

Institutionen för didaktik och pedagogisk profession

Undervisning och lärande i naturvetenskap

Elevers lärande i relation till en forskningsbaserad undervisning
om ljud, hörsel och hälsa

av

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Abstract

- Title:** Teaching and learning science: Students' learning in relation to a research-based teaching-learning sequence about sound, hearing and auditory health.
- Language:** Swedish with summary in English.
- Keywords:** Learning; teaching; science education; formative assessment; sound; hearing; health; tinnitus; portable music players; loud noise.
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The aim of this thesis is to contribute to increased understanding of students' learning about sound, hearing and auditory health. Concerning the health issue, researchers have highlighted the growing problem of loud sounds among young people particularly in leisure-time environments, recently even emphasizing portable music players, because of the risk of suffering from hearing impairments such as tinnitus.

Taking students' known preconceptions as a starting point, a research-based teaching-learning sequence (TLS) was designed. Teachers made use of the TLS as a resource material and as a basis for planning their lessons. Swedish students in grade 4 (aged 10-11), 7 and 8 were given pre- and post-tests, and delayed post-tests one year after the teaching intervention. The students' answers in these tests were carefully analysed from the different frameworks developed.

The results show that learning about an abstract field such as sound and sound transmission offers content-specific challenges for students. The main challenge for the students is constructing an understanding about sound transmission as transmission of motion and not as matter. Moreover, it might be difficult for students to conceptualize the meaning of risk associated with loud noise, and for this reason it might be fruitful for students to learn about some fundamental ear structures and the function of the ear. The results also show that the students' health awareness of loud sounds was improved after the teaching intervention, and there are also signs of positive behavioural change in relation to loud sounds.

The overall results show that it is beneficial to teach young students (aged 10-11) about sound, hearing and auditory health. A trend seems to be that the older students, the more advanced is their reasoning about sound transmission and the function of the ear. Besides, it appears that the older students are, the more their health awareness increases qualitatively in the year following the teaching intervention, especially among the girls. These results imply a need for recurrent teaching.

The combined results are summarized into a content-specific hypothesis about what might improve the students' opportunities to learn and understand the specific content. This hypothesis provides a basis for further research and contributes to improving practice by bridging the theory-practice gap.