

Technology Centre

By Andrew Stewart

Sound Field Systems (SFS)

SFSs are ideal for children with Attention Deficit Disorders or who have hearing loss (or symptoms of a hearing loss in the case of CAPD – Central Auditory Processing Disorder) without hearing aids, due to fluctuating hearing loss, glue ear etc.

For children with hearing aids personal FMs are the best solution and provide wonderful results which can be further enhanced by being integrated with a SFS. When a SFS is used in conjunction with a personal FM (ie FM transmitter is plugged into the base receiver) the child's hearing is no longer limited to the teacher's voice. The FM user is more fully incorporated into the classroom activities by simple connection of the classroom technologies such as TV, CD player, laptop or electronic whiteboard into the base receiver. In this way the FM user will receive these sounds directly into his/her hearing aid. If the SFS includes the optional, large hand held microphone then this will enable the FM user to also hear the other students' responses at question / answer time and when giving presentations or a second teacher in a team teaching situation.

A lot of children tend not to wear the FMs from about the age of 10 or 11, or to only wear the FM some of the time. Where FMs are not used (for whatever reason) then SFS will provide significantly better clarity than the teacher's voice alone, as well as reducing vocal fatigue.

Conclusive research has found that the performance of over 90% of children without hearing loss have also improved when placed in a classroom where a SFS has been installed.

There is a lot of confusion about what a SFS is. It is not a PA system which focuses purely on volume and high quality music. A SFS is designed for voice reproduction with minimal reverberation, thereby dramatically increasing clarity

A SFS is designed specifically to provide a result where the teacher's voice is heard evenly throughout the room, reducing the reverberation, and therefore increasing speech intelligibility. In other words, it is about not just improving the volume, but making the speech clearer and easier to understand.

Sound Field systems consist of (usually) 4 speakers (sometimes more) around the room (correctly located and placed) and the teacher wears a lapel mic. There is also an optional handheld microphone for team teaching or for the children to use. Music systems and televisions can also be played through the SFS utilizing the surround sound amplification.

The following is from the draft Australian Standard AS 1428.5:

A specialised amplified sound system for a meeting room improves communication, by providing low level amplification, an even distribution of sound throughout the room, and reduces the effects of reverberation.

It enables every listener in the room to hear all speech components of the person speaking (or sound source) with minimal reverberation, no matter where the listener is located relative to the person speaking (or sound source).

A SFS shall consist of:

- (a) an audio amplifier
- (b) a lapel wireless microphone

system, or head worn microphone, for the primary user,

(c) one speaker per 10 to 20 square metres,

(d) no less than four speakers,

(e) no position in the room shall be more than 7 metres from a speaker.

(f) each speaker mounted between two and three metres above finished floor level.

A SFS should, and is highly recommended to, also have a handheld radio wireless microphone system. This is to enable children or another teacher to use the SFS e.g. asking questions, team teaching.

This is designed to overcome the limitations caused by meeting room acoustics, where reverberation is commonly the limiting factor for good speech intelligibility.

Research has shown that these systems benefit people with mild hearing loss, with and without hearing aids, as well as those with fluctuating and/or conductive hearing loss, and people with normal hearing.

A SFS is not a replacement for an Assistive Listening System (ALS). People with moderate or worse hearing loss will require ALS regardless of whether a SFS is installed.

For a number of years I have been installing Sound Field Systems (SFS) in classrooms across NSW. The results are fantastic, but are dependant upon correct installation.

Andrew is hearing impaired and has two hearing impaired children. He is the Technical Manager for Printacall.