

PUPILS' (AGE 10 - 11) ATTITUDES TO LOUD SOUNDS

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Abstract

The paper reports on an investigation into pupils' attitudes to loud sounds before and after teaching. This is part of the research project 'Design and validation of a teaching learning sequence about sound, hearing and health' for pupils aged 10 – 11 years. Pupils (41) have answered a multiple-choice questionnaire about their experiences of tinnitus, practices of headphones, attitudes to sound levels in general, attitudes to sound levels when listening to music, attitudes to using earplugs, ideas of how to manage the sound level at a class party, ideas of how to solve a conflict of sound levels at the same class party and the pupils' experiences of sound levels at discos. The method of analysis is quantitative. It was shown that the pupils' attitudes were changed in a way that support hearing-health. This work is the Swedish part of the ISSUE-project (Integrating Subject Science Understanding in Europe) in Comenius 2.1 within the European communities.

1. Background

Working and leisure-time environments with high sound levels have become more and more common. (Hörselskadades riksförbund, 2004; Ising, Babish, Haneer & Kruppa, 1997). In a study (Hellqvist, 2002) of adolescents 15% reported daily problems of tinnitus. The younger the child, the more sensitive to loud sounds (Socialstyrelsen, 2003). Socialstyrelsen (2005) informs that every fifth twelve-year-old Swedish pupil have suffered or suffers from some form of tinnitus after having listened to loud sounds. Holgers (2003) found that 12 % of 7 year old children suffered from tinnitus. Many young people listen to walkmans like Mp3-players. Since they do not always use them carefully enough, the hearing organs are often exposed to unnecessary stress (Berglund, Lindvall, Schwela & Goh, 2000). In 2003 a part of the Swedish national evaluation of compulsory school was a project investigating pupils' problem solving skills (Kärrqvist & West, 2005). The results show pupils did not take scientific knowledge into consideration when they had to make decisions about sound levels. Aikenhead (2006) argues that an important goal for science education is preparation for the everyday world including moral reasoning integrated with values, human concerns and scientific reasoning. E. Widén (2006) has studied the complex process behind attitudes to loud sounds and the use of hearing protection aids. He concludes there is an interaction between self-image, attitudes, risk consideration, experiences and behaviour. Social norms and normative ideals are also important factors for building the self image.

2. Research questions

The overall aim of the project is to find out to what extent a carefully designed teaching-learning sequence might improve pupils' understanding of the properties of sound, the function of the ear and hearing and acoustic conditions that might cause damage. The study presented in this paper tries to make a contribution to this overall aim by answering the question:

Does the teaching-learning sequence contribute to changing the pupils' attitudes in a way that improves their awareness of risks connected with exposure to loud sounds?

3. Methodology

There is an increasing interest in design and validation of teaching-learning sequences (TLS) (Meheut & Psillos, 2004). Like most of the research groups working with TLS the following steps have been taken:

1. Didactic analysis of the content of the teaching and research findings about pupils' conceptions of sound and hearing.
2. Design of a teaching sequence by a researcher in collaboration with teachers that is tested on a small scale. The sequence is gradually revised and tested again.
3. Evaluation of pupils' learning and attitudes to loud sounds, using pre and post tests.

In this second test cycle there are 41 pupils, aged 10-11, and three teachers from a middle class school in a city on the west coast of Sweden. The children have not previously met any formal teaching about sound, hearing and hearing-health. This paper deals with the pupils' answers to the attitude questionnaire that was given before and after teaching. The same questionnaire was used as pre- and post-test and the pupils expressed their agreement or disagreement to statements on a five-point Likert scale. The statistical significance was tested by paired sample t-test.

4. Results

Fifteen pupils report they have some experiences of tinnitus and two pupils are often bothered by tinnitus. Fourteen are worried of tinnitus. These results are the same before and after teaching and consequently the pupils were not scared by the teaching. Fourteen of the students listen to music with headphones several times a week or more and 14 usually don't listen to music with headphones.

Regarding the attitude questions most of them show differences that support hearing-health when the results are compared before and after teaching. The pupils are getting more aware of high sound levels when listening to music and of using earplugs. Such statements are *'I never think that the sound level may be too high when I listen to music'* ($p < 0,05$), *'I don't think it's necessary to have earplugs at the cinema'* ($p < 0,001$), *'I will not use earplugs at pop or rock concerts'* ($p < 0,005$) and *'I don't think it's necessary to use earplugs when you're at a disco'* ($p < 0,05$). The pupils are also getting more critical to sound levels at discos. Examples of such statements are *'I think that the sound level at the disco is generally too high'* ($p < 0,05$), *'The sound level at discos should be lowered'* ($p < 0,005$) and *'I could consider leaving the disco if it's too loud'* ($p < 0,001$). Others are *'The risk of hearing impairment is exaggerated. I think we should turn up the volume or there won't be a proper party'* ($p < 0,001$) and *'I want to turn down the volume if there's anyone in the class who already has impaired hearing and can't stand a high volume. Everybody has to be included, otherwise it's not a class party'* ($p < 0,01$). In the questionnaire there was also a history of a conflict at the imaginary disco that has to be solved. The numbers of pupils that relied on methods based on chance decreased. Examples are *'We put it to the vote. The suggestion that gets the most votes wins'* ($p < 0,05$) and *'The DJ has to decide'* ($p < 0,01$). The pupils are getting more interested in a scientific foundation such as *'We ask the teacher to measure the volume with a noise meter and adjust the sound so it's not louder than what doctors say'* ($p < 0,05$).

5. Discussion

Several studies (Hellqvist, 2002; Socialstyrelsen, 2005; Holgers, 2003) report results concerning young people's experiences of tinnitus. Some of the studies analyse experiences of tinnitus as a whole, and others' report more exactly suffering from daily tinnitus. In this

study there are also pupils that answer they have less or more experiences of tinnitus and these results are more or less in line with the studies reported. Besides the results show that one third of the pupils are worried of getting tinnitus. About 30 % of the pupils often listen to music with headphones. Berglund, Lindvall, Schwela and Goh (2000) states that you must be aware of the sound level when listening with headphones. The pupils in the present study increase their awareness of high sound levels when listening to music.

The pupils are getting more conscious of problems with loud sounds and some questions indicate that their willingness to take action and change behaviour has increased. Of course what the pupils answer in a questionnaire is not equivalent to what they are doing in a real life situation. As mentioned E. Widén (2006) points out that there is an interaction between self-image, attitudes, risk consideration, experiences and behaviour. Therefore it is possible that the changes of attitudes found in this study might promote changes in the pupils' behaviour. An interesting question is: What are the pupils' attitudes one year after the teaching-learning sequence was completed?

Why did the attitudes change? Is it due to factors concerning the scientific content or is it due to other factors? In the teaching-learning sequence the pupils have learned of sound and hearing, they have practiced how to distinguish between scientific knowledge and values, they have discussed sound levels in different ways including measuring sound levels at different places like dining-hall, woodwork room and gymnasium. Some pupils did measure their own Mp3-players. You can say that the pupils have touched on social norms and normative ideals. These are important parts in the building of self-images that interact with attitudes (E. Widén, 2006). You might think that these parts of the teaching-learning sequence make an important contribution to the changes of the attitudes. But unfortunately it is not possible to state this. Further research might improve our understanding of how pupils' are influenced by activities like the ones just described.

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