

# Teaching the Blind



## Music



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



The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

## **Teaching Music to Students who are Blind**



## Contents

<b>Inclusion in Europe through knowledge and technology .....</b>	<b>7</b>
Teaching Guides.....	7
Inclusion Guide on good practices Inclusive learning and Teaching .....	7
SMART E-learning .....	7
For all materials produced by this project:.....	7
<b>Introduction to this teaching guide.....</b>	<b>8</b>
General objectives for teaching music .....	9
<b>Specialized pedagogies when teaching music to blind students .....</b>	<b>11</b>
The role of music in communication and psychosocial relationships of the blind. ....	12
<b>Challenges relating to the disability/specific learning difficulty.....</b>	<b>14</b>
Issues related to culture and music education in the family.....	14
Aspects related to the music teacher .....	15
Issues related to the classroom environment .....	15
Issues related to the materials used.....	15
<b>A description of suitable teaching methodologies practices .....</b>	<b>17</b>
Demonstration.....	17
Exercise .....	18
Story-telling.....	19
Conversation.....	19
Problem-solving .....	19
<b>Learning technologies associated with inclusive teaching of music to blind students .....</b>	<b>21</b>
Screen readers .....	21
RoboBraille.....	21
Tactile music score.....	21
Swell-paper and Thermoforms .....	22
Resource centres and 3D print .....	23
<b>References.....</b>	<b>24</b>



## 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 specialized 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 good 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, and 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

Sometimes the human body can be so efficient that it is able to supplement the lack of a sense through very complex functions allowing it to operate as a whole. Specifically, the compensatory auditory functions. The perception of beauty through hearing is the simplest and most straightforward development of the right hemisphere functions of the brain. If auditory perception of beauty is accompanied by the ability to represent beauty (e.g. the child is able to play the piano), then we have truly addressed the core of the matter. It is necessary that the education system is able to provide comprehensive training opportunities, in a balanced and healthy environment.

Music triggers affective processes of the most varied and unexpected kind, from musical emotion with a wide range of expressions – joy, inner experience, the feeling of harmony, spiritual elevation – to explosive discharges of collective exaltation.

Music may be very important in the life of a blind child, both as a therapy (emotional balance) and also as a possible form of future professional orientation. Blind children often listen to a lot of music and learn spontaneously, without coercion, dozens of songs.

Blind students often have outstanding musical skills (rhythm, auditory perception, voice playback, auditory memory, perfect pitch, musical creativity).

There are studies that demonstrate a higher percentage of blind children with perfect pitch (Absolute pitch in blind musicians. Hamilton RH, Pascual-Leone A, Schlaug G) This is also the experience amongst partners in this project.

Although some children do not have the capacity to play a song very well (false singing ) they may have an excellent rhythm and a very good capacity for learning an instrument, focusing easily on the instrument (piano, drums, guitar etc). Most blind children can easily learn to keep up the rhythm of the song using a percussion instrument (tambourine, maracas,).

Learning a song should take account of the creativity of the blind child, the desire for active participation, the enthusiasm, and a more accurate rendering of the song will be further improved (if necessary).

Actual presentation of as many musical instruments (different types of guitars, saxophone, singing bowls, drums, etc.) as possible, allows the blind children to discover the preferred musical instrument and increase motivation for learning it.

Listening to a variety of songs, may refine their taste and increase the desire and confidence that they can learn an instrument.

Learning music should focus on the sense of hearing from very early stages, practical learning of the musical concepts will subsequently be followed by reading and writing the musical sheet notation using Braille signs or tactile sheets (musical notes with raised-out tops).

Recording the songs sung by the blind child and hearing them again allows him/her to be aware of any mistakes, of the moments that can be improved, the balanced development of self-esteem by observing the qualitative differences between a starting moment and a final one.



If there are children in the class that are less gifted musically, it is useful to use the tools that require more auditory attention than skills, such as: rain stick, ocean dreams, tank drums, singing bowls, bells, etc., which will encourage them to participate in the music classes.

When teaching a music class, the teacher must take into account the musical skills of each child, their own learning rhythm, their interest for an instrument or a vocal interpretation, and it is important to it both in groups, as a music band and individually as well.

Regardless of the age at which learning an instrument begins, the evolution can be spectacular, although an early start and early discovery of qualities is preferred.

Warning! There are certain blind children who are apparently reserved and less participating in music class. They can have great musical qualities, and it is actually their pleasure of listening which is the real culprit for their apparent reserve. Getting them involved in musical activities can lead to a general improvement, both at a personal level and also in performance at school.

It is particularly useful that at the end of each musical activity, the blind child should be allowed to express the feelings that he or she had during the activity (what he or she liked or disliked, what to improve or change etc.).

### General objectives for teaching music

The objectives to be observed when teaching music must also target and acknowledge the individual and social aspects:

- To understand that one can be heard even if the person does not make a sound (in any song the voice is in the foreground, the instruments just giving support in the background).
- To learn to actively listen to each instrument/person.
- To realize the role of each instrument/person in performing a song or in a harmonious activity.
- To collaborate, to communicate, to help each other, to enjoy the results obtained by their classmates knowing that everyone's progress is made at their own, unique pace and that every person is important and has their role in the group.
- To increase the motivation of students for learning music.
- To improvise in critical moments (in musical activities and in life).
- To improve their self-esteem, confidence in their own capabilities and in their emotional balance.
- To develop the vocal and instrumental skills.
- To enrich the experiences on different levels (language-communication, social-affective, psychomotor, sensory-perceptual, cognitive, skills, creativity).

- To sing out known songs harmoniously and to compose new songs.
- To increase parents' confidence in the future of their child.
- To increase receptivity and active involvement of the community towards the specific needs of a visually impaired child.

Music is beneficial for:

- Significant increase in the qualitative level of communication.
- Enriching nonverbal communication.
- Manifestation of desire and pleasure to communicate.
- Progress in establishing social relationships.
- Increased self-confidence.
- Decreasing and even resolving anxiety.

## Specialized pedagogies when teaching music to blind students

Analysing the effects of music on people in general, the following functions may be observed:

- Emotional function (arouses various emotions of different intensities)
- Cognitive function.
- Physiological function.
- Social function.
- Pedagogical function (helps us learn more easily and relieves intellectual fatigue)
- Therapeutic function.

For children who are blind, music has a different role too. For them, the unity of sound, movement and language has a central role in playing and in the process of learning. Through play, children develop their social, intellectual, physical and curative skills. In a music activity, they explore and investigate the sounds made by the musical instrument. This approach by investigation is done by using their head or vocal sounds, voice and environment. Children become motivated to experiment and learn new things.

It has been shown that music exerts a number of beneficial effects, including:

- Determines a series of emotional tonic states.
- Induces a state of serenity to the subject, and contributes to reduced tension and anxiety.
- Allows escaping routine and often induces a feeling of security.
- Enhances tone and strength to the effort, while contributing to overcoming obstacles inherent to such states as illness or disability.
- Facilitates communication between people.
- Contributes to the development of mental functions and processes, starting with the primary ones, like sensations, perceptions, representations and ending with the most complex ones, such as affection and imagination.

For shy, anxious children, percussion instruments (castanets, bells, tambourines, dulcimer, and xylophone) facilitate communication. They can also improve student's performance in motor function. To calm anxious and hyperkinetic learners, it is a good idea to use a tool that emits prolonged, harmonious bell sounds.

Experience and research has shown that music therapy has great effects on the development of communication, improves voluntary inhibition of motor acts and helps to achieve certain goals.

In emotionally unstable students, music is recommended for:

- Reduced tension.
- Reduced aggressiveness.
- Enhanced cooperation within the group.
- Improved teamwork.
- encouraging spontaneous participation to group activity.

During activities, the following should be accomplished:

- Arousing interest in musical activities.
- Training and development of musical hearing (melodic, rhythmic, harmonic-polyphonic sense).
- Educating the voice as the main means of playing music.
- Developing practical musical skills (singing, rhythmic, melodic, harmonic-polyphonic interpretation, the use of instruments).
- Educating the skills to listen to music.
- Integrating schools in the artistic life.
- The cultivation of imagination and creativity.
- Balancing the entire personality of the child by cultivating positive character traits.
- Developing child's sociability by taking part in group activities, improving mime and gesture orientation.
- Enhancing verbal expression.
- Developing chromatic musical sensitivity.
- Triggering states of relaxation, joy and delight.

### The role of music in communication and psychosocial relationships of the blind.

Musical activities offer the blind student a relaxing and secured environment, suitable for his/her own personality, for socialization and for the free expression of feelings.

These activities help to develop positive attitudes and prevent isolation, and also contribute to the restructuring of self-image, and to powerful interpersonal relationships. Getting the blind student involved in group or individual artistic activities (school festivals, competitions, and exhibitions) stimulates a positive self-image, increases self-esteem and results in a better relationship with others.

These activities also teach blind students to communicate more appropriately, more spontaneously, raising self-awareness of their roles, attitudes, and to better understand those with whom they get in touch with. The result is better socialization, better performance, and better relationships and communication with others.

The passion of playing an instrument (piano, clarinet, drums, and pipe organ) leads to a better balance in life and emotional security. Voice singing opens important channels of communication.

A popular study, which led to the spread of the "Mozart Effect", suggested that listening to classical music, especially to the famous composer, was associated with increasing IQ for children. The results of the experiment by Frances Rauscher and his collaborators have shown that students who have listened to Mozart's Sonata for two pianos have obtained the best results in the cognitive tests they have been given. The effect was noticed after just 10 minutes of listening. However, the findings have not convinced the experts of the power of this phenomenon, but the conception that Mozart's music enhances the brain's abilities has spread at astonishing speed.

Six years after the experiment, another group of Canadian experts re-evaluated the "Mozart effect," using this time a work created by Franz Schubert. The results confirmed the existence of the phenomenon observed in the Rauscher study. The same effect, of improving cognitive abilities, was also recorded after the participants had listened to the work composed by Schubert.

## Challenges relating to the disability/specific learning difficulty

Regarding the complexity of the human being, it is a real challenge to understand what inner resources blind children need in order for them to find the way around (spatial orientation).

The psychological aspects of the blind student may be: being too emotional, shyness, low self-esteem, poor differentiation of audible sounds or, on the contrary, absolute pitch, low-quality voice, singing out of tune, and the absence of a visual model to follow.

The initial assessment of the blind student is particularly important for addressing the strategies to be followed in music lessons. The teacher should be fully aware of any great abilities of the student (i.e., absolute pitch, good rhythmicity, the ability to reproduce a large number of “fashionable” songs etc.) because that would enable the teacher, on the one hand, to understand the difficulties that the student might encounter, and on the other hand, to exploit the abilities to the full potential and increase the students’ self-esteem.

For example, the student might have absolute pitch or good quality voice but he/she might not be able to sing because:

- The student is too shy.
- The student is too perfectionistic about sounds and may be bothered by dissonance and sometimes by other students.
- The student feels that his/her voice does not allow for singing as well as he/she would like.
- The student does not have very good hearing differentiation, he/she might sing out of tune, but has exceptional rhythm.

During the music lessons, the lack of visual perception of a model to be followed should be replaced with a predominantly tactile - kinaesthetic presentation, i.e. gestures made by the teacher (ex.: the teacher puts their own hand on the student’s hand and gently guide the student into increasing or decreasing the intensity of the sound, how to beat rhythm etc.).

## Issues related to culture and music education in the family

Sometimes, if the blind student has been accustomed to hearing only a certain type of music (ex.: oriental music, classical music, soul music) it may happen that he/she rejects other musical genres.

Getting the students to be gradually accustomed to listening carefully and to verbally expressing what they feel and notice during this experience can bring unexpected benefits.

Teachers should pursue not so much the rejection of some kinds of music, but rather changing the student’s behaviour of listening to the songs in their leisure time.

Sometimes parents think that music is less important for the blind child’s development and even a waste of time. Therefore, it may be necessary to counsel the family about the importance of music in the child’s life.

## Aspects related to the music teacher

Sometimes the music teacher is scared or anxious that they may fail to find the most appropriate way to teach music to a blind student. More than ever, in this situation the teacher must be flexible and be patient. He or she must be attentive to the tone of voice that can convey a variety of emotions. The music teacher should not impose but propose! ...

What might be considered as a "difficulty" or an "obstacle" is actually a valuable indicator of the moment when the teacher should change the approach. How much and when to insist, when to be patient and how to change the approach – are all elements directly related to the creativity of the teacher.

If any audio-visual material is going to be used, the teacher should ensure that:

- The sound is of good quality.
- Visual content that is important to the lesson should either be verbally described (by the teacher during the viewing) or given in a written form to the blind student beforehand;
- Any text included in presentations (like Power Point), should also be given in a written form to the blind student beforehand and images should be described.

## Issues related to the classroom environment

The student should be allowed to choose where to sit in the classroom. But sometimes sitting closer to the teacher might be better since it will allow him/her to be the first one to get a new object in his/her hands and also ensure that he/she will be able to listen better to the teacher.

For a blind child's ear, the sounds provide a lot of information about the environment in which it resides, the direction of travel of a machine to the size of a room or position of obstacles.

The classroom environment should be adopted to be accessible to the blind student (e.g. obstacles between the entrance door of the classroom and the student's place should be avoided, classmates should be careful where they leave their bags or other material). When changes are made to the classroom the student who is blind should be notified and be given the time needed to explore the changes and be accustomed to the new situation.

## Issues related to the materials used

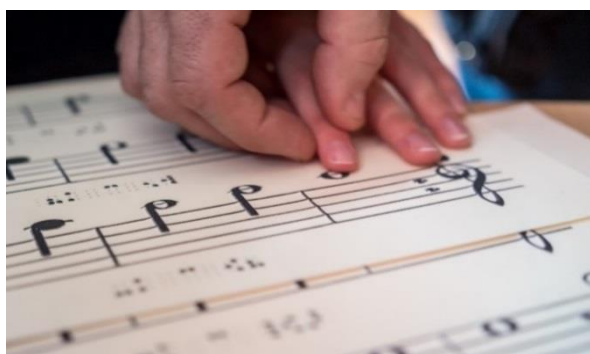
Any lack of tactile musical sheets should not hold back the blind student's progress, since they should be seen more as an extension or support rather than as a condition of further study.

Blind students often prefer to rely on hearing and imitation (feeling the teacher hands while they sing).

Although there are differences in the writing systems (Braille transcription), the student can write a musical sheet by dictation or can record the necessary information. For the student to understand how the sheet music look like in black and white, the teacher can use tactile marks representation (e.g. Musical notes and staves made of wood) or tactile stave image and musical notes made in thermoform, noting that this exercise require more time to practice tactile-kinesthetic perception and that there is no database where the teacher can get access to resources.



*Figure 1: Wooden musical notes*



*Figure 2: Teacher is guiding the student hand to touch tactile musical score*

Regarding the auditory perception of each musical instrument, since there is no difficulty in differentiating the hearing capability, the existence of concrete, physical tools facilitates the learning process.



## A description of suitable teaching methodologies practices

The teaching methods used in music classes are useful optimizing tools in the educational process, through the functions they perform:

- Opening paths to knowledge.
- Helping to increase efficiency in formative content of education through children's active involvement in training.

They provide a variety of work methods to the teacher, facilitating differentiated and gradual practice of the mental processes of the children.

The success of training and education depends on whether you use appropriate educational and therapeutic methods suggested by the most appropriate content.

In the educational-therapeutic activities which involve music, the basic, classic methods are: demonstration, exercise, story-telling, conversation and problem-solving. They "are modelled" by the level of mental development, learning ability and social adaptation, as well as personal experience in music.

### Demonstration

Its purpose is to make children perceive music directly, in all its aspects. The value of this strategy derives from the fact that it is, by excellence, focused on the intuitive side. By demonstration, the educator will appeal to auditory, visual and motor intuition.

- **Hearing intuition.** Hearing intuition is achieved by listening carefully to the song to be learnt (pitch, duration, rhythm, text). In music, hearing intuition corresponds to the first stage of knowledge.
- **Visual intuition.** For a better understanding of the text content of a song, the demonstration will be accompanied by auxiliary materials (illustrations, pictures, toys, models etc.)
- **Motor intuition.** Used in demonstration, motor intuition is achieved through the execution of movements and gestures related to the musical problems involved in the musical song to be learned. Motor intuition is more about rhythm rather than melody. Enduring values and forms of rhythm are acquired faster when they are motorically intuited, not just acoustically.

The teacher can combine the sounds in audition with his own gestures, and ask for their precise playback.

Demonstration is used continuously, both in teaching and memory retention activities, and requires the execution of the teacher's interpretation model. The model interpretation ensures an accurate retention of song content and melody, in the imposed tempo. The model execution must be absolutely accurate, complete and expressive, demanding a very good musical education as well as vocal qualities.

Demonstration of the song is carried out by the teacher once, twice or as many times as necessary. Also, the teacher must arouse children's interest, enthuse them and develop in them the ability to acquire the emotional and ideational content of the sound material. The demonstration will be present throughout the whole activity, the teacher will permanently demonstrate the proper way of interpretation, will play along with the child as the model, will demonstrate how to open his mouth properly, how to pronounce the words by syllables, following the melodic line.

Using demonstration in musical activity is particularly important, since it determines the ability of perceiving and understanding the formation of the elements of intensity, pitch, duration, pauses, rhythm, harmony and polyphony.

Explanation refers to the concise and clear exposure of the sound material. It is often accompanied by demonstration and practice.

The explanation is applied in doses and includes the ideational content of the songs, but also breath, emission, diction, tone, voice and rhythmic synchronization.

The teacher should use simple phrases, be concise and have a clear pronunciation of the messages contents, taking into account the children's age and their degree of musicality, organize activities in such a way as to keep the attention and interest alive, and avoid boredom, fatigue. The teacher should show goodwill, calm, patience and understanding, encouragement, without neglecting the authority he/she has as coordinator of activities.

## Exercise

The types of exercises involve breathing control and voice practice. Along with reinforcing the skills to breathe properly, other requirements are homogenization of voices and proper emission of musical sounds, together with the correct emission of syllables.

The exercises are classified into:

- **Rhythmic exercises.** These contribute to rhythmic skills, which further help to mark the breaks, the duration of the sounds, stressed and unstressed beats. For this purpose, percussion musical instruments can be used (drums, triangles, tambourines, castanets), and in their absence, the rhythm can be marked by walking in marching steps, jumping, clapping, snapping the fingers. This type of exercise can make the child to accompany the melody with rhythmic movements of the arms, body, legs, engaging his/her attention and interest in the activity.
- **Melodic exercises.** They involve the execution of a simple melodic line, which includes elements of intensity, duration, pitch and timbre combined upward and downward on the musical scale.
- **Musical memory exercises.** Children reproduce after hearing melodic-rhythmic fragments, improvised by the teacher or included as fragments from a song.

These exercises should be organized successively, logically, from simple to complex, using methods as varied and attractive, the teacher having the task to prepare and apply them with care and tact, making them an ongoing form of lively game, motivated positively.

### Story-telling

This is a method less frequently used in music therapy activities, given its specific verbal exposure over the ideational content (in music, this is expressed through the language of musical sounds).

It is used more in song teaching, as a stimulus, and in listening to music activities. When listening to songs, short narratives may come in handy, exposed by the teacher on the melodic theme, to stimulate the children to imagine an action, a landscape, a dialogue etc. – this way, music greatly contributes to the development of children's imagination. Such an approach may take the form of a complex activity of educational therapy, which also involves language education by using songs.

### Conversation

Conversation consists in the dialogue between the children and the teacher and can be achieved in all educational-therapeutic activities related to music. Questions should take into account the degree of musical perception, understanding of ideational content and the degree of interest in this activity.

By questions and answers, the teacher sets the overall level of musical development, on an individual or group level and at the same time can arouse interest, curiosity and desire of children to learn songs, musical games or hear certain songs.

### Problem-solving

Using this method, the teacher verbally engages the children in unknown situations, situations that are often at odds with their experience. This method actually means finding the right tone or suitable tempo of a song, singing game or musical game.

Any method can lead to either passivity or activation of children's interest. It is the teacher who must choose those methods and mobilizing processes which will determine children's conscious participation in musical activities. In order for learning to become aware and active, the novelty factor must first be understood, and then fixed in the memory: a task which requires an effort of will. Children need to know the reasons why they learn these things, know the theme subject, the moral message of the song, but at the same time they should know they must pay attention in order to assimilate and play exactly as required.

Conscious and active acquiring is reflected in interpretive work, in the play of gestures and mimics, in the nuanced execution of the tempo and in the emotional content of the song; only then can we say that the proposed musical material has been appropriated. This level is reached only through a systematic music education, centred on combining methods and processes that include different types of educational-therapeutic activities.

Methodical preparation, experience and teaching skills are the elements which help the teacher to positively influence awareness and musical problem-solving by children. He/she needs to show a good understanding of above-mentioned issues and tackle them successively and gradually in order to achieve active musical education, through assimilation of skills and musical knowledge appropriate for children's age, to master the most suitable methods and work procedures, able to solve issues related to rhythm, hearing, memory and voice. The value of the methods employed depends entirely on the person/teacher employing them.

## Learning technologies associated with inclusive teaching of music to blind students

Many of the barriers that students who are blind face at school, can be overpassed by using technology. Technology can help in adopting teaching material and/or giving to the student access to the same material as his/her peers in the classroom. Hence, it can be used both by the teacher and the student in different ways.

A 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 in existing or adopted versions in digital format. 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.

### Screen readers

Hence, 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. Example of a screen reader: <http://www.free-domscientific.com/Products/Blindness/JAWS>

### RoboBraille

The use of the RoboBraille Service: 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.

Using the RoboBraille Service may help the student improve his/her reading skills and pronunciation, by giving him/her audio feedback - try at <http://www.robobraille.org/>

### Tactile music score

If the teacher wants music sheets on paper (print) to be embossed in Braille, the following procedure may be used:

1. The music sheet is scanned and saved as an image using a simple scanner.
2. The image is then opened with SharpEye 2 software, where changes can be made on the music sheet. For more information, visit <http://www.visiv.co.uk>
3. The edited music sheet is saved as a NIFF file. (NIFF = Notation Interchange File Format, a music notation file format).
4. The NIFF file is imported in Dancing Dot's GoodFeel software. >For more information, visit <http://www.dancingdots.com/main/goodfeel.htm>

5. It is transcribed in braille where changes can be made on the braille text before embossing.

Alternatively: Music can be written directly in braille using any braille editor and then embossed.

### Swell-paper 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.



*Figure 3: Student reading tactile music score on swell-paper*



*Figure 4: Tactile music sheet with tactile score and Braille (swell-paper)*



*Figure 5: Sheets of tactile music with tactile score and Braille (swell-paper)*



*Figure 6: Student exploring tactile sol key (swell-paper)*

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”.

### Resource centres and 3D print

Resource centres for students who are blind are equipped with such devices which 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.

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/>

## References

1. The RoboBraille Service in Education: Catalogue of Good Practice – 2013
2. Motora A.I.: Methodology of teaching music, Pedagogical publishing house, Bucharest. 1983
3. Rozorea A. and contributors: Music and the brain, science and technology no. 10. 1998
4. Rozorea, Anca: Deficiency of sight and Specifics of instruction and recuperative in sight deficiency in Verza E., Verza F. E. Treaty of special education, Publisher: The University of Bucharest, Bucharest. 2011
5. Muşu I., Taflan A. and contributors: Educational complex and integrated therapy, Publisher : Pro Humanitate. 1997
6. <https://semneletimpului.ro/social/cultura/muzica/muzica-prieten-sau-dusman.html>







With the support of  
Erasmus+ Programme  
of the European Union

