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SOUND OF STORIES

# BENEFITS OF SOUND USAGE IN EARLY EDUCATION

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Międzynarodowa Szkoła Podstawowa
Edukacji Innowacyjnej w Łodzi

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## Content



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# Introduction

## The background to "The Sound of Stories"

Literacy skills are fundamental for the development of children. Within the umbrella of literacy, a wide array of subjects, some of which are sometimes overlooked. Vocabulary, in general, tends to be underdeveloped for the primary learner's level. Yet, speech is critical for children to develop language and communication in their early years. Indeed, children with poor language skills are likely to have low school readiness and are at risk for subsequent academic problems. Further studies have shown that a child's vocabulary is one of the most significant contributors to their performance at school in all subjects, including maths. Many academic programs rely solely on conversation and reading to teach vocabulary, but experts emphasise the importance of explicitly exposing students to vocabulary in various contexts and settings.

One of these innovative settings lies with the idea of sounds. Sounds surround us all; they are everywhere and can provide a unique learning experience. Indeed, one of the most efficient ways to learn vocabulary is in context, when a new word appears within

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a sentence, context, or idea. Sounds, to this end, can provide the perfect surroundings. In addition, by using sounds, teachers can foster pupils' imagination to create stories and use storytelling to reinforce their literacy and vocabulary skills. Whether exploring historical periods through specific sounds or creating an account from routine sounds, using sounds can act as weapons to fill the word gap.

## Creating stories through our listening experience

When we take the children outside for a walk to the playground, for example, we are often preoccupied with what we see: a big tree, a dog, a car, or a flower growing between the tiles on the sidewalk. These are all things that create little stories from everyday life and stimulate the children to put their experiences into words - with their eyesight first.

But what happens if we put our hearing first?

Closing our eyes, we suddenly start to notice all the sounds around us: the wind blowing in the trees, cars driving by, bicycles rattling over the cobblestones onto the street, footsteps on the pavement, someone talking on a phone, birds singing, music playing softly from somewhere, dry leaves rustling over the road, the sound of walking through fresh green grass after it has stopped raining etc. These are all sounds that are unique to this particular place where we are right now. Sounds that together create a specific landscape of sounds, a ‘soundscape’.

Asking the children what sounds they can hear, they immediately embark on a storytelling journey, creating little stories about everyday life from a child’s perspective - what is it like to be a child right here and now?

Being amazed about noticing the sound of playing in dry leaves on the way to the playground, being surprised about how small the birds singing in the trees actually

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are (and how loud they can sing!), being surprised about the screeching sound of running in the wet grass with your rubber boots, etc.

In other words, noticing the world, both seen and unseen, through the listening experience.

## Listening to the soundscape around us

When we listen, we switch off our eyes for a moment and let our ears examine the place where we are. We soon realize that we can easily "see" with our ears and even describe quite accurately the place where we are. Moreover, we can hear many extra things that we can't see with our eyes: birds chirping somewhere in the forest, the sound of the sea behind the dunes, people walking around the corner, cars on a nearby street, someone coming up the stairs, etc.

If we lived in the Stone Age[1] , the sounds and hence soundscape would be very different: apart from the birds and the sea, we would maybe hear someone chipping flint outside a hut to make an axe. Or hear someone chopping wood somewhere for making a fire or a boat. Or hear the bubbling sound of dinner cooking on the fireplace, the crackling sounds from the fire, etc.

Whether it's today, in the Stone Age, or any other era, the sounds of a specific place form a very precise picture of life here. Such a sounding place is called a soundscape – a landscape 'seen with the ears'.

Listening to soundscapes is all about paying attention to the sound details of a specific place and expressing them in words. Every soundscape is a sonic complex

[1] Such sound awareness can be used as a catapult back in history, for example, to the Stone Age, when the soundscape was completely different from today. The Stone Age Center Ertebølle's outdoor facilities are perfect for such a time travel back in time through the listening experience.

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made up of myriads of different sounds, which together form a unique sonic space in time.

In soundscape exercises for children, language stimulation is essential to the soundscape listening approach. Here, they are urged to constantly put what they hear into words: a bird, a dog, wind in the trees, footsteps, people talking.

For example, A soundscape exercise can be practiced outdoors on a walk to the park or indoors by listening to a soundscape audio recording of a specific place.

If you're listening to a soundscape audio recording with older children, don't reveal the location of the recording right away. Instead, ask questions that will help them gather information about what kind of place it might be. Sound by sound, they will piece the soundscape together through mutual listening experience and teamwork. All you must do is to ask general questions about what they hear: e.g. “What sounds do you hear?”, “Where are we?”, what is happening?”, “What makes you say it has just been raining?” etc.

Let them investigate the soundscape as if they were going on a treasure hunt, looking for sonic hints and clues leading to the exact soundscape.

**The pedagogical benefits of working with soundscapes are**:

- Stimulating listening attention (listening awareness)

- Investigating sound and meaning

- Ability to concentrate

- Language stimulation

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- Togetherness/teamwork - we embark on the listening experience together

- Awareness of all the sounds we are surrounded by and how they affect us

## The soundscape

Looking at a landscape, you let your eyes wander from side to side, back and forth, examining all the different visual details that make up this landscape. The same goes for the soundscape; only here, you use your sense of hearing instead of your sense of sight.

A soundscape is a landscape that you 'see' with your ears.

Listening to a landscape – a forest, for example – you close your eyes and let your attention wander back and forth from one side of the forest's soundscape to the other. Suddenly you hear the wind rushing through the treetops, birds singing in the distance, the sound of footsteps on the soil, and a small river in the distance - all sound details that create this unique soundscape of this very place in this forest.

Now imagine that you're in a city. Close your eyes and listen to all the sound details and information you hear around you: cars driving by people walking on the pavement, talking on cell phones or with each other, busses going by, music from a store – this too is a unique soundscape that tells something about what it's like to be right here right now.

All the sound elements are here. Now it's up to you to make the story.

## Sound workshop examples – different target groups

Here are some examples of sound workshops for children in daycare, school, and youth education and for refugee children who have just arrived in a new country.

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a) Sound comprehension and language stimulation for children in nursery and kindergarten

For children in nursery and daycare, it's all about learning new words, to articulate and communicate their minds and impressions of the world through language. Through exercises on sound comprehension (connecting things with their names), their vocabulary and language skills are improved, preparing them for school.

The vocabulary of the everyday soundscape is quite complex. Not only do the children need to learn the names of things (e.g., a dog), but also what these things 'say' (the dog barks) and what it sounds like ("woof woof woof").

Exploring the everyday soundscape with children is an excellent opportunity for expanding their vocabulary, for example, through storytelling, where they make up a story about the world as they see it.

Through listening exercises like the 'sound hunting' just mentioned, the children learn to connect things with their names, to articulate what they look like, how they sound, how they smell, how they feel etc. – all sensory impressions expressed in words form a powerful tool for the rest of their lives.

Example of a 2-day course from University College Copenhagen's teacher training project 2017-18 "Music and soundscape":

DAY 1 – At the kindergarten: Sound hunting and listening exercise.

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- In the kindergarten: Sound hunting and listening exercise – find different sound things: what do they sound like? (imitate the sound) What are their names? (older children) What do they say? (“bow wow”, “meow”, “oink” etc.)
- Let the children record sounds from everyday life with a microphone/audio recorder (the traffic outside the kindergarten, in the playground or the park, on the way to the playground or the park, etc.)
- If you don’t have audio recorders available, use a phone or just note the different sounds on a piece of paper or on your phone
- Go back inside. Select the best sounds from the audio recordings - or have some sounds ready for the next listening exercise
- Find pictures or print photos of the sounds
- Set up a board divided into three levels (happy smiley, medium happy smiley and sad smiley)
- The children now listen to each sound, choose a picture of the sound and whether it’s a good sound (happy smiley), medium sound (yellow smiley) or bad sound (sour smiley)

The older the children are, the more they can explain what they hear and why they like or dislike a particular sound. For example, enjoying the sound of someone playing

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with the sandbox bucket and shovel: "because I like playing in the sandbox", or disliking traffic: "because it makes my ears hurt", or liking the sound of a dog barking: “because I love my dog. Her name is Molly”.

This exercise stimulates language; from pre-language age (imitating the sound of the dog: “woof woof woof”), to language learning (learning the name: “A dog”), to speaking in sentences (Why do you like the sound? “Because I have a dog. It’s called Molly”).

The children have now recorded sounds and talked about sounds. The exercise can be expanded with a more musical investigation into their own sound imagination.

DAY 2 - at the Music Museum: Sound analysis and sound translation for musical instruments

- Go to the Music Museum with the children / or a room with different musical instruments
- Play some of their recorded sounds and ask them to draw the sounds (e.g. bells, pig, car, rain, etc.)
- Go into the musical instrument room, and select some instruments
- Let the children try the different instruments to get to know how they sound
- Let them look at their drawings and choose the instrument(s) that sounds like the thing have drawn (Fx bells = bells, rain = tapping drum, pig = whistle)
- "Compose" a little sequence of sound events by placing the drawings after each other (fx a pig walks on a road, meets a bell, it starts to rain, they run for cover)
- Let the children play the sequence – they've now created their own sound story

(Soundscape and Children Project, Music Museum Denmark 2017)

b) Sound analysis extended to school children and students in youth education

The sound analysis exercises and drawing of the sound mentioned above experience (EXAMPLE 1, Day 2) can be taken up to school and higher education. Here the listening awareness can be further explored by analyzing their sound experience on two different levels: listening for the sound source and sound timbre[2] . To enter these two levels, you can the following questions:

[2] For more details, see chapter : Listening modes and Strategies – how to enter the sound experience with children.

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- What do you hear? (sound things, events or actions. Fx the sound of a car)
- How do they sound? (describe the sound's timbre. Fx "wrooouuuumm")

In the first photo below, students from 6th grade visually analysed their audio recordings taken in front of their school. They have drawn all the things they can hear (footsteps, cars, motorcycles, etc.) and how they sound (colored objects). The arrow in the middle marks the start and end of the audio recording and serves as a time indicator in the analysis.

In the second photo, students from a dance and theatre school, higher education, have mapped the sounds of a shopping mall's ground floor next to the school. Here, a view from above has replaced the horizontal time indicator.

(soundscape analysis in 6th grade 2015)

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(soundscape analysis in higher education/dance&theatre)

c) Listening comprehension and language stimulation for refugee children

The exercises above have proven to work particularly well for children who have recently arrived in the country and are still in the process of learning the language.

The advantage of working with sound experience is that you get to practice putting

everyday things, events and actions into words. You don't need to be good at writing or arithmetic - you just need to listen and explain what you hear, both in words and drawings.

On several occasions, I've seen students, newly arrived from another country, who usually sat passively at the back of the class, suddenly join in and even prove to be highly skilled at listening precisely into complex soundscapes. This exercise motivated them to articulate in detail what they heard, using every word they knew within their limited vocabulary - simply because attention was given to the immediate sensory experience of hearing: What do we hear? What does it sound like? Where do you think

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we are? What's the weather like? How old are the people in the audio recording? What clothes do they wear? etc.

(soundscape analysis and instrument building workshop at Karlebo 2015)

d) Soundscape analysis and listening exercises in a historical framework/historical context

The soundscape listening exercises and soundscape analysis can be taken into a historical framework or context by adding an extra exercise: fx comparing this soundscape now with that of the Stone Age.

A listening exercise, visiting a longhouse with a class, could look like this:

- Being here at the Stone Age Center Ertebølle, in a longhouse, what do you hear? (Student: "I hear the wind, a cell phone, my polyester jacket, the sea, someone breathing")
- What sounds do we hear that didn't exist in the Stone Age? (Students: "Cell phones, cars, airplanes, polyester jackets")
- What sounds do you imagine we would hear in the Stone Age, right at this place? Imagine it (Students: "The sea, the wind, the sound of someone making flint stone arrows", another student: "a cow?", museums guide: "no cows at the time, not up until the Bronze Age when agriculture was introduced")

Going deeper into the soundscape of everyday life in the Stone Age, it could continue like this:

- Teacher: Take, for example, a cell phone. What do you use it for? (Students: Communication and entertainment)

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- How do you think they communicated with each other in the Stone Age without cell phones? (Students: "They shouted to each other, used sign language… Museums guide: No, they blew in a horn from a wild beast, and the sound could be heard over a long distance. Students: cool.)
- How do you think they socialized without online video gaming? They told stories around the fireplace and played games with bones and other things.



(soundscape analysis and instrument building workshop for 10th graders at the Stone Age Center Ertebølle 2021)

## Listening modes and strategies – how to enter the soundscape experience with children

When entering the soundscape experience, we can use different listening approaches (modes) to draw our attention to the sounds around us. The methods are strategies that invite us to focus on various aspects of the sounds so that we can start to differentiate them from each other, categorizing them and developing a language for what we hear.

In our modern culture, most of our attention in school is drawn to what we can see, which is what we analyze and learn to vocabulize. But we seldom develop a language for what we can hear. This steals a whole aspect of our sensory experience away, leaving us speechless and lacking storytelling tools.

The aim of exercising different listening modes is to broaden our vocabulary of sounds and, thereby, our attention to the sounding world.

a) Entering the listening experience by asking questions

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A simple way to enter a soundscape is to ask questions instead of giving answers. By asking questions, you open the children's sonic imagination in a free space.

Start by asking questions like:

- •What do we hear? (e.g., a car, birds, an airplane)
- What does it sound like? (e.g., the airplane sounds like ‘swuuuusch’, a fast sound, like thunder)
- Where do you think we are? (e.g., near the airport, near the sea, in the forest)

When the children have grown accustomed to this listening exercise, you can begin to go into details, like, for example:

- What's the weather like on this soundscape recording? Can you explain why?
- How old are the people in the audio recording? Can you explain why?
- What season of the year are we in? Can you explain why? etc.

In this way, the children are urged to articulate further what they hear, expanding their vocabulary.

The teacher should let all the children present their individual answers before revealing the ‘right’ answer. All answers are right in the sense that we all pay attention to different sound details because we connect them with other sound memories from our life experiences. The main goal of this listening exercise is not to get the right answer but to embark on a journey together to discover all the possible sounds and meanings (and words!) that can be drawn from this soundscape.

b) Geophony, biophony and antrophony

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Another listening exercise focuses on different aspects (modes) of the soundscape. For example, all the sounds related to geography, biology and antrophony (human-made sounds).

- Geophony - Typically, geophony refers to the sounds of natural forces, such as water, wind, and thunder, occurring in wild, relatively undisturbed habitats.
- Biophony - The collective sound produced by all living organisms that reside in a particular biome (tundra, rainforest, etc.) .
- Antrophony - All of the sounds we humans generate- cultural, social, technical, etc.

The first two listening modes could be combined. For example, what bird species live in what biomes? What does deforestation have to do with the disappearance of bird species? In a research project, bird song from the Amazonas was recorded to document what bird species disappeared after deforestation.

In the third listening mode, anthrophony, attention is focused on the soundscape of our daily life as human beings. If we live in the city, anthrophony is the sound category of sounds we are mainly surrounded by. If we live in a remote area in the mountains, we are surrounded more by sounds from biophony and geophony than anthrophony (unless we make much noise!).

If we want to move to another time in human history, we could try to imagine what this biophony would sound like, geophony or anthrophony would sound like. In the Stone Age, the balance between geophony, biophony and anthrophony was very different from today, as the population of human beings where much smaller than today.

d) Sound source and sound timbre

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This exercise, the sound source/sound timbre-listening exercise, has to do with separating what we hear (the sound source: e.g., “a dog”) from the sound itself (the timbre of the sound: “wouff wouff”). These two listening modes are important because they open deeper layers of listening awareness of our everyday soundscape.

In our everyday life, we use our listening ability to gather sound information (of sound sources) that can help us navigate and make decisions. For example, when we cross a street, so we don’t get run over by a car. Or we hear someone coming up the stairs; maybe someone we know?

In this listening mode, we listen for sounds that can give us information about things we can’t see. Here, sounds work as ‘signs’ that point to specific items, actions or events happening in the world – to its sound sources.

- Sound source (the sound of an airplane, the sound of a dog, the sound of a car)

But what happens if we try to forget the sound source and instead focus our attention on the sound itself? The sound becomes a sound of its own, no longer attached to the thing or source that caused it. What we hear is the sound’s timbre.

- Sound timbre (how things actually sound: splashhhhh, creeeeeeeek, crnch crnch crnch, WOOOOAAAAAAHHHHHHRRRRRR, sssssssssssss)

In this listening mode, you can choose to listen to the sound as something musical (crnch, crnch, crnch - creeeeek) or imagine that the sound ‘points to’ another thing in the world. For example, tinfoil could sound like a crackling fire or walking on frosty snow. This is what sound designers and foley artists with sound effects do.

The two listening modes – sound source and sound timbre – can be turned into a graphical soundscape analysis, as shown below in the table.

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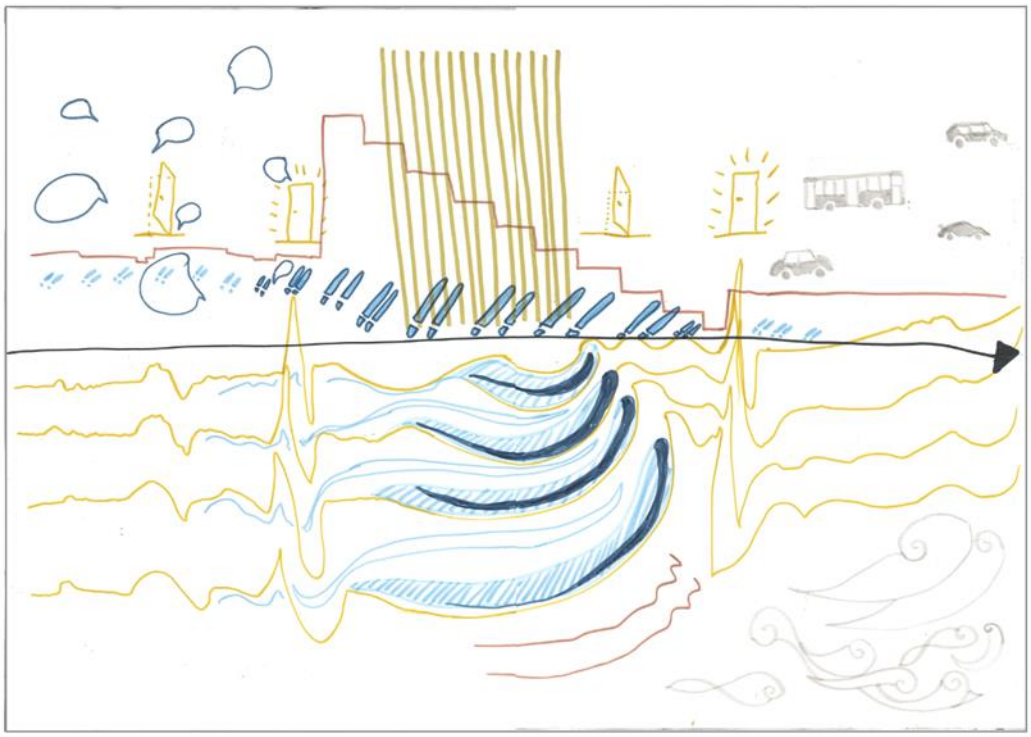

(soundscape analysis of a sound walk from inside the School of Architecture in Copenhagen, down some stairs and out on the street 2018)

Creating a soundscape analysis is like making a score of your soundscape:

- Record a soundscape you want to analyze (fx 2 minutes long)
- Draw a timeline on a piece of paper, dividing it horizontally into two sections – an upper and lower part. The beginning is where the audio recording starts, and the end of the arrow is where the recording ends
- On the upper part, draw all the things you hear in the recording from beginning to end (all the sound sources)
- On the lower part, draw what all these sounds sound like (sound timbre). You can draw it in whatever way you like.

Below are some ideas on how to draw the same sounds in the two listening modes.

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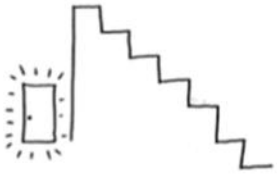
| | | | |
|---|---|---|---|
| **Sound source**<br>the sound of something |  <br>the sound *of* a car |  <br>the sound *of* people talking and foot steps |  <br>the sound *of* door slamming and walking down the stairs |
| **Sound timbre**<br>what the sound sounds like |  <br>sounds *like* "woouush" |  <br>sounds *like* "dadidedada" and "dikdakdikdak" |  <br>sounds *like* "SLAM!" and "dakdakDakDAK" |

## Background of the soundscape term

In the 1970s, the Canadian composer Murray Schafer introduced the concept of soundscape into the discourse of electronic music. In this context, 'soundscape' was understood as a counterpart to the landscape: with our eyes, we look at landscapes, with our ears at soundscapes.

Schafer's studies of the soundscape emerged during a politically and ideologically heated time. The concept of soundscape initially had an ideological aim: to provide an ecological diagnosis of society through sound recording.

Schafer aimed to make the world aware that global pollution is not only about waste poisoning the soil and CO2 emissions into the atmosphere. It also manifests itself sonically in the form of machine and industrial noise – as sound pollution. According to him, becoming aware of sound pollution goes through practical soundscape programs and exercises such as sound walks and listening exercises.

In recent years the soundscape term has been revived as the interest in and concern about environmental issues and global warming has risen.

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Schafer's book: “The Sonic Environment and the Soundscape. The Tuning of the World” from 1977 is a chronological review of the soundscapes of different historical periods, which aims to show the transition from pre-industrial, balanced soundscapes to polluted soundscapes of modern industrialized society.

**The interdisciplinary field of soundscape:**

Since the 1970s, the term soundscape has developed in various fields and disciplines. Acoustic Ecology is the direct successor of the original soundscape term and focuses on sound and environmental issues. Soundscape studies have also branched into other fields like Soundscape Composition, Sound Studies and Audio Culture, focusing mainly on electronic music, sound art and performance art.

In recent years soundscape has started moving into other fields.

In architecture, Sonic Architecture takes the listening perspective as its starting point for a sculptural-architectural design process, building good and healthy acoustic environments in buildings as well as esthetically interesting designs.

In archeology, the term Sound Archeology has emerged recently, focusing on reconstructing the soundscape of ancient times to better understand everyday life in specific historical time periods. The topics of sound archeology vary from rebuilding musical practice and what it may have sounded like in ancient times, to Archaeoacoustics that reconstruct archeological sites and way of life and rituals, from acoustical measurements of caves combined with cultural traits and artefacts (artistic paintings of hunting, rituals etc.).

Recently the field of Sonic Pedagogy has been introduced by Salomé Voegelin, who focuses on techniques and practices for listening as a pedagogical and creative tool. One of Sonic Pedagogy’s inspirators, Adam Tinkle, wrote in 2015:

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While techniques for listening to music are part and parcel of any form of music education or music appreciation, the discourses I call 'sound pedagogy' offer techniques for listening in general, often promising some benefits to the listener in everyday life.

Both Sonic pedagogy and Sound Pedagogy are put in the world to open our ears and minds to the infinite possibilities that lie in the sound of everyday life, and through different listening practices learn to engage in the world.

This project aims to teach children to engage in the world by creating their own sound stories.

## Using Sound in Early Learning Perspectives

**How to use audio teaching traditionally in schools?**

In the last decades of the 20th century, there has been a shift of interest in music education from "music" to "sounds". Acknowledging the sound as the central element of music teaching and learning has its roots in the "New Sounds in the Classroom" movement and the pedagogy of Murray Schafer, John Payner and George Self (Schafer, 1965; Self, 1967; Paynter&Aston, 1970; Paynter, 2000). After the 1970s, the afore mentioned composers-educators emphasised sound rather than music. This entailed that students could learn through sounds coming from themselves, from classroom objects, from tonal and atonal percussion instruments, and sounds from their bodies. It was asserted that all people were capable of producing, understanding and notating sounds and had equal chances in music creation and expression (Tinkle, 2015; Kanellopoulos, 2012).

Listening to sounds involves paying attention to them with an open mind. It requires focusing on the volume, tone, sources of coming out and meaning.  It engages imaginations to interpret, understand and describe it.

While using sound in early years education, teachers apply different sounds and different sound sources. Audio teaching traditionally in schools involves incorporating various methods to enhance learning through sound. It is an effective way to engage and educate young students.

**Here are some considerations for using audio teaching traditionally in schools:**

- Songs and rhymes: Popular and well-known pieces of music that always appear in classrooms. Teachers incorporate songs and rhymes into lessons to facilitate language development, improve phonemic awareness, and enhance memorization skills. Moreover, singing together as a group or using recorded music can make learning more enjoyable.
- Audiobooks and Storytelling: Reading aloud to students or playing recorded stories can captivate their imagination, develop listening skills, and improve comprehension. Teachers can choose age-appropriate books and engage students in discussions or activities related to the story.
- Audio Recordings: Using audio recordings to supplement lessons and provide additional resources for students. This can include recording lectures, instructions, or explanations, allowing students to revisit the material at their own pace. Audio recordings can be made available for students to access on school platforms or devices.
- Language Learning Resources: Utilizing audio materials such as language-learning apps, podcasts, or recorded dialogues to improve vocabulary, pronunciation, and listening comprehension. Students can practice listening and speaking skills through interactive language exercises.
- Oral Presentations and Debates: Encouraging students to give oral presentations or participate in debates as a way to practice effective communication skills. Audio equipment can be used to record and evaluate

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these presentations, enabling students to reflect on their performance and improve their public speaking abilities.

- Field Trips and Audio Tours: Arranging field trips or virtual tours to places of educational interest and provide students with audio guides or narrations. This allows them to learn about different subjects, cultures, or historical events through an immersive audio experience.

When using audio teaching methods, it is important to consider the needs and preferences of individual students. Providing a variety of audio materials, ensuring accessibility for all students (including those with hearing impairments), and offering opportunities for active engagement and interaction can maximize the effectiveness of audio teaching in schools.

**Examples of working with sound in early years education**

Listening for the source of sounds and meanings (Schafer, 1994/1997) is a very fundamental way of listening, a skill that has been important for the survival of humans and other species. This way of listening used to be essential for the early humans to find their way around the forest, protect themselves from predators, communicate with conspecifics and secure their own food. It is obvious that even today, humans still need to listen and not just look in order to ensure their safety while moving around busy streets. Identifying sound sources and their localization is an important skill to develop. It is the one that leads to enhance awareness of our environment and their connection with it.

While working with sound in early education in the field of preschool and early childhood education, educators try to apply many possible approaches. Those can be divided into:

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- Music Education: Incorporating musical activities, such as listening to different genres, playing instruments, or participating in group singing, to promote creativity, rhythm, and cognitive abilities.

For example: Teachers suggest to students the repetition of rhythms. Rhyme is found in poetry, songs, and many children's books and games. Most children also love to sing and recite nursery rhymes. Words that a familiar sound can group together. Students can learn and memorise new vocabulary faster while clapping, stomping, and reflecting with movement.

What rhymes with this picture? (Whole class)

Students decide if their objects rhyme with a picture and then compare written rhyming words.

Match the rhyming objects (small group)

In small groups, students match images of objects that rhyme to develop phonological awareness.

The other everyday activity is using basic percussion instruments to create rhythmic sequences. Teachers provide students with tambourines, drums, cymbals, xylophones, and maracas and try to follow the sound or sequence of sounds heard. Everyone plays together.

Developing a child's phonological awareness is an important part of developing a reader. Young children's ability to identify rhyme units is an important component of phonological awareness. Research shows that students benefit from direct instruction on rhyme recognition paired with fun activities that target this skill.

- Sound Recognition: Engaging students in listening exercises where they identify and differentiate sounds, such as animal noises, musical instruments, or environmental sounds.

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Students are supposed to recognize the sounds of the environment (tasks such as: what animal makes such a sound, or what are sounds of the street, forest, everyday objects, etc.)

Another exercise done by teachers is reacting with movement to the melody (musical and movement reflection of simple scenarios such as we are in the meadow and a light wind is blowing, now it's raining, now the sun has come out, etc.)

While working with sound, some challenges appear that teachers and students need to conquer. Those challenges may arise from a pedagogical and didactical standpoint:

- Accessibility: Ensuring that all students have equal access to audio resources, including those with hearing impairments or limited access to technology.
- Attention Span: Maintaining students' focus and engagement while listening to audio materials can be challenging, particularly for younger learners.
- Comprehension: Verifying students' understanding of audio content without visual cues or immediate interaction can be more complex than traditional teaching methods.
- Multimodal Learning: Balancing the use of audio with other sensory experiences (visual, kinesthetic, etc.) to cater to diverse learning styles.

To address these challenges, educators can implement various strategies, such as providing visual aids alongside audio, incorporating interactive elements into audio lessons, encouraging active listening through discussion or follow-up activities, and offering alternative formats for students with different learning needs.

Overall, integrating sound into early education can enhance learning experiences, promote language development, and stimulate creativity, but it is essential to

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consider the unique challenges it poses and design pedagogically sound approaches to maximize its effectiveness.

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## Soundscaping at the Museum

**Why does it make sense to involve museums in educational activities?**

Where, when, and how does learning happen? Clearly, there are challenges in the traditional school system, and perhaps there may even be great benefits in working to move parts of the lesson out of the classroom and into a museum. Museums can be an essential player in the future of education!

Many museums have a long tradition of offering teaching programs for kindergartens, primary school classes and secondary school students. These are linked to permanent or temporary museum exhibitions. These may be historical environments such as reconstructions, open-air museums, or museums with a particular architecture that challenges pupils with a special aesthetic which motivates pupils.

(The Medieval Center is an open-air museum with very progressive teaching using roleplaying in a living medieval town. Photo: Kim Callesen, Vesthimmerlands Museum, Denmark)

Sometimes museums are used for social events, entertainment, etc. However, museums can play a much more proactive role in education by being clear about what they can offer and perhaps being innovative in complementing what is taught.

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**Udeskole (Translated: Teaching outside the classroom)**

In the Nordic countries, when goal-oriented education is moved out of the classroom and into nature, the supermarket, the cemetery, companies, or museums, it is called "Outdoor School". However, this can be a misleading term, as it is often confused with nature and nature-related subjects, which in Denmark are taught by nature guides at special Nature Schools. "Outdoor school" is more than that. Therefore, it's probably more aptly described as:" Targeted teaching outside the classroom" Moving teaching out of the school offers unique opportunities for student learning. This is described in the research findings below:

Several meta-studies show a link between physical activity and learning, and in a statement from the "Consensus Conference on Physical Activity and Learning" held on October 25-27, 2011, researchers from Denmark and Sweden state: "Based on the research results presented and the discussions at the conference, it can be concluded that there is a documented link between physical activity and learning regardless of age".

The research points directly to the following arguments:

**The social perspective**: Well-developed teaching and learning activities in the environment support a good social climate in groups, support the ability to concentrate, immerse and lay a good foundation for immersion.

**Learning in context**: Learning through the local environment seems meaningful to children, youth, and educators. Teachers report that children enjoy these forms of learning more than traditional classroom teaching.

**The versatility argument**: Teaching outside the school can mean more versatile education, i.e., teaching outside the school can mean more versatile learning in terms of:

- catalogue knowledge
- analogue knowledge
- dialogic knowledge
- body-based knowledge

With different types of knowledge, many other parts of the brain are affected, and more complex neural connections are formed (neuro-education):

- episodic memory - narrative
- procedural memory - bodily
- semantic memory - linguistic and factual

**The brain science argument**

Children contribute more actively to language processes in outdoor learning, and language use in these contexts is more imaginative and exploratory.

To summarize the following quote from Lars E.D. Knudsen, Associate Professor at DPU (Danish University of Education). "Teaching in external learning environments is associated with practical, bodily and sensory knowledge, meaning it is stored longer. The brain remembers very well because we use aspects of our brain that are not just imagination but also sensations, and the two, in combination, fill several dimensions of our brain in terms of sensing it and using it for something later. To sense it and use it later."

The research points to several benefits of using external learning spaces in teaching, also when it comes to developing language skills!

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**Soundscaping - First experiences with language learning, sound, and cultural heritage**

The STEAM Builders

7 different European organizations from 7 countries: France, Cyprus, Spain, Belgium, Denmark, Slovenia, and Greece have collaborated for two years to develop STEAM Builders.

(The logo of STEAM Builders visit www.steambuilders.eu)

The Erasmus+ project had these very specific outputs:

- A Pedagogical guide on STEAM through History
- A booklet on formal and non-formal approaches to STEAM
- •35 manipulations and their Blueprints
- The corresponding pedagogical sequences
- A Good practices and implementation booklet

One of the 35 manipulations is called “The sound of the Stone Age” https://steambuilders.eu/wp-content/uploads/2022/09/Sound-of-the-Stone-Age-Final_EN.pdf ,and the corresponding pedagogical sequence not only provides instructions on making a flute in bone but also on how teachers can get started working with sound and soundscapes. Soundscapes are traditionally understood as authentic sound recordings, but since we don't have recordings from the Mesolithic period, we have categorized them as: "reconstructed ancient soundscapes”.

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(Two students testing the 1st edition of their flute. Photo Kim Callesen, Vesthimmerlands Museum, Denmark)

The teaching material was tested on several groups of children, mainly between 12-16 years old, and was an eye-opener for how instrument making, sound work and cultural heritage opened the students' ears to "put into words" manufacturing techniques, materials, actions related to The Stone Age.

The sound of antiquity - “From kitchen midden to orchestra pit” A kitchen midden is a waste pile with a high content of oyster shells from the Mesolithic period.

In 'The Sound of Antiquity', we experimented with materials and compared the knowledge of archaeologists from Danish finds and finds from our neighboring countries with the understanding of musical anthropologists and sound researchers and with the artistic approach of musicians. All for use in school classes.

What does it sound like when we knap flint, row a dugout boat, grind grain or clean skins? What rhythms are hidden in ancient work processes? What sounds are hidden in the materials? And what sounds were there in nature?

We don't know for sure, but this uncertainty leaves room for curiosity and reflection. In this way, the story creates a great framework for creativity and experimentation in the present, and who knows what will happen in the future...

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(Music anthropologist Eva Fock shows how the wooden horn may have been used. Photo: earswideopen.dk)

( The sound of flintknapping at the Stone Age Center  photo: earswideopen.dk)

The result was a large website - unfortunately only in Danish containing:

- Educational materials with building, playing, and listening guides https://earswideopen.dk/om-ewo/oldtiden/undervisningsmaterialer/
- Ancient audio pages https://earswideopen.dk/om-ewo/oldtiden/workshop-lytte/

- Movie clips https://earswideopen.dk/om-ewo/oldtiden/workshop-lytte/lyde.html
- Photos https://earswideopen.dk/om-ewo/oldtiden/workshop-lytte/
- Inspirational materials https://earswideopen.dk/om-ewo/oldtiden/andet.html

The two projects more than suggest that it is possible to work with a different way of teaching history, material knowledge, collaboration, measurement, etc., but also that our language for sound is inferior when we have to describe the sound, but that the course made the students very talkative, imaginative and put a lot of new words - therefore the following question arises: Is it possible to make similar courses for younger students? This is precisely what "Sound of Stories" focuses on.

(Ph.D. Ingeborg Okkels, Lydvaerk.dk is instructing the students. Photo: earswideopen.dk)

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## Introducing sound to children with SLD

### Definition of children with SLD

SLD, standing for Specific Learning Disability, is a type of neurodevelopmental disorder which a doctor diagnoses. Children and adults affected by this disorder are not lazy or less intelligent; they just perceive things differently and can have trouble understanding and recollecting information.

It is still unclear and not certified where SLD comes from, but some researchers suggest that it could come from genetics and that the chances are higher that a child will have a learning disorder if one of their parents has one too.

According to the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-5, 2013), specific learning disorders are generally diagnosed in a child's early school years, although in many cases, they remain undetected until adulthood. Disorders are neurological in nature and are characterised by permanent

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impairment of abilities in at least one of the three main areas: reading, writing (written expression) and/or maths.

Specific Learning Disability is often confused with ADHD (attention deficit hyperactivity disorder) or ASD (Autism Spectrum Disorder). However, even if they have some similitudes in the intrinsic causes and can co-occur with SLD, they have different origins. More children than we think are concerned by this disorder: “Globally, the prevalence of SLD has been estimated to be around 5 to 15%.” (American Psychiatric Association, 2013).

People suffering from SLD can have issues with maths, reading or writing. “SLD interferes with how children take in and process information.” (Rowe, 2021). The difficulties can differ from one person with Specific Learning Disability to another.

There are different types of SLD affecting other learning areas; some can co-occur and can also have the exact causes:

- Dyslexia: Difficulty with reading and spelling
- Dysgraphia: Difficulty with handwriting and some fine motor skills
- Dyscalculia: Difficulty with arithmetic and mathematics
- Dysphasia: Difficulty in producing and understanding spoken language
- Dyspraxia: Difficulty with gross and fine motor coordination

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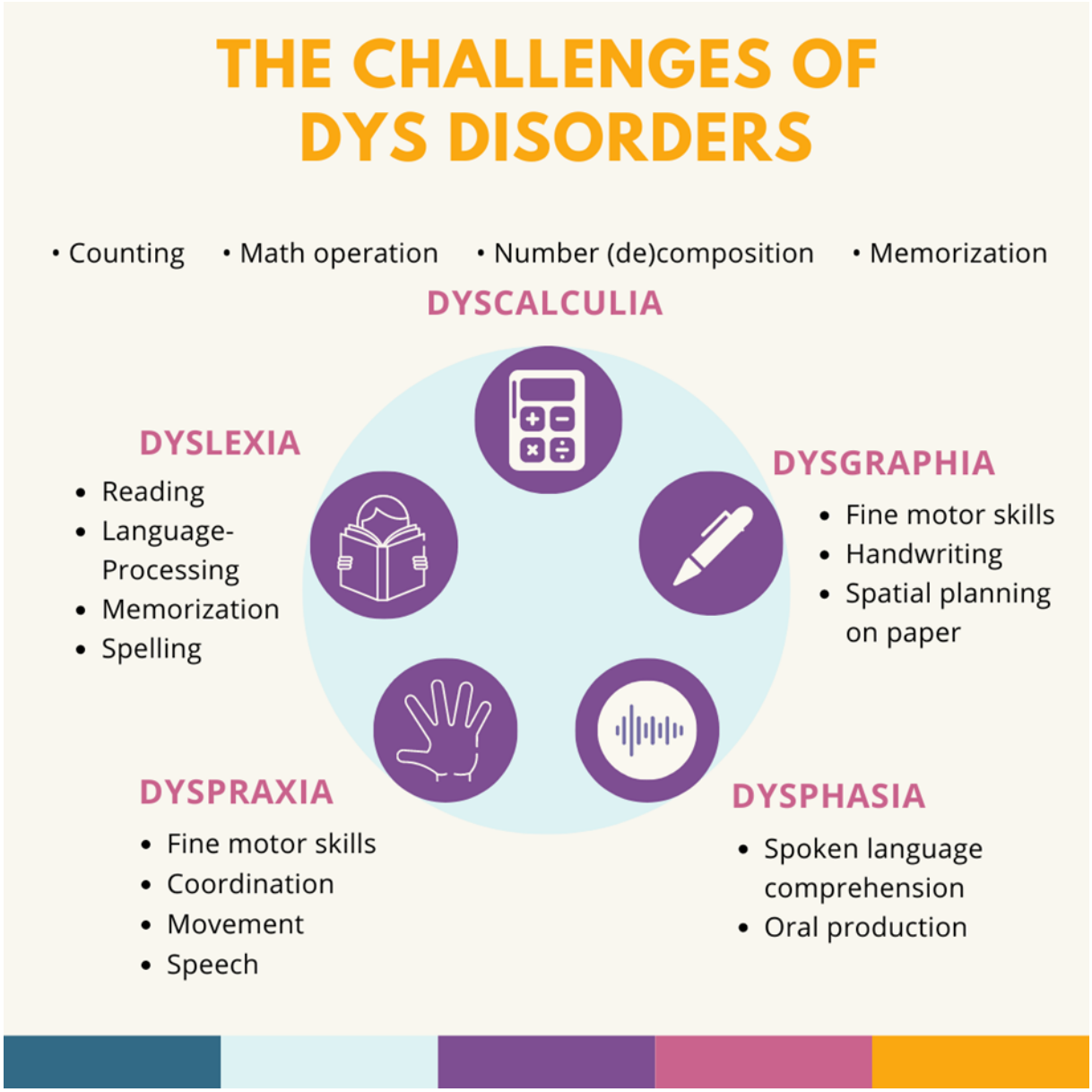


Dyspraxia is classified as Developmental Coordination Disorder, not a specific learning disorder.

Remember that Dys are not considered pathologies, but they are referred to as developmental disorders that can have corrective interventions that mitigate their effects.

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**What can be the challenges in working with children with the diagnoses?**

The challenges are different from one pupil to another one. Here you can find a non-exhaustive list of the main ones: slow speed reading, trouble understanding the meaning of what they are reading, struggling to be clear when writing out thoughts without grammatical errors, difficulty with spelling, trouble with mathematical concepts, difficulty completing math problems or knowing how or when to apply the concepts.

In addition to the learning difficulties, children with Specific Learning Disorders can face some challenges at an individual level, such as confusion, low self-esteem and self-confidence, difficulty in focusing on a specific task, being easily distracted, inability to express oneself, difficulty in adapting to the environment or recalling a proper instruction.

Teaching pupils with SLD can be challenging and, of course, asks a different approach. However, with good support, attention and a method based on SLD children's strengths instead of their weaknesses, they can accomplish the same work as children without specific learning disabilities.

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To help them, it is important to keep consistency and communication between school and home settings, use concrete objects to teach the basic concepts, provide specialized materials if needed, be explicit on your expectations, plan enough time for work review, transform exercises into games, use technology, … The list of improvements available to help children with Dys is long and endless; a tool helping one can be useless for another. That is why you will only know what works for your child by testing different methods.

**Can sound support this group of students?**

Even if the concept of sound helping students with SLD is still very new, some tools already exist and can support them to learn, read or memorize more easily.

- Tape recorder: Recording first directions, stories or any specific lessons the student struggles with and replaying them can help children with SLD understand the principles and concepts. Tape recorders can also support reading: the pupil can read silently and simultaneously listen to what is recorded on the tape.
- White noise: White noise is noise containing many frequencies with equal intensities. A recent Swedish study (Göran B. W. Söderlund, 2021) shows that it

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would help children with Dyslexia to listen to white noise in reading tasks and memorisation.

- Auditory Integration Training: Various types of AIT exist and could help children with SLD. The concept is to listen to specially filtered and modulated music during specific time sessions. Even though it is considered an experimental procedure and not a treatment because of a lack of scientific evidence, different methods are inspired by AIT: Tomatis method, Advanced Brain Technologies, Integrated Listening Systems, …
- Animal sounds: Researchers have found that learning animal sounds can help children with speech and language difficulties develop their vocabulary and train their communication skills. Because they are simple, all around us, and repetitive, it is easy for children to imitate the sounds of different animals and learn to pronounce new sounds and words. You can, for example, play association games, imitate animal sounds when reading a book to your child or take him to the zoo or the farm.
- Whisper Phones: Also called Phonics Phones, they are used to help children whisper read without distracting their classmates. It also allows the teachers to notice what kind of support the student needs and the student to focus on what he is reading.
- Assistive Technologies: AT are tools you can find online, on your computer, other devices or even in non-digital format. Here are some of the ATs for reading: Text-to-speech (looking at the text and reading words out loud at the same time); audiobooks and digital TTS (books read aloud by human voice); optical Character Recognition (reading text from a picture or an image out loud), graphic organisers (make you keep track of information and can be digital or written on paper), annotation tools (let you write notes during your reading) and display control (allow you to change the font, font size, spacing of

texts on your screen). This list is non-exhaustive, and various other assistive technology tools exist.

- Music: Music has been shown to train some brain parts, including the auditory cortex. Knowing that it makes sense that music lessons can positively impact reading skills, phonological awareness, spelling, writing skills, arithmetic cognition, working memory, auditory attention and rapid auditory processing. Learning to play some specific instruments can help children in various ways. The brass instruments: ask for a few hand manipulations, you are not using all your fingers at the same time, so it makes it easier for children to focus on what they are doing (i.e., trombone, saxophone, tuba, trumpet,...). The voice asks you to coordinate different parts of your brain simultaneously to read the music score while translating it into sounds and trying to reproduce them; it is beneficial for children with speech difficulties. The piano is challenging (but rewarding), as it requires your eyes to follow the score, both hands, your feet for the pedals and ears to listen if you are playing well. Again, those instruments are examples; maybe the one which will work for you is among them, or perhaps you will find it yourself.

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## How to get started with recording the Audio work.

The issue of sound recording (today exclusively in the form of digitization) is very broad. First of all, it is necessary to decide for what purpose the sound will be recorded. From our point of view, it can be easily divided into two categories:

- high-quality recording, e.g., high-quality music recording (hardware and software + possibly anechoic chambers)
- standard recording, e.g., for the regular recording of voices or sounds, which we want to be well reproducible and recognizable (realizable using standard available hardware and software)

For our purposes, recording the highest quality sounds, realized in a recording studio, is unnecessary, and we can get by with standard equipment on a mobile phone, personal computer, notebook, or tablet. It is also necessary for some soundscapes to be recorded with surrounding noises.

**Hardware we can use to record the soundscapes, and what software we can use to edit the recordings on our computers.**

Generally, for the recorded sounds, we will need three things:

- Computer (combination of hardware and operating system) – foes ease of use, it can be a mobile phone or tablet (Android, iOS, Windows), personal computer or laptop (Windows, Mac).
- Recording software - may be included with the operating system or can be installed.
- Microphone (acoustic converter to electrical signal) – basically, it is an embedded part of a computer or mobile phone. You can also use an external one connected by a cable (analogue or USB) or wirelessly (Bluetooth, Wifi ...).

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Of these 3 things, the microphone has the most significant impact on the quality of the recording. The built-in microphone in a computer or mobile phone can be used. A mobile phone is more suitable when recording various sounds, especially outdoors. However, these microphones are mainly intended for telephone calls, where significantly higher frequencies are suppressed. In some cases, the sound quality may seem insufficient to us. In that case, an alternative, higher quality external microphone is recommended.

When selecting the microphone, consider the selection according to several parameters:

Directional characteristic (from which direction the microphone receives the most):

- Omnidirectional – e.g., suitable for moderators, it captures all directions.
- Unidirectional (Cardioid) – suitable for capturing sound from the front and sides with suppression from the back.
- Very narrow directional (Shotgun) – suitable for recording a sound in front of the microphone with suppression of interference from the sides and the back.
- Stereo microphone – suitable, for example, for recording a spatial effect, such as an approaching train from one side to the other. However, recording in stereo (two tracks) is necessary, then playing it back from stereo speakers.

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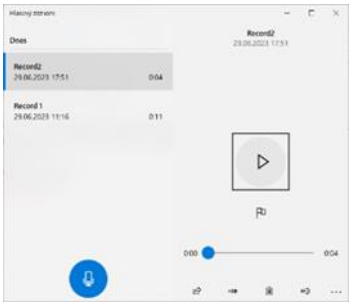
Connection method (most used):

- Jack 3.5 audio connector – this type of connection is probably the simplest and does not require any further intervention in the mobile phone or computer settings.
- USB-C



In general, it can probably be said that choosing a Unidirectional or narrowly directional microphone in the price range from 50 euros will contribute to improving the quality of recording on a computer or mobile phone. Of course, you can also buy microphones with higher studio quality included for over 300 euros.

The appropriate software must then be used for recording:



**Basic** – this is usually part of the operating system and allows you to record, save, and play recordings with the possibility of simple editing tools:

- Android - Recorder
- Windows - Voice Recording
- iOS - Voice Memos

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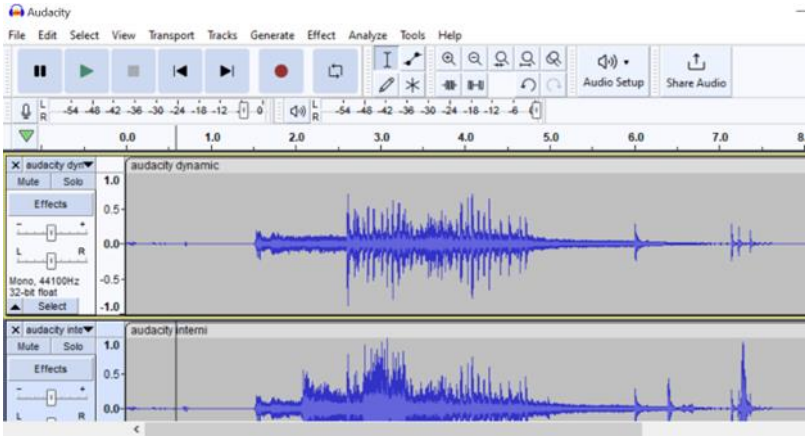
Each recording is then saved and can be renamed, deleted, and played back. Recordings are stored in one directory; for multiple recordings of different topics, sorting must be done manually.

**Advanced** – if, in some cases, we want to work more with the audio recording, for example, stereo recording, cutting, removing deaf spots, removing noise or adding another audio track and merging them (adding some noise in the background - noise from the street), then we will need more powerful software. Among the selection of free downloadable but powerful enough programs, for example, a widely used program is:

Audacity (Windows, iOS) available from audacityteam.org:




Eazy Voice Recorder (Android) - one of many free downloadable programs which looks like a basic program Recorder but allows the user to set a higher quality recording, clipping, suppression noise, editing volume and more.

**Comments or tips for recording the sounds.**

When recording, setting the correct microphone input level is a good idea. It is usually set between 90 and 100 %. When the recorded sound is too loud, it is good to lower this level so that the recording is not overexcited, or you can put the microphone further from the sound source.

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# Conclusion/ perspectives/summary

## Summary

This booklet is designed to introduce the topic of sound to educators and reveal the benefits it has in vocabulary acquisition for young learners. The conventional way of how we tell stories is abandoned as we lead with our ears.

The overall listening experience has proven benefits for students with many forms of learning disorders, and these guidelines help to demonstrate the impacts of Sound in their world.

But this new experience is not only limited to the student. Teachers and educators find it all too easy to show a picture and elicit a response. With a lesson, educators will find themselves evaluating their own sense of hearing to follow the stories being created in their lessons. What one student's imagination conjures up will be neither right nor wrong but will serve to encourage their peers to perceive a new viewpoint.

The 'Sound of Stories' collaborators have a history of teaching in very different fields of education. Teaching in Primary and Secondary schools, educating through Museum lectures and hands on experiences, plus a wealth of knowledge and experience with working with students with SLD and other special needs. The methods laid out in this booklet offer the exciting opportunity to explore new ways to teach.

## Perspectives

The created sound recordings found in this project can be beneficial vocabulary building exercises for young learners, but a useful tool for teachers and educators too.

The project will deliver 100 new Soundscapes, which in turn, can be used in conjunction with multiply lesson themes and projects.

New learning teaching methods and approaches will be developed to help primary teachers, trainers, mediators, and other actors related to teaching literacy and language skills to young learners.

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The partnership has created these soundmaterial and associated teaching methods for those educators, looking to expand their teachers' training, which allows them to learn and develop new ways of teaching literacy skills to their learners.

The way educators will have to adapt to help explain what the students hears, rather than what they see, will create a stronger educational tutoring experience. One where educators and teachers will be able to understand the problems faced with young learners in a modern world where visual content is increasing at an ever-alarming rate.

**Conclusion**

Wherever your Sound lesson takes place, this booklet has been designed to help guide you on your 'listening' adventure.

Inside this booklet you will find examples of Soundscape lessons applied to young learners. With this as a base for further development, we will create a comprehensive library of a further 100 varied Soundscapes that can be used in schools, museums, or any other educational institution.

The 'playback and listening' forms the structure of the lesson which invokes feelings and memories from the students. The booklet highlights the resources young learners can benefit from their fellow students in vocabulary acquisition but also in a form of acceptance as they will realize that they share some comparable thoughts or have similar memories.

As mentioned within this booklet, we hope some of the pedagogical benefits of working with sound are proven to stimulate listening attention and enhancing learners ability to concentrate. You will find a chapter dedicated to sound usage with students who suffer from SLD and other learning disorders. There is a list of examples that help explain different teaching techniques, as well as showing how listening to music or working with instruments, can help enhance their learners experience and work towards vocabulary acquisition.

With a chapter offering tips on how to record your own Soundscape, young learners and students can have fun recording their own sounds to be played in front of their fellow learners.

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By using this booklet and asking the right questions, educators can work towards creating a whole landscape dictated by sound.

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