nuance hearing

Voice Selector **Study**

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Introduction

The learning experience of children with ADHD is often challenging, as they constantly need to inhibit activation of irrelevant stimuli and control their focus of attention.
Voice Selector Study functions as an attention management tool – toning down distracting noise while emphasizing relevant voice, thus freeing up cognitive resources. The following white paper reviews key benefits of our product and provides insights from our ongoing clinical trial and pilots conducted in school environments.

Problem

Attention deficit/hyperactivity disorder (ADHD) is a chronic condition characterized by excessive symptoms of inattention and/or hyperactivity-impulsivity. Children with ADHD are easily distracted and often lose attention due to external stimuli, causing them significant difficulties in performing tasks and participation in classroom.
Children with ADHD are not reaching their full academic potential. Moreover, their learning difficulties are not exclusive to the classroom. Children experiencing problems following their teachers' instructions often get labeled (by their peers, their teachers and by themselves) as incompetent. The frustration they carry often result in low self-esteem, and social and emotional difficulties.

The unmet need

Current treatments for children with ADHD include medication, cognitive functional interventions, interactive gaming and neuro-stimulation. Except for medication, none of the above offers real-time assistance in learning situations.
Parents and children are seeking an effective digital assistive solution.

Parents and children are seeking an effective digital solution

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Solution

Voice Selector Studyis designed to meet the needs of children with ADHD in classroom settings, through focused listening technology.

By providing clarity from the lead speaker and reducing the prominence of background noise, Voice Selector Studyleaves the children with more cognitive resources to comprehend and participate in lessons.

Voice Selector Study includes a directional microphone and wired earphones.

The student can either choose manually the direction of listening (single or dual) or use the automatic mode which changes the listening direction towards the lead speaker(s) without user intervention.
That way, the student can stay focused on the task while Voice Selector Study follows a moving teacher or questions from other students in the room.

Voice Selector Study provides a clear voice of the teacher while toning down all other directions

Emphasize speech over noise

Enhance the learning experience

Free-up cognitive resources

Focused Listening technology

Voice Selector Stud yconsists of an array of microphones and advanced beamforming algorithms that tones down ambient sound by up to 14dB.

Beamforming hardware

Nuance Hearing's beamforming solution uses 8 digital MEMS microphones incorporated into a very low power DSP. The beamforming calculation takes more than 32MIPS to generate a stereo output at 16kHz frequency in less than 5ms.

The polar pattern to the right describes the sensitivity of the microphone to sound waves coming in from different directions. We can clearly see that sounds from the front (or wherever Voice Selector Studyis pointing) are entering the device, while sounds from other directions are filtered out.

Beamformer Polar Pattern

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Voice Selector Study has been tested in 3 different settings:

1 Internal pilot studies

Carried out in different stages

How difficult is it for you to listen to the teacher when...

1 - Always difficult 4 - Always easy

Overview

Scope: 30 students aged 11-17.

Participants used the device for a period of up to one month, and data was collected using questionnaires and interviews with the students and their parents.

Results: Most participants reported high satisfactory rates. Students expressed significant improvement in the ability to listen to the teacher in a noisy classroom and when other students are talking.

They even reported improvement in the ability to ignore visual distractions (people entering or leaving the class and distractions seen from the window).

The graph to the left describes an example of responses to questions regarding learning experience with and without Sound Selector.

Conclusion

Voice Selector Study enabled the students to gain more control over their attention skills. With Focused Listening, students were able to choose to participate and learn. Both teachers' and parents' feedbacks similarly pointed out the sense of control the child has when using Sound Selector.

"It's amazing! I sit in class and see in the corner of my eye people talking behind me, but I just don't hear them!"

2 Geula high school pilot

A school for students with learning difficulties

How did Voice Selector Study improve your learning experience?

4.2 out of 5 stars

6 reviews

Overview

A pilot study was completed in Geula high school in Tel Aviv on January 2020. "Geula high school" is a school for students who struggle to succeed in standard educational frameworks. Most of the students who attend the school are challenged by learning disabilities and attention disorders.

Scope: 6 Students used Voice Selector Study twice a week in a specific lesson prior to their matriculation.

Conclusion

All students reported a significant improvement in their attention when using the device. Students were able to concentrate more, with less distraction.

Teachers from Geula high school further report that children in their classrooms were more learning-oriented when using the device, and their final grades also demonstrated this.

At the end of the pilot, the school purchased devices and added Voice Selector Studyto students' education support toolbox

3 A Clinical study

Led by the psychiatrist, Prof. Iris Manor, chair of The Israeli Society for ADHD

Overview

Scope: 30 male students, aged 15-17 diagnosed with ADHD

Study protocol: Students fitting the criteria fill out questionnaires regarding their difficulties in listening to the teacher in classroom situations (Listening Inventory for Education L.I.F.E., Anderson et al., 2011) and their overall student experience (Duarte de Cruz et al., 2016). In addition, their parents complete the ADHD-RS which is a parent-report inventory consisting of multiple questions used in the diagnosis of ADHD (DuPaul et al., 1998).

Students use Voice Selector Studyat school for one week and report daily questionnaires: L.I.F.E. and student experience. At the end of the trial, parents fill ADHD-RS as the global clinical impression – improvement scale (CGI-I), a rating scale used to assess the efficacy of treatment or intervention for mental disorders.

Preliminary results: So far, clinical trial data show significant improvement in the motivation to participate in class with the device. Also, students experience the classroom as less noisy and find it easier to follow the teachers' instructions and to listen to the lecture.

"Regularly when I sit in class, I see and hear, but I don't get much. With Voice Selector Study I see and hear and understand everything"

Less distraction. More attention.