

## **Noise – A Stress Factor? Acoustic Ergonomics at Schools**

The main topic of this interdisciplinary examination about “acoustic ergonomics of schools” is less the physical properties of the classroom than the problems of teaching reality in everyday school life. By the example of two primary schools with different pedagogical basic settings the current educational trends with their concrete work forms and the communication behaviour resulting from it are regarded. In the first step we analyse how different teaching methods (direct teaching vs. student centred teaching) affect basic noise level (LA95) and working noise level (LAeq) on the basis of 175 lessons.

In the second step we investigate how an altered room acoustics (reverberation time and speech intelligibility) has an effect on the sound levels in the context of each teaching method. The data records available as time series allows for the first time to analyse single phases of the lesson, which are characterized by certain pedagogical characteristics or individual instruction phases, instead of average values from the whole lesson.

Is it correct to speak in general of “noise stress” or is this stress more an emotional reaction to the kind of work in which teachers are engaged? Based on recordings of teachers heart rate in these 175 lessons we analyse in the third step the effects of noise level on the work load of the teachers, regarded in the sense of a stress reaction. A distinction is on the one hand made on the subject of different teaching methods, on the other hand on the basis the different room acoustic conditions. In one primary school we had four classes with a reverberation time  $> 0,5$  s and four further classes with a reverberation time  $< 0,5$  s. At a second primary school we analysed the effect of the room acoustic refurbishment (reverberation time improved from 0.7 s to 0.4 s).

Both schools examined here practice a very similar social educational concept, which marks itself by uniformly used rituals on the part of the teachers as well as valid behaviour rules for the students. The difference to other comparable primary schools, which do not practice such a concept, was shown in other place by the clearly lower noise levels at these two schools.