Dropping the volume around schools can improve learning

June 22 2015, by Kate Cockcroft, Joseph Seabi And Paul Goldschagg

Credit: AI-generated image (disclaimer)

There's no escaping noise, whether it's caused by traffic, construction, or planes flying overhead. Usually we have no choice but to get on with our daily lives and in many instances noise is little more than an annoyance. But children may be affected differently to adults, particularly when continuous noise is an environmental feature of their place of learning.

There's been an increased interest in noise during school hours recently, particularly in Europe where there is stringent legislation about noise pollution. In South Africa, there is no legislation prohibiting the operation of schools near loud noise sources. The only protection comes in the form of guidelines for different types of land uses in noisy areas. It is up to the authorities to ensure that recommendations in the guidelines are followed.

This is further complicated because in the past, schools were built near airports which originally only had a few flights. Many of these airports have become very busy, transforming previously quiet neighbourhoods into places which are not optimal learning environments. Often, as a result of urbanisation, schools sit alongside busy traffic intersections, noisy taxi ranks and large airports.

Noisy vs quiet school environments

School learning still relies heavily on oral communication even though there's an increasing use of blended learning approaches incorporating multimedia and the internet. This means the acoustic conditions under which teaching occurs are important, especially for younger children - the ability to concentrate on speech under adverse listening conditions only reaches adult levels in adolescence.

Children also appear to have a reduced cognitive capacity to anticipate and cope effectively with noise. In a noisy environment, children have to use increased cognitive capacity to decode verbal information. This information can easily be misheard, misunderstood or not heard at all.

We conducted a three year study of children attending primary schools - an average age of 11 years and seven months – near the old Durban international airport both before and after it was decommissioned.

More complex abilities were far poorer in the children attending noisy schools. These included prospective memory – remembering to do something in the future, like homework after school - and reading comprehension. They faced a double struggle, as many were reading in their second language and so lacked proficiency. These children also had poorer attention spans, motivation and higher levels of annoyance towards noise than the children at schools in quiet locations.

But the results were surprising in parts. While the airport was still operating, children at the noisy schools fared better on several aspects of simple memory ability when compared to their peers of matched age, grade and socioeconomic status at similar but quieter schools.

A possible explanation is that children at the noisy schools may have become used to the noise, a process referred to as habituation. They may have developed some coping mechanisms to deal with it, as they had also all been living in the area for at least two years.

We concluded that children's memory capacities appear to be amazingly resilient, but there are limits to this. Children seem able to cope with the effects of chronic noise so that it doesn't negatively impact simple aspects of cognition such as basic memory. But noise does affect the performance of tasks that place greater demands on cognitive processes.

Creating quiet spaces

After the airport had been closed for two years, children from noisy schools struggled less with reading comprehension, attention, motivation and annoyance. This means that the simplest solution to dealing with the effects of noise on learning is to remove the source of the noise or move away from it.

Ideally, schools should not be located near busy airports. The new King

Shaka Airport in Durban is sufficiently far away from any schools to pose a problem, but this could change because of future development.

If the noise source can't be removed there are still practical solutions. These include interventions to target specific components of the noise problem – like phasing out noisy aircraft and providing soundproofing for school buildings. This can be paired with strategies like cognitive training to improve children's focus as well as specific activities to improve prospective memory and reading comprehension.

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