Sound-field dramatically improves phonological skills

Phonological awareness and skills are indicators of a student’s development and are linked to mastery of literacy. Statistically significant (Figure 5) improvements were noted in the intervention group on all achievement gains, the improvements in the intervention group greater than that of the control group in all aspects of the test.

High acceptance of sound-field by teachers

Some 98 percent of students reported using the sound-field systems consistently throughout the year-long study. Sixty-three percent used the equipment consistently for more than half of the teaching sessions while 27 percent used it consistently for selected sessions.

Students find it easier to hear

Some 98 percent of the students who provided feedback about the sound-field systems were positive about them. Most students commented that it was easier to hear the teacher and that the teacher’s voice was clearer. Students also commented that it was easier to hear when sitting a distance from the teacher and that it was easier to hear when repeating or repeated. Students were also able to hear instructions more clearly no matter where the teacher or they were in the classroom.

Teachers found that fewer students needed instructions clarified or repeated. Students were also able to hear instructions more clearly no matter where the teacher or they were in the classroom.

Students find it easier to hear

Some 98 percent of the students who provided feedback about the sound-field systems were positive about them. Most students commented that it was easier to hear the teacher and that the teacher’s voice was clearer. Students also commented that it was easier to hear when sitting a distance from the teacher and that it was easier to hear when repeating or repeated. Students were also able to hear instructions more clearly no matter where the teacher or they were in the classroom.

Enhanced classroom harmony

Both teachers and students commented on the enhanced learning environment which sound-field was used consistently. Teachers commented that they could discipline students without raising their voices and that it was easier to hear when they went off-task. Students commented on the enhanced learning environment where they could listen and understand the teacher’s voice.

Reduced vocal strain

In a previous study of classroom acoustics, 35 percent of teachers claimed that the level they needed to speak at to be heard strained their voices. Sound-field systems address the issue of vocal strain by reducing the effort required by teachers to project their voices.

Over 50 percent of teachers who used the systems consistently claimed that the level they need to speak at to be heard strained their voices. Sound-field systems address the issue of vocal strain by reducing the effort required by teachers to project their voices. Over half of the teachers involved in this study identified being able to speak naturally at reduced voice intensity levels and the ease of communication as key factors in feeling less tired and being able to maintain energy reserves.

“Vocal strain is completely nonexistent.”

“I feel far less tired after a day at school as I am not having to battle to be heard and the classroom is much quieter and calmer.”

Over 30 percent of teachers who used the systems consistently for all teaching sessions noted reduced irritation levels in themselves and in their students. One teacher enthusiastically commented that it was easier to hear when they went off-task. Over 10 percent of teachers who used the systems consistently for all teaching sessions noted reduced irritation levels in themselves and in their students. One teacher enthusiastically commented that it was easier to hear when they went off-task.
decile schools improved more than those in high decile schools. No significant difference between the deciles, those in the lower all decile schools improved markedly (Figure 6). While there was for the each of the different decile rated schools. The means for the PAT for listening comprehension was analysed intervention period. The benefits of less vocal strain when they some were able to remain teaching rather than taking time off. Absenteeism was recorded from each school’s weekly returns of students in the intervention group were identified as having a history of middle ear dysfunction. There was no significant difference between the improved results for those students that had previously been treated for middle ear dysfunction and those that had not.

**SUMMARY**

Sound-field improves listening and literacy outcomes, creates enhanced classrooms harmony and improved student behaviour, and reduces voice strain among teachers. Sound-field achieves this by addressing problems associated with noise, distance and reverberation. Sound-field is not a panacea for all problems in modern education. Effective teaching practice needs to be considered, as well as other environmental factors such as acoustics, lighting and ventilation.

- Sound-field should not be reserved for children with special needs, as it benefits all students, regardless of school decile, ability or whether or not they have middle ear dysfunction.
- Sound-field is one of the most cost effective interventions a school can invest in to increase literacy outcomes.

**RECOMMENDATIONS**

- All classrooms should be fitted with sound-field systems to support good teaching practice. Other research shows that the benefits of sound-field are equalitary evident when children are children in initial, intermediate and secondary school.
- Teachers in classrooms with sound-field should use the system consistently to maximise the benefits that sound-field can provide.
- Teachers and schools should take advantage of opportunities to try and experience sound-field in a classroom setting so they can experience the benefits for themselves.
- Schools should install sound-field that are compatible with deaf and hearing impaired students’ personal FM systems.
- Trainee teachers should be made aware of the issues associated with classroom acoustics and the benefits that sound-field can provide.
- All classrooms should have basic acoustic treatment, including carpet and curtains, to reduce noise levels.
- All schools should consider adding advanced acoustic treatment such as absorptive ceiling.
- Issues associated with the use comfort of sound-field microphones should be proactively addressed.

Appendix: Performance measures

1. Progressive Achievement Test (PAT)—as standardised to New Zealand students and are group-administered to all New Zealand students from year three. Children’s percentile rankings are not expected to change significantly from year to year. The following PATs were undertaken for this study:
   - Listening comprehension—to year three and above students
   - Reading vocabulary and reading comprehension—to year four and above students
   - Mathematics—to year five and above students

2. Phonological awareness tests—were developed by Joy Allcock for New Zealand children based on the Sutherland Phonological Awareness Test. The tests measure achievement in six specific phonologic areas from letter-sound relationships to counting phonemes and the ability to substitute phonemes in blend words. Children in year one and two junior classes that were too young to participate in the standardised PAT tests took tests at the beginning and end of the 2002 school year.

3. Teacher questionnaires—teachers in the intervention classrooms were surveyed using a written questionnaire. Teachers were asked to focus on the frequency of using the equipment and its effect on student behaviour, the learning environment, and their health and wellbeing.

4. Student perceptions—teachers were asked to invite students to comment on the sound-field systems from their perspectives. Students were asked to focus on their ability to listen to directions, noise levels in the classroom, and the effort related to the teachers.

5. Parents provided information on ethnicity and history of middle ear dysfunction.

An overview was presented from each school’s weekly returns to the Ministry of Education.

**REFERENCES**

3. The Oticon Foundation in New Zealand (2002). Classroom Acoustics: A New Zealand Perspective

**ACKNOWLEDGEMENTS**

- Oticon Foundation in New Zealand for funding the research.
- Rotorua Energy Charitable Trust for providing the sound-field systems.
- The principals, teachers and students at Western Heights Primary School, Westbrook School, Sunset Primary School, Otonga School, St Mary’s School for participating in the study.
- Dr Rod Beattie, University of Newcastle for supervising the study.
- Rotorua Energy Charitable Trust for providing the sound-field systems.
- The principals, teachers and students at Western Heights Primary School, Westbrook School, Sunset Primary School, Otonga School, St Mary’s School for participating in the study.