

HOW TO OVERCOME PHYSICAL BARRIERS IN NATURE EXPERIENCE

Brochure I04



Picture:

Three dwarfs: deaf, blind and in a wheelchair. © ETNA

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I. Introduction

The project Nature without Barriers provides practical guidebooks on how to deal with accessibility and inclusion in natural surroundings. The goal is to focus on enabling everyone to feel the surrounding nature and enjoy the experience. This guideline wants to complement the Decision matrix - a self-assessment tool where you can analyse the most appropriate, efficient and realistic alterations and adaptations of your offers by yourself. Every adaptation, every offer and every additional information will be a step forward towards a better inclusion of the impaired and of everyone into nature experience.

This brochure addresses the communication barriers that different groups of people may encounter during a nature experience.

In communication, we consider 3 elements: source (sender), transmission medium and receiver. In the brochure *Nature experience and education for people with disabilities*, we discussed communication for **guided nature experience**; in this one, we focus on **self-determined nature experience**. In this case, the sender has no contact with, and receives no feedback from the receiver of the message. Consequently, the media play the role of information source for the receiver. It is important to carefully design both the form and the content of the message.

When dealing with a barrier that prevents a person from reaching a certain place or experience, we can address the problem on the person's side or on the place's side. For example, to help people on the wheelchair to climb stairs, we can replace or add to the stairs a lift or a ramp. As alternative, we can design a special chair instead. Such special toboggan-like chairs are known in Spain as aids for people with reduced mobility.

Removing barriers on the receiver side would have the benefit that a person would be able to go to any place whether barrier-free or not. Special devices such as hearing aids or smartphone apps are useful in many situations. On the other hand, removing barriers to accessing natural places on site, would also help those without these special aids or in situations when they are insufficient.

Adapting a place that is already very frequented by visitors, has the advantage of benefiting a large number of people such as families with children and seniors. Ideally, all materials are inclusive – available for all. If the material is designed for all from the start, there are no additional costs for adaptation later on. An alternative would be to create materials aimed at a specific group of people with disabilities or to adapt existing materials.

Not all types of communication materials can be used and understood by everybody. For example, a leaflet in Braille can be read by a small percentage of people whereas a 3D model can benefit a much larger number of people. Furthermore, it is important to underline how making a content attractive to the target audience, by going beyond presenting dry, scientific information, is key to make the largest number of people interested in a topic. When resources are limited, cost estimation in relation to expected number of visitors should be taken into account. It is understood that applied adaptation should not disrupt natural sites.



Even the best designed boards should not replace or screen nature. Barycz Valley, Poland. © ETNA

As the state of standardisation on accessibility and the measures to meet the regulations are different in each country, we are not able to introduce all national requirements in detail. Instead, we would like to give an overview on the functional requirements. If you are interested in implementing measures to improve the accessibility of your nature trail or exhibition centre, please check your national requirements in advance.

There are some legal regulations, such as the Accessibility Act, EU and other international standards and norms to be observed. These may be mandatory for some institutions (e.g. public institutions) and recommended for others (private organizations). Some standards from outside the EU, such as ADA from the US, may be useful as guidance. For more information on legal aspects, see the brochures: *Nature experience and education for people with disabilities* and *How to overcome physical barriers in nature experience*

2. How to use this brochure

In this brochure, we describe communication barriers for people from different target groups and how to deal with them with the appropriate communication channels. The paragraphs are marked with pictograms showing different target groups. The pictograms were described in brochure *Nature experience and education for people with disabilities*.



The brochure contains examples and guidelines but does not claim to be complete. It is intended more as inspiration and mind-changing tool than as a recipe for all situations. We hope that this will be an inspiration and a help to those working for a more accessible nature.

3. Communication barriers

Communication barriers occur when someone cannot communicate with others because they cannot use one of their senses or are unable to reach the information properly. These include, for example, misunderstandings and misinterpretations. They may result from unclear statements, inattentive listening, unequal qualifications or language skills. Communication problems can lie more on the side of the sender, the recipient of the transmission means themselves. Nature educators (senders) and those preparing the medium, should focus on the needs and restrictions of the recipients in order to convey clear and attractive messages.



Communication barriers: Cyrillic text and confused visitor. Language is only one of the communication barriers. Tsarska Bara reserve, Serbia.] © ETNA

3.1 Problems with Hearing

Hearing is a sense helpful for communication. However, in self-determined nature experience, communication rarely relies on sounds. Nevertheless, the loss or impairment of hearing diminishes the ability of listening to Nature's concerts or reacting to artificial or natural warning sounds. Hearing related issues have been widely presented in the brochure *Nature experience*



Sound of the wind blowing against this sculpture in Hohenburg, Germany, provides the feelings that cannot be shared by everyone © ETNA

and education for people with disabilities, from the complete loss of this sense, to the need of using a hearing aid or concentrating to properly hear and understand softly spoken words. When creating information material for the hearing impaired, we should take into account that deaf and hard of hearing people have different abilities, needs, and therefore communicate differently. **Deaf people** have a complete hearing loss. Since hearing aids do not improve their condition, they usually do not wear them. To communicate, most deaf people use sign language. In contrast, **hard of hearing people** have hearing deficiency (on both ears or only on one), but they can still hear and understand certain sounds and noises. Therefore, they can understand spoken language with the help of hearing aids. As spoken communication is accessible to them, they do not use sign language, which in most cases they do not even know *(If you are interested to learn more about the special needs and problems of hearing-impaired people, you can find it in the “Guided nature experiences and educational programmes” guideline.)*

The greatest difficulty for people with hearing impairment is understanding spoken information. Therefore, if you want to prepare information materials (e.g. a video film or audio guide) for them or give oral information on site, it is important that the information is presented in a visual, readable form as well. Even though we speak of unsupported experience, some combined offers may include a talk at the reception desk or an introductory film in the educational centre before going out. The use of sign language seems to be a good option in such cases, but it is not always sufficient. Not all people with hearing problems can understand sign language (especially those who lost this sense during their life). Access to interpreters specialised in the requirement terminology is often not available. In larger groups, especially mixed groups, or in activities that involve interactive exercises, adequate support for people with special needs may be impossible. In the implementation phase is important to take into account the economic aspects as well. Solutions, such as visual information (written text, illustrations) can serve all visitors, without incurring additional cost of hiring specialised staff.

3.2 Problems with Sight

Also for people with visual impairments can appreciate nature experience: the tranquillity of a lakeshore at sunset, the sound of birds or frogs, the smell of pine wood or the touch of wet grass. Apart from not being able to enjoy the colours, the landscape or the actions of wild birds, there are two other barriers related to seeing. One is the access to information about nature,



Touch is a very important sense for the blind. © UWD

often provided via printed materials or information boards. The other - logistics of moving around, orientation in the field. It is not easy to find places of interest or remain on a safe side in the dark.

As described in the brochure *Nature experience and education for people with disabilities*, there are many forms and degrees of reduced visibility. Complete blindness is the most severe form, but some people can distinguish light from darkness, others have tunnel vision - with limited angle of vision, or are colour-blind. Reduced sharpness, coming with the age-related loss of the eyes' ability to accommodate, though not considered a disability, causes some problems as well.

Surprisingly, it is estimated that only 5-15% of blind people in Europe can read Braille¹. As little as 80 UK school students take Braille lessons in a year. With the development of modern technologies, Braille continues to lose its importance. Audiobooks have led to the replacement of reading entertainment. Nevertheless, Braille is still an important way for indicating directions (or floor numbers in elevator lift), describing goods or providing value of banknotes. It is also indispensable in scientific publications, especially math formulas.

3.3 Learning difficulties

Among the project's target groups, this is probably the most diverse one. See the brochure *Nature experience and education for people with disabilities* for a more detailed description. Some people have difficulties with understanding, due to their intellectual deficiencies, and the extent of these difficulties varies. For others, it is the emotional background that causes problems with understanding or concentration. Problems with understanding may result from not knowing the language, like in the case of foreigners or less educated people. The main tools here - simple (or easy) language and illustrations may be used regardless of the transmission channel. However, we must remember that it does not break all barriers.



Graffiti on the walls of environmental centre is noticeable from the distance, and you do not need to be able to read. Naturschutzzentrum Eriskirch © Gerhard Kersting
Problems with mobility

¹ How to use braille for accessible information (sensorytrust.org.uk)

3.4 Problems with mobility

From all target groups, people with mobility impairments are the least affected by communication barriers.. Some mobility restrictions have neurological roots and are accompanied by other inabilities. These are discussed under the appropriate heading. However, mobility impairment could also create difficulties to access information e.g. information boards inaccessible by wheelchair users etc. This is partially a physical barrier, which was described in the brochure *How to overcome physical barriers in nature experience*. This chapter will cover some problems and solutions. Inaccessible information (too far away from the path, small letters, placed high, wrong angle, inappropriate lighting) is a problem for anyone. Furthermore, we must remember, that sometimes the visitors in wheelchair cannot turn their head. It can be impossible to come closer to the board because of the curbs or uneven terrain. This also makes it difficult for people with walking sticks and families with prams.

Miscommunication caused by a poorly designed guidance system may cause additional walking, for instance to confirm that the path chosen at crossroads was correct. This would be an undesirable situation for anyone, but especially inconvenient for people with reduced mobility.



This birdwatcher in a wheelchair copes with moving around a nature reserve in Dorset, UK, very well by himself. © ETNA

4. Communication channels

In order to make a document accessible to the largest number of people, we should firstly try to create a document universally accessible by all different target groups. In case this was not possible, we should try to create different documents that fit best each target group. For instance, when the objective is to give information to people with and without learning disabilities, it could be better to create two different versions of the same document. One using simple language and the other regular language, rather than trying to combine the text into a single document for all. In such a case, you should clearly inform the recipients on the purpose of each leaflet. In both cases, you should keep in mind the different target groups needs and communication barriers. Below you will find some concrete suggestions on how to use different communication channels for the different target groups.

4.1. Website



The barrier-free design of the website is decisive for whether people with disabilities decide to visit a given nature conservation centre. Here they can get initial information on whether there is an offer on site that suits them and if a visit is worthwhile. Technical adaptation of the website has become a standard. Most companies that manage websites will have this in their portfolio for their customers and, if in doubt, offer it to their clients. Less standard, but just as important, are content adjustments.

These recommendations for websites apply also to social media profiles. However, the framework provided for the users by the media owner restricts their applicability. You have much less choice in formatting your content.

Barrier-free websites have been mandatory for public institutions in all EU Member States since 2018. However, private conservation centres are often not up to date with these trends and do not even fulfil the basic criteria. "Aktion Mensch" from Germany names five reasons why accessible websites have positive advantages for everyone:

Reach a broader audience: Accessible websites reach a wider target group and thus more potential users/visitors/donors.

Increase user satisfaction: Usability is key to the success of any website. Good usability makes the content accessible to all.

Increase outreach: Search engines reward accessibility on the web: online a website is found more easily on Google & Co. if it is designed to be user-friendly and easily accessible.

Become a role model: The legal requirements for website accessibility are becoming more and more demanding - investing in an accessible website is sign of professionalism for a conservation centre.

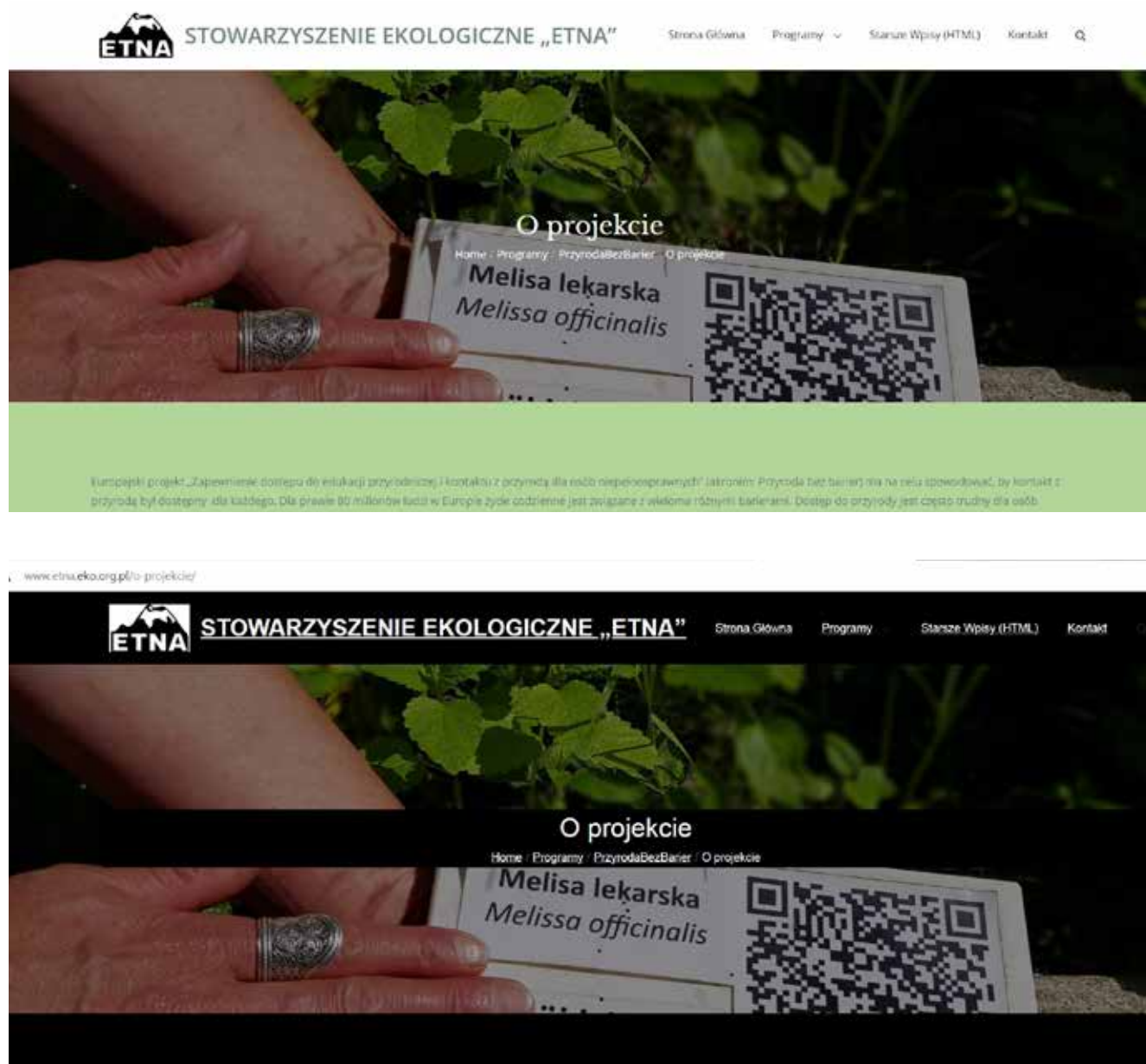
Promote digital participation: With an accessible online presence, conservationists contribute to digital participation and reach people with and without disabilities with the content offered.

A website is accessible if limitations in seeing, hearing, moving or processing information do not negatively affect how we use the website. What would be the barriers here?

People with **visual impairment** may have difficulty recognising text or form fields if they do not have enough contrast with the background. **Deaf and hard of hearing** people cannot use videos without subtitles. **Blind** people cannot use websites properly if images, forms and buttons are not described by captions. (Source: Aktion Mensch, Germany)²

Technical Adaptations:

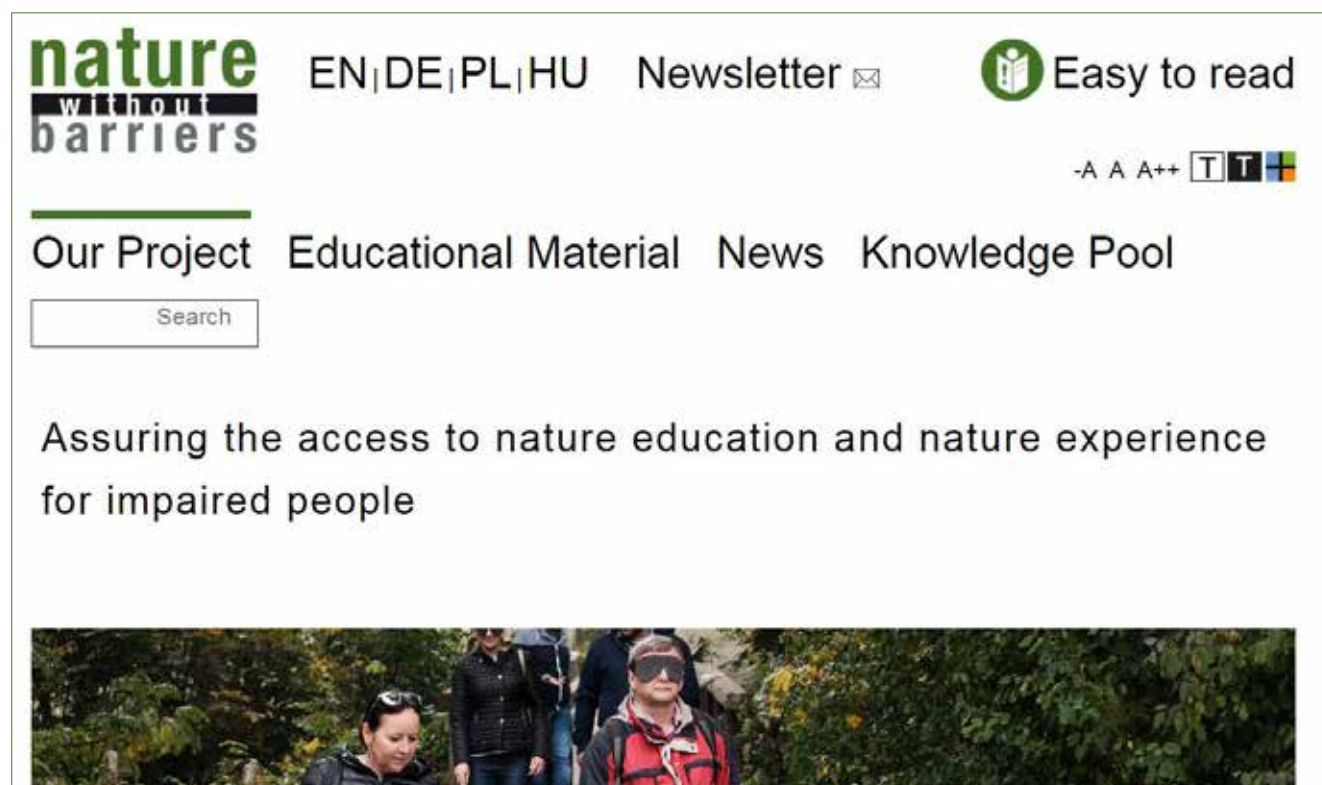
Technical adaptations mainly concern accessibility for people with visual impairments.



Choice of contrast and colours are important for the legibility of the website.] © ETNA

² <https://www.aktion-mensch.de/inklusion/barrierefreiheit/barrierefreie-website>

Font size: The font size can usually be changed by the user on the computer without technical adaptation of the website. Keyboard abbreviations like CTRL +/- change the font size. However, this also affects the whole page and can lead to unwanted effects. Technical add-ons will insert buttons that allow only the font size to be increased and decreased. These buttons should always be placed in the upper right corner.



Standard placement of the buttons at upper right screen corner helps in quick orientation on the web page. © GNF

Contrast: The contrast on the screen of many internet pages is not sufficient for people with visual impairments to read the text. This can be remedied by technical add-ons. A button inserted in the top right-hand corner of the website can be used to switch the page to black and white. Any writing is then displayed in black on a white background. Often, it is added a button that switches the page to white-and-black. Every font then appears white on a black background. Other options are also possible.

Captioning of images: People with visual impairments who cannot see pictures or can barely see them, rely on picture descriptions. These descriptions can technically be added to the images at the programmer level and will be displayed or read aloud if a user requests it (yellow text captions). The image descriptions do not have to be detailed or extensive. Usually descriptions such as: *People sitting in a circle on a meadow recognise different plants by their smell, or Wintry Lake Constance with many ducks and other birds in the foreground, with the Swiss shore and the snow-covered Alps in the background* are sufficient. Do not add expressions like "in the picture you can see...", as most of screen readers will add that anyway. Practical suggestions provided by a visually impaired web developer can be found here: Daniel Göransson. Alt-texts: The Ultimate Guide. Published 15 October 2017.³

³ Source: <https://axesslab.com/alt-texts/>. The axesslab.com website contains also other relevant articles, like: "How to make your site accessible for screen magnifiers".

Buttons and other interfaces: For whom use the internet on their tablets and smartphones, is also important to have a sufficiently large user interface that can be operated not only with the mouse pointer but also with the finger. The webmaster will be able to solve that.

Structural adjustments: Websites consist of various structural colour elements, e.g., menus, text fields, images, links, downloads, and more. An accessible design puts these elements in a logical order and links elements to common content. This enables a voice assistant to read out the website in the correct order. In addition, headings are marked as such for speech use, images are identified as such and links are displayed accordingly.

Forms: People with visual impairments are used to using forms on the internet via voice control. The technical adjustments can also be made by the webmaster.

Adaptations of content

Adapting content to different user groups is sometimes more complex.

Language: Websites are generally not the right place to document the competence of an institution through complex presentation of content, frequent use of foreign words and technical vocabulary. The aim is to get people excited about nature conservation and experiencing nature. In general, communication professionals assume that texts must be optimised for ten to eleven-year-old children to be accessible, appealing and interesting for everyone - including adults without so called specific needs. This includes short sentences, a simple sentence structure and the avoidance of Latinised expressions and Anglicism's. Instead, the wording should allow to understand a website even without specialist knowledge. If necessary, important terms can be explained briefly. Specific important scientific and specialised details content can be provided in subpages, boxes and PDF downloads.

Videos: With high-speed internet, videos have become a standard content on websites and in social media. However, as they are used much more widely, they are presented in a separate chapter in this brochure (4.2).

Descriptions of the offers: The description of the nature experience offers is a key function of a website offering nature experience for people with visual and mobility impairment, for groups of disabled people as well as for families with children. It should explain what the visitor can expect in terms of the content along the way. Descriptions of the surroundings and conditions on the trail are crucial: accessibility by public transport, parking spaces, toilets, special services offered by the nature conservation centre, length of the trail, places to sit and rest, structure of the trail for people with wheelchairs and prams, potential danger spots for blind people. All this can be easily explained in a few sentences on the website; usually you know your offers well enough and can provide this in a few minutes.

Visually impaired and blind people, but also everyone else, will choose an offer if they know the surroundings in advance. Besides obvious content, i.e. nature information, which is usually well conveyed, the website should include a description of the surrounding landscape, special terrain marks, striking trees, sounds you might hear at different times of the year, and other aspects that are interesting for the visiting person. Describing the condition and characteristics of the trail is very important. For example, you could say that the entrance leads slightly uphill through a leaf forest for 500 m and then opens into a landscape with meadows and pastures and a lake in the background. With this information, potential visitors can assess accessibility of a trail by themselves and get prepared for a visit.



4.2 Videos

As nature experience is expected to happen in Nature, videos may seem out of context at first glance. In reality, video material is ideal for the promotion of the site and its offer. It can be broadcasted on TV, YouTube and other internet streaming channels, social media or dedicated websites. Electronic advertising boards have become more and more popular and seem a good option.

It is worth to include practical guidance for the target groups in the video. If there is not enough space in the promotional clip, it should say where to find this information. Videos are an ideal tool for introductions on site, in visitor centres. They can be presented on demand by the staff, running in loop on e-boards or launched individually at interactive stations.



Introduction to the field exercise in the visitor centre may use boards, videos, exhibitions. Here: Albufera Natural Park Interpretation Centre (Raco de l'Olla), Valencia, Spain.] © ETNA

Another purpose of the videos is education. For visitors, they can simply explain nature, show the ways to enjoy it, despite the barriers and prepare the visitor to outdoor experience. For staff, it could provide training on the needs of disabled visitors and the specifics of the target groups. This could also be a tool for sharing experience between the educators. Once a creative rarity, live transmissions have become a standard approach. These are often streamed to the Internet, which limits quality of the video. Stationary installations can offer higher screen resolutions and better sound quality.



Infrared high resolution adjustable cameras make it possible to watch a portrait of the Greater horseshoe bat on a 70" screen in the Bat Centre in Hohenburg, Bavaria, Germany (left). Watching the stork families is quite common use of streaming, here (right) insight into one of the nests in the largest tree-nesting colony of storks in Europe, Marchegg, Austria.] © ETNA



Universal filmmaking

When producing a video or film, try to make it available to everyone from the beginning. If you want to adapt existing material, you can add subtitles at the bottom or a sign language interpreter in the corner of the screen. You can also produce a separate soundtrack in simple language. Such adaptations generate cost but they may be the only and cost-effective alternative to producing completely new videos.

The visual and sound layers should be consistent, and the whole film should be led with slow, quiet narration and avoid quick turns of action or sudden cuts. The commentary, doubled with subtitles, should describe what is seen on screen to provide both deaf and blind with the same information. The story should be interesting but offered in easy words and simple sentences. For more details on how to produce universal films, see **Annex 1**.



Videos adapted for people with hearing impairments

To help deaf and hard-of-hearing people to make use of the spoken information in videos, there are two main approaches.

Sign language interpretation can be the best solution to visualise spoken information. It can also provide additional information on non-verbal sounds. However, as we know, sign language interpretation provides access to information only for deaf people. Most of the hard of hearing people will not understand it. More information about sign language can be found in chapter 4.7 and in the **Annex 6**.

Unless you already cooperate with an organisation of the deaf, you will have to arrange the sign language interpretation through a specialised company. You will find professional translating agencies in every country. In Germany, the translation of a 5-minute video clip would cost approximately 400€, including technical adaptation.



Subtitles

Subtitles are a good alternative and are useful for everyone (e.g. foreigners who are not so fluent in a language or people with learning difficulties). It is recommended that all information heard in the video is subtitled, so that people with hearing impairments can understand the entire video. Adding subtitles to a video means adding another communication layer and it is a standard operation as adding a different language version. Similarly, we can make a video accessible by people with learning disabilities by providing easy language subtitles and/or voice over.

Practical recommendations for subtitles (see also **Annex 1**):

- Provide subtitles for all information heard in the video. If it is not possible to subtitle all the information word-to-word, text simplifications should not modify its original meaning.
- Allow enough time for the subtitles to be read by leaving them on the screen as long as possible. This can be a challenge as we generally speak faster than we read. In a new video, actors should be asked to speak slowly. Adding some neutral visual content may also help.
- Subtitles should refer to the image we see in the video and to the information we hear., There should be no delays between the speech we hear, the text we read and the image we see.
- Some subtitles are specially provided for people with hearing impairments to inform them about sounds other than narrative: [bird singing], [howling of the wolf], etc. Square brackets differentiate them from the spoken text.
- The subtitles should be easily visible and readable and have a strong contrast with the background as well as having a readable font and size of the letters.
- Subtitles should be located in the same position, preferably at the bottom of screen, through the entire video. Subtitles additional to existing ones, may be placed on top of the screen or in a separate row (e.g., with another background).
- Viewers should have the option to hide the subtitles on demand.



Videos adapted for people with sight impairments

In videos, the soundtrack provides less information than the visual layer.

Audio-description is the main help for blind and visually impaired people. Assuming they hear well, the audio-description of what is shown on the screen must fit between other sounds. It is not an easy task. Additional comments must contain as much information as possible in a very compact, sometimes few second long portions. Using precise, well-thought phrases is a critical factor here. Audio descriptions should be read by a reader with clear voice, distinguishable from the main the narration and the actors.



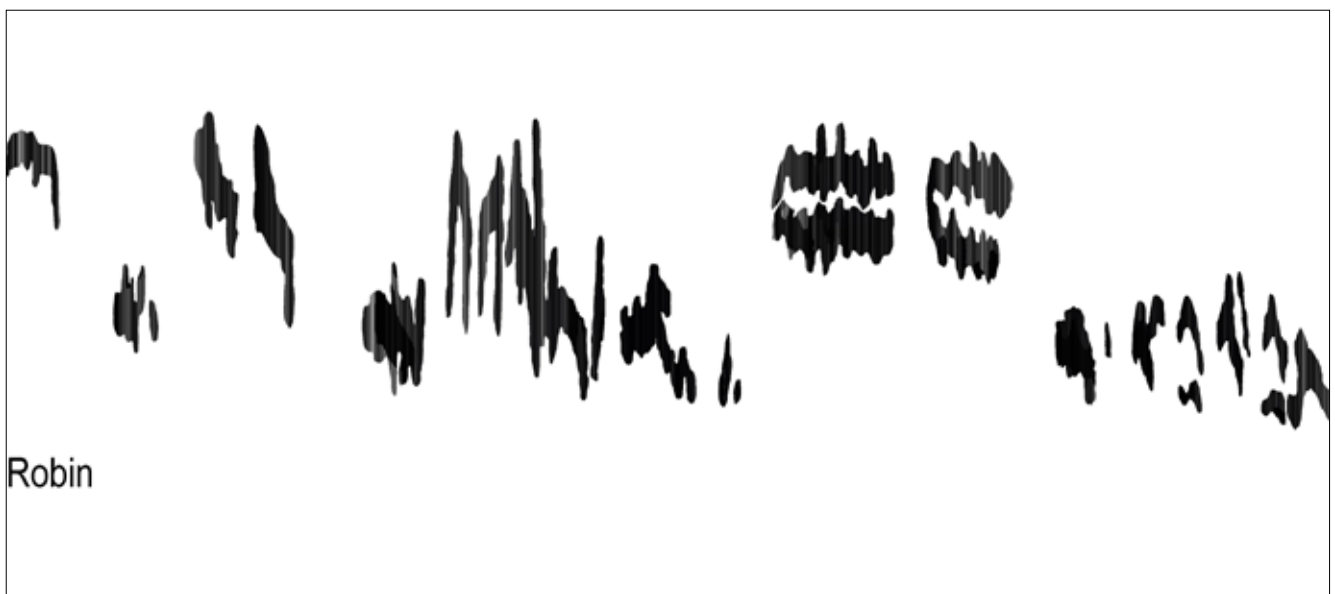
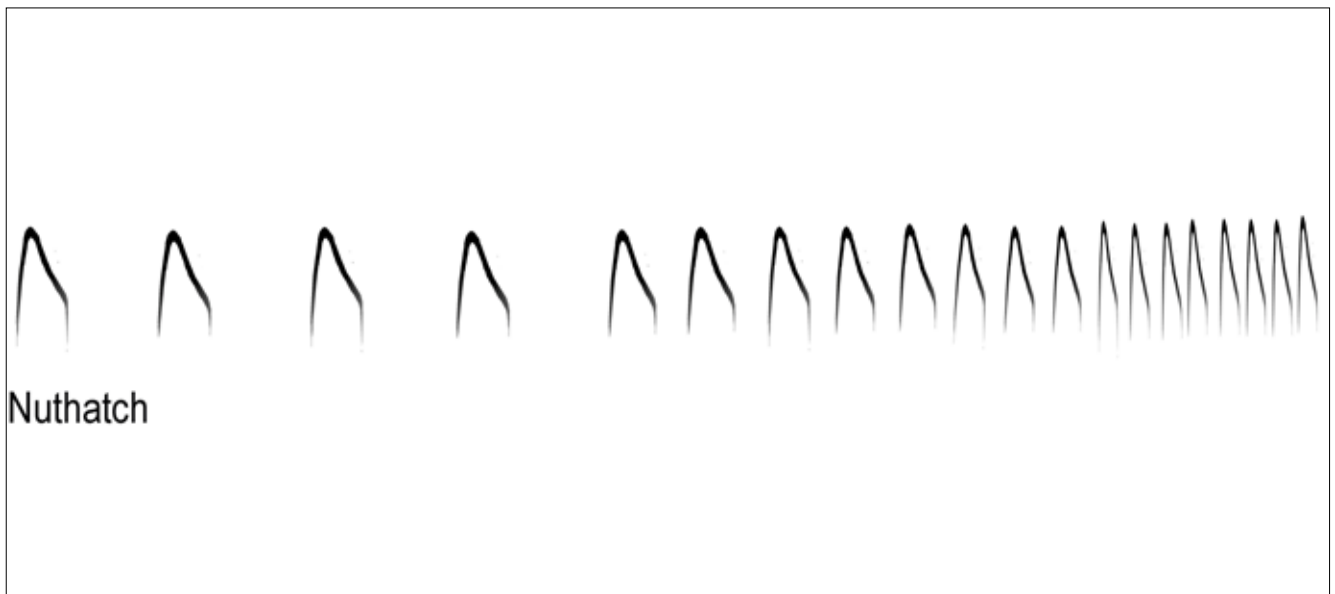
Visualization of sounds

In the past people tried to imitate bird songs with the text. Example vocalisation of Common rosefinch song in folk tradition runs: “Nice to meet you”.

Scientists have developed a way to convert sounds into special graphs that show the frequencies contained in the analysed sound sample over time. These so-called sonograms make it possible to determine species and sometimes even identify specimens. The sonograms are also useful for non-professionals. The graph is static, but playing the displayed sound makes it dyna-

mic. By adding a pointer - like in karaoke - you receive the movie (hence they are presented in the chapter on videos). This can also be done without technology by simply pointing to the still image with a pen or straw or pretending to conduct an orchestra.

This method is especially useful for deaf people, but may serve everyone. Learning bird songs or other voices is easier as the sonogram shows the rhythm and pitch of the sound. Differences and similarities between songs can be pointed out with an additional sense: Sight. In practical application, the method may use printed sonograms of pre-recorded samples to compare them with the sounds met in the field. By using special devices, it is also possible to do the reverse - i.e., display sonograms of sounds heard in nature.



Comparison of simple song of nuthatch and complicated song of robin. Nuthatch repeats a single note, sometimes changing the rhythm, faster songs meaning more excitement. © ETNA

4.3 Audio materials

Obviously, blind people are the main target group, but audio channels should be designed for everyone. Yet, in the future new technologies might even make it possible for deaf people to listen to audios. Engineers are designing a converter of sound into tactile stimuli. The device plastered to the skin would send signals representing letters or even whole syllables/words of the spoken language.

The main approach for people with learning difficulties would be trying to “keep it simple”.

Advantages for everyone:

- People walking or observing do not get distracted by reading, whether it is a guidebook, leaflet or map, they just watch around and listen to the commentary at the same time.
- Using headphones creates no disturbance to other users nor to the wildlife.
- Audio material may not only contain voice of the reader, but also voices from nature or other sounds for a richer experience.
- Electronic recordings are easier to update than printed material, they have also a smaller impact on the environment.

Audio guides

Audio guides may be designed as on site stations that play recordings on demand, as purpose-built mobile devices that visitors take with them (often on hire in the visitor centre), or as recordings that can be played on a smartphone or a tablet. Another option is the on-line access to recorded material.

The essential part of the audio guide is about the content - descriptions of what you pass or stay by. One can imagine that in the near future, intelligent audio-guides will rely not on the recordings but will update information basing on data taken from the environment. They may be able to inform you about the weather, explain which bird are singing, analyse the information from a camera to determine plant species. Some apps that provide a base for such smart-guide already exist.

Most audio guides are based on the descriptions of a particular spatial place (points of interest). At best they offer versions for different seasons or level of difficulty.

Audio guides are very useful as aids for blind people. They should make comparisons, explain distances, provide descriptions of landscapes, plants, animals and other objects. The spoken descriptions should be very vivid and include shapes, colours, size and any information that helps to imagine the place.

Audio guides can have very simple orientation systems where the user knows where they are and can choose which part of the text to play. These solutions contain information about points of interest. A more sophisticated system would inform the user where to go next. Ideally, it would determine its actual position by using the GPS tracking and guide him to the next point, as in car navigation. An intelligent system will maintain the map of the area and allow the users to choose the route at their convenience. There are some internet systems that allow you to create your own route descriptions and upload them to the internet. Traditional approaches are based on the tactile or sound markers in the field. A Spanish standard for city parks suggests planting bushes with characteristic scents to bring attention to the interesting points along the path.



Picture left: Phonomat in Austrian town of Marchegg, a European Stork Village, offers a voice connection to the Visitor Centre. © ETNA

Picture right: This audio-guide in L'Albufera de Valencia, Spain offers a choice of access methods: via specially constructed device, by a phone call or as downloadable mp3 files. It suggests listening to more than one (podcast/text/article) relevant to the standing point.

Alternative caption: This audio guide for the L'Albufera near Valencia, Spain, offers approach via specialised device, phone call or as downloadable MP3 file(s). There is more than one story relevant for each point on the path.]

© ETNA

Can deaf use audio-guides?

Audio-guides bring advantages to anyone, especially to visually impaired people. However, when it comes to deaf people, audio guides are usually unusable (depending on the level of hearing loss) unless the information shared is also visible. There are two ways of providing access to the content for hearing impaired people: the signo-guides and the textual transcription. In order to ensure maximum accessibility, the best solution would be to provide both sign language interpretation and transcription.

Signo-guides

Signo-guides are video tracks in sign language designed to provide content access exclusively to those who understand it. For people with hearing impairments, who do not understand sign language, other accessibility solutions must be ensured. In addition, the production of these videos will considerably increase the cost of the audio-guide. The signo-guides are recommended to be used only if a good Wi-Fi connection is provided at the facilities of the nature trail.

Transcription:

We can provide access to audio-guides for hearing-impaired people using transcription. This function can be used, for example, by pressing a button near each track. The production of transcription is more economical respect to the one of signo-guides. Furthermore, it can be used also in offline mode which makes it ideal for nature trails with poor internet coverage.

Podcasts

Storytelling is quite popular (e.g. on the Spotify platform) and podcasts offer the opportunity of sharing short production containing a story or an interview covering a specific topic related to the barrier-free nature experience. Podcasts, similarly to videos, can be a good introductory material, informing potential visitors about the offer and the site and encouraging them to visit the place. Such material can reduce the anxiety of the unknown and motivate people to go out in nature.

Educators and guides can use podcasts as a tool to share good practices and to exchange experience. They can also encourage nature experience as such and provide general know-how on the related values and benefits, for instance for physical and mental health.



Recording the podcasts in a professional studio will assure clear sound, important for good perception.] © ETNA



4.4. Printed materials

Printed materials are a broad category, important for most or even all the target groups.



Format and technical aspects

People with mobility impairments will have trouble carrying around large foldable materials. Wheelchair user usually have a small bag on their chairs, where they can keep booklets and small equipment. For stick walkers, material of an even smaller size that fit into a large pocket would be the perfect choice. Please, keep in mind that wheelchair users would often put the book on their knees and it is important that such booklets are light but made out of a strong material; it is better if they are binded, not glued or sewn, in order to assure durability.



For visually impaired

All printed material should have a large font size and a high colour contrast.



For people with learning difficulties

As described under the section “website”, most people should be informed by using a simple language that avoids technical terms, foreign words, uncommon Anglicisms and long sentences. As general rule, texts should be easy to understand for children aged 10 to 11. “Easy Language” for people with intellectual disabilities is characterized by a language code further reduced. For people with intellectual and emotional disabilities, the material needs to include a special language easy-to-read, which might not be suitable for the usual visitor. Therefore, it is recommended to provide a separate page or document in simple language where the main content appear. It is recommended to attend training courses for simple language and eventually obtaining certifications. However, guidelines for simple language in German, English and other European languages offer good support. If you have some linguistic skills, you will probably be able to summarise the most important information in the easy language even without training. Illustrations are always supportive to underline important content, and for this specific user group they should be large, and simple. The pictures should clearly show what they are meant to show. Use of pictograms is helpful as well.



Short sentences explaining main bullet points (marked with the pictograms and text colours). Sheets laminated for use in the field may be presented by a guide or left for display in observation hide. Example from Suffolk Wildlife Trust, UK.] © ETNA

For hearing impaired and deaf

People with hearing impairments need a replacement for sound reception. Printed materials, as a visual stimulus, seem to fit best this group. In general, people with hearing impairments can use printed information materials without any problem.

Even though hearing impairments do not correlate with intellectual problems, some of the deaf (especially the ones born with it) may have problems with reading (complex) texts. In order to make the understanding of information easier for them, it is recommended to use simple language and simple structures. Moreover, using pictures and pictograms is also helpful.

Additionally, in case of direct contact, the possible support may be handwriting in the sand, on a piece of paper or on a mobile board. Prepared plates with printed communicates or illustrations are also very useful.



Simple printouts, laminated for water resistance and durability, serve anybody able to see. Example from Suffolk Wildlife Trust, UK.] © ETNA



4.5 3D materials

Using three-dimensional objects is especially important for people with visual and intellectual disabilities. Touching something makes it easier to imagine. The 3D model is an attraction in itself - helps to keep the attention of people with concentration problems.

The ideal nature experience relies on natural objects, such as things found in the field by the visitors (trees, stones, cones) or prepared earlier – dried plants, stuffed animals, collected on the sensory tables or placed within the educational path / area.



Picture left: Sensory table in Żmigród City Park, Poland.] © ETNA

Picture right: Encouragement to touch the (selected) exhibits in the Natural History Museum, London, UK.] © ETNA

Live animals and plants bring always a good emotional reception. In animal clinics and some nature conservation centres for example, it is possible to offer to all visitors, included visually impaired helped by assistants, to touch live animals and plants. This activity always brings a good emotional reception. Please, check whether those activities, especially with animals, require specific permits from the authority in charge in order to avoid legal issues.

An alternative is to provide the fully 3D models of such plants and animals. Please, keep in mind that if those tools need to be touched, they should be made of a durable material. Different technologies, materials and tools may be used e.g. wood sculptures, concrete castings, plush toys and many other. When possible, real-size objects are advisable. Or at least use comparable proportions. To model life-size elephant can be imagined, but what about the mosquito? The models may be placed near information boards, along the path or at any public spaces – near resting points or as a decoration of the entrance. With the popularity of dinosaur parks, it seems not unreasonable to offer similar installations depicting presently living animals in their environment.



Picture left: Licensed ringer showing the birds to the public. Bird Fair, Rutland Water, UK. © ETNA

Picture right: Large 3D models may have additional practical function, like this fish-shaped bench on Balaton Lake coast, Hungary. ©ETNA

Portable gadgets should be made of light material e.g. plush, inflatable etc.

There are alternatives to the fully 3D tools, where a minor component of 3D makes them readable by touch e.g. all types of dioramas, reliefs, flat sculptures or convex print. Contours of shapes that represent a map or a silhouette of an animal should be filled with a picture, so that it can be useful for everyone. Braille, even though used by a small percentage of people, still represents a good solution to provide information to blind people. Braille can be combined with complementary text and pictures in order to make the tool beneficial to a wider audience. Braille prints, as any other material which needs to be handled often, should be made of durable material and in case of booklets, it is advisable to have them bounded instead of glued or sewed up.

As part of pilot projects, the Living Lakes Network Germany has developed materials that combine information in simple language, printed in high-contrast, with tactile information. The special feature here was that both sides of the information materials were equipped with tactile elements, dots and lines. For this purpose, adhesive dots made of hot glue were applied using an advertising printing process. The information in easy language was provided in the usual way, the cards were therefore printed twice. The translation into braille was done by using a translating software available online, which provided a good result. If a suitable printer can be found, this is a nice way to make materials available for people with different disabilities in one product. Short comment on braille: Braille is a brilliant invention for blind people to read text in a block of six dots that encode the alphabet. If you learn it from an early age, you can read as fast as anyone else. However, Braille requires specific training and very sensitive fingertips. Thus, many people getting blind later in their life will not be able to learn it. However, these people will remember written language. Therefore, many additionally offer pyramid texts to help blind people find their way around. Common (Latin) letters are provided in elevated format and can be touched and interpreted also without knowing braille.



Braille is ideal for short texts, small plate on the inclusive path in Wałkowa, Barycz Valley, Poland] © ETNA

4.6 Boards in the field



Placing information panels

The boards are sometimes difficult to read, to access or to understand. Interactive panels with turning elements, flaps covering answers to riddles, etc. are very attractive, but can be difficult to use for some disabled. Classical boards are usually vertical plates, mounted relatively high, often roofed. They were designed for a standing person of an average height. Such design had many benefits, including resistance to bad weather or little space needed to install the board. On the disadvantage part, these solutions created barriers to some disabled groups.

Another design of the boards that is becoming more common, is trying to answer the needs of all groups of recipients. Angled panels, placed low, can easily be read by a standing person, while at the same time are more accessible to the wheelchair users. It is important that the knees of a person on a wheelchair fit under the lower edge of the panel. They are also within reach of anyone who need to touch them. It is obvious that such board should not be placed away from the path, out of reach of those for whom it is intended.

If the board already exists but not accessible, an additional board for the disabled may be considered. But rebuilding the boards or crowding the place with too many of them is neither the best nor the cheapest option. Instead, a leaflet or small brochure about the path, available in the information centre seems a better choice. Even better would be to provide the possibility of using IT. Electronic information is in principle cheaper, updatable and reachable without external assistance (such as having to go back to the information centre for help).

Having solved the problems of physical arrangement, we should make sure that the content of the board is readable and understandable for most users.



Moving parts make the board more attractive. People spend more time at them and get more information. On the left picture: the elements are well designed and accessible, except for the uncut nettles which will disturb the wheelchair users, Barycz Valley, Poland. The righthand picture: Interesting and informative design of this “board”. But placed at the edge of the path that is dangerous for wheelchair users and blind persons. Excitement of overspirited persons may drive their attention away and cause an accident, as well, Black Water Park, Wrocław, Poland.

© ETNA



Picture left: The lower edge at 60-65cm makes it possible to place the legs under the board. However, the handrail of the platform, placed 130 cm high, safe for standing people, distracts viewing of the landscape in case of sitting person. Bwlch Nant Yr Arian, Wales, UK © ETNA

Picture right: Give a purpose to your visit. On this board visitors exchange information about their sightings of birds.

© ETNA



Poor visibility

To avoid unreadability, texts on information panels should be written with high contrast letters of the correct size. There are guidelines for information boards in public buildings that include detailed prescriptions as to the size of the letters by height and watching angle.⁴ Illustrations also should be clear, with high contrast and size.

For existing boards that do not meet these expectations, there are some alternative solutions. Users who know their limitations may be prepared and carry binoculars with them to better see the texts. Binoculars are useful in many nature experience situations anyway. An effective way is to take a photo and zoom in on it to enlarge the writing. Using automatic reader apps for smartphones may be very helpful as well, especially for people with restricted vision.

The organisers of the path may provide some more sophisticated tools. Special staff support or printed materials can be provided at the visitor centre.

QR codes that direct to read information boards, the possibility to download the board's content on your device and online information, are all options that can be enjoyed without external support by people with impairments. In fact, convex QR codes can be read by blind people using their smartphones (you can feel the code area with your hand and at the same time take a picture of it by using the phone with your free hand). This is one of the best alternatives to rebuilding existing boards.

All types of audio guides can be used here, either via smartphone application or as playback after pressing a button (see chapter 4.5). These may be read aloud or transferred wirelessly to the personal device (e.g., via Bluetooth or from a chip, as in contactless payments). Such systems have yet to be developed, but these technologies are appearing very quickly.



QR codes for access to information via classic download or by installing an app (here: MOBO) and feed it with data. Wałkowa, Barycz Valley, Poland © ETNA



Difficult content

The content of the information boards should avoid technical terminology and should clearly explain the basics of the message. There is usually not enough space to explain complex issues anyway.

If several difficult topics have to be presented on a board, they can be combined by using a simplified language.

One way is to use illustrations that are informative and emotionally resonant. Picture captures, subtitles and main theses can be used to convey a simple message. The main text can address more complicated issues. Messages that are simplified in their form or content are shorter, so they can be written in larger type and engage the reader's attention. Each text should be written in a simple way, avoiding jargon, complex sentences, and unclear statements. This will be helpful to any user, as reading complex texts during an excursion is difficult in itself.

Separate part (paragraphs) in easy language should be placed in the lower part of the board, enabling the access for young children.



Combining very simple message, take away leaflets and additional more complicated information makes this board useful for all. Exhibition in the Castle on Chiemsee Herreninsel, Germany. © PTPP "pro Natura"



4.7 Sign language

Sign language helps to transmit and interpret information when understanding spoken language is not possible. Therefore, when we want to communicate with a deaf person, a sign language interpreter is of great help.

Sign language is a visual language, but it is very similar to spoken language in many ways. Everything that is used in spoken language can be used in sign language as well: for example, the words, the pauses, the breath intake, the intonation and melody, the stressing or deemphasizing of sounds, the facial and vocal emotion, the body posture and head and hand gestures, etc.

Even without knowing the language, gestures such as pointing at something or waving to come or to follow the guide may be tried. Some deaf people can also read lips. See **Annex 6**.

Language versions

It is important to know, that sign languages vary from country to country, in both vocabulary and grammar. For instance, the sign language in German is not the same as in English. Moreover, there are differences in British and American English, too. The British use bimanual alphabet, communicating with both hands, while the Americans use only one. Although there is the International Sign System (ISS), it is not precise enough to allow accurate translations of texts.

4.8. Guidance systems

This part describes the orientation with the help of different communication channels. In the context of overcoming communication barriers, this is the issue mainly for two target groups: visually and intellectually impaired. For people with restricted mobility, the problems are more physical than related to communication and have been described elsewhere.

People with hearing problems will not be able to benefit from the sound signals or spoken directions. This may be remedied by displaying texts on signboards, directly on the paths, or even on screens (the latter mainly indoors, e.g., on events). Some people do not read maps. Symbols painted directly on the road or on the trees, signboards installed along the way, would help anyone to orientate on the way from the parking or train station or bus stop, and on the path itself.

Blind people will need a system based on their other senses. There are solutions for tactile guiding (touched with the white cane) developed for the cities that can be used in natural surroundings as well. Such a standard for the city parks has been developed and agreed in Spain. It uses road verges and path surface and are supported by the scent signals, meant to attract attention to something interesting near the path. Trail crossings, side paths (like dead-end path to the viewpoint), etc. can be marked by mimicking standardised city systems.

Tactile guiding may also use symbols carved in the wood to mark the nature path within certain natural area. Sound signals for the blind may show a lead to the board or some other attraction. Tactile maps may help blind people to build the map of the area and move around without support.



Picture left:

Solid handrails and verges, besides guiding, function as safety precautions, especially important in this, often crowded, viewpoint for the vulture nests in Monfrague, Extremadura, Spain.] © ETNA

Picture right:

Guiding system does not have to be boring. Creative signboards on the Po-yang Lake, Yangtze province, China.] © ETNA



4.9 Other

Here we cover additional issues related to communication in nature experience.

For some disabled people, the idea of walking out in nature can be a barrier itself. There is not much information about accessibility of nature experience, the know-how of going out. There are some good initiatives, like Birding for All association, based in UK but open for membership from any country. They popularise this sort of activity and present benefits of outdoor experience and contact with nature. It is also important to overcome the fear of the unknown and to show that it is not that difficult. Instructive materials encouraging people to go out and enjoy nature despite barriers are needed. For example, a video may explain which garments are important in the field, how to plan the trip etc.

Creative approaches

It is possible to create a scent guidebook like the ones offered by the cosmetic industries, where rubbing certain parts of the leaflet with a finger releases a smell, similar to e.g., different plants. A bird guidebook for all may concentrate on bird songs for the visually impaired.

IT

Modern technologies develop very quickly. They will offer opportunities that are at present even hard to imagine. In the Polish castle in Nowy Wiśnicz, it is possible to take a Virtual Reality tour and see the castle from a bat point of view. There are apps that help to identify plant species after taking a picture (e.g., PLANTSAP). Fundación Global Nature in Spain developed an app that is able to recognize the landscape and names the mountain peaks after pointing the smart-phone camera at them.

Smart Braille allows Android users to communicate via an app-version of braille. Its functions comprise one that helps the user to read text in braille and another that allows them to translate text into Braille.



Picture left: Map of the Lake of Constance made of flowers. Mainau Insel, Bodensee, Germany. © ETNA

Picture right: Bird song pen – after its moving over bird name in the book, the pen replays voice of that bird.

© ETNA

In the near future, with the development of Artificial Intelligence and Machine Learning algorithms, the support available on your smartphone will become enormous and may change the prerequisites of accessibility and barriers. For example, there are GPS navigation apps (e.g., BlindSquare) that speak about the surroundings. It imports data from crowdsourcing platforms like Foursquare, public mapping sources, service providers like Uber and public transit companies. They may be used to lead a visitor through nature trails. Someone just needs to upload information to an open-source platform such as Open Street Map or Foursquare data. BlindSquare is being integrated with popular *what3words* service that combines localisation data with uploaded information describing the site.

Another example, being now developed in Poland, is a speech recognition programme that translates text into electric signals. These would stimulate some parts of skin and thus make the deaf people “hear” the spoken language. Honda tests vibrating shoes that will indicate directions to blind people and should become available on the market in 2023.



Interactive electronic systems. Already a bit outdated, analogue device (on the left, Tancat de la Pipa, Albufera de Valencia, Spain). The more advanced computer software approach (on the right, Cley Marshes Visitor Centre of NWT, UK) can be multiplied in unlimited numbers and easily adapted to any new circumstances. © ETNA

Durability/maintenance

All the elements described above require updating, repair, replacing batteries etc. This should be considered at the decision-making stage, as it generates some costs.

When intervention modifies the space, the cost and responsibilities will be on the side of managers. Adapting the person will keep the cost on their side.



Lack of management caused depreciation of the path's function. At least for those, who need to touch the signs.

© ETNA

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