

The relative value of sound field systems and acoustic treatment in  
creating an optimum listening environment in mainstream  
classrooms: A case study.

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## **ABSTRACT**

The detrimental effects on learning of poor listening environments in classrooms have been well documented. Pupils most at risk from these poor conditions are those with special educational needs, in particular, those who have a permanent childhood hearing loss. Inclusive education has meant that more of these pupils are now being taught in their local mainstream schools, which may have poor acoustic conditions.

There are several options to enhance the listening conditions for these mainstream pupils: including sound field systems and effective acoustic treatment applied to the classrooms.

This small scale research project used a triangulation approach incorporating: parametric measurements; questionnaires and direct observation to compare the listening benefits gained through the use of a sound field system and acoustic treatment. Fifty children (aged 8 – 10 years old) and two teachers took part in the research.

The findings of the parametric and observational data appear to demonstrate that a sound field system can make a positive difference in a room with low reverberation levels, by distributing the sound more evenly. This resulted in a statistically significant increase in audibility, whilst reducing the ambient noise level. In contrast, the use of the sound field system in a room with high levels of reverberation appears to be less effective because no statistically significant change in the level of intelligibility, or audibility was detected. It is possible that these highly reverberant conditions may have a deleterious effect on the distribution of sound in the room.

There appears to be a strong correlation between the parametric data, the observational data and the responses from the teachers' questionnaires, suggesting that the acoustically treated room provided a much better learning environment either with, or without, the sound field system. The acoustically treated room appears to produce a statistically significant increase in intelligibility, whilst reducing the ambient noise level. These results suggest that a truly inclusive listening and learning environment can only be obtained through high quality acoustic treatment of classrooms.