An evaluation of voice-actuation of microphones within a digitally-controlled Group Hearing Aid system.

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ABSTRACT

The poor acoustic conditions that prevail in many classrooms can reduce the intelligibility of speech for all pupils. It is, however, the hearing-impaired pupils that will be most disadvantaged by such poor acoustic environments. The ability for these pupils to comprehend their teacher's speech can be greatly enhanced by the provision of appropriate amplification.

One option for classroom amplification is the hard-wired Group Hearing Aid (GHA). This can significantly improve the signal-to-noise ratio (SNR) at which a teacher's voice is received. The linked personal microphones of a GHA system also enable each pupil to hear the voice of his / her peers at high SNR.

The digitally-controlled GHA, developed by Mary Hare School, employs voice-actuated microphones with automatic timeout. These mechanisms were designed to ensure that each pupil's microphone only remained active for the duration of their speech. This reduction in the number of 'live' microphones would further increase SNR.

However, due to an inability to directly monitor GHA microphone activity, it was not known if these automatic mechanisms for microphone control were operating as intended. This question formed the initial subject for the author's research. A second research question was to examine whether there was any potential to improve the operation of this microphone-switching system.

This small scale research project utilised action research to initiate a series of problem solving cycles to address operational difficulties. Evaluation was achieved through non-participatory observation and interview. The two groups of test subjects that participated in this research comprised of nine hearing-impaired Year 9 pupils and eight adults with normal hearing.

Initial results suggested that the automatic microphone actuation mechanism was not working as intended. Following a series of problem solving cycles, within the action research framework, it was discovered that the considerable improvements in operation, that followed a +9dB increase in actuation threshold, were the maximum achievable for the current GHA design.

Further tests of a previously untried configuration, intended to limit microphone access to a single pupil, revealed that this would be inappropriate for normal GHA use. These results suggest, however, that further research should consider the possible benefits that might result from allocating prioritised microphone access to the teacher.