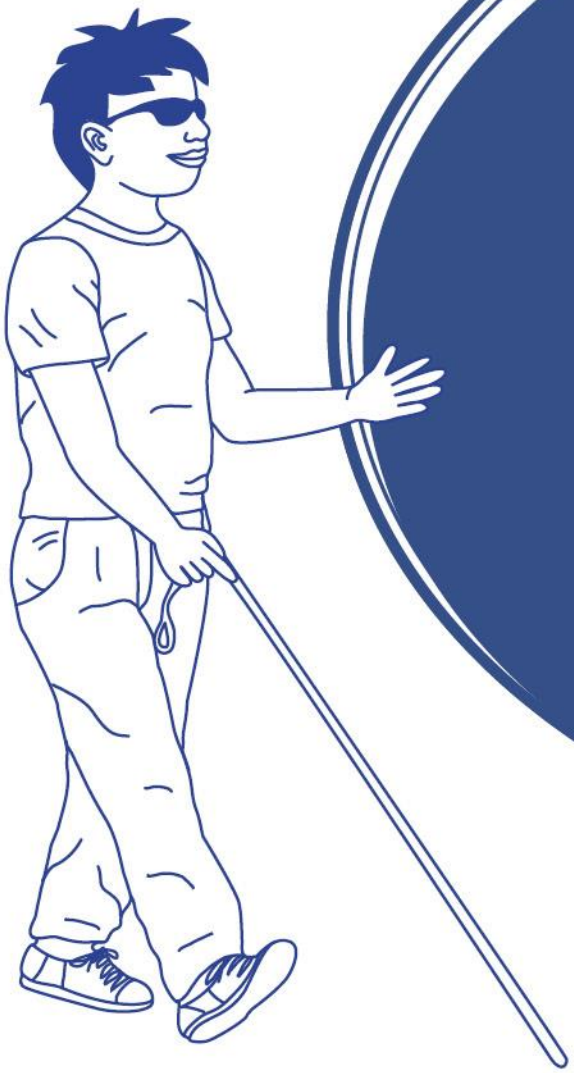
Teaching the Blind

First Language

(Mother Tongue)



With the support of
Erasmus+ Programme
of the European Union

A series of special education teaching guides

Inclusion in Europe through Knowledge and Technology

Project no: KA201-2015-012

Teaching First Language to Students who are Blind

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Inclusion in Europe through knowledge and technology

Information on the fundamental principles, practices, educational material and teaching aids used to teach various subjects to students with special needs are few and far between. In some cases, material has been prepared for internal use at specialised schools or in other closed environments. In other cases, knowledge has been passed from teacher to teacher as part of workplace training.

No systematic material on pedagogical principles, practices, educational material and teaching aids exist for areas such as teaching first language teaching, foreign language teaching, mathematics and music for the blind.

With this in mind, the goal of this European project is to further develop, implement and disseminate good practices in the area of inclusive education and learning technologies by delivering three primary components: *Teaching Guides*, Guide on g*ood practices Inclusive learning and Teaching* and *SMART E-learning objects*.

Teaching guides

In completing the project, RoboBraille partners have created a series of twelve educational guides covering fundamental principles, practices, educational material and teaching aids covering first language teaching, foreign language teaching, mathematics and music for the blind, partially sighted and dyslexic.

Inclusion Guide on good practices Inclusive learning and teaching

In support of this, the project has collected and collated information on good inclusion practices in five select areas (teacher skills, alternate media, support structures, preparation for inclusion and teaching environments) which are published in a catalogue of good practices.

SMART e-learning

Finally, the project will adapt a comprehensive set of educational material on the RoboBraille service prepared in the LLL LdV RoboBraille SMART project into a set of learning objects for popular e-learning platforms for web and tablet deployment.

For all materials produced by this project

Because the material covers teaching of students of various age, they are named students, learners, pupils and children. The material also reflects the different culture and level of inclusion practices of the project partners. The guide is not a substitute for formal training of teachers.

Introduction to this teaching guide

A **first language** (also **native language**, **father tongue/mother tongue** or **L1**) is the language or are the languages a person has been exposed to from birth or that a person speaks the best and so is often the basis for sociolinguistic identity (https://en.wikipedia.org/wiki/First_language)

One can have two or more native languages, thus being a native *bilingual* or multilingual. The order in which these languages are learned is not necessarily the order of proficiency.

The term 'first language' is not the chronologically first language, but the one a speaker is fluent in and feels most comfortable to speak.

Specialised pedagogies when teaching a first language to blind students

Legal blindness is usually defined as having central visual acuity of 20/200 or less in the better eye with correction or having a visual field no greater than 20 degrees.

Teaching a first language to students who are blind it's about trying to transmit the same content as to other, but it's also about teacher knowledge about learning difficulties, skilled use of specific teaching methods, parent and teacher support.

Some special needs groups (for example dyslexia) have argued strongly for the need for particular specialist approaches. In contrast, many proponents of inclusion have argued that "good teaching is good teaching for all" and that all children benefit from similar approaches. (More on: https://eric.ed.gov/?id=ED493257).

We believe that teaching methods should be tailored to blind students. Not all are relevant. Yet, many general pedagogical methods can be used successfully teaching first language to a blind student. Adapting material is however very necessary and can be a challenge. Teacher creativity is also important.

In order to succeed during the educational process, it's very important to understand some of the pedagogical principles related to the special needs of teaching a bind student.

The principle of conscious and active participation of students

- Learning activity should respond to the real necessities of the child, to arouse interest and willingness to participate in the process of acquiring new knowledge.
- The student should be trained to become the object of knowledge, and subject of self-training.
- Some students should be praised and encouraged in ever more frequent contexts of hyperactivity associated with visual deficiency; students should also be guided so that their work may be organized.
- Keeping their interest alive should be carried out by using the adapted materials and methods.

Principle of intuition

Knowledge processes rely on perception, and students need intuitive support in order to assimilate and understand information. This process has 3 stages:

- Sensory-perceptual knowledge through direct contact with the material.
- The transition from concrete to abstract thinking through operations.
- The correct transfer of the theoretical definitions to the real world.

Principle of systematization and continuity

This will ensure the succession of the educational process.

- The activity should be orderly and systematic.
- This principle is carried out by planning the lessons ahead.
- Given the slow pace of work of the blind student, there will be special focus on reiterating certain pieces of information.

Principle of connecting the theory with the real word

- It states the necessity of a stable connection between the theoretical knowledge and practically transferring it to the real world.
- There are certain benefits in the compensatory process.
- It is an important principle and in close connection with the very purpose of educating the visually impaired: that is, their socio-professional integration.

Principle of accessibility

- This principle can be observed by focusing on some peculiarities determined by the type and degree of deficiency;
- There should be established relationships between the known and the unknown, between the simple and the complex, between the practical and the general, and between the concrete and the abstract.

For example, if we use an electronic document during a first language class, we have to be sure that is an accessible document for the blind student, otherwise the student won´t be able to read the document and understand the content. So, when we present or create a document, the idea is to create an accessible document, that can be read by most persons including students with disabilities.

To create such a document, one must use structural elements (tags) such as headings to properly structure documents and therefore identify clearly the various elements which compose the document.

These structural elements are often referred to as ‘styles’ in word processors. One must pay attention to the following:

1. Does the document have a title?
2. Are proper Headings (of part, chapter, sessions, subsections, etc.) used and do they impose proper hierarchical order e.g. do Heading 2s define subsections of Heading 1s, Heading 3s define subsections of Heading 2s and so on?

3. Lists: are true numbered and/or bulleted lists used?
4. Is presentation separate from structure? For example, there should be no additional blank lines inserted, whose purpose is to put spaces between paragraphs. Set the "space before/after" attribute for paragraphs instead. Also, do not insert blank lines to move onto a new page. Insert a page break instead.
5. Similarly, formatting should not be used to mimic headings.

Every non-textual element, such as an image must have a textual alternative. In all cases this alternative needs to take the context into account. For instance, a single picture might have a different description whether it is used in a context or just as decoration. If the picture is not relevant for the text, is better to renounce it. More information of how to create accessible MSWord documents can be found at http://www.sensusaccess.com/sites/default/files/resourcefiles/accessible_microsoft_word_documents.pdf

Principle of respect for age and individual particularities

- We (as teachers) should know and understand the learning curve and developmental level of the student, respecting the particularities of age, as well as maximizing their cognitive potential.

Principle of thorough acquisition of knowledge and skills

- In the educational process, acquisition of knowledge doesn't solely rely on simply memorizing things one after the other, but also on being able to organize and combine the pieces of information into flexible systems, where knowledge can be updated and used in solving tasks and challenges.

Pedagogical methods teaching first language to blind students

Etymologically, the word “method” comes from the Greek words “metha” (towards) and “odos” (path). The method is a dynamic element, a resource of special creativity in the act of teaching.

Working and classification methods

1. Direct methods for developing communication skills
    - Exposition
    - Explanation
    - Storytelling (Narration)
    - Lecture-Debate
    - Conversation
    - Interactive Listening
2. Methods of cultivating creativity and problem solving
    - Problematization
    - Brainstorming
    - Dilemma
    - The Model (Role playing)
    - Solving problems in a creative way (problem solving)
    - Discovery
    - The Literary Process
3. Methods and techniques of intellectual work with textbook/reading text for the first time
    - Explanatory Reading
    - Critical Reading
    - Reading texts designed for problematization
    - Guided Reading
    - Self-Guided Reading
    - Reading quickly and efficiently (this method is useful started at 11-12 years old when the blind student could easily read the Braille alphabet; reading in Braille (tactile reading) takes much more time than reading black print using eyesight.

4. Methods based on group discussions:
    - Cooperative Learning
    - Focus Group
    - Debate Technique
    - Mind Maps
5. Methods of direct exploration of reality:
    - Observation
    - Experiment
    - Case Study
    - Demonstration
    - Modelling
6. Action-Based Methods:
    - Exercise
    - Research Topic
    - Project
    - Game
    - Dramatization
7. Rationalizing Methods of teaching and learning:
    - Working with worksheets adapted in Braille
    - Scheduled Training
    - Computer-Aided Training
8. Assessment methods
    - Oral and Written Tests
    - Tests
    - Exercises (Practise)
    - Examinations

Pedagogic methods for specific types of lessons

The pedagogical methods used during first language teaching are adapted for the specific type of lesson. We could classify the different lesson types as:

1. Lesson Type: Acquiring new knowledge

This is a type of lesson encountered throughout all years of study and found in all subjects. The steps are:

- Updating and checking prior knowledge
- Acquisition of new knowledge
- Providing feed-back

2. Lesson Type: Reinforcing and Consolidation

This type of lesson comes:

- After activities during which students acquire new knowledge and more difficult skills.
- At the end of any chapters containing complex information (such as literary essay, spelling and punctuation rules and so on).

During these lessons, the methods employed generally refer to examples to illustrate certain rules, exercises, dictation, thematic essays etc. Consideration should be given to the variety of teaching methods to avoid monotony.

3. Lesson Type: Review and Systematization

This is a type of lesson which is based on a rigorous plan, ending with synthesis-facilitating schemes

These lessons are held at the beginning of the school year or in the transition from one major chapter to another, aiming to reassess elements of language and literature previously studied. In such lessons teachers make use of recognition exercises, characterization exercises and creativity exercises. It is recommended that such lessons finish with teachers implementing certain schemes.

Such lessons are also conducted before national exams (high school entrance exam or baccalaureate – depending on the different education systems throughout Europe.

4. Lesson Type: Assessment

This type of lesson is performed at the end of chapter or books/articles; the end of the semester or school year. They should follow these questions:

What should students know / do at that time? vs. What do they know on an individual / collective level?

How is the relationship between the quantity and quality of knowledge at that level? And how do they usually operate with that knowledge?

Teaching and learning techniques

1. Focus on the formation, development and consolidation of skills to communicate by reading and writing.

   Objectives: improving pronunciation techniques, linking sounds to letters, involving syllables in the flow of words, associating graphical form of the word with its meaning(s), learning the meanings of sentences / texts, correctly spelling of letters and syllables / words and contexts.

2. Focus on technique of forming and developing oral and written expression

   Objectives: communication of some messages adapted to context; performing certain kinds of dialogue; the ability to convert a dialogued text to indirect speech; summarizing texts; performing argumentative speech etc.

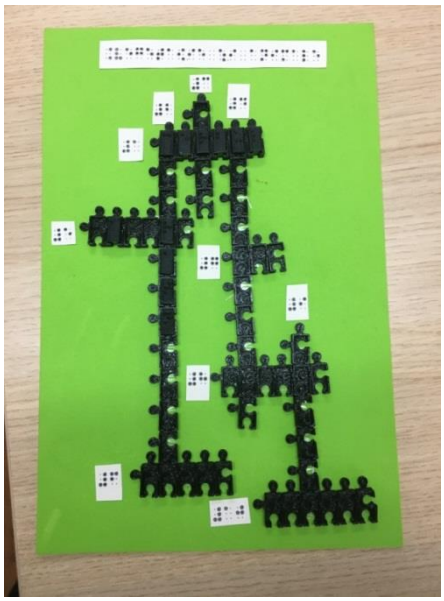

Figure 1: Adapted crosswords for blind students

3. Focus on technique of developing spelling, punctuation and orthopedical skills

   Objectives: scientific assimilation of using basic spelling and punctuation marks: full stop, comma, hyphen, dialogue dash (Romanian language, for example, marks the beginning of dialogue lines with dashes and not inverted commas), question and exclamation marks; learning the correct hyphenation rules of syllable division; learning the correct spelling of homophones (words with same pronunciation but different spelling) or homographs (words with same spelling but different pronunciation / stress which leads to different meanings); familiarizing students with writing groups of letters in certain words; the correct spelling of words based on the letters in the vicinity of other letters, etc.

4. Focus on technique of using language in various communication contexts

Objective: The proper use of language styles depending on the context (fictional style, administrative style, legal style, journalistic style, etc.).

When "instructional techniques originating in general education were adapted to assist students with disabilities in acquiring and assimilating new knowledge, the efforts demonstrated significant success and much improved academic outcomes" (http://www.docs.hss.ed.ac.uk/education/creid/NewsEvents/03viii_BERASeminar_Paper_lf.pdf).

Challenges relating to the disability /specific learning difficulty

The communication in our native language is acquired by imitation, in the family. Writing and reading usually begin at age 6-7 years (depending on country) and is usually acquired at school. Blind students learn to write the Braille code (https://en.wikipedia.org/wiki/Braille) using a Braille typewriter (Perkins in most cases) at the same age as students without disabilities

Figure 2: Perkins Typewriter for blind students; the six keys are numbered

Figure 3: Stylus and card stock-paper

Braille characters are small rectangular blocks called *cells* that contain tiny palpable bumps called *raised dots*. The number and arrangement of these dots distinguish one character from another. A full Braille cell includes six raised dots arranged in two lateral rows each having three dots. The dot positions are identified by numbers from one through six. 64 solutions are possible from using one or more dots. A single cell can be used to represent an alphabet letter, number, punctuation mark, or even an entire word.

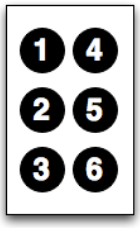

Figure 4: Braille Cell

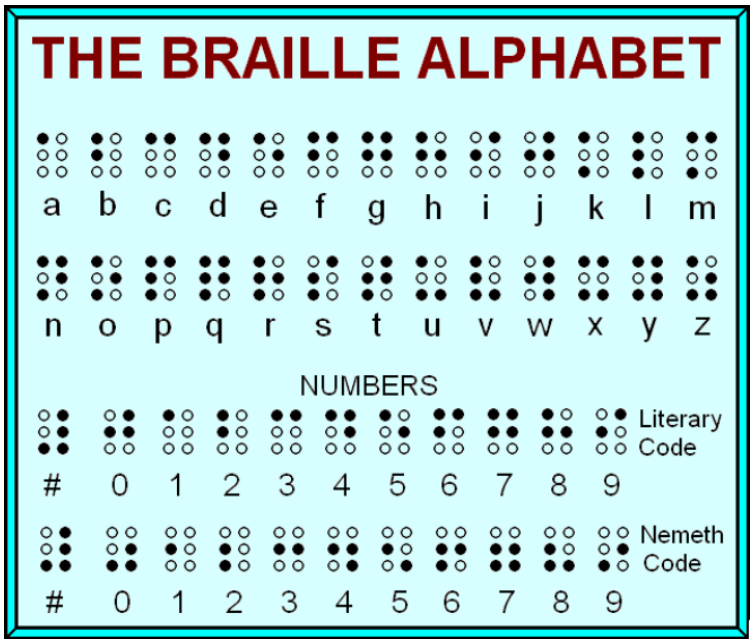

Figure 5: Braille Alphabet chart including numbers

Reading in Braille (tactile reading) takes longer time than reading black print and learning how to read Braille also takes time because it requires a lot of exercises and the tactile stimulation at early ages is necessary; below we have pictures contains examples of “Tactile Stimulation Exercise Books” for acquiring the basics of Braille Code in preschool :points, lines ,cells, dots, dot space, etc. Here they are represented in relief for the blind students:

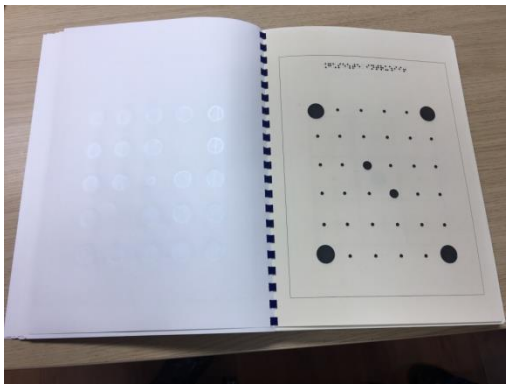

Figure 6: Taktile symbols, example 1

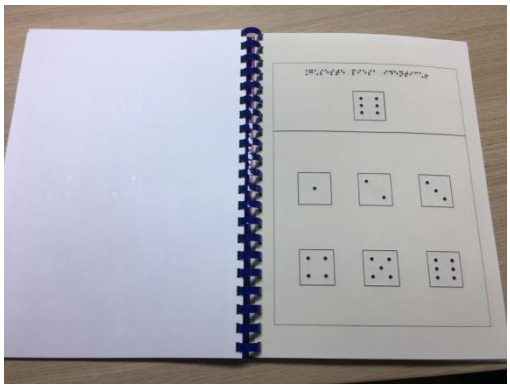

Figure 7: Taktile symbols, example 2

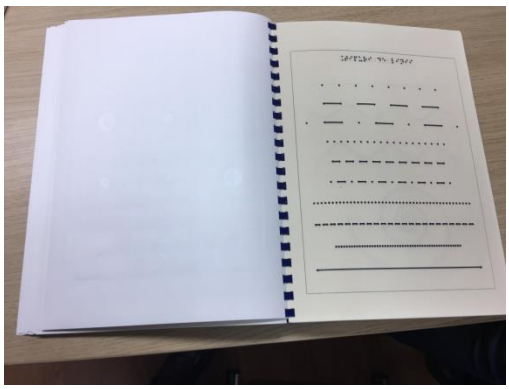

Figure 8: Taktile symbols, example 3

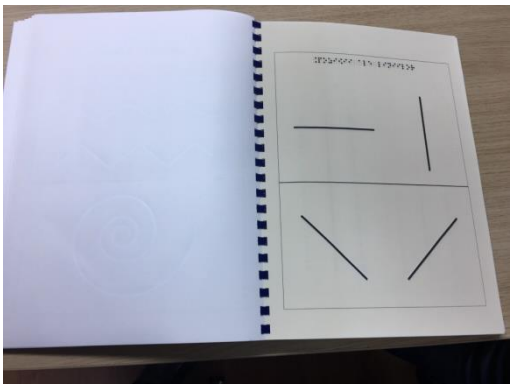

Figure 9: Taktile symbols, example 4

Improving the vocabulary

The direct vocal communication is perhaps the most important way for the blind student to interact with others, to get to know the world and express their opinions. Hence, good communication skills and vocabulary development are essential. Often, a poor vocabulary can be a challenge. Specific words may seem familiar to the blind student, but their meaning and the context are not. It is recommended in this regard: vocabulary exercises: exercises that require solving synonyms, antonyms, homonyms, the meaning of words in certain contexts, derived words exercises on compound words (depends on complexity of a language), spelling exercises. The teacher must always ensure that the blind student knows how to

use the word in context. Ask the blind student to compose sentences with a new word, rather than explaining only the meaning of the word as in a dictionary.

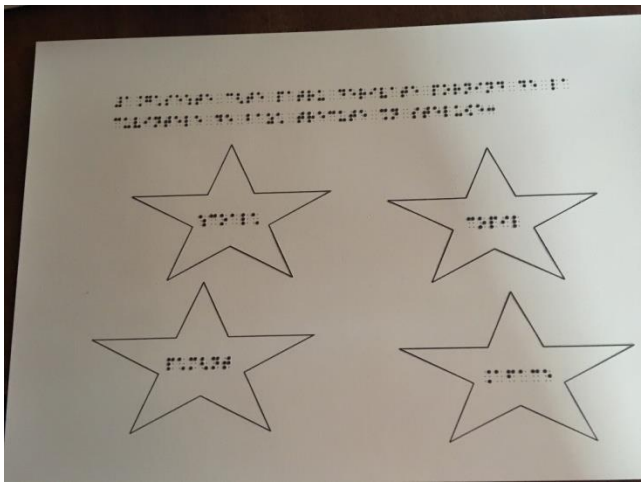

Figure 10: An adapted vocabulary exercise for blind using swell-paper

To avoid monotonous speech (when producing an essay, for example), exercises that develop creativity and spontaneity in communication are highly recommended.

How and what to describe?

Describing the environment, using colours can be very difficult for a blind person. Realizing expressive descriptions, as required in the native language classroom, may be very difficult for a blind student.

Another difficulty in the descriptions is the **notion of colour**; the necessity of knowing some conventional information: the colour of the sky is blue or grey, but not green; the grass is green, not blue, etc.

The teacher must try to find the most appropriate examples for explaining the **spatial concepts of the environment**: height, length, depth etc. for the blind student

Providing examples as concrete as possible: if the student has to imagine the height of a mountain, it will be easier for him/her to understand the idea of height if we ask him/her to count how many steps there are along the classroom wall and multiply the result by a number.

Sometimes, a poetic description (a landscape) can be imagined using flowers, spices, herbs etc. These concrete objects help the blind student to “see” the universe described by an author. Such exercises are very useful for everyday life too, and improve the comprehension of a text which otherwise may be too abstract.

Adapted materials

In order to address the needs of blind students, teachers may find the following useful:

- Creating adapted materials, such as Braille documents (embossed), or digital to be read on a Braille display or use Thermoform.
- Use 3D materials or real object in order to understand a literary description.
- Add descriptions to all images.
- Use life situation in order to develop the communication skills.
- Dramatize the stories by role play.
- Repeating the information as many times as it takes for the students to properly understand
- Reading Braille takes more time than reading print. The speed depends on how much training the reader performs, but the teacher or the support teacher have to know this aspect, in order to adapt the volume of work in reading activities (reduce the volume or allow extra time for the blind student).
- Allowing more time to vocabulary exercises (solving synonyms, antonyms, homonyms, the meaning of words in contexts, spelling exercises, etc.**)** in order to improve communication and avoid stereotypes.
- Use riddles to develop creativity
- Allowing more time for tests and national exams;
- If the book is not in Braille, use audio-books.
- Reading, theatre and other art forms helps the blind to develop vocabulary, imagination, communication and become an integrated and a successful person- access to information.

A description of suitable teaching methodologies practices

In this section, we present a recent system invented for blind students. It is called: “Audio-Book Electronic System for Blind” The original name is *Cartea Vie*. The system consists of both hardware and software and is a very practical tool not only for teaching first language but also for foreign languages, geography, history or sciences. The advantage is that the student works individually; it’s easy to use it and generally the students enjoy this activity. The device can be used both in inclusive education and in special settings.

The “Audio-Book Electronic System for Blind” is a digital electronic mobile device, equipped with a 12.1” touch panel input and an audio output, meant to add audio content to items of maps, drawings and other embossed A4 format sheets (using recorded natural voices), placed on the touch panel surface. It also uses an optical device in order to automatically identify the current page.

At a simple touch on an item in the A4 tactile sheet, placed on top of the device, an audio recording is played, providing information about the touched item. “Audio-Book Electronic System for Blind” is an innovative solution, developed by Ilie Șerban Mihai. The system was awarded with gold and bronze medals both at invention exhibitions in Cluj-Napoca, Romania and Geneva, Switzerland in 2014.

Audio-Book Electronic System for Blind

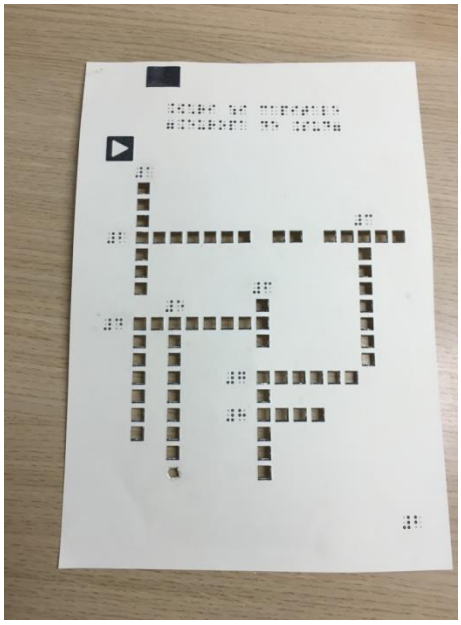

Figure 11: Content subject sheet in Braille

Figure 12: Double sided Sheet

Figure 13: Plastic dice with letters in Braille

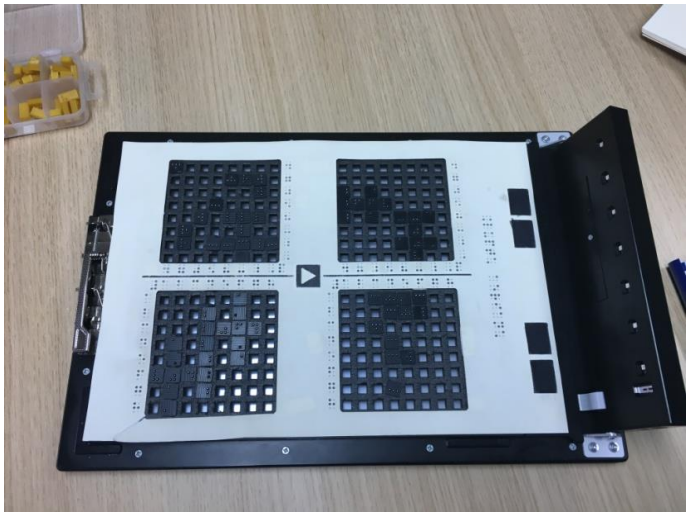

Figure 14: Audio Book Electronic System

Depending of the type of information, the device could be used in horizontal or vertical position:

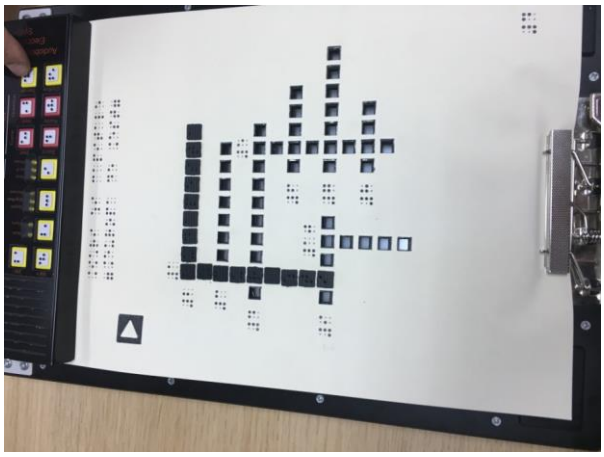

Figure 15: Device can be used in horizontal or vertical position

Information on how to get the system, go to: www.interactivebooks.ro

Learning technologies for inclusive teaching of first language to blind students

Many of the barriers that students who are blind face at school, can be overpassed by using technology, particularly since electronical devices now are part of everyday life. One of the most important areas in which technology can offer helpful solutions, is that of access to information and more specifically access to teaching/reading material. This therefore applies to many –if not all- subjects of the school's curriculum, including first language.

Technology can help in adopting teaching material and/or giving to the student access to the same material as his/her peers inside the classroom. Hence, it can be used both by the teacher and the student in different ways.

Use of Computer with a Screen Reader

An ordinary computer – laptop or desktop – can be used by the student in the classroom or at home, to give him/her access to books, documents, exercises and other material either existing or adopted in any digital form (as mentioned in the section above regarding Adopting material). In order to make the computer accessible to the blind student, a screen reader needs to be installed. This is a software that speaks out loud the focus of the computer's screen. The student uses the keyboard instead of the mouse to move around the different applications and utilities and the screen reader announces what is going on. Thus, the student can listen to whatever he/she is writing, read a text or a book that he/she's been given by the teacher, write exercises in a form that the teacher can also read and use the internet for studying if necessary.

There are a number of possible screen readers to use. Examples are:

- NVDA Screenreader. This is the Non-Visual Desktop Access Screen Reader for Windows from the Non Visual Access Group, NVAccess. A nice feature is that a portable

version can be created and this can be run from a USB stick. Select Create portable version when following download steps.

- Narrator is built into the Windows operating system but does not work with all applications. On older versions of Windows (Windows XP/7) the Thunder screen reader is an option, but once again only works with the system and basic applications.
- For MAC users the VoiceOver screen reader is already built in.
- For Linux users the ORCA screen reader can be considered.

As well as screen and speech there are other forms of output such as Braille. This can be output to Braille printers (embossers) or to Braille displays which provide a tactile form of the 6 dot characters through round-tipped pins raised through holes in a flat surface.

Use of computer with a Braille Display

A braille display is a device that can be connected to the computer and through the screen reader can reproduce what is spoken into refreshable braille. There are several benefits by using it, especially in the classroom:

- The student can read in braille instead of listening and thus he/she can pay attention to the teacher and the lesson and does not have to use earphones to avoid disturbing the rest of the classroom.
- He/she will improve his/her spelling skills since he/she can actually read the words and not just listen to them.
- He/she can use a combination of the two to learn both spelling and pronunciation, which could be really helpful learning a first language.

Use of DAISY books and players

DAISY (Digital Accessible Information SYstem) is an e-book in mp3 format that is structured to allow navigation, bookmarking and notetaking in an audio book, which facilitates studying. A student who is blind can benefit from the use of a DAISY book if listening to it with the use of a DAISY Reader.

- Additional information on DAISY at Wikipedia: https://en.wikipedia.org/wiki/DAISY_Digital_Talking_Book
- Link to the DAISY Consortium: http://www.daisy.org

The use of the RoboBraille service

The use of the RoboBraille Service may help the student improve his/her reading skills and pronunciation, by giving him/her audio feedback:

RoboBraille is an online automated document conversion service, that can convert text to a number of alternate formats such as MP3 audio format, E-books, DAISY-books, Braille books and otherwise inaccessible documents into better accessible formats.

- More information about RoboBraille: http://robobraille.org/introduction-robobraille

The use of a digital recorder for taking notes

Tape/Digital recorders are often a great tool for students who are blind in the inclusive setting. Listening back to the lesson on their own studying time, will allow him/her to create his/her own notes on the preferred method or better understand and comprehend parts of the lesson that he/she did not fully comprehend while in class. This approach is more widespread among students of higher grades and/or in cases where the student's braille skills are very poor.

Minolta Machines and Thermoforms

This kind of technology can be used by the teacher/support teacher and not the student, prior to the lesson to adopt reading and other teaching material in a tactile form for the student who is blind.

There are two traditional ways for producing tactile forms in 3D shapes:

The use of a Minolta Machine and swell paper, will make tactile any line, shape or pattern in black, printed on it, once passed through and be heated by the machine. The Thermoform, will heat plastic film of paper to a point that it will take the form and shape of any material that is laid under, thus creating a tactile "picture"

Diagrams, shapes maps etc. can be reproduced, to be explored by students who are blind. Resource centres for students with visual impairment are equipped with such devices and can offer you support on how to prepare the teaching material that you wish to have in a 3D format as such procedure requires adaptation and simplification of the existing learning material.

You can find a list of websites with information on how to create tactile diagrams at: http://www.perkinselearning.org/scout/tactile-graphics-students-who-are-blind-or-visually-impaired

The use of 3D models of entire objects should also be used as 3D printers are easier to come by and data bases can be found online with dozens of options. Example of databases: http://oedb.org/ilibrarian/5-great-sites-downloading-30000-free-3d-printing-models/

OCR Software

Both the teacher/support teacher and the student could use this technology, again prior to the lesson, to adopt reading material in digital form for the student who is blind.

OCR (Optical Character Recognition) is software that will “recognize” a scanned or photographed text, into an actual text, so that it will become accessible to the student who is blind.

The support teacher, the teacher or the student him/herself, can use a simple scanner, a computer and an OCR Software (there are free utilities available to use through browsers online), to transform text written on paper, into a digital form. Thus, the student who is blind will be able to read it, either listening to it with a Screen Reader or tactilely with a Braille Display.

References

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With the support of
Erasmus+ Programme
of the European Union