

## **Validation study of computer modeling of source directivity.**

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Previous research has focused on the changes in objective and subjective results when changing source directivity in a computer model, but little work has been done to validate these simulated changes experimentally. An investigation was carried out to compare the measured and simulated room acoustics parameters which result from using a directional sound source, a JBL Eon-10 G2 loudspeaker. Measurements were made in a 100-seat lecture-style classroom, using the sine sweep method, with (a) an omni-directional and (b) the directional loudspeaker oriented in four directions. The measured differences in reverberation time (T30) were minimal across the two source types and four orientations, while significant differences resulted for early decay time (EDT) and clarity index (C80). An ODEON v6.5 model of the classroom was calibrated against the omni-directional results to within two just-noticeable-differences (JNDs) across the three parameters of interest: T30, EDT and C80. Simulations with the directivity of the JBL loudspeaker were then performed and the results differed by less than two JNDs from the measurements for all source-orientation/receiver combinations. In conclusion, ODEON v6.5 does accurately model the changes in room acoustic parameters which result from using different source directivities.

[Work supported by the National Science Foundation.]

Vigeant, M.C., and Wang, L.M. (2007) "Validation study of computer modeling of source directivity (A)." *J. of Acoust. Soc. of Am.*, **121**: 3174