The Potential Advantages Of Increasing Ventilation In Schools

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Background
While there are broad benefits to society from all buildings becoming more naturally comfortable and therefore more energy efficient, the benefits of increasing ventilation in schools may potentially deliver the largest benefit to society.

Increased Ventilation = Decreased Energy Costs
There are few arguments against the science showing that increasing natural ventilation decreases the amount of energy consumed for heating and cooling buildings.

- A study of 39 offices at Sydney University in 2002 identified annual energy savings on heating and cooling of 79%

- A 2001 study of 18 UK buildings identifying an average of 52% measured annual savings in heating and cooling energy.

- In 2001 the CSIRO calculated that in a 12 hour a day building, mechanical cooling is not necessary 48% of the time
  Quoted in "Emerging technologies in ventilation" by Dr Mark B Luther and Dr Zhengdong Chen in TEC12, Nov 2002

Decreasing energy consumption decreases electricity bills which in turn decreases school expenditure potentially freeing up funds for other productive uses.

Increased Ventilation = Improved Learning Outcomes = Increased Future Productivity
The productivity of future generations of workers will be impacted greatly by today’s educational outcomes. There is a strong body of science showing a strong relationship between ventilation and learning outcomes.

- Children in classrooms with higher outdoor air ventilation rates tend to achieve higher scores on standardized tests in math and reading than children in poorly ventilated classrooms.

- One international review of 30 green schools, Greening America's Schools: Costs and Benefits, found that green schools and universities deliver:
  - 41.5% improvements in health of students and teachers (such as reduced incidence of asthma, flu, respiratory problems and headaches),
  - Up to 15% improvement in student learning and productivity,
  - Up to 25% improvement on test scores from good lighting and ventilation.
• Controlled studies show that children perform school work with greater speed as ventilation rates increase. The performance of adults, including teachers and school staff, has also been shown to improve with higher ventilation rates.


• A European Multidisciplinary Scientific Consensus Meeting reviewed the scientific literature on the effects of ventilation on health, comfort and productivity in offices, schools, homes and other nonindustrial environments. The group agreed that ventilation is strongly associated with comfort and health and found an association between ventilation and productivity (performance of office work).


• A 2005 study of 10-year-old school children showed that increasing ventilation rates could improve the children’s performance in tasks representing eight different aspects of schoolwork, from reading to mathematics.


• A literature review by Mendell and Heath found evidence suggesting a link between low outdoor ventilation rates in buildings and decreased performance in children and adults.


• A study in eight English primary schools of over 200 pupils showed significantly faster and more accurate standardised test responses (by up to 15%) when classrooms had high ventilation rates compared with low ventilation conditions.


Jonathan Dalton (Technical Director of Viridis E3) asserted in his seminar “The IQ of IEQ” at the Green Cities 2012 Conference (http://www.thefifthestate.com.au/archives/32909) that the current requirements for ventilation openings in schools in the Australian Standards are not currently sufficient to generate enough ventilation to maintain carbon dioxide, volatile organic compounds and hydrocarbons at safe levels for children and argued that the Australian Standards should be updated.

Increasing ventilation requirements in schools would be a sound investment in the future of our society.