

CO2 monitor testing: singing, piano and wind instruments

November 2021

With winter in mind, we decided to test CO2 monitors for peripatetic music teaching. These monitors can help because CO2 build up helps identify when a room needs ventilating / fresh air flow which is one of the mitigating actions you can take to reduce aerosol/droplets transmission, which is one of the ways Covid can spread. *

We used [Aranet 4 monitors](#) which have a simple traffic light system for indicating air quality and are small, wireless and easy to use. There is an optional app to record and monitor CO2 activity, but essentially it's a traffic light display system – green is good, amber OK, red is dangerous. These cost £189 each - there are both cheaper and more expensive monitors available, ranging from about £50 upwards.

Six Associates tested these CO2 monitors across 32 different settings, working with a total of 664 students, across a six week period from start of term Sept 2021.

Teaching spaces were varied, and included:

- “Tiny, cupboard” sized teaching room, 2m square teaching room
- Large and medium classrooms
- Home teaching spaces
- School/church halls

Most teaching spaces had windows that could be opened with doors opening into internal corridors or to the outside.

All six Associates took direct action on at least one occasion. This included:

- Opening doors/windows/ventilation shutters
- Requesting a larger teaching room
- Working out the best window/door open combination to create a more stable environment
- Planning in ventilation time between pupils

Unsurprisingly the monitor alarms went off / reached very high levels when windowless teaching rooms were used, even with door propped open.

High levels were also recorded when using a room previously occupied by a large group, and when a teaching room with an open door was close to an adjoining large classroom.

Testers noted that levels could be brought down very quickly by creating through-draft for a few minutes – but when through-draft includes air from an adjoining occupied room this doesn't work.

One Associate pointed out that finding the right place to place the monitor is important – it will of course show a high reading if very close to someone's face (speaking/singing -breathing directly onto the monitor) – and they now place the monitor on a music stand or shelf in centre of room.

One Associate recorded high humidity levels, and high CO2 levels during hot weather, and passed this information on to the school SMT.

Whilst one Associate was able to use the monitor to provide evidence to negotiate with school for a different, safer teaching space (with window), another was concerned that if school knew they were using the monitor it could be used as an excuse to prevent music tutors coming into school. (if high CO2 levels were recorded in music teaching sessions)

One Associate reported that levels were higher for beginner piano teaching than for woodwind – and deduced that this may be because there's a lot more talking with beginner piano students.

Another also tested with their adult choir rehearsals in a large church space. Levels remained low at all times, but they noted a slight increase on 10 minute breaks – when everyone was chatting – than for the actual singing sessions.

Five Associates said they will continue to use the monitors for their music teaching, and one said they were not currently using – but would use “if Covid resurfaces” (at time of writing)

All said the monitor was easy to use, and useful.

Other comments included that it was reassuring and empowering, a useful way to demonstrate to pupils, teachers, (“reluctant teachers”) choir members why mitigating actions were being taken, including keeping choir volume down, as they can see levels of CO2 go up with volume.

“Pupils are aware of me using the monitor and as a result, they know that I want to keep the door open etc. I felt it was a very useful aid to give immediate feedback on a teaching space and evidence if needed to any inadequacy. It also showed anyone who needed to know that I was serious about maintaining a safe environment.”

“It was particularly useful at the start of the academic year to work out, in school 1, which doors/windows needed to be open to give the relevant air flow. Also, useful to see that there are lower rather than higher levels in my lessons - again reassuring for pupils/staff/parents”

“Easy to use. Reassuring in a lot of cases, to know that a well ventilated large space does not fill up with CO2 even when singing”

“Easy to use. Empowering during delivery of sessions as it provides the evidence to teachers who might be reluctant to open windows /doors during cold weather, that it is important to do so.”

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**Government Health and Safety Executive information on CO2 monitors and Covid:*

<https://www.hse.gov.uk/coronavirus/equipment-and-machinery/air-conditioning-and-ventilation/identifying-poorly-ventilated-areas.htm>