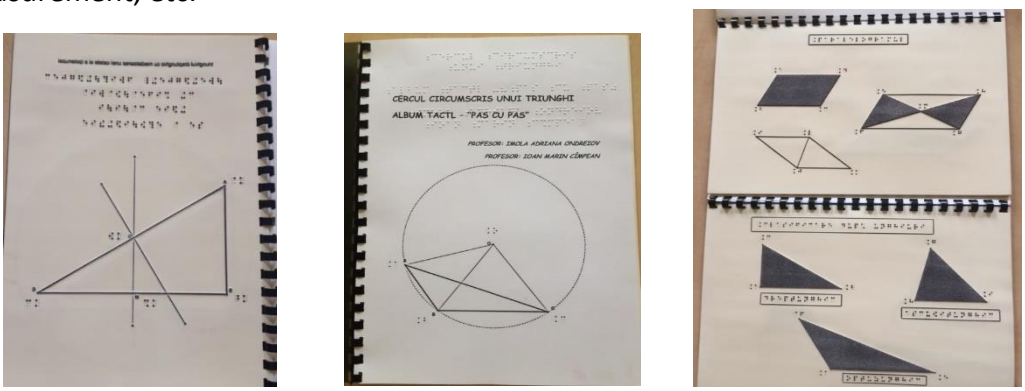

Fig. 20 Tactile geometrical forms

3.2.4 Pre-Braille methodological framework

There are special auxiliaries used by teachers with young children with VI as a first step to start the exploration process in the pre-learning literacy activities. In this process may lay the base of the development of spatial thinking of VI students. Pre-Braille auxiliaries contain different types of lines, in different directions, and shapes like circles, squares, and combined forms.

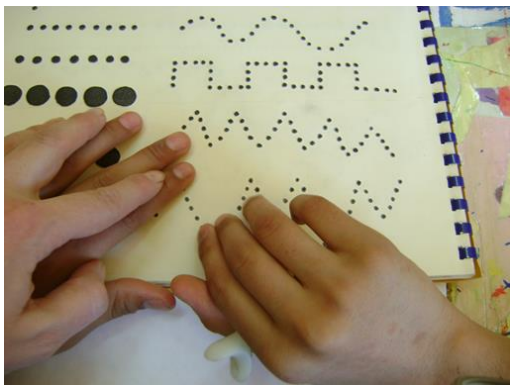

Fig. 21 Pre-Braille auxiliaries

3.2.5 Tourist city guide for VI visitors

The tourist guide was developed thanks to the Project "Terra Mirabilis- Tourist tracks for visually impaired young people"[113]. It was created and developed by Babilon Travel Association (NGO), the Special High School for Visually Impaired, and City Hall of Cluj – Napoca. The Guide includes adapted images (tactile images and large print images- Fig. 22) along with the description (audio-mp3, Braille and large print) of the most important touristic sites and monuments from Cluj-Napoca city.

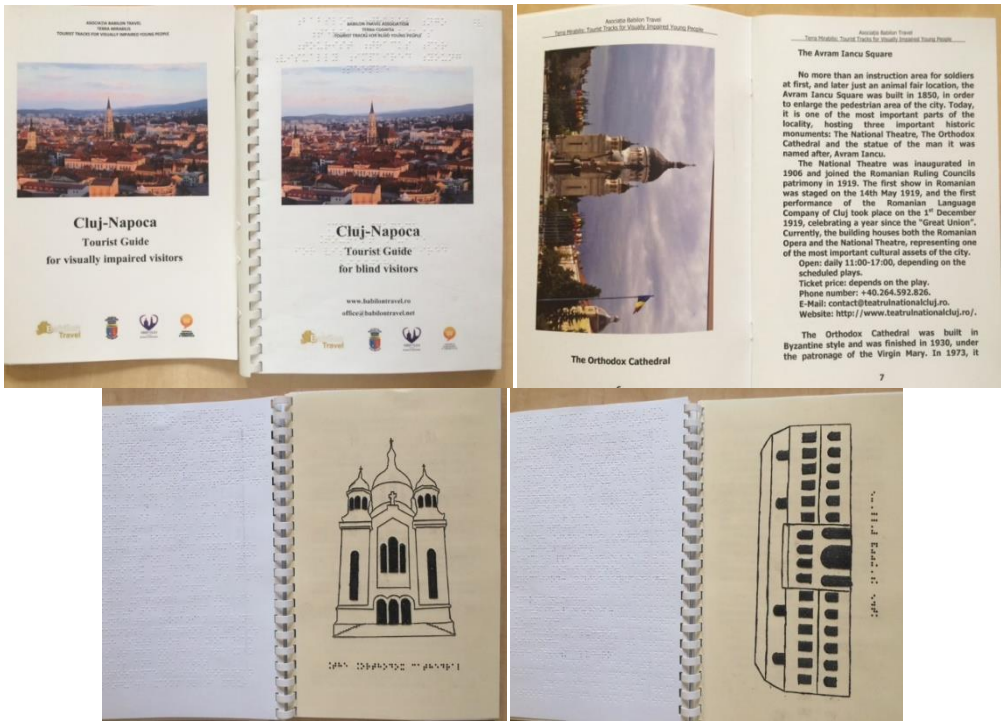

Fig. 22 Cluj city guide tactile images

Students with VI have to use concepts about space, directions, and reasoning processes (extract spatial structures, perform spatial transformations and draw functional inferences) by making structured and sequentially movements of their hands on the surface of the picture with the major purpose to acquire a clear and accurate representation of the object from the picture.

3.2.6 Project "The sky in your hands"

The "Sky in your hands" is a project designed by The Astronomical Complex from Baia Mare Romania for the period February – November 2016. The purpose of the project was to develop tactile diagrams (Fig. 23) to make the sky and the constellations accessible for the visually impaired population and to allow casual visitors to capture a special sensory experience.

[113] http://english.babilontravel.ro/projects/terra-mirabilis-tourist-tracks-for-visually-impaired-young-people/

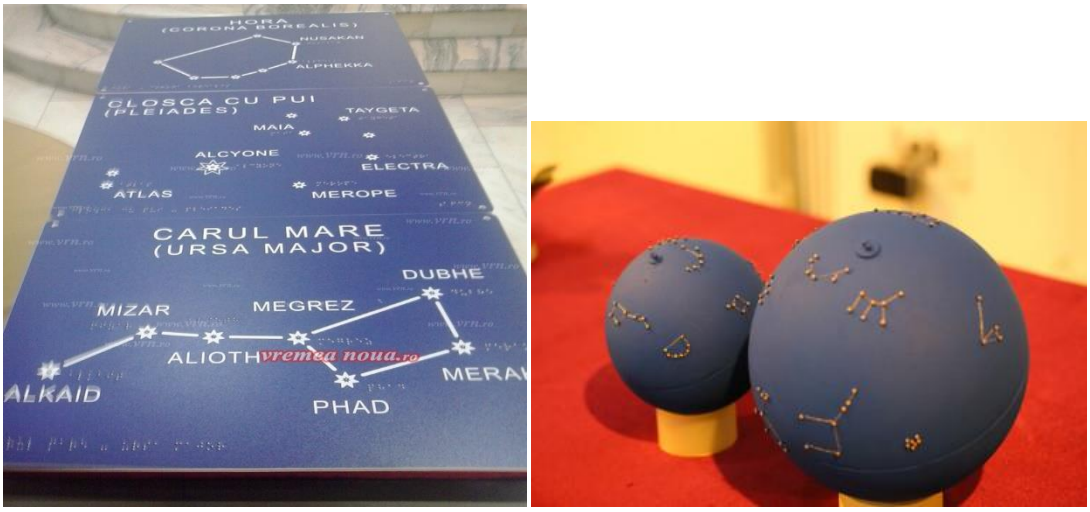

Fig. 23 Tactile constellations representation

3.2.7 The GEOTHNK Project

GEOTHNK[114] was a 2-year project under the Lifelong Learning Programme Erasmus of the EU (1/12/2013-30/11/2015). The project aimed at enhancing spatial thinking through an innovative ICT-based approach and an open, collaborative educational environment and at offering a methodological approach, which allows the interdisciplinary organization and semantic linkage of knowledge. The project's innovation lies in the following: (i) transversal character (different target groups of educators and learners), (ii) transfer of recent geospatial research on semantics, ontologies, and knowledge visualization, as well as, innovative teaching methods, (iii) integration of knowledge (development of integrated blocks of knowledge), and (iv) interdisciplinary approach (semantic linkage of knowledge components from different disciplines).

Liceul Special pentru Deficienti de Vedere in collaboration with Teachers Training House from Cluj-Napoca, Romania was involved in the GEOTHNK Project to develop adapted scenarios and activities in order to identify the impact of the project on VI students. Visually impaired students together with the Geography teacher have traveled a route from a point to another using a GPS guide for directions and distance. This learning scenarios approach helped the students to use interdisciplinary knowledge and to apply theme in daily activities.

3.3 Proposals for enhancing current educational practices through the VISTE partnership

VISTE will introduce essential strategies to cultivate spatial thinking skills of VI students. New and functional approaches will be developed; inclusive educational settings and proper learning scenarios will be created to stimulate the development of spatial thinking skills of VI students from special and inclusive education systems. The development of essential skills in different domains and the stimulation of the

[114] http://www.geothnk.eu/index.php/en/

collaboration between sighted and VI students is the right direction to foster inclusion.

There is tremendous need for trained and specialized teachers to help VI students in inclusive education settings to develop all the abilities necessary to face the educational challenges which appear with all the new concepts studied in different disciplines or school subjects at Mathematics, Geography, History, Science, Biology, and Geometry. Spatial thinking is a key concept which helps VI students to understand concepts, to reason about formal and intangible things, to be independent in orientation and mobility through space, to create connections and make valuable judgments on things.

The process of inclusion is at the beginning in both Greece and Romania, while it is already a bit more advanced in France. Erasmus+ projects provide valuable resources to develop new and indispensable tools, instruments and methods so students with VI have the same opportunities than sighted children to understand, make clear representations, develop valuable cognitive maps, use cognitive learning and access the new and formal concepts so they build up all the abilities required by the curriculum and develop knowledge of the world. All that serves the major purpose of becoming independent and gaining autonomy in mobility and orientation.

Students with visual impairments need an educational system that meets the individual needs of all students and fosters independence. Students with VI in an inclusive education system are capable of cognitive learning and are of good learning results. Appropriate teaching methods, adequate materials, tools and instruments will make a difference. VI students have to have access to proper ways of understanding abstract concepts and learning. The right process of understanding is measured by the success of each individual in the school and community.

Vision is fundamental to the learning process and is the primary basis upon which most traditional education strategies are based. Students who are visually impaired are most likely to succeed in educational systems where appropriate instruction and services are provided in a full array of program options by qualified staff to address each student's unique educational needs.

Generally speaking, visually impaired children across Europe are confronted with the same problems and the necessity of more and accurate tools to fulfill their needs in the learning process, even when in special schools, or benefit from the services offered by an inclusive education system. So, in both situations they still have difficulties concerning personal autonomy, self-confidence, the development of relationships with the others and social integration, in understanding new and abstract concepts and in making clear representations of the environment.

All partners involved in the project have identified the need of children with VI to gain independency and autonomy in daily living skills, the need for ICT tools and new

educational methods so that children from inclusive education systems feel confident, use modern tools to understand abstract concepts and develop the most important ability for VI students – spatial thinking.

The VISTE project comes with an innovative idea, which applies to all VI students within an inclusive educational system: a modern ICT toolkit and an educational framework developed based on a practical and real analysis of the VI students' needs, along with a guide of best practices for teachers with the major purpose of enhancing spatial thinking of VI students.

The project offers the partners involved the opportunity to give precious support to inclusive education systems. Teachers from special and mainstream schools from Romania and Greece will collaborate to enhance spatial thinking of VI students from both special and inclusive education systems. Teachers from special and mainstream schools from both countries will exchange ideas, experience and knowledge. There will be a bidirectional exchange of practices

The project includes two staff training programs and multiplier events which will be a good start for teachers from an inclusive education system to enhance their abilities, to enrich their methods and knowledge in the field to work with VI students, and support in better ways their needs and particularities in learning. Furthermore, the project also offers opportunities for the exchanges of good practices in the field of spatial thinking of VI students for teachers from Romania and Greece who work in special and mainstream schools.

VISTE is also good starting point to create learning scenarios to develop the spatial thinking of VI students and to enhance current educational practices in Romania and Greece.