Classroom architectural design evolution: Acoustic evaluation of public-school classrooms in Malaysia

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Abstract. Education transformation greatly emphasises curriculum modification to produce impactful future generations and yet often disregards the impact of classroom design in achieving desired education outcomes. The prioritisation of optimal acoustic quality in classroom design is crucial due to the inherent reliance on auditory abilities in the process of teaching and learning. Therefore, a comprehensive acoustic standard guideline for classrooms, ANSI Standard 12.60, was launched in 2002 and adopted for school classrooms in the USA. However, the scenario might be different in Malaysia, as there is no acoustic standard guideline established. Therefore, this study seeks to identify the actual acoustic conditions of classrooms that were constructed in the post-independence era. On-site acoustic measurements were performed to evaluate significant acoustic parameters, including reverberation time (RT), background noise level (BNL), speech transmission index (STI), and sound pressure level (SPL). The findings revealed that the RT for both classrooms was within the recommended value, while the BNL and STI of both classrooms failed to comply with the established recommended guidelines. In a similar vein, these findings translate the degree of awareness among the education institutions and construction sector of the importance of classroom acoustics in providing a better learning experience among students.

1. Introduction

A comprehensive movement of education system reformation in Malaysia that centres on curriculum changes to cater to future needs is indeed a remarkable effort by the government. Curriculum development has long been recognised as a crucial aspect of educational advancement and reform, particularly in developing nations primarily to furnish the necessary education required for the development of human resources, thereby addressing the demands arising from the country's social, economic, and political progress [1]. The non-formal pedagogy that emerged in the early 19th century placed significant emphasis on religious, moral, spiritual, martial arts, and handicraft teaching [2]. However, the current educational landscape in Malaysia, as outlined in the Malaysian Education Blueprint 2013-2023, has shifted its focus towards student knowledge acquisition, the development of critical thinking skills, fostering leadership qualities, promoting bilingual proficiency, and constructing a national identity [3].