

The Education Benefits of Improved IAQ

Indoor air quality plays a role in healthy bodies and healthy minds.

By Eve London



After years of research, the connection between improved indoor air quality (IAQ) and improved performance of children and adults in schools is well-established. Studies consistently show improved scores on standardized tests as school conditions improve; nearly 80% of teachers in one study reported that school facility conditions—IAQ in particular—were important factors in teaching quality (Schneider 2002).

Temperature, humidity level, air filtration, and acoustics affect a student's performance and ability to learn in the classroom. Consequently it makes sense for districts to choose heating, ventilation, and air conditioning (HVAC) solutions that help create quiet, comfortable classrooms for students and teachers—all while keeping energy efficiency in mind.

The Importance of Classroom Environments

Consider some simple facts from the studies linking classroom IAQ to student and teacher performance and satisfaction:

- Children often have difficulty separating speech from background noise. To hear well, most children under age 13 need background sound levels that are significantly lower than the sound they are trying to hear (Nelson 2003).
- Excessive noise and reverberation interfere with speech intelligibility, resulting in reduced understanding and therefore reduced learning. In many classrooms in the United States, the speech intelligibility rating is 75% or less, according to the Acoustical Society of America.
- As many as one-third of all students miss up to 33% of the oral communication that occurs in

the classroom; poor classroom acoustics create extra challenges for students who are coping with learning disabilities, are hindered by impaired hearing, or struggle to learn in a non-native language (Nelson and Soli 2000).

The good news is that new advancements in terminal technologies can help schools create a healthy and productive environment for students and teachers, which in turn can affect performance and comfort. Terminal products such as fan coils, unit ventilators, and blower coils often are the unsung heroes K–12 schools and college classrooms and are the first line of defense in creating an optimal learning environment. Innovations over the years have led to terminal products that offer vastly improved performance.

Terminal Technologies and IAQ

One technology that can have a significant impact on IAQ for schools is variable-speed technology. Variable-speed technology is exactly what it sounds like: it provides the ability to vary the speed of a unit based on the current needs and demands on the space. Because overall sound levels are lower than those of constant-speed units, the result is improved classroom acoustics.

Schools can also use this technology to improve humidity control, thanks to the additional dehumidification capabilities that are possible



when fans operate at low speeds for an extended period of time.

Variable-speed technology also can help districts save money. The technology in these systems can deliver up to 66% higher efficiency compared to constant-volume systems, along with temperature stability, quiet operation, and dehumidification advantages for spaces where occupancy varies.

Different technologies allow a unit to be programmed to vary motor speed and power. Schools can use this to run equipment at a lower—and typically quieter—speed when necessary, to help reduce sound levels in a classroom when it is occupied.

Unit controls have undergone technology enhancements in recent years that help schools achieve better IAQ in classrooms. When controls are easy to use and adjust, schools can precisely manage the temperature and humidity to maintain classroom conditions within the parameters that are ideal for learning.

Hearing Is Believing

They say that “seeing is believing,” but for a school district in Illinois, “hearing is believing.” The Cook County School District had several aging facilities that made it challenging to provide a comfortable learning environment for students in an energy-efficient manner.

The district worked with an indoor comfort solutions and services provider to ensure classroom environments were quiet, efficient, and safe. For example, school mechanical systems were redesigned and a building automation system (BAS) was installed. In one classroom, a working unit ventilator was retrofitted to demonstrate the quiet operation possible with new technology. When the old, rattling unit was turned off, the noise level decreased significantly.

Optimizing the Technology

The best way to optimize performance is by leveraging BAS, no

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matter how efficient the frontline technology is. A BAS provides greater controls and insight and convenient access to building systems, and allows for easy adjustment of classroom temperatures. Building automation can ensure that a school gets the best performance out of advanced terminal technologies—which in turn helps optimize the performance and efficiency of the entire system.

It’s also easier for schools to install a BAS—or to upgrade an existing automation system—by using wireless communication technology. Eliminating the need

for wires between controllers and devices reduces installation time and risk, and provides easier troubleshooting and maintenance over the life of the system because there are no wires to maintain. This can help make a BAS a more financially feasible option for many schools.

Wireless technology is especially beneficial in retrofit applications, where a BAS can be installed without disturbing walls or other parts of the building to run wires, for faster installation with reduced risk.

Options to Address IAQ Issues

Providing an environment that makes it easier for students to pay attention and learn—and for teachers to instruct—is critical to creating a high-performing school.

Districts have a range of technologies and solutions to consider for addressing IAQ issues. New advancements in terminal technologies can provide lower sound levels

and better temperature and humidity control, all while saving the district money that could be redistributed to academic programs.

References

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