

IMPACT OF EDUCATIONAL EQUIPMENT NOISE ON SMART CLASSROOM ACOUSTICS

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Abstract Numerous studies investigated the acoustics of conventional classrooms for good Speech Intelligibility (SI). However, a new generation of high-tech classrooms referred to, as "*smart classrooms*" is becoming a necessity at educational institutions. This paper describes the features of smart classrooms focusing particularly on the Background Noise (BN) generated by instructional equipment. Measurements were conducted in similar classrooms to assess the magnitude and characteristics of generated noise. With instructional equipment in operation, measurements revealed an appreciable increase in the ambient noise level. A computer model of a typical smart classroom is developed to investigate the appropriateness of the classroom layout and alternative surface finishes as published by the Acoustical Society of America (ASA) [1] for creating a learning environment with desirable listening conditions. To determine the impact of the resulting BN due to instructional equipment noise on SI in such specialized enclosures, simulations of the classroom model with recommended surface finishes under various BN conditions were carried out. Results showed the need to restrict the overall BN level to NC-25, and emphasized the selection of quieter operating instructional equipment. Alternative surface treatments need to be investigated to further verify ideal surface finishes for this emerging generation of classrooms.