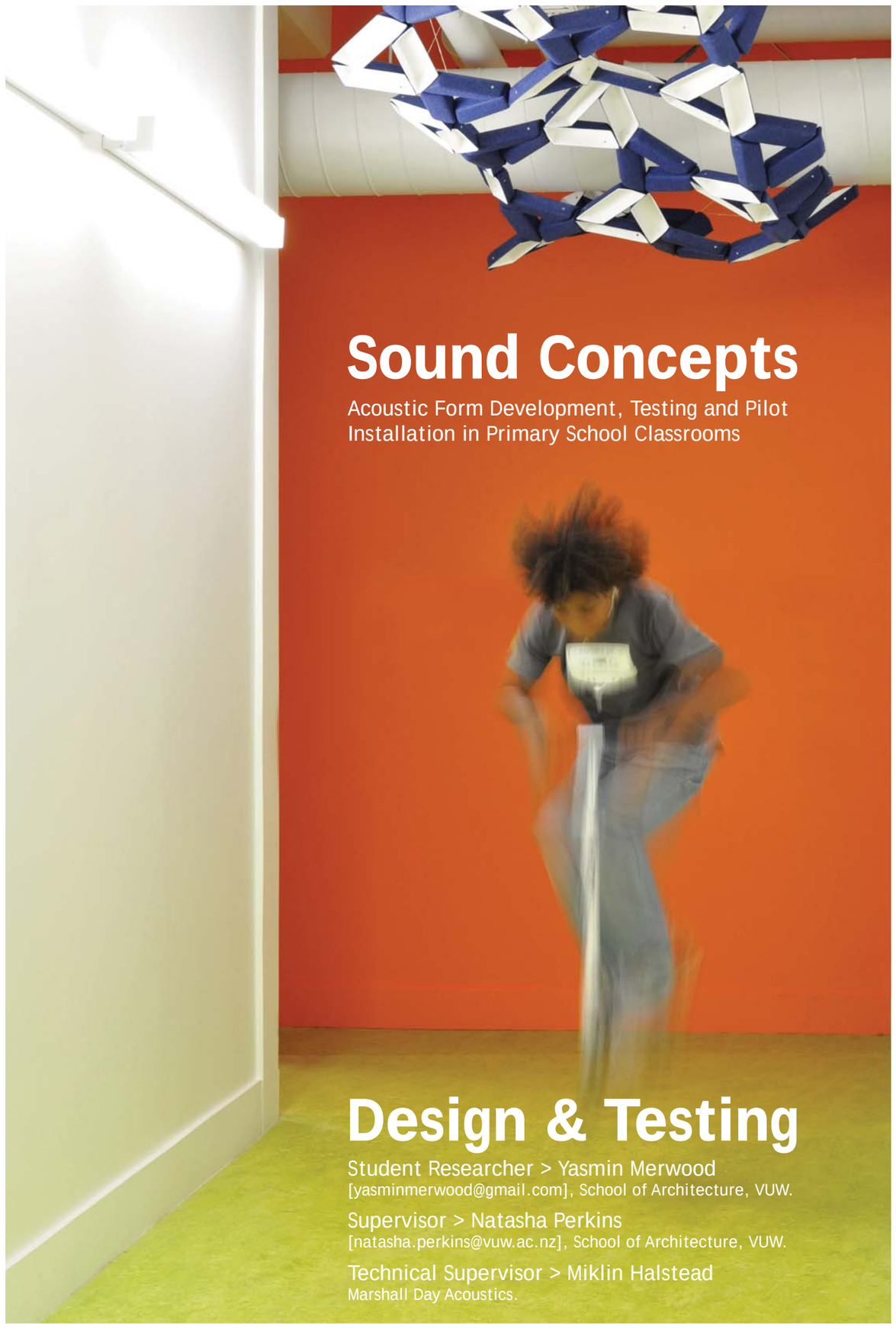

Sound Concepts

Acoustic Form Development, Testing and Pilot Installation in Primary School Classrooms

Design & Testing

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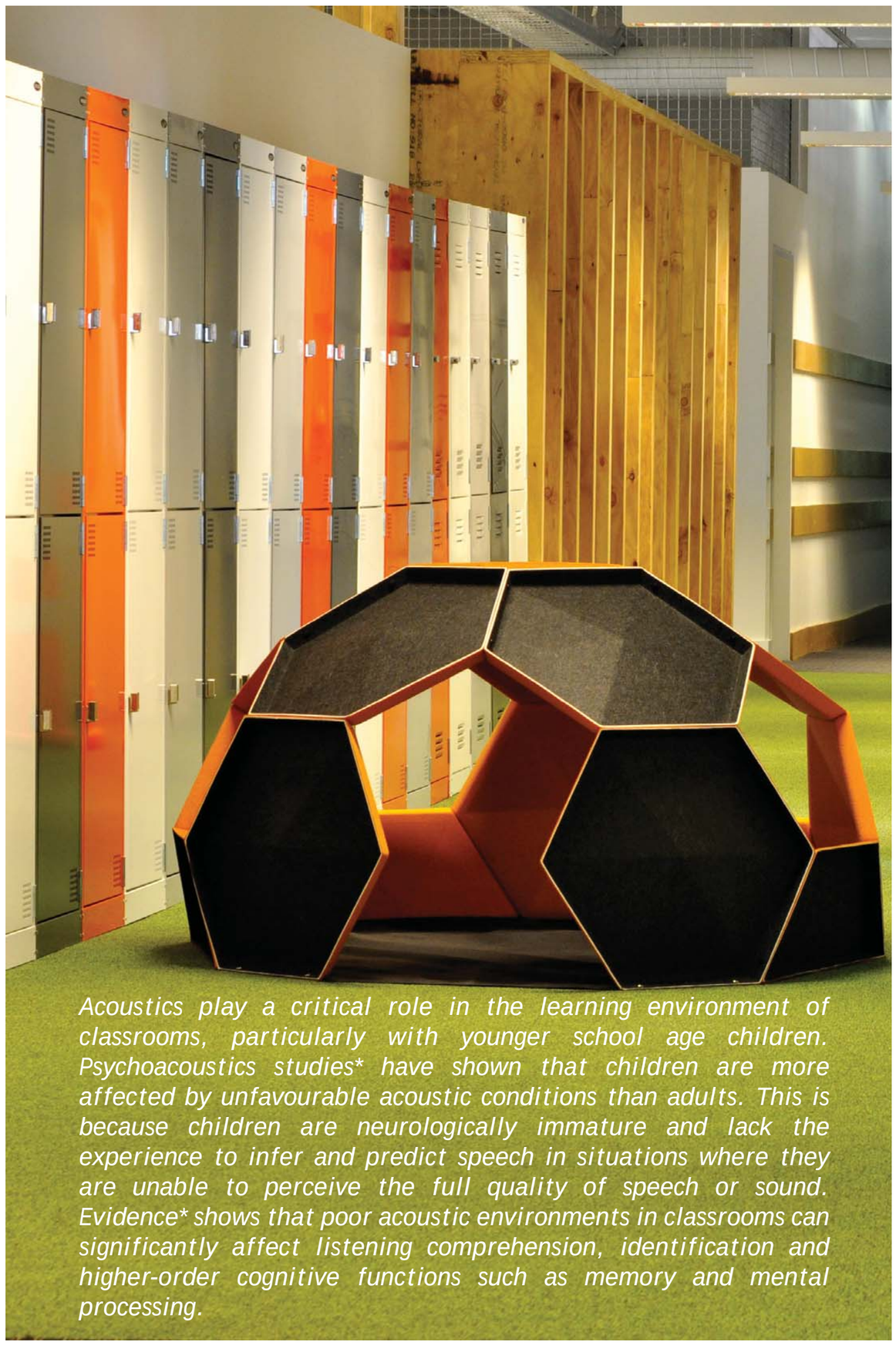
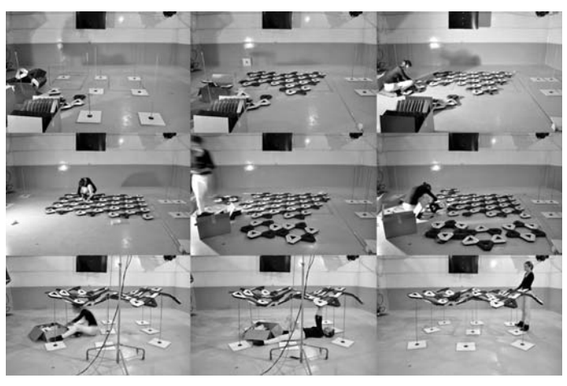
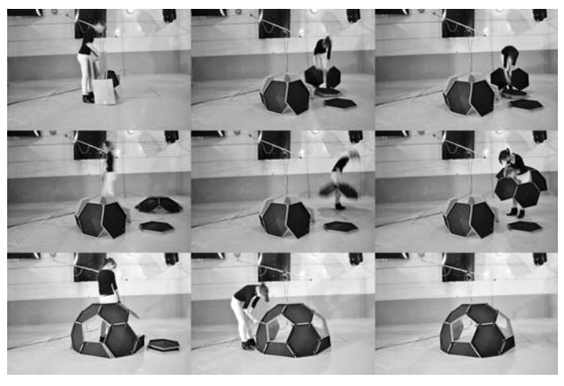


Acoustics play a critical role in the learning environment of classrooms, particularly with younger school age children. Psychoacoustics studies have shown that children are more affected by unfavourable acoustic conditions than adults. This is because children are neurologically immature and lack the experience to infer and predict speech in situations where they are unable to perceive the full quality of speech or sound. Evidence* shows that poor acoustic environments in classrooms can significantly affect listening comprehension, identification and higher-order cognitive functions such as memory and mental processing.*





The aim of the Sound Concepts project was to develop and produce prototypes of acoustic baffle and pod designs for technical and pilot installation testing in Wellington primary schools to create classroom spaces that will reduce the medical, social and language issues, as discussed by researchers on children's ability to learn. The objectives and key outputs of the project were to:

> raise awareness of the necessity for good acoustics in New Zealand classrooms for all children but particularly for hearing-impaired children.

> produce prototype tooling at the School of Architecture, University of Wellington and undertake a pilot production run with industry partners.

> carry out technical testing of prototypes at the Acoustics Research Centre, University of Auckland.

> identify classrooms to undertake a pilot installation of prototypes.

> undertake a pre and post installation acoustic survey and review the test outcomes.

> design a simple A3 poster that explains the basics of acoustics in classrooms to be made available to teachers, parents and pupils, principals, schools boards, architects and designers.

> forward the results of the project to the Ministry of Education.

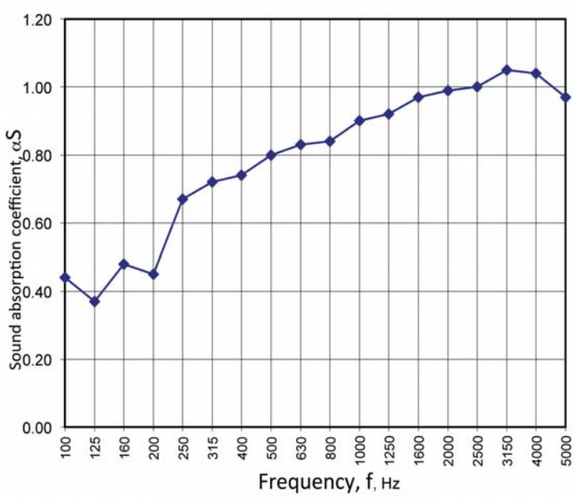
A major criteria for the design project is that the designs be affordable to schools to implement on a room by room basis that have hearing impaired pupils.

Research Methodology

The research methodology consisted of technical acoustic laboratory testing, test product assembly and installation, survey of potential research classroom environments and, detailed acoustic testing of the five selected classrooms pre and post product installation.

Findings

1. Technical acoustic tests were conducted for the two products in the reverberation chamber of the Auckland Acoustic Laboratory using pink random noise to assess weighted sound absorption coefficients for units of the 'Pod' (Per assembled 'Pod') and the 'Tri-Form' (per m2) products. As per ISO 11654.



Resultant weighted sound absorption coefficients were:

Tri-Form (m2)

> With/Without AUTEX 'AAB Blanket

> 1m suspension α_W= 0.4 (H)/0.35 (H)

> 0.6m suspension α_W= 0.4 (H)/0.4 (H)

Pod (per assembled 'Pod')

> α_W= 0.85

NOTE: *This single number rating should be used only in combination with the complete sound absorption coefficient curve ('Pod' graph shown left) which will be available in the complete research report**

2. The products were tested for methods of assembly and installation.

3. A number of classroom environments in 5 schools around the Wellington region were surveyed for this study. Appropriateness for the research was based on:

> The age of children to be taught in the classroom (younger ages (years 1-3) were required for the 'Pod' product); and,

> Availability of space for the product(s); and

> Estimated reverberation time of the classroom (unoccupied) – the larger the reverberation time within the space, the easier it is to assess the impact of the Sound Concepts acoustic products.

4. 2x 'Tri-Forms' and 3x 'Pods' were installed in the Wellington region schools.

5. Detailed assessments were then made of the chosen classroom environments in terms of their acoustics and the acoustic impact of products with calibrated equipment and a set research subject criteria including:

> Reverberation time measurements of original and changed(with products installed) classroom environments

> Live noise measurements of original and changed(with products installed) classroom environments correlated to a live activity log

> Qualitative questionnaires completed by classroom teachers

The technical results for this section of the research are pending following the completion of the research report in late March.

Initial comments and measurements indicate a positive acoustic impact response following the pilot installation of the Sound Concepts products in the classrooms.

**Full results will be available from the Oticon Foundation website early April 2012*
www.oticon.org.nz

Acknowledgement
Support for the research has come from the following organisations: The Oticon Foundation, Research Trust - Victoria University of Wellington, Autex Industries and Marshall Day Acoustics.

the oticon foundation

Victoria
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o te Ūpoko o te Ika a Māui

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