

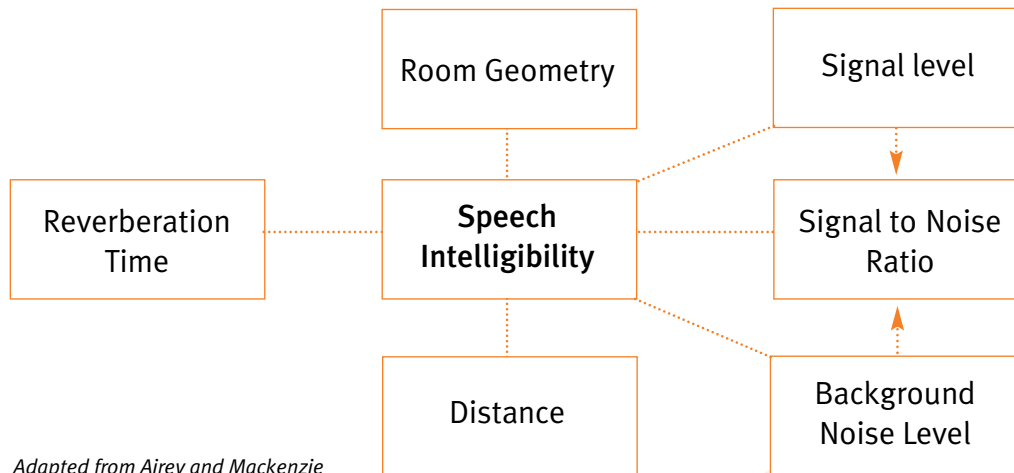
Speech Intelligibility for school s

Introduction

The main aim of the Acoustic Toolkit is to provide you with the tools to identify and remedy the problems in the school listening environment and improve speech intelligibility for the pupils and the teaching staff.

Airey and Mackenzie (1) defined speech intelligibility as, “the process whereby a person can clearly hear what is being said and fully understand the context of the spoken word.” They also stated that, “In a classroom situation, children should not only clearly hear what the teacher is saying but also the teacher must hear what the pupil is saying in reply.”

The factors which can affect speech intelligibility are shown below



Adapted from Airey and Mackenzie

Building Bulletin 93 (BB93), The Acoustic Design of Schools produced by the Department for Education and Skills (2), states that “The intelligibility of speech depends upon its audibility as well as clarity. Audibility is affected by the loudness of the speech relative to the background noise level. An increase in the background noise will cause greater masking of speech and hence will decrease intelligibility.

BS 7827:1996; Code of practice for designing, specifying, maintaining and operating emergency sound systems at sport venues, (3) provided definitions for the following terms:

Clarity the property of sound, which allows its information bearing components to be distinguished by the listener.

Audibility the property of sound which allows it to be heard among other sounds

Intelligibility this is the measure of the proportion of the content of a speech message that can be correctly understood.

Clarity + Audibility = Intelligibility

Room geometry - critical distance

We have already covered reverberation time, signal to noise ratio and the importance of lowering background noise. The other factor that can affect speech intelligibility in the classroom is the room geometry.

We know that where a deaf child is positioned within the classroom is very important. However, in addition to this we have what is known as the critical distance for hearing sounds. Critical distance is the distance from a sound source at which direct sound and reverberant sound are at the same level. You may remember the visual representation of this in the section on reverberation time.

Critical distance depends on both the room size and the reverberation time within that room. Rooms that are large and have a long reverberation time have a short critical distance, this may mean that the optimal distance for a deaf child to sit to hear at the critical distance is inappropriate and impractical.

By lowering the reverberation time in a room, the critical distance is increased.

With a good signal to noise ratio, short reverberation time and background noise kept to minimum speech intelligibility will improve.

There are numerous tests that can measure speech intelligibility. They can be an important measure of the effectiveness of a communication system or of the ability of people to communicate in different environments. Education audiologists or teachers of deaf children will be able to undertake speech intelligibility tests which will provide further information about the needs of individual children for good speech intelligibility. If you are interested in learning more, further information about speech intelligibility tests is provided in the last section of the toolkit.

Speech Intelligibility for school staff

Pupil questionnaires

The pupil questionnaire LIFE-UK IHP (Listening Inventories for Education UK Individual Hearing Profile) (Appendix D) is a useful tool to find the opinion of the child when they are listening in a classroom.

The aim of the inventory is to provide an opportunity for students and teachers to express their opinions about the listening conditions in the school and classrooms.

Five areas are covered in the inventory:

1. Student questionnaire - this asks the student questions about the listening conditions they experience.
2. Scoring sheets - there are two scoring sheets and they allow the tester to present the child's opinions in a user friendly way
3. Good test retest reliability - the test can be used before and after intervention and will demonstrate how the intervention has benefited the student.
4. The results can be used for INSET work for teachers and students
5. Help to encourage 'self-advocacy for good listening environments.'

The inventories can be used with students from the age of seven years old. It has been used with all degrees of hearing impairment and students who have development delay which bring them to the age of seven and above.

A major study in New Zealand called, Classroom Acoustics: A New Zealand Perspective produced a teacher survey.

www.oticon.org.NZ/pdf/classroomacousticssummary

This questionnaire covers many topics as well as acoustics and personal problems with voice vocal strain.

