COMFORT DIGISYSTEM

Multi-microphone system
Involvement and self-confidence

Being able to hear well at school is imperative for both learning and general social interaction. For students with a hearing instrument or cochlear implant, the classroom sound environment is very difficult and often becomes a barrier to feeling involved in the everyday activities of the classroom, and even for simply hearing and understanding the teacher and what their fellow classmates say. Very often, the reasons for this barrier are the noisy classroom setting, and the distance from the student to the sound source (for example, the teacher).

Why choose a multi-microphone system?

In a large classroom setting, students with hearing loss need extra microphones to hear what their teacher and fellow classmates are saying during the lesson. Typically the teacher uses a microphone and the hearing impaired student has a receiver to be able to hear the teacher’s voice clearly. In this case a student microphone is used, and passed around the classroom to the student who is talking so that the hearing impaired student can hear their classmates. In this way, the hearing impaired student is not dependent on the teacher always acting as an intermediary for what is being said.

However, it is a great challenge to get several students to share the one microphone in the classroom. Learning at school is largely based on joint discussion and spontaneous classroom dialogue and participation. Having only one student microphone severely limits this natural learning process. Moreover, the one student microphone in the classroom often results in the microphone being left on a chair or desk, or at best, being used by the closest student to it. The hearing impaired student misses large parts of the valuable things their classmates are saying and despite the equipment being in the classroom, it is not sufficient.
Advantages of using a multi-microphone system in schools

Research studies* have shown that there are many advantages of having several student microphones in a classroom for a hearing impaired student. However, in a traditional multi-microphone system there is often a lot of interference. Students do not generally use one microphone at a time, resulting in the microphones interfering with each other when they are used at the same time. A hearing impaired student may therefore find it very difficult to understand what is being said.

Comfort Audio has developed a special function - Free Channel Request (FCR) – in order to avoid the problem of interference and so that the hearing impaired student can experience a clear, interference-free sound. FCR means that only one student at a time can be heard; sounds from other microphones in the classroom are not picked up. If the student uses the push-to-talk microphone, there is no risk of classmates talking into another microphone at the same time, and so the problem of interference disappears.

The main benefits of using a multi-microphone system are:

- The student with hearing impairment becomes more involved and can hear everything that both teachers and classmates are saying.
- Learning becomes more effective and the student has the opportunity to acquire knowledge under the same conditions as their normal hearing peers.
- Discipline among the class improves significantly when only one person can be heard at a time.
- The distance to the sound source and the risk of missing any information is reduced.
- Being able to hear contributes greatly to personal development and strong self-confidence.
- Challenges due to poor acoustics are reduced.

*“More microphones in the classroom” by Åsa Folke and Roger Brodin
*“Multi-microphone system in schools”, Ryhov County Hospital, Jönköping County
The pupil’s equipment

The range of equipment varies between countries, but a common combination may be:

- A receiver
- A teacher microphone

The aid the student receives should be supplemented with one or more student microphones that are placed among the other students in the classroom. The teacher may add a lapel microphone or a boom microphone connected to their teacher microphone.

The student microphones have a push-to-talk function. The classmates press the push-to-talk button and their voices are sent via the teacher’s microphone to the receiver of the hearing impaired student. The hearing impaired student can now hear clearly what the teacher and classmates say.

The push-to-talk microphones should ideally be positioned at arm’s length from the student using it.

The equipment in the classroom may be expanded with a loud speaker system/sound equalization system so that all students in the class can hear well.
Comfort Digisystem – digital hearing products

Assistive listening devices help those with impaired hearing to hear better when there is a lot of background noise, for example in the workplace, in school, or at home. The assistive listening devices absorb and process the sound via a microphone before the sound reaches the receiver and the hearing instruments or hearing implant. Distracting background noise is filtered out and speech is enhanced.

The cleaner sound makes day-to-day life more comfortable and less effort is exerted on trying to hear. Comfort Audio’s hearing products are digital and work with hearing aids, cochlear implants, and bone anchored hearing aids.
An example: Trönninge school, Halmstad, Sweden

Nine year old Isac attends Trönninge school, which lies south of Halmstad, Sweden. He was born with a severe to profound sensorineural hearing loss and has bilateral cochlear implants (CI). When he started his first year at school, he was given the opportunity to try the Comfort Digisystem and a new world opened up to him.

The system that Isac uses includes a teacher microphone with a lapel microphone used by the instructor teaching the class and a receiver which Isac wears around his neck. The students’ seats are arranged around the classroom in islands with a student microphone (push-to-talk) placed on each island, within easy reach of the classmates. In total, there are five student microphones in the classroom.

About one year ago, two speakers were installed on the wall behind the teacher. This means that everything that is said in the classroom – both in the teacher microphone and the student microphones – is played through the speakers so that everyone in the classroom can hear clearly what is being said, creating a calm and safe atmosphere among the class.

Both teachers and students are very pleased with and positive towards the user-friendly system and it is used in the classroom during all of the lessons.
Teacher Caroline Nilsson says that everyone is very good at using the microphones and adapting to them so that they work for Isac. It is all about social interaction – waiting for your turn and not speaking over one another.

Isac is good at saying if there is anything that is not working or if he cannot hear what is being said. Even when Isac is not at school the microphones are used, and if the equipment should at any point break down, everyone notices when it is not being used. Using the system has become second nature!

Caroline believes that it would have been more difficult for Isac to follow the curriculum if he had not had the Comfort Digisystem and the increased number of pupil microphones.

The curriculum is largely based on discussions and reflection during the lessons. This would have been very difficult if Isac had experienced the insecurity and anxiety of being left behind in school that can happen when you cannot hear. Now he always joins in with the rest of the class and understands what is being said.

Isac’s classmates Theo and Elsa also think that the system works well – it is not hard to talk into the microphones and they rarely forget to use them. Seeing them they are always reminded of Isac!
Since 1994, Swedish company Comfort Audio has developed and manufactured products for people with hearing loss. With leading technology and innovative solutions, we have a mission to make people with hearing loss feel comfortable interacting in all situations through all stages of life.

We are dedicated, curious, highly technically motivated and are driven by passion and joy. This has made us one of the leading companies in hearing product technology. Our products have been developed for working life, school, public places and private life. The needs of the individual are always in focus and we have a genuine desire to improve the quality of life for people with a hearing loss.