The Best Listening Environment in School According to Hard-of-hearing Pupils

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ABSTRACT The aim of this study was to illuminate the listening strategies which are revealed when pupils described their choice of the “best listening environment” in school. The study comprises 165 hard-of-hearing pupils from five compulsory schools in Sweden. The results are mainly based on the pupils’ drawings and their attached written explanations. The pupils’ explanations are analysed in the form of four different needs associated with being a listener: a “cleaned-up” sound environment, visual support, conversation rules and comfortable surroundings. The explanations can be seen as reflective knowledge and experiences of listening strategies. Not every pupil in this study has a verbalised awareness of listening strategies in all categories but, as a community, they describe a lot of experiences and knowledge to be shared. How to take the role of listener and continuously develop new strategies might be a matter of self-image.

Introduction
Listening environment in school offers hard-of-hearing pupils unequal opportunities for listening. To listen has been described as a situation when a person devotes their full consciousness to hearing (Barthes 1991). The difference between “hearing” and “listening” is the ambition to understand. Different levels of attention include not only perception, but also opportunities for producing meaning. As Nichols (1947:84) expresses it, “the words ‘apprehend’ and ‘comprehend’ serve rather well to distinguish between hearing and listening”. As this study is applied in an educational context, it is listening that will be in focus.

Pupils involved in this study need hearing aids as well as different environmental preconditions to be able to listen. Some conditions are well known to the teachers, whilst others operate at a subconscious level, to either a greater or lesser extent verbalised by the individual pupil. In addition, individual variation is large – two persons with the same hearing loss according to the audiogram can provide two completely different descriptions of how to cope with a listening situation (Gullacksen 2002). Teachers
invariably make plans for speech activities from their perspective, often with no experiences of their own of having hearing loss. It is difficult to find studies where the users are asked about their listening environment, not only in school, but also in other, out-of-school contexts. In this study pupils had an opportunity to tell their stories, and at the same time give voice to opinions of other hard-of-hearing pupils. The tools used for telling their stories are pupils’ pictures and written texts.

The present study concerns five compulsory schools in Sweden. The Swedish compulsory school system includes nine school years for children between 7 and 16 years old. One preschool year starts at the age of six and is optional. All the schools in this study have a local commission to offer classes for hard-of-hearing pupils. They comply with the same curriculum as schools for hearing pupils and the educational language is spoken Swedish. These schools are also involved in a national school improvement project designed with an action research approach. This project runs for three years and has the overall aim of improving the learning environment for pupils who need hearing aids and/or technical equipment. This study can be seen as a part of the action research project with a clearly defined aim. In action research projects the participants are active in the research process, and in this case the participating teachers collected the empirical data (further described in the Method section).

At the heart of action research is the opportunity to make people’s voices heard and in this case it is about pupils’ voices. In the Swedish curriculum it is said that, at a very early age, pupils should be involved in and participate in discussions concerning their learning environment:

A democratic school gives the individual pupil power concerning their own learning processes. Such a school enables the pupil to be involved in the planning, carrying out and evaluation of education. (SOU 1996:51)

To participate is to be an actor in a learning dialogue, in this case in speaking and listening situations. Participation is put into practice in studies concerning the awareness of young learners (6–7 years) about how to learn (cf Kullberg, Pramling & Williams 1996). Young pupils are able to reflect upon their own learning but are very much dependent on teachers’ attitudes. To be active in your learning process as a pupil with a hearing loss, you have to be aware of your individual needs to listen. Therefore, from an educational perspective, it would be of interest to investigate how pupils verbalise their needs for having an optimal listening environment in school.

The aim of this study is to illuminate the listening strategies of pupils asked to describe their choice of best listening environment in school. To find out about choices and listening strategies, the process will be guided by two questions:

- What kinds of listening environment do pupils choose in a conversation setting of four peers?
- What kinds of explanation concerning the best listening environment do pupils provide?
Background

In the Swedish school system there is a distinction between schools for the deaf run by the state and schools for hard-of-hearing pupils run by local authorities (municipalities). The educational language in schools for the deaf is sign language, whilst in schools for the hard-of-hearing it is spoken Swedish. The focus for this study is five local schools that provide classes for hard-of-hearing pupils. These schools have an average number of seven to eight pupils per class, and offer acoustically adapted classrooms with technical equipment, e.g. hearing loops. Two different microphones can be used with hearing loops: either a wireless and flexible conference system with the microphone placed in the middle of the table, or an individual microphone with a locked position at each desk. The desk alternative can be controlled with a mechanical on/off button (the traditional system) or by voice (see www.rnid.org.uk). Sign language is taught as a subject once or twice a week. This is not to be compared with a bilingual situation, since most of the pupils and teachers are unable to use the language fluently. In classes for hard-of-hearing pupils there is a need for the use of hearing aids in the environment as well as, on occasion, the use of signs from sign language in addition to speaking.

This study originated during the school improvement project mentioned earlier, in which teachers tried to change the learning environment for hard-of-hearing pupils in order to promote a more dialogue-oriented and participatory classroom communication. The traditional technological solutions had contributed to an inflexible arrangement of furniture in the classroom. The desks were positioned in the shape of a half circle and linked together with wires for individual desk microphones. The teacher used a wireless microphone whilst the desk microphones for the pupils were supposed to be turned on and off manually when each pupil wished to speak. When pupils did not activate their microphones, this also prevented other pupils from listening via the hearing loop. In order not to risk a misunderstanding, pupils preferred to speak to the teacher rather than to their classmates, which led to a relatively passive approach amongst pupils in the classroom (Ahlström & Preisler 1998). One might say that in such classrooms the teacher significantly controlled the classroom communication. In a description of the improvement process mentioned above, a very experienced teacher expressed the following view:

I have worked for many years in classes with hard-of-hearing pupils and you might say this has been authoritarian and very controlled by the teacher. I haven’t thought of the idea of peer learning; this is something new. It is embarrassing, but I have to admit that it is in fact a new perspective (Wennergren, 2006:150).

During the improvement project, the teachers were encouraged to introduce a wireless and more flexible technical system. The new technology did not have to be activated, since the hearing loop was always connected when the system was being used. The arrangement of the furniture was altered so as to include
a central group table for dialogues with opportunities for pupils to use the hearing loop. In this environment the students had the physical opportunities to take responsibility for listening. They could choose either to use the hearing loop (the hearing aid at t-setting) or to use the microphone of their hearing aid (the hearing aid at m-setting).

However, during the process of change it became a challenge for the teacher to maintain a balance between the technologies and to create opportunities for dialogues. In a limited evaluation study comprising a number of students aged between 13 and 16, the results highlighted the problem: whilst the new technology was a positive experience for most pupils, it was at the same time a negative experience for some (Wennergren 2004). The longer distance between the microphone and the speakers captured more background noise. Some pupils mentioned this as disturbing the perceived sound quality. On the other hand, some pupils saw the background sound as a “positive sense of being present”. It made a difference to be aware of everyone’s comments, which they had often missed when using the traditional technology. When the sound was turned off individually, they could not always know which parts of the whole situation they might have missed. According to the pupils’ responses, the new technology provided situations where it was possible to grasp “the whole picture”.

In the current study the words “learning environment” are intended to be defined in a more holistic way, i.e. including a wider perspective than just the physical environment. The classroom setting, activities, as well as attitudes are included in the concept. The term “listening environment” is based on the same perspective but instead of learning, listening is in focus. For a hard-of-hearing person not only hearing but seeing is an essential part of the prerequisites for listening. Referring to the aims of the Swedish compulsory school curriculum, the learning environment is supposed to be multi-voiced, where the teacher knows how to support language development from a holistic perspective. A multi-voiced classroom implies that four elements of the language, i.e. speaking, listening, writing and reading, are practised and used consistently (Liberg 2003). These four elements should not be focused on separately, as fragmented skills; instead it is intended that they are worked with as part of a holistic meaning-making interplay (National Agency of Education 1999). The classroom dialogue thus involves at least two roles, the listener and the speaker, both of whom are dependent on one another (cf. Bakhtin 1981). The role of the speaker is easy to support and value, while the role of the listener can be more difficult to define and encourage. Adelmann (2002) points out that the listening aspect is neither integrated in the Swedish curriculum, nor in practice, and has called for more experiences and knowledge about taking the role of listener in classroom communication as a part of the learning process.

In the past, generally speaking, a student with a hearing loss was taught how to be a speech producer. Assumption of the role of listener was taken for granted, or at least the skills needed to be an active response giver were very much a secondary consideration (Wennergren 2006). Listening and providing a response is, however, just as important as speaking for participating in a
learning dialogue. Participation is a cooperative activity for constructing meaning together. Liberg (2003) stresses the importance of learning being seen as a social activity in which meaning is constructed together with others. Hence, the degree of awareness of the effects of a hearing loss will influence communicative participation, as well as the pupil's own self-image and identity. According to Bergöö and Ewald (2003), participation in communities is a determining factor for the development of identity and self-image.

Coping strategies connected to persons with a hearing loss are seen as opportunities for action to reduce the effort involved in listening. They might also be seen as guiding life towards gaining control, whilst, at the same time, providing a relaxed feeling. The process of learning how to handle life, for the purpose of satisfying one’s needs, can be described as a form of empowerment and provides autonomy and control of one’s life situation (Gullacksen 2002, Lazarus & Folkman 1991). Empowerment gives the individual the strength to implement adjustments and participate in communities. One problem with the traditional classroom format described by Wenger (1998) is that it is both too disconnected from the world, and too uniform to support meaningful forms of identification:

If an institutional setting for learning does not offer new forms of identification and negotiability – that is, meaningful forms of membership and empowering forms of ownership of meaning – then it will mostly reproduce the communities and economies of meaning outside of it (Wenger 1998:269).

Applied in a setting with pupils who have a hearing loss, the experience of taking an active role as a student is not only important in achieving a meaningful learning situation, but a necessity for empowerment.

Method

This study was a part of an action research project in which 50 teachers from five different compulsory schools participated. The project ran for three years and the overall aim was to improve the learning environment for pupils who need hearing aids and/or technical equipment. In action research projects the participants are actors during the process and the design of this study has, according to the action research philosophy, been developed during the teachers’ own changes in their practices. In such an approach research outcomes and the applications of results to problem-solving are inextricably linked (Greenwood & Levin 1998). The process of action research can be described as a cyclic process comprised of four steps: planning, action, observation and reflection (Kemmis & McTaggart 1982). In this case the method was designed by the researcher, whilst the procedure was subsequently discussed and developed together with the teachers. Finally, the teachers were responsible for ensuring that the procedure was explained to the pupils at an adequate level in relation to the pupils’ age.

The choice of method was based on a holistic perspective of the text. The “whole language approach” implies an expanded definition of a text (Cope & Kalantzis 2000, Liberg 2003). In this case, both pictures and written texts
were used, the cumulative result being regarded as a text. In accordance with Trost (1993), the pictures could be seen as a method/tool of preparation for making the written explanations more concrete. Without the picture there was a risk of making the task too abstract. Since language includes more than oral speech, Alerby (2004) advocates a method that involves something more than just the spoken perspectives of the students. “In addition to spoken words, let’s use drawings and photos as well, all with the aim to visualise the students’ experiences” (p. 558).

To test the method, a pilot study comprising eight 10-year-old pupils was carried out in December 2004. In the pilot study the method only included pictures without any written explanations. The results showed the importance of making a written statement of explanations in connection to the pictures. According to Säljö (2005), pictures used in interaction with texts can function as a mediated tool with a high potential for learning and understanding. Since learning and empowerment are important factors in the action research approach, the choice of the methods is in accordance with the philosophy of action research (Greenwood & Levin 1998, Mattsson 2004).

Data were collected from March to May 2005. One or two teachers had the responsibility for each group of pupils and altogether 165 pupils were included in the study. The ages were spread from pre-school classes to the ninth year, which meant that the participating pupils ranged in age from 6 to 16. The teachers asked their pupils to draw a picture of their “best listening environment” in school in a situation when they were supposed to have a discussion in a group with three other peers. (Photos were used by 14 pupils.) They also asked the pupils to explain their choices in text. For the youngest pupils this meant having the teacher as their secretary. The explanations varied from 1 to 15 sentences. When the task was completed, the teacher added a written reflection on how the instruction had been carried out. During the month of May the researcher met 65 pupils and conducted follow-up conversations (5–20 minutes) about their pictures and explanations. The choice of pupils was based on a need to verify interpretations of the data. During the conversations it was possible for the pupils to clarify some of their explanations or exemplify details in their pictures.

The qualitative analysis process started when data were transcribed into texts and arranged in order to maintain the original groupings of pupils. The analysis began by searching for small parts to end up with a holistic perspective. The purpose was, in the initial stages, to keep interpretation to a minimum in order to make it more visible in the latter stages. The analysis was conducted in the following series of steps:

1. All the texts were read, with the aim of gaining an overview and a picture of the whole material.
   • The details of the pupils’ choices of listening environments were focused on.
   • The pupils’ choices and explanations were searched for school by school.
   • The explanations were listed separately.
2. In accordance with the starting point of this study, a more holistic approach was used to sort and reduce the explanations into overall categories.

- Overall categories were searched for in the whole material.
- The categories were sorted and condensed into four more overarching categories.
- The relation between the number of pupils and the categories was made visible.

3. Research colleagues were involved in finding out whether the pre-understanding of the researcher had made it difficult to “see” the content of the material.

- Seven independent (co-)researchers read a part of the material and constructed their own categories.
- The categories of the researcher and the co-researchers were discussed and were thereafter found to complement each other.
- Finally, the four categories were tested to discover whether they covered the content of all the texts (Table 1).

Since all participating teachers worked with pupil with disabilities they had knowledge and experience of handling ethically sensitive issues. This was of great value, since pupils of different ages were involved. In such small schools

| Categories                        | Subcategories          | Texts from different 12-year-old pupils                                                                                                                                                                                                 |
|-----------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A cleaned-up sound environment    | The level of sound     | In the classroom I can use the hearing loop and there are almost no disturbing noises. I can’t use the conference system all the time, and therefore I also use the m-setting on my hearing aid.                                             |
|                                   | The level of noise     | Soft chairs with ordinary chair legs – no wheels. I want armchairs and a desk at an adequate height. Neither the chair nor the desk should make any kind of noise.                                                                                 |
| Visual support                    |                        | My best place for listening is in a corner of my classroom sitting at the round table. I like the lamps. The level of the lighting is neither too dark nor too light. The clock must be on the wall.               |
| Conversation rules                |                        | I want the conference system but we need to be careful and only speak one at a time. When I use the t-setting I can hear everybody and everything.                                                                                                      |
| Comfortable surroundings          |                        | I prefer a soft carpet on the floor. I also want flowers in the windows and some private boxes on our desks with individual choices of colours. I want the room to be decorated in pleasant colours. Otherwise it might look boring. |

Table 1. Four categories based on the pupils’ authentic texts.
and classes it is a crucial issue to take pupils’ anonymity into consideration. In view of these ethical perspectives, it was decided at an early stage to present the results as a whole and not to compare individual schools.

Comments Regarding the Method

The differences in pupil’s ages can be seen either as an advantage or a disadvantage. Valuable results for future educational opportunities have been made visible in an interview study where deaf pupils aged between 8 and 10 were asked about their communication situation in school (Preisler, Tvingstedt & Ahlström 2005). Since the design of the present study was based on the idea that every child is seen as a resource for their own learning, the different ages can be viewed as a resource for the entire study. To be asked to give a personal opinion is also a part of the learning and empowerment inherent in the action research process. To enable pupils to adapt an open-minded attitude about telling their stories, the pictures functioned as a door-opener, both in terms of text and in speech. During the short conversations, pupils’ attitudes and personal opinions contributed to establishing mutual confidence.

Information about the project was given by the teachers. There is always a risk of different interpretations of the method when more than one person is involved in communicating instructions. On the other hand, in this case the relationship between teachers and pupils has contributed to a rich supply of data. However, information can also be missed, since close relations can contribute to the non-verbalisation of obvious arguments. Even if the method did not necessarily capture every detail, the total number of the pupils’ explanations yielded an overall picture of pupils’ verbalised needs as listeners when participating in a communicative situation in school.

Pupils and their teachers affect one another continuously. Of course, when making an individual choice about environment, this will be based on common experiences. This is also true in this material since it is undoubtedly the case that the result is influenced by the socio-cultural environment. When putting all of these different arguments together, and after having analysed the data, my reflection was that, for me as an individual researcher, it would have been impossible to obtain the same amount of data using any other approach. All in all, there are sound arguments in support of the method used, and, from my own perspective, it has served its purpose in relation to the aim of the study.

To combine a research design which includes both essential closeness and critical distance is always a dilemma (Stjernström, Lund & Olin 2006). However, this dilemma was reduced thanks to the active participants and my own more passive role of collecting data. A weakness of this study could be that it focuses on listening strategies that are all, to a greater or lesser degree, successful. To take even less successful strategies into consideration would have contributed to a broader perspective.
In this study, in which many participants are involved, trustworthiness requires an extensive description of the process and, according to Kvale (1997), is dependent on the researcher's ability to interpret data and combine them with relevant theories. In an action research study with democratic validity, the voices of persons affected by the study must be heard (Anderson, Herr & Nihlen 1994). Since the results cannot be generalised, trustworthiness also includes the question of transferability, that is to say the extent to which the findings can be transferred to another context (Lincoln & Guba 2002).

Results

Three different choices of environment can be found in the pupils' texts. These environments are classrooms, smaller group rooms, and different locations in the school that are used by pupils during periods of recreation. From the explanations provided by the 165 pupils, 56% made an active choice of the classroom, whilst 44% made other choices. From these results it is possible to say that almost half the group chose a room where a hearing loop was not available since, in order to have access to the hearing loop, they had to choose a classroom.

To find out what kinds of explanations the pupils gave for their choices, the data was analysed and sorted into four categories. Table 1 provides an illustration of how the four categories and two subcategories were based on the texts. As regards the categories, each pupil had at least one explanation, several had two or three, and a few even had four.

The categories "a cleaned-up sound environment" and "conversation rules" can only be found in the written texts, while "visual support" and "comfortable surroundings" are also expressed in the pictures. In addition, it is possible to find out about the setting of pupils' hearing aids in the subcategory "the level of sound" and descriptions about the noise condition in the subcategory "the level of noise". Data from the short conversations clarified some issues that at first were uncertain and provided new information only in a few cases. The age of each pupil is put in brackets when referring to their empirical data. The term "younger pupils" is used for children aged between 6 and 11 whilst "older pupils" refers to children aged between 12 and 16.

In the following sections results are sorted in categories and subcategories and verified by means of examples of pupils' actual statements. Each category ends with some comments about the content.

A Cleaned-up Sound Environment

The Level of Sound

This subcategory concerns the pupils' setting of the hearing aid and hence the use of technical equipment. Of the total of 165 pupils who participated in the study, 58% use their hearing aid with the m-setting whilst 30% do so with the t-setting. The m/t-setting or a variation of m- and t-settings
was used by 9%, whilst 3% did not use the hearing aid at all. When participating in listening activities in a small group, it is evident that most pupils will wear the hearing aid without using the telecoil. For pupils choosing the hearing aid with the m-setting, they do so in a wider variety of environments in school.

It seems that the age of the pupil is a factor when deciding how to use the hearing aid. The younger pupils use the hearing loop more frequently, although they give few explanations for why they like to use it. The older pupils give more explanations of why they like the m-setting than why they use the t-setting. The few arguments in favour of the t-setting are due to reasons for achieving better listening:

When the sound is coming directly into the hearing aid it is easier to listen (Girl, 13).

Explanations for not using the technical equipment in the classroom relate to sound quality; “using the telecoil gives me a feeling of a strange sound” or “the sound is too loud for me” (Girl, 14 & Boy, 11). “Too loud” is sometimes connected to the conference system with the explanation that the sound is too loud for the pupil because the sound level is adjusted to the background of a person in the class who has a more pronounced hearing loss than the informant. Some statements are made about difficulties related to relying on the loop because of frequent disturbing noises. “Sometimes it is not working or there is some other problem” (Girl, 11). According to several respondents the hearing loop is not useful when sitting close to three other peers.

Some of the younger pupils advocate the use of two systems at the same time, using the conference system for listening to short comments in combination with the person in charge of the conversation using a body portable microphone. According to some older pupils, their choice is the opposite; that is to say they prefer either the conference system or the traditional system, but not both at the same time. When using both, the portable microphone will be too close to the speaker compared to the conference microphone and it demands another volume adjustment of the hearing aid. “I only like the conference system. When using the portable microphone at the same time it sounds too loud; it is hard to explain” (Boy, 14).

Reading between the lines of the written explanations and more so in face-to-face conversations, there are pupils who show a tendency of not accepting their hearing loss and consequently do not use the hearing aid at all:

My hearing is almost perfect and I hear too much, more than a hearing person, when I’m using my hearing aids. [Therefore] I don’t use them at all (Boy, 14).

I can hear everything without my hearing aids; there are only some hearing cells missing. I haven’t used my aids for two years (Girl, 15).

The choice of not using the hearing aid at all only appears in groups of older pupils.
The Level of Noise

The large number of different explanations clarify that the pupils are more dependent on a cleaned-up sound environment, and have a greater need for visual support and for conversation rules when using the hearing aids without a hearing loop. There are two aspects of the explanations about the optimal sound environment. First, there are descriptions that only show the need for silence, and secondly there are statements containing arguments about how to achieve silence. These differences might be a reflection of language development, consciousness of the pupil’s own particular needs, or a different understanding of the task.

When describing the optimal environment, the pupils frequently use words like “silence”, “calm”, “quiet”, “still”, “peaceful”, “smooth”, etc. The word calm is often used to mean there is no unnecessary movements from peers: “My choice is this group room because there aren’t any people coming and going all the time” (Girl, 11). With regard to acoustics, there are statements about arrangements to reduce noise. The older pupils made detailed descriptions of reducing noise, for example by using tablecloths, carpets on the floor, chairs with pads against the floor or chairs without any disturbing noise. Equipment such as computers, printers or rotating fans are mentioned as disturbing factors. The younger pupils often draw things without mentioning them in the text: tablecloths, curtains or special chairs. But this does not necessarily mean that they see such things as factors of individual needs.

There also are pupils who ask for background sound, such as small talk, or different sounds that make them attentive of things that happen: “I am more relaxed when I can hear small talk in the background” (Girl, 13).

Comments

In summary it appears that when using the hearing loop in a small group conversation, the preferred choice for two thirds of the pupils is for no extra technical equipment to be present in the environment. Statements about the sound from the loop being “too loud” reveal an absence of knowledge concerning adjustments. The level of the individual sound is connected to the hearing aid, not to the equipment in the classroom. Many experts are involved in determining the optimal listening environment in school for the user; the audio assistant is responsible for the hearing aid, the audio technician is responsible for the technical environment and the teacher is responsible for the learning environment. There is a risk, however, that no one takes the main responsibility for the overall listening environment for the user. Without reducing the user’s responsibility for listening strategies, the pupils’ statements reveal a gap of knowledge caused by a lack of communication.

Pupils made distinctions between background noise and background sound and the differences in this context are important and have to be clarified. They described noises as disturbing factors emanating from, for example,
printers, fans, furniture or too much movement in the room. The background sound they actually ask for, on the other hand, is more about an awareness of persons, for example whether there are other peers in the room or if other peers are talking in the classroom. This might be seen as a paradox – having a need for silence but at the same time asking for technical equipment that does not eliminate the background sound. However, the importance of getting the feeling of being present is something that demands to be taken seriously. As described by Gullacksen (2002), empowerment and coping strategies are connected to increased opportunities for participation.

Pupils choose rooms other than the classroom for several reasons, a fact which reveals that they like to use their hearing aids in a varied way. Although it is not the same as not needing the hearing loop at all, the task only related to a conversation with three other peers. In large groups where information or presentations are given via one-way communication, use of the hearing loop would provide a more relaxed listening situation.

**Visual Support**

Pupils of all ages describe the need for visual support. It is also the category where it is possible to find broadly similar explanations in several of the age categories: A seven-year old boy writes, for example, that “the choice is a round table to make sure that everybody can see each other for lip-reading” whilst a sixteen-year old boy writes that “thanks to this round table everybody can have an optimal listening and visual situation”.

According to the pictures there is a heightened consciousness about how to sit in order to achieve optimal visualisation. For a hard-of-hearing person it is important to use other senses in listening situations and her/his ability to see the speaker and use lip-reading skills is sometimes an invaluable support (Arlinger 1999, Gullacksen 2002). Nowadays, after a period of changes, the group speech situation in many classrooms is to sit around a big table. When the round table is the choice for the task, it often includes a recommendation for pupils to sit as closely to one another as possible. In the drawings one can find four persons at one end of the table. There are also comments about how to sit in order to see one another:

> We will sit straight-backed so as to be able to see one another (Girl, 9).

> The best is to sit close // it is possible to come closer to the eyes of my classmates (Boy, 10).

When using an ordinary table, the choice is to sit in two pairs opposite one another. “For the best listening we have to sit opposite one another” (Girl, 11). In the pictures the individual's position is sometimes marked out, such as, for example when three peers have to sit to the left or to the right of the pupil who had done the drawing. This can be a sign of choosing the side representing the ear with a less severe hearing loss.

Other visual artefacts often shown in the drawings are the whiteboards, as well as clocks on the wall. Even if this task focuses on a conversation, it
might provide a feeling of security to be in a room where it is possible to use a whiteboard. “On the whiteboard we can write and read what has been said” (Boy, 10). For lip-reading, lighting is an important factor. Nobody mentions light from the windows in their written texts, but there are often windows in their drawings. On the other hand, lighting from lamps is something mentioned in both the drawings and the written texts. One girl for example wrote that she needed “perfect lighting and sound” (Girl, 13).

Comments

This category is frequently described by pupils of all ages. Although an awareness concerning lip reading is commonly known, it is less well-known that this is dependent on how you decide to sit and the need for perfect lightning. It is obvious that the teacher’s way of trying out different furniture constellations and different ways of arranging listening environments sheds light on both positive and negative differences, and in most cases this leads to a greater awareness among pupils. Pupils explain that a smaller table makes it easier to come closer to one another; in addition it also makes it easier to get eye contact with the speaking person.

Conversation Rules

This category highlights the need to be aware of the unwritten social rules of communication. It also contains different vocal pitches and in some few cases, the need for sign support. It sheds light on the fact that different technical equipment contexts lead to different rules of conversation.

In a learning environment, it is not only the physical aspect but all aspects of being active as a listener that have to be considered. In the past, when using the traditional technical equipment in the classroom (see Background), the technique also functioned as a “word taker”. When someone wanted to talk she/he pressed a button and it was possible for everybody to listen via the t-setting of the hearing aid. If small-talk or comments were going on simultaneously, it was not possible for pupils using the telecoil to be aware of this. Situated knowledge of how to take part in a conversation without pressing the button was not useful. If peers were chatting without being involved in the conversation of the main group, this did not disturb the classmates. According to the teacher’s reflections on the project, the following comments describe a situation when a class had recently changed their technical system. As a consequence, the teachers and pupils realised the need for new or other rules of conversation than had previously been the case. In different ways the whole group mentioned the importance of speaking one at a time:

When one classmate is speaking the others have to listen, otherwise my ears will hurt (Boy, 7).

I don’t have to put up my hand before I start speaking. I can speak when someone else is finished (Girl, 8).
In rooms other than the classroom there are obviously fewer interruptions during the conversation. It is mentioned as important not to be interrupted. “When I am sitting in the corridor nobody interrupts my listening” (Girl, 14).

When using technical equipment, it may be difficult to be aware of the intensity of voices. Some older pupils think it is easier to find a suitable range of voice in smaller groups or in smaller rooms. There are more opinions expressed about their classmates’ voices than about their own. With a lot of background noise, they make their voices increasingly louder and it is not that easy to know when it becomes too loud for some of the classmates:

In this place I can listen. Nobody needs to raise their voice (Girl, 15).

With ordinary speech intensity it is clear to me what everybody is saying (Boy, 15).

A person can be either more or less sensitive to noises as a result of her/his hearing loss. The consequences do not only imply being more sensitive; soft sounds almost impossible for others to hear can also be perceived as noise (Arlinger 1999).

Comments

A communication situation demands that hard-of-hearing pupils invest a lot of energy into both listening and visual concentration, and might be one reason why pupils point out the need for conversation rules. If your concentration is on who is going to speak next, you can miss the opportunity to notice how each turn is taken. It might be tough to catch a voice signal, for example a change of tone, which is often the case when finishing a contribution. According to Wood, Bruner and Ross (1976), the teacher can take on the role of the scaffolding structuring expert concerning how to take part in the dialogue. But it is still a necessity to illuminate the unwritten rules of communication and maybe this is even more obvious when trying out different technical equipment. Vedeler (2004) found it typical for young hard-of-hearing children not to ask for clarification from their peers, but instead to appeal for help from adults, which has also been noted to be the case in the classroom setting (Ahlström & Preisler, 1998). The teacher is not a lifelong support in society one has to be aware of how to be a participant in everyday, out-of-school communication patterns. The scaffolding structure is only supposed to be a temporary guidance, in order to internalise new listening strategies based on what the pupils already know.

Very few pupils mentioned the need to use sign support during communication. The fact that the task focused an oral conversation might have been one reason which reduces the need to make use of sign language. Pupils who mentioned it during face-to-face conversations also actively chose peers who were able to sign.
Comfortable Surroundings

This category means that a comfortable surrounding is experienced as providing a feeling of security and is frequently mentioned in pictures and in the pupils’ texts.

“I am a better listener when I’m comfortable [sitting on the sofa]” (Boy, 10) is one of many statements that describe the meaning of this category. In this case the sofa is what makes the situation comfortable. In the pupils’ pictures and texts it can be seen that a number of artefacts are significant for creating the feeling of being comfortable or relaxed. When the pupils’ drawings contain many items intended to create a nice atmosphere, they are also mentioned in the text. Such details are most common for pupils aged between 10 and 13.

In one school investments in creating pleasant classroom environments have been made, which it is possible to discern in the drawings. The pupils also show their feeling of having an influence on their classroom environment: “We have made our classroom cosy, that’s why I like it” (Girl, 15). It is not possible, however, to say that those pupils have a greater need of being comfortable in the listening situation than other pupils, but they show a consciousness concerning such factors. They make a connection between being comfortable and being able to achieve more sustained concentration:

My choice is this place because I can concentrate when I’m sitting comfortably (Boy, 14).

The feeling of being comfortable can be a matter of details concerning furniture, such as when wooden chairs are described as being uncomfortable. The ideal is often to sit in other rooms than the classroom that have sofas or soft armchairs: “There are sofas and armchairs that make this place pleasant for me” (Girl, 13). Frequent explanations in the pictures and descriptions are about gaining a feeling of contentment from nice colours and flowers:

I prefer a lot of light and deep colours in the room, some flowers and other stuff to brighten up the atmosphere (Girl, 13).

With pupils from all schools it is possible to find explanations where the comfortable feeling can be a result of an understanding of the classroom as a familiar context with close relationships with their classmates and/or teacher:

My best listening environment is in my classroom, thanks to my classmates; they are peaceful – and I’m happy being with them (Girl, 15).

The fact that seven to eight is the average number of pupils per class should make it easier to establish closer relationships between classmates and with teachers.

Comments

The feeling of being comfortable as a result of a pleasant physical environment is not unique to pupils with a hearing loss. But the absence of
a comfortable feeling might have more significant consequences for concentration, since greater effort is required to concentrate when one sensory faculty, in this case hearing, is reduced. Substantial amounts of energy are also needed for visual concentration, not only lip-reading, but also searching for eye-contact with the people speaking round the table (Arlinger 1999, Gullacksen 2002).

Concluding Remarks

The point of departure for this study was the desire to convey pupils’ explanations and to gain an understanding of their awareness of coping with a hearing loss and being able to participate in dialogues in school. Pupils’ pictures and explanations have been seen as verbalised knowledge and experiences (Alerby 2004) as a part of their listening strategies. Within the same group it was possible to both find pupils who had multiple and often well grounded explanations, as well as those who provided a single sentence containing no explanation for their view. The different numbers and levels of explanations can be seen as a sign of a lack of open and regular discussions about environment related differences in relation to participation in dialogues. From a socio-cultural perspective (Säljö 2000, Wertsch 1998) humans are seen as mediating resources. In this case the resources related to having a hearing loss are to be found within the group of pupils themselves. In accordance with the Swedish National Curriculum (National Agency of Education 1994), there are ambitions to view pupils as resources, although the traditional approach has been to see the teachers as the person having most of the resources.

Not every pupil in this study has a verbalised awareness of her/his hearing loss, but in each group and among all ages there were pupils who had a clear understanding of her/his best listening environment. This means that, as a community, they have an accumulation of experiences and knowledge to be shared. A school situation where listening strategies are neither verbalised nor communicated by the individual is far from having shared knowledge within a community of practice. To select and use the best listening environment when working in a group of four is not a question that concerns the needs of one individual, but of four. For the individual, there will always be something more to learn about than simply how to cope with the hearing loss (Lazarus & Folkman 1991).

From an educational perspective, it is of interest to obtain knowledge about whether and in which circumstances pupils use additional technical equipment instead of just their individual hearing aid. In several evaluation reports describing how to create prerequisite conditions for learning dialogues, teachers appear to have as their starting point the need to plan for all pupils to have access to the hearing loop (see www.dialogprojektet.se). When pupils themselves can try out different possibilities and can make choices that best suit their own particular experienced hearing loss, it is also positive for their self-image. Older students provide many statements concerning increased options for being flexible and not being limited because
of the hearing loss and the use of a hearing loop (Wennergren 2004). In a similar vein Odelius and Johansson (2007) found in a study of 15 pupils that pupils had a strong preference for the m-setting on the hearing aid. As the amount of explanations show, it also demands a higher degree of consciousness and more detailed knowledge about individual needs connected to the hearing loss. Since classroom communication has, traditionally, meant listening via the hearing loop, the needs for listening in other circumstances may not have been seen as valuable knowledge in school. On the other hand, communicative situations outside school are mostly managed using an m-setting on the hearing aid and this provides an important argument for learning how to handle different communication situations.

The study has shown that there are older pupils who do not accept their hearing loss, and even if that is not surprising, this is harder to explain when bearing in mind that the norm in the social practices focused upon in the study is that pupils are in need of technical equipment. It might be a signal of power, i.e. the norm in society is more powerful than the norm in school. Pupils in this context are continually going back and forth between the norm in school and the norm in wider society. If it is difficult openly to communicate different needs in school this might imply that it is equally difficult to communicate in practices outside school. On the basis of this result, it would be valuable for the culture of each school if teachers and headteachers discuss ways in which change towards a more open-minded attitude could be achieved. Why not, for example, let pupils systematically act as resources for communicating different listening strategies, since all of the pupils find themselves in a similar situation? Such a strategy would provide a unique educational opportunity for peer learning (see Williams 2001) as all pupils have an abundance of experiences of successful and less successful strategies, if only they are asked to describe them.

None of the strategies mentioned by pupils in this study are by any means new to professionals working with rehabilitation (Gullacksen 2002). The development and learning of new strategies is contextually situated and therefore hard to prepare. Teachers’ attitudes and perspectives are important factors since it is important that they do not usurp the pupils’ own responsibility. It does not support the individual if the teacher is the only person who can control the different prerequisites for pupils who assume the role of listeners.

According to Atterström (1995), dialogue competence for people with different kinds of communicative difficulties can be regarded as role competence, interpretation competence and message competence. Transformed into the context of the current study, role competence can be understood as knowledge of different needs and strategies to be able to take the role of listener. Interpretation competence can be understood as awareness of how to contribute to a meaning-making context. Finally, message competence touches on the meaning of the category, conversation rules and can be understood as knowledge about how to participate in a dialogue and to be a giver and recipient of the content of a mutual exchange. There are three levels
of message, the content (what), the relation (how it is said) and timing (when it is said). Combined with a hearing loss, Gullacksen (2002) points out that such competences are less robust and have to be developed with greater effort in comparison to hearing pupils in the same situation. According to the results of the present study, none of those competences can be put into practice without role competence concerning individual needs for taking an active part in the learning dialogue.

When placing the results in the light of self-image and identity, there will always be a question of accepting the hearing loss before one can develop knowledge about how to participate in communication. At the same time, expectations about participation in meaning-making processes with peers are also of great value to the pupil’s self-image. Thus, one might ask what the consequences might be, if the limitations related to the hearing loss form the central focus. There is always a risk of difficulties if the hearing loss infringes too greatly upon the self-image. All attention focuses on the identity of being hard-of-hearing and the person herself/himself can become more or less invisible (Gullacksen 2002). When a learning dialogue can provide ownership of meaning and does not require a choice between meaningful identity and learning, it will also engage the individual’s identity (Wenger 1998). To hear what is said does not necessarily mean to understand, and to create meaning and coherence in an utterance is difficult when only part of it is heard (cf. Preisler, Tvingstedt & Ahlström 2005).

During the process of change to promote a more dialogue-orientated classroom environment, initial questions lead to subsequent ones, such as, for example, how the question about the pupil’s listening strategies was expressed. The different levels of awareness have revealed that pupils have to be asked and to learn, in order to be aware of listening strategies. According to the different activities in the action research process, the teachers, pupils and the researcher have been through a learning process by conducting this project together. All of those involved have learned about needs and strategies in the school environment and thereby acquired knowledge about how to create more optimal conditions by the active solicitation of pupils’ opinions. To be asked is one way to make strategies explicit at a conscious level, but it might also be a way of trying to put words on more unconscious strategies. Since not every pupil in this study works actively to overcome problems, it implies a potential to develop both knowledge and strategies. In this socio-cultural context, self-image and individual growth can be increased towards a more multi-voiced perception.

Note

1 Hearing aids are personal aids that can have three different settings (m, t and m/t).

- Microphone (m)-setting: The microphone of the hearing aid picks up and amplifies the sound (speech and background sound).
• **Telecoil (t)-setting**: A hearing loop is used to amplify and transmit to the hearing aid what pupils close to the desk microphone are saying; the background noise is cut off.

• **Microphone/telecoil (m/t)-setting**: The microphone and the hearing loop amplify and transmit the sound at the same time. Very few pupils have this setting on their hearing aid.

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