

Preparation of Papers: Impacts of COVIDSAFE Practices and CO₂ Feedback Devices on Indoor Air Quality in Classrooms

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Abstract : Most of Australia's school classrooms are equipped with operable windows and occupant-controlled air-conditioners that do not provide fresh air. This can result in insufficient ventilation and high indoor CO₂ levels, which comes at a detriment to occupant productivity and health. This paper reports on the results of an in-situ study capturing indoor CO₂ levels in classrooms at a school in Victoria, Australia. The study consisted of 3 measurement periods: First, CO₂ levels pre-pandemic were measured, finding that the readings exceeded the recommended ASHRAE threshold of 1000 ppm more than 50% of the time, with levels often rising as high as 5000 ppm. Then, after the staff had been informed of the poor indoor air quality and the Victorian government had put COVIDSAFE measures in place, a second data set was captured; the impact was significant, with now only about 30% of readings above the ASHRAE threshold, and values rarely exceeding 2500 ppm. Finally, devices were installed that gave the occupants visual feedback when CO₂ levels were high, thus prompting them to open the windows; this further improved the air quality, with now less than 20% of readings above the threshold and values rarely exceeding 1500 ppm. The study suggests that, while relying on occupants to operate windows can lead to poor indoor air quality due to insufficient ventilation, it is possible to considerably influence occupant behavior through education and feedback devices. While these interventions alone did not mitigate the problem of inadequate ventilation entirely, they were sufficient to keep CO₂ levels within a generally healthy range. Considering the large energy savings that are possible by foregoing mechanical ventilation, it is evident that natural ventilation is a feasible operation method for school buildings in temperate climates, as long as classrooms are equipped with CO₂ feedback devices.

Keywords : COVID, CO₂, education, feedback devices, health, indoor air quality, natural ventilation, occupant behaviour

Conference Title : ICIES 2023 : International Conference on Innovative Educational Systems

Conference Location : Sydney, Australia

Conference Dates : August 24-25, 2023