# Language, Identity and Technologies in Classrooms for the Differently-Abled

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## Abstract

This paper reports upon some of the overarching findings from project CIT at the CCD research network based environment in Sweden. It highlights the ways in which individuals and institutions both use and also account for the roles that technologies, particularly hearing-technologies (like sound amplifying technologies, outer ear hearing aids, cochlear implants, bone anchored hearing aids etc.), play in disabling and enabling access for participation in societal arenas generally and learning in mainstream and segregated school settings particularly. Taking both a sociocultural oriented perspective and a decolonial framework on communication, identity positions and use-of-technologies, the study presented in this paper focuses ethnographically framed analysis of data that critically explores the role that different types of technologies play in the lives of individuals who are deaf. Some previous and ongoing analysis of data from a mainstream school where a blind child is a member is also drawn upon for contrastive purposes (JC project). Data and relevant findings from the following parallel Deaf Studies projects at CCD are also drawn upon: RGD project, SS project and LISA-21 project.

**Keywords:** Sign language; Hearing-technologies; Cochlear implants; Visually-oriented; Decoloniality

## Introduction

Communication and identity as a dimension of everyday life across time and space in Sweden is explored through the analysis of the following specific datasets: (i) archival data composed of journals of three prominent NGOs in the Deaf-Hearing World since the end of the 1800s in Sweden, (ii) video-recordings of everyday life at mainstream primary school settings where one pupil has CIs and where Swedish Sign Language (SSL), is used in addition to Swedish, (iii) ethnographic data, including video-recordings from segregated schools for the deaf (primary, secondary and upper-secondary classrooms), and (iv) ethnographic data, including video-recordings from mainstream schools where one pupil is blind. The findings are presented under the following seven themes: (1) the technologically framed lives of members in the deaf-hearing world and interest that its members display for hearing-technologies across time, (2) shifts in communication ideologies across time for deaf pupils with and without CIs, (3) school placement patterns of deaf pupils with or without CIs across time, (4) range of technologies in classrooms where differently-abled pupils are members, (5) communicative strategies in mainstream classrooms where differently-abled pupils are members, (6) handling hearing-technologies in mainstream classroom settings where one pupil has CIs, and (7) role of resource persons attached to differently-abled pupils in mainstream settings.

Going beyond single project reporting, this study highlights the relevance of ethnographic analyses for revisiting the ways in which identity positions get signed-talked-and-written-into-being, framed in and through social practices. We call attention to the participatory patterns that emerge in technologically-rich mainstream classroom settings where differently-abled pupils are members as well as the work that institutions and its members do to mainstream differently-abled pupils in the 21st century.

In addition to making available new perspectives on issues related to "communication dis/orders" and "hearing dis/abilities", our study also highlights the need to privilege analysis of mundane human interaction as well as archive materials in order to understand the role of tools in social activities across time and space. It furthermore contributes to the young multidisciplinary field of Deaf Studies with a new empirical focus in the Educational Sciences, where a specific interest relates to dimensions of marginalization processes in a broad sense.

This paper reports upon some of the overarching findings from primarily project CIT at the CCD network based research environment in Sweden. It highlights the ways in which individuals and institutions both use and also account for the roles that technologies, particularly hearing-technologies (like sound amplifying technologies, outer ear hearing aids, cochlear implants, bone anchored hearing aids etc.), play in disabling and enabling access for participation in societal arenas generally and learning in mainstream and segregated school settings particularly. Data and relevant findings from the following parallel projects at CCD are also drawn upon: RGD project, SS project, LISA-21 project and JC project. The parallel projects address questions related to language, technology-use, and identity positions in the lives of adults and children inside and outside of mainstream and segregated institutional school settings. Our work examines how technologies are handled in mainstream (and to some extent in segregated) classrooms, how these both create opportunities but also

present barriers in the everyday lives of "differently-abled" [1] pupils like those with the surgically implanted hearing aid cochlear implant (henceforth CI), deaf pupils who do not have CIs, blind pupils, etc., and how adults enable/disable participation and specific identity positions in mainstream and segregated settings. In other words, issues related to access that pupils like those with CIs have to classroom communication, the range of ways in which adults facilitate or curtail that access, and the types and everyday role of technology in the classroom are of interest. Finally, the study presented here highlights the implications of the use of hearing-technologies for the emergence of language ideologies and the construction of pupil identities in institutional settings.

There is mounting evidence that CIs do not give deaf children access to hearing classrooms and curriculum: "Despite high expectations, CIs have not proved to be a uniform solution to the academic challenges of students who are deaf over the long term" [2]. Furthermore, there is also a gap in knowledge about the nature of technologies and how these are used/not used in mainstream settings and how this enables/disables participation of pupils with CIs. The majority of parents of deaf pupils in the geopolitical spaces of Sweden choose to send their implanted children to mainstream schools (at least initially) rather than, as was the situation until the turn of the century, to one of the five segregated deaf schools in the country. This constitutes a major shift in school placement for deaf children in Sweden [3]; see also Technology framed lives in DH worlds and patterns of communication and interaction in school settings where differently-abled children are members). A result of the near total-population CI implantations is that increasingly, mainstream schools serve pupils whose hearing loss requires special adaptation of both classrooms and teaching strategies. This has raised significant challenges and issues in these settings [4]. Depending on the situation, the use of Swedish Sign Language (henceforth SSL) may be complemented by or replaced entirely with oral communication. This in turn shapes what is normatively understood in terms of mainstreaming, inclusion and exclusion, including the role of language and communication in learning and instruction.

The central aim of the study presented here, thus, is to examine the types of technologies used, the communicative strategies that get played out in mainstream and segregated classrooms, the identity positions offered and that get taken up by pupils who use CIs in classrooms together with hearing pupils, the interaction order in the classrooms and the roles that adults (teachers and assistants or resource-persons) play in these settings. Such a broad aim is significant given the near-total population implantation of very young children in nation-states like Sweden and the continuing gap in knowledge about the situation of these children in mainstream schools. The analysis we present in section "Technology framed lives in DH worlds and patterns of communication and interaction in school settings where differently-abled children are members" below builds upon dimensions of social interaction that we have previously referred to as "visually-oriented" [5]. In comparison to visual communication or auditory communication, visual-orientation (or visually-oriented) specifically gives prominence to the following dimensions of interaction

- use of the signing modality,
- deployment of the written-textual modality and
- use of the auditory modality and/or its resources.

The present study is empirically focused and builds upon sociocultural perspectives and decolonial frameworks where an ethnographic approach to fieldwork has been employed.

Going beyond a visual communicative or an auditory communicative ideological position we have argued in our previous work (from different empirically pushed projects), that a visually-oriented communicative perspective attends to the ways in which human beings – deaf and hearing – interact in different settings. Furthermore, giving recognition to the hearing-deaf symbiosis inside and outside school settings, we have more recently argued for the need to discuss the "Deaf World" more appropriately in terms of "Deaf-Hearing World" (henceforth DH world or worlds; 6,7). The mainstream settings as well as the segregated school settings for the deaf that we focus upon here constitute examples of the DH world. Deaf and hearing human beings are part of these settings.

The next section discusses the theoretical framework as well as the rationale for ethnographic studies of DH world spaces that has guided our analysis. Parameters of our primary data from CIT project as well as some of the other projects are presented in section "On datasets and schools". The main analytical section that follows highlights the salient findings under seven themes. Here we underscore the need for studying social life in situ (rather than narratives about social life or technological tools like hearing aids or CI independent of how their usage shapes peoples' lives in learning settings). This analytical section presents the main findings, highlighting the tools used and the technologically mediated communicative strategies of adults and children in a range of learning settings inside and outside classrooms where one pupil is differently-abled. The final section of this study discusses the findings in light of the central aim and the datasets explored. Directions for future research are presented.

## Theoretical-Methodological Framings and Previous Research

Taking both a socioculturally oriented perspective and a decolonial framework on communication, identity positions and use-of-technologies, the study presented in this paper focuses ethnographically framed analysis of data that critically explores the role that different types of technologies, and particularly hearing-technologies, play in the lives of individuals who are deaf.

A sociocultural framing highlights the significance of human action, where language-use is closely intertwined with use of tools [6-8]. Language here is also understood as humankinds' most central (intellectual) tool. Thus social interaction is acknowledged as fundamental for ontological development, social networking, and learning; language-use is a fundamental aspect of everyday life both inside and outside institutional settings (like schools, workplaces, health care, etc.). This framework recognizes that children as well as adults in novice positions are capable of understanding or achieving more in collaborative situations than they can achieve on their own. Their abilities are situated and distributed and it is in interactions with other peers (children) or adults who are more experienced in different dimensions (use of tools, use of language, subject-content, etc.) that novices can perform in ways that they cannot on their own. This fundamental proposition has been extended by scholars like Wertsch and Säljö [9,10] who highlight the role of cultural tools for mediating reality through actions. Thus inter-actions and use of tools socialize novices into different ways-of-being [11]: children or adult novices' engagement with cultural tools (including the intellectual tool of language) makes available a "natural link between action [...] and the cultural, institutional, and historical context in which action occurs. This is so because the mediational means, or cultural tools, are inherently situated culturally, institutionally, and historically [9]. In

other words, learning = socialization wherein it is the appropriation of cultural tools in situ that makes us human. Formulated differently, learning, thinking and cognition itself is the result of our participation in social practices and knowledge development is contingent upon participation rather than the transfer of pre-packaged information units between individuals.

Here studying teacher lead instruction as well as pupil-pupil interaction in everyday life in classrooms is significant. Pupil-pupil "private" exchange of comments, gestures, glances, chat, etc. during whole class teaching is increasingly recognized as an important aspect of pupils development and socialization [12,13]. Our work thus contributes also to a growing body of research that complements research on teacher-lead classroom interaction.

The key aim of CI surgeries on deaf children is to enable their participation in spoken communication both inside as well as outside school settings [14,15]. In addition to training oral language skills, there is growing recognition for making language varieties such as SSL (or other forms of communication, for example signed supported speech) available in classroom settings to support deaf children with CI's participation in mainstream settings [2,14]. More recent classroom interactional research indicates that many pupils with CIs use special support, for example interpreters or specialist teachers, as a means to participate in everyday communication and instructional activities (see e.g. Punch and Hyde 2010). More recent studies indicate that deaf pupils with CIs who have access to different types of communication deploy these to varying degrees and this is often related to the communication capabilities of the other members of the classroom settings [15,16].

In contrast to the literature on the communication of children (and adults) with CIs in educational settings that primarily builds on reported data, our recent work as well as this study, focuses both issues of participation and the ways in which children with CIs' identity positions are enabled/disabled in everyday interaction. Furthermore, a performatory dimension of a sociocultural position highlights the need to go beyond seeing identity as being essentialistic, fixed or static. Participation in social actions are the context in which identity is nested. It gets created relationally and is constituted of multiple layers of possible identifications that get played out within the framings of mundane interactions (rather than being made up of an authentic core). None of these identity-positions is more fundamental than any others. They are negotiated in everyday life and thus are co-constituted in different contexts. This frames our interest in the identity-positions that technologies, including the technology of CI, enables or disables in social actions in school settings.

Recent scholarship related to CI has also focused identity issues. Some discussions in this area highlight the DH worlds initial skepticism towards CI hearing-technologies in terms of a threat to deaf identity and deaf or visually-oriented ways of living and being: "Implantation was viewed as a process of invading a healthy body and creating an artificial modification when one could easily be happy following a culturally Deaf way of life" [17,18]. However, several recent studies have also shown that people who have chosen implantation surgery position themselves in terms of context specificity rather than in terms of an either-or dichotomy, i.e. "hearing" or "deaf" [17,18]. Children with CI "can and do often have a clear identity and can shift between identity categorizations as the situation demands" [17]. Our work, including the study presented here, does not focus upon narratively based identity positions that are reported by deaf pupils with CI or how their care-takers or teachers view them. Instead we are interested in contributing to the literature on identity-positions from socioculturally pushed performatory framings. Thus, our aim here is to throw light upon how different technologies (including hearing-technologies) interactionally frame membership positions in a range of settings.

In addition, underlying language ideologies in classrooms shape the identity positions that pupils with CIs are afforded in mundane interaction. Irvine [19] frames language ideologies as a "cultural system of ideas about social and linguistic relationships, together with their loading of moral and political interests" (1989:255), while Kroskrity [20] discusses it as an inquiry into the presumed link between local language-use and broader historical and institutional practices, values, and interests. These issues are related to decolonial perspectives in that power differentials in social practices are center-staged empirically [21-24]. Decoloniality highlights a new reflexivity where a Boundary-Turn in the domains of language and identity is seen as significant and includes the need to engage in empirically framed research [25,26]. Such framings are important for throwing light on how technologies dis/empower the differently-abled in classroom settings where ideological ideas have dominated the field across time. Sociocultural and decolonial theoretical positions thus complement our analysis in this study.

Following these explications, we understand language ideologies as emerging from overarching social practices rather than being restricted to language alone. As soon as people engage in language-use, they formulate their understandings of the nature of language and of what counts as normal communication: of good, normative, improper, or bad undesirable language-use. In other words, a theory of language ideology augmented with decolonial framings goes beyond discourses about language itself to include the interactions and linguistic practices where ideas are enacted [27,28] and power differentials get played-out [6,22-25]. Using a semiotic system in a community of practice, discussing language varieties, or commenting on linguistic norms often means more than just elaborating on structural patterns in a linguistic system. A theory of language ideologies, augmented by decoloniality and a sociocultural perspective on communication thus highlights the intersections between language and identity, language and morality, and language and normality [29-36].

Irvine and Gal [37] distinguish three important semiotic processes in linguistic differentiation that are also significant for present purposes: iconization, fractal recursivity and erasure. Iconization highlights the relationship between linguistic features and the representations they can (re)create. Fractal recursivity points to contradictions evident at any level in the relationship which also has a bearing at other levels. Erasure highlights processes where identity-positions or subtle mundane actions or a linguistic variety are ignored or made invisible. This last semiotic process of erasure, is of particular interest in our analysis: erasure highlights that "[f]acts that are inconsistent with the ideological scheme either go unnoticed or get explained away. So, for example, a social group or a language may be imagined as homogenous, its internal variation disregarded. Because a linguistic ideology is a totalizing vision, elements that do not fit its interpretative structure - that cannot be seen to fit - must be either ignored or transformed" [37]. Issues vis-à-vis erasure are significantly related to decolonial framings that make visible power dimensions. Our work contributes to decolonial scholarship through its analytically framed methodological focus where social interactions and performances of individuals in situ are privileged.

Ideas related to standard language varieties can serve as an example of how the social construction of a "standard language" often get treated as if they are empirical linguistic facts [36]. This can be understood as part of the mythical "Eurocentric" normativity of the one-language-one-nation ideology [30,38,39] or a "double monolingualism norm" according to which, "persons who command two languages will at any given time use one and only one language, and they use each of their languages in a way that does not in principle differ from the way monolinguals use the same language" [40,41]. The idea of language separation is also discussed in more recent literature on deaf education in the Deaf Studies domain. Our previous work is relevant in this respect since it describes how the language ideologies of researchers and deaf schools in Sweden have, since the mid-1990s upheld the normative stance of keeping Swedish language and SSL apart in teaching deaf pupils; and both historically and internationally deaf pupils education has been framed by a monolingual philosophy where the use of oral language has dominated [38,42-44] The multilayered theoretical framework employed thus highlights the need and relevance of studying both (i) social practices, i.e. setting's where differently-abled pupils (like children with or without CI) are members in mainstream and segregated classrooms as well as (ii) historical data in order to throw light upon shifts with regards to usage, ideologies and understandings vis-à-vis language and identities as well as technologies and their deployment across time.

## On Datasets and Schools

Communication and identity as dimensions of everyday life across time in the geopolitical spaces of Sweden are explored in the present study through the analysis of the following specific datasets: (i) archival data composed of journals of three prominent NGOs in the DH world since the end of the 1800s in Sweden, (ii) video-recordings of everyday life at mainstream primary school settings where one pupil has CIs and where SSL, is used in addition to Swedish, (iii) ethnographic data, including video-recordings from segregated schools for the deaf (primary, secondary and upper-secondary classrooms), and (iv) ethnographic data, including video-recordings from mainstream schools where one pupil is blind.

As highlighted in the introduction, the data has been created in project CIT through an ethnographic approach, and consists of two different types of materials: a) archival data for the years 1890-2014 from periodicals published by three Swedish NGO's (one deaf NGO and two parents' NGO's), and b) ethnographic field work at two mainstream schools, located in different parts of Sweden. The data from phase one in project CIT consisted of about 2000 articles, field notes from participant observations, approximately 25 hours of video-recorded material, and digital images from daily life in the project classrooms [45]. During phase two in project CIT, all the periodicals since 1890 have been digitalized and are accessible for systematic analysis. Furthermore, during phase two, the analysis of phase one data has been augmented (primarily for contrastive purposes) through data from parallel projects at CCD. This consists, for instance, of case studies of deaf children without CI and of a blind pupil across time.

Ethical approval from the Swedish Regional Ethics Board allowed for identifying and accessing schools where pupils with CIs were enrolled.[1] The pupils in project CIT attend ower-middle classes – here identified as classrooms A and B – and are in the age range of 7-11. Each class consisted of 10 to15 hearing pupils, one pupil with bilateral CIs, a teacher, and one or two resource persons (henceforth RPs).[2] The size and layout of these classrooms are similar to classrooms at segregated deaf schools in Sweden [5,38,42]. Both are rich in different types of technologies (see section "Technology framed lives in DH worlds and patterns of communication and interaction in school settings where differently-abled children are members") and have tables and chairs arranged in a U-formation, allowing visual access to other members directly. However, in contrast to learning environments in the segregated settings, classrooms A and B were adapted acoustically with teacher microphones, pupil microphones, special furniture, i.e., chairs with sound-absorbing pads, etc. The pupils with CIs, Ella (school A) and Maja (school B),[3] received their first CIs before turning three years.[4] According to the teachers, neither Ella nor Maja had any additional disabilities and their current academic progress was satisfactory. Ella's and Maja's families and the RPs in the schools use oral communication. They also sign while communicating with the girls. All the other pupils and the teachers use only oral communication with Ella and Maja. The video data in project CIT suggests that the girls themselves primarily use oral Swedish to communicate with others. They sign primarily when they are in direct contact with their RPs during instructional activities or oral communication with others in the classrooms (see section Technology framed lives in DH worlds and patterns of communication and interaction in school settings where differently-abled children are members).[5]

The RPs have studied SSL and have taken some courses in pedagogy, but they are neither teachers, special teachers nor interpreters.[6] The RPs are employed to support the pupils with CIs during the school day.

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[1] Despite the implantation of almost all deaf infants, since the turn of the century, no national registry exists on the exact numbers or school placements of children with CIs in Sweden. The project schools and classrooms were recruited after a long-drawn and systematic search with support from the National Agency for Special Needs Education and Schools (SPSM) and the parent's association Swedish National Association for Deaf, Hearing-Impaired and language-Impaired children (DHB) – both of which we have long-standing collaboration with. More information regarding the identification and selection of the cases is available in Holmström (2013).

[2] The number of pupils in classes in Swedish schools differs. Small village schools have small class sizes, 12-15, but in cities, the classes can consist of about 30 pupils. The project classes had fewer pupils on account of the presence of pupils with CIs in them.

[3] The pupils' names used in this study are pseudonyms.

[4] Given the specific aims in project CIT, biometric data on these pupils has not been explicitly elicited. However, information from parents and teachers indicate that both pupils received their first implants when they were two-three years old. Ella is reported to have received her second implant at age five. She receives a new implant at age seven, when her first implant malfunctions.

[5] In addition, they occasionally signed some words to the project CIT researcher or interpreters.

[6] Certified interpreters in Sweden work in order to interpret between two languages. Their role is to interpret, not to support participants or get involved in the everyday ongoing activities. Interpreters are routinely deployed in the education of older pupils (13-14 years and above). RPs appear to be preferred in the primary and lower-middle school years where they can provide a range of support in addition to interpreting.

Such support includes: visual mediation of oral communication through the use of SSL or by mouthing (i.e. enabling lip-reading), checking that the hearing technologies are functioning, giving the pupils with CIs additional explanations orally etc. While the teachers plan the lessons, they occasionally schedule meetings with RPs to discuss the teaching and especially the situation of pupils with CIs. While the teachers in classrooms A and B have a teaching degree, Ella and Maja are the first pupils with a hearing loss that they have encountered in their professional lives.[7]

The other four projects from which data are drawn upon in order to highlight specific issues are, as has been mentioned above, also ethnographically framed. The SS project, the LISA-21 project as well as the RGD project focus classroom ethnographies at segregated primary grades of three of the five compulsory segregated schools for the deaf in Sweden during the early part of the 21st century, one secondary grade at one of the five compulsory segregated schools for the deaf at the end of the first decade of the 21st century and upper-secondary grades of four programs at two national upper-secondary schools for the deaf during the late 1990s respectively. Teachers of the deaf (henceforth ToDs) at the compulsory segregated schools have formal teacher education degrees, SSL training as well as university education for working with deaf pupils. ToDs working at the upper-secondary schools are often qualified teachers who may not always have SSL training and/or special education certificates for working with deaf pupils. SSL interpreters work alongside some teachers at upper-secondary segregated settings for the deaf. RPs are commonly engaged in providing support in segregated deaf school settings. They are often deaf and are experienced users of SSL.

The JC project data drawn upon for contrastive purposes in this study consists of school ethnographic data from a grade 7 class where a blind child is a pupil. Only data from the early part of the 21st century in project JC is drawn upon here. The teacher in this setting, similar to the teachers in project CIT classrooms, has a regular teacher education degree and the RP in this classroom is an adult whose role is to support Jonny who was born without eyes. There are 19 pupils in this classroom and Jonny has access to his own braille reading machine at his desk. Ethical approval from schools, pupils and the parents were obtained in each project before fieldwork was started. An important dimension of the datasets from all the projects is the salient presence of technologies and tools that are in place in these school settings.

## Technology Framed Lives in DH Worlds and Patterns of Communication and Interaction in School Settings where Differently-abled Children are Members

The analysis of the multilayered datasets has given rise to the following interactional patterns and/or themes: (1) the technologically framed lives of members in the DH world and the interest its members display for hearing-technologies across time, (2) shifts in communication ideologies across time for deaf pupils with and without CIs, (3) school placement patterns of deaf pupils with or without CIs in different school settings across time, (4) the range of technologies in classrooms where differently-abled pupils are members, (5) communicative strategies in mainstream classroom settings where differently-abled pupils are members, (6) handling hearing-technologies in mainstream classroom settings where one pupil has

CIs, and (7) role of RPs attached to differently-abled pupils in mainstream settings, for instance children with CIs or blind pupils. The analysis of the archival data has generated themes 1-3 and the analysis of classroom data themes 4-7. These themes both complement but also in important ways reinforce previous findings from some of our parallel projects at CCD.

## The technologically framed lives of members in DH worlds and the interest its members display for hearing-technologies across time

The sociohistorical analysis of archival data from the three NGO's in our dataset highlights that there has always existed a prominent interest on the theme technologies in the DH world [45]. Approximately 40 percent of the data from the deaf NGO periodical, SDR, focuses on technologies of different kinds. Four subcategories of technologies emerge in the analysis: i) audiologically-oriented technologies (including hearing-technologies), ii) visually-oriented technologies, iii) tactile-oriented technologies, and iv) "other"-technologies. The fourth group of technologies include experimental medical technologies, genetically-related technologies, "signal" dogs, etc. Data from the deaf NGO periodical also illustrates that the DH world not only have been and are explicitly interested in different technologies, but that they also appear to appropriate them earlier than the hearing citizenship in the nation-state of Sweden. For example, articles discuss television technologies in the periodicals in the early 1950s. This is six years before regular television broadcasts commence in Sweden (see e.g. SDR 9/1950). Other examples in the data from the early 1980s include articles on multimedia and information technology, themes that are not discussed in the Swedish society at large at that time. One article in SDR (18/1982), interestingly suggests that computer terminals would find their ways into every household in Sweden in the near future.

Although the analysis highlights that visually-oriented technologies, such as television, text-telephones, information technologies, visual door alarms, etc. were in focus and discussed in the periodicals, audiologically-oriented technologies were also discussed. Hearing-technologies such as hearing aids, microphones and CIs are focused. This dataset suggests that the DH world is curious and interested in hearing-technologies. However, this initial interest wanes across time and seems to be related to a power differential wherein the dominant normalizing discourse in society takes hearing-technologies for granted in terms of the primary means for participation. In other words, the audiologically deaf members of the DH world shy away from these hearing-technologies when they are expected to or forced to accept new technology-mediated opportunities to hear and participate in oral communication. The flip-side of this expectation is that both SSL and a deaf identity-position are required to be ignored. A dichotomy arises here since hearing-technologies focus on what is dysfunctional and represent a "reparative" perspective (compare with "compensatory" perspective, see below) where, in addition to deafness, culturally deaf-ways-of-being are considered defective and in need of being repaired. Members of the DH world display an interest in technologies that further visually-oriented and tactile-oriented ways-of-being i.e. via senses that are intact. This displays an active interest in alternative technologies that "compensate" for hearing losses. These

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[7]    Teachers in classrooms that receive or have pupils with CIs are provided information, both prior to the arrival of the pupils and during the course of the school year. They are offered in-service training on areas such as audiology and hearing loss from SPSM and from special education advisors.

two – a reparative and a compensatory perspective – in general collide particularly during the 1990s when CI surgeries are initiated for children in the nation-state of Sweden. Many members of the DH world experience the focus on hearing-technologies at this point in time as oppression and in terms of the re-emergence of normality thinking (Figure 1).



**Figure 1:** Example of DH world challenge to a power differential expressed through CI implantation of children in the 1990s: "Save Deaf Children" (SDR 2/1996).

### Shifts in communication ideologies across time for deaf pupils with and without CIs

The first theme identified in our analysis highlights the highly technologically framed lives of members in the DH world and how tools and strategies both facilitate but also obscure participation possibilities. This, as we will see in the analysis presented under themes 4, 5 and 6, also gets mapped in classroom settings where differently-abled pupils are members. This second theme emerges from the analysis of our archival dataset and highlights shifts in language ideologies across time in deaf education. This entails focusing upon expressions of language ideologies and norms in the three NGO periodicals. The language ideologies identified are, like the theme 1 above, framed by audiologically-oriented and visually-oriented thinking, and the dichotomy between the two perspectives on deafness and hearing-technologies. Similar shifts in language ideologies have also been focused upon and have been reported in previous projects at CCD [46-48].

The analysis shows both similarities and differences in dominating language ideologies across the 20th century. A prominent recurring theme in the periodicals is how SSL's role gets framed for deaf pupils in school settings. An example that illustrates an expression of language ideology from the early part of the 20th century can be noted in the following quote:

In order to achieve true happiness, the deaf-mute must learn the language of the community in which he lives. Then it is said: teach him both the normal language and the language of gesture. However, if the deaf-mute learns normal language so well that it really breaks his isolation, he must learn to think in it. This is largely hampered; in fact, given the short time available to teach him, it is impossible if the deaf-mute should be taught in both the language of gesture and the normal language. These two languages are, in their structure and their entire character, so different from one another that any combined effort between them to achieve a common goal, to create the possibility for the deaf-mute to enter into communication with the community in which he has to live, and assimilating what the cultural currents have to offer, cannot be realized (SDR 1/1923).[8]

Here, one language receives a higher status as compared to the other. This is apparent from the names attached to the languages: SSL is called the "language of gesture" and Swedish is called the "normal language." This indicates the presence of a norm that should be pursued. Proponents of this norm argue in the 1920s, that pupils have insufficient time to learn both language varieties. Moreover, we can see that the author of this specific article expresses an idea of a double monolingual norm, where language varieties are in need of being kept apart. The author argues that the striking differences between the language structures and characters of SSL and Swedish implies that they cannot together achieve the goal of helping deaf pupils become members of the larger society once they have graduated from school. Here, issues related to identity positioning are also significant: deaf individuals are expected to adapt to a hearing norm and learn to interact with the majority language and the "normal" hearing citizenship. This idea resonates with society's audiologically-oriented technological focus illustrated above under theme 1. A similar view regarding language-use can be noted in the 1950s. For example, in SDR 12/1953, a school principal advocates that oral speech should be used primarily for teaching, and in SDR 3/1957, a deaf writer expresses concern over the fact that "sign language" (Swedish original: teckenspråk) is not permitted in the teaching in schools.

Interestingly, two decades later, in the 1970s, the language ideology shifts and an idea of mixing different communication methods emerges.

Many educators and researchers believe that to speak and use signs simultaneously constitutes the best method in deaf education. It is also the method that the Swedish National Association of the Deaf (SDR) has been advocating for a long time (SDR 18/1973).[9]

Here, arguments are offered suggesting that it is best to talk and sign simultaneously. The national deaf association SDR, at that time, endorses the views of educators and researchers and regards this as "the best method" for providing deaf people with the most adequate

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8    Swedish original (we have done all the translations): Alltså, för att uppnå verklig lycka behöver den dövstumme lära sig språket I det samhälle, vari han lever. Då säges det: lär honom både normalspråket och åtbördsspråket. Skall den dövstumme lära sig normalspråket riktigt, så att det verkligen bryter hans isolering, så måsta han lära sig att tänka i det. Detta försvåras i hög grad, ja med hänsyn till den korta undervisningstid, som står till buds, omöjliggöres det, om den dövstumme samtidigt skall undervisas i både åtbörds- och normalspråket. Dessa båda språk äro till sin byggnad, till hela sin karaktär varandra så olika, att något samarbete dem emellan till uppnående av ett gemensamt mål, möjligheten för den dövstumme att träda i förbindelse med det samhälle, där han har att leva, att tillgodogöra sig vad tidens kulturella strömningar har att bjuda på, icke kan komma till stånd.

9    Swedish original: Tala och göra tecken samtidigt är den bästa metoden i dövundervisningen, anser många pedagoger och forskare. Det är även den metod som Sveriges dövas riksförbund (SDR) förespråkar sedan länge.

opportunities for communication and participation in society at large. This idea marks a shift away from the earlier decades monolingual (oral) norm to the use of different language varieties together (albeit in complex ways) for providing deaf pupils with a good education. Such an idea can be related to what has more recently been termed as polylingual thinking.[10] However, later during the 1970s, this polylingual complex use of languages position starts getting replaced by yet another norm. Now SSL receives a key role in the instruction of deaf pupils. For example, in SDR 4/1978, the deaf organization wants deaf schools to not only take responsibility for its pupils as far as the learning of Swedish language is concerned, but it advocates the use of "sign language" and wishes it to be treated with the same respect as Swedish language. Thus "full bilingualism" becomes a clear goal. This struggle to give SSL an equal status to Swedish in schools goes on to give Sweden's deaf schools a new curriculum in 1983. This curriculum explicitly states that the deaf school should be bilingual, with both "sign language" and Swedish as the languages of instruction [38,49,50]. For deaf pupils, Swedish language is highlighted in terms of both a written as well as an oral language while "sign language" is regarded as the pupil's "primary" tool for acquiring knowledge.

The analysis of the archival dataset supports our earlier analysis in previous projects and highlights the next shift in language ideologies during the 1990s. Now a further discussion on the role and place of oral communication in the curriculum can be noted. An increasing number of hard-of-hearing pupils start attending deaf schools and receive instruction in oral Swedish with the help of hearing-technologies during this phase. The bilingual school, in which SSL had a strong position, had by then been in existence for a decade. The 1998 report by the national FUNKIS[11] committee also suggests that oral Swedish should be a language of instruction in the deaf school for those who can benefit from it. However this idea is not supported by SDR or the Swedish Deaf Youth Association. They now argue that oral Swedish in the segregated deaf schools would affect the "sign language" environment in these schools (SDR 8/1999).

The suggestion to once again give oral communication a prominent place in the segregated deaf schools in the 1990s, therefore, appears to have emerged as a threat to the "sign language" environment. This perhaps gets perceived in terms of a re-newed domination of oral Swedish. The discussion about the position of oral Swedish language in the segregated deaf schools continues during the 2000s, and the archival dataset indicates that there is a gradual implementation of oral language in the segregated schools [51-53]. These shifts and the tensions regarding appropriate language varieties and modalities in school settings across a century can be understood in terms of a decolonial experience.

Language ideologies shape the conceptualizations of ideal communication that can be and should be deployed in deaf education in Sweden during the last century: during the 1920s and 1950s, oral language is highlighted, whereas more recently, i.e., the 1980s and 1990s, SSL comes center-stage. During the 1990s particularly, we also see expressions of a double monolingualism norm. Here not only are Swedish and SSL required to be kept apart, but Swedish gets reduced to

its written modality. The 1970s, and in a more distinct manner the new curriculum in the 1980s, distinguishes itself from the other decades in that a polylingual approach surfaces. This shift advocates and accepts the mixing of oral (and written) language and signing (during the 1970s) and the bilingual model where use of both SSL and Swedish are acknowledged (during the 1980s). This phase can therefore be seen as a transitional period where the shift in preference occurs from only oral language instruction to mixing to acceptance of a bilingual instructional phase to primarily SSL instruction with written Swedish to the re-emergence of oral Swedish. The 2000s are also different from the other decades in that both oral language and SSL are used in segregated deaf schools. However, oral language is present in specific classrooms (for children who are hard-of-hearing and those who have CIs) and SSL is reserved for deaf classes [53]. Such demarcation of spaces for different language varieties too is illustrative of the double monolingual norm. It can be noted that the different language ideologies that are pushed away or center-staged across time seem to lack grounding in theoretical framings of learning. In other words, the authors of the different articles do not argue for one or the other position across the 20th century by presenting any discussion related to learning.

## School placement patterns of deaf pupils with and without CIs across time

Shifts in language ideologies in the DH world and deaf education across time are shaped by hearing-technologies which in turn also shape shifts in school placement patterns for deaf pupils with and without CIs. The archival dataset present interesting dimensions related to these shifts across time. As has already been highlighted, school placement patterns in Sweden are unique in that almost all deaf children attend the segregated deaf schools since their establishment in the early 1800s despite shifts in language ideologies across the 19th and 20th centuries [48,54]. However, this situation changes at the turn of the last century (3).

After the implementation of more advanced hearing aids in the 1950s, a distinction is made between deaf individuals (who primarily rely on visual communication forms) and hard-of-hearing individuals (who primarily rely on oral communication, and the use of hearing aids) in the nation-state of Sweden. As a consequence, hard-of-hearing pupils are, in comparison to deaf pupils, enrolled in a number of different school forms: mainstream schools, classes for hard-of-hearing pupils in mainstream schools, or in deaf schools (Figure 2). During the 1970s an "integration" movement takes momentum in Swedish policies. From a decolonial perspective, "integration" or mainstreaming involves recognizing ideas of normalization that frame inclusion and exclusion [54,55]. Thus the placement of hard-of-hearing pupils, and deaf pupils with CIs during the 2000s into mainstream public schools, can be argued to be equivalent to integration since this placement situation is similar to that of the normal population of hearing pupils.

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[10]   The strategy of using several resources from different language varieties (in primarily hearing settings) to communicate has been termed polylingualism by Jørgensen (31,51,52) and others. Such more recent conceptual terminology is a counterpoint to the double monolingual norm that is particularly dominant in Eurocentric framings in the language sciences (6,11). These newer concepts highlight the fact that interaction where more than one language variety or modality is in play needs to be conceptualized in analytical terms that represent a counterpoint to language ideologies that build upon static notions of language codes and upon a monolingual bias.

[11]   Swedish: Utredningen om Funktionshindrade elever i skolan, i.e. Investigation of Disabled pupils in school.

Four different alternatives for the school placement of deaf and hard-of-hearing children are presented in an article in the archival dataset from 1977:

- Individual integration in a normal hearing class in the place of residence. This school placement often means that the pupil will largely be taught remedially. There is usually a personal assistant.

- Group integration in a class for hard of hearing. The class for hard of hearing is generally in public schools within the county.

- Group integration in a special-education class in public schools, known as an external class. These are either in the same town as a special school or elsewhere within the catchment area.

- Group segregation in a special school. The country is divided into five catchment areas with special schools in Lund, Vänersborg, Örebro, Stockholm, and Härnösand. (DHB 2/1977)[12]

Three of these placements are related to mainstreaming in public schools and one is concerned with the segregated placement of pupils in a deaf school (Figure 2). The forms of integrated school placement are termed individual integration, group integration, and external classes. In the first setting (individual integration) pupils are placed in a mainstream classroom and participate in the regular teaching there (the classroom data in project CIT comes from this type of integrated setting). In the other two settings (group integration and external classes), pupils with a hearing loss are grouped together and receive their own instruction. The groups are geographically placed in a mainstream public school (see Bagga-Gupta 1999 for an analysis of interactions between hearing and hard-of-hearing pupils during recess time in such a setting) [56]. The difference between group integration and external classes is that the latter are organizationally part of one of the five special deaf schools in Sweden. These settings constitute satellite spaces of instruction.

The group segregation discussed as the fourth option in the article refers to the separate classes for deaf and hard-of-hearing pupils present in some (not all) special schools for the deaf. "Spatial integration" constitutes a fifth mainstreaming strategy that complements the four organizational strategies taken up in the 1977 article (Figure 2). Spatial integration can be understood in terms of a "two-schools-in-one" solution. It can constitute a satellite instructional arrangement in a mainstream school setting. The mainstream and special schools' organizations are separate; they have their own classrooms and teachers, but they use some shared spaces, such as the cafeteria, library, gym, and playground.

An example of spatial integration existed in Örebro, where the segregated deaf school, Birgittaskolan's secondary classes, were situated at the public school Almbyskolan until the turn of the century. The national upper secondary schools in Sweden, RGD (for deaf pupils aged between 16 and 19) and RGH (for hard-of-hearing pupils aged between 16 and 19) are also examples of this fifth organizational

strategy and are situated in the city of Örebro. These have different parts of their organization located in several other public upper secondary schools in the city.
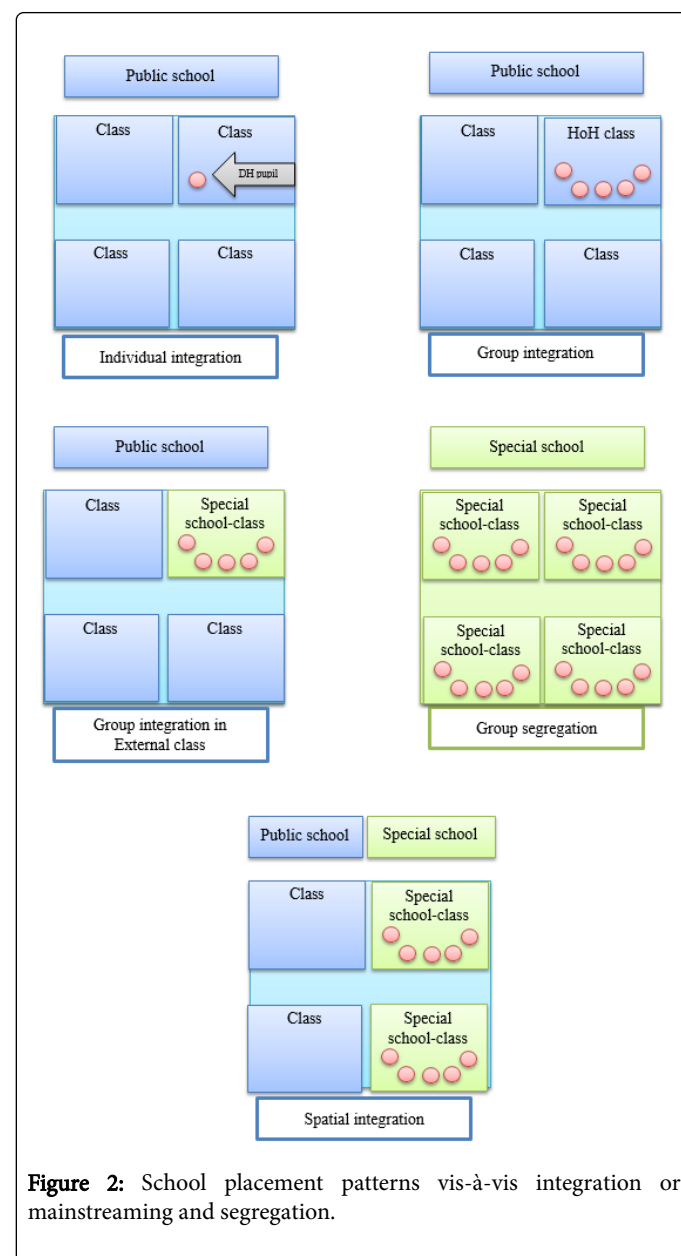


**Figure 2:** School placement patterns vis-à-vis integration or mainstreaming and segregation.

Analysis of periodicals in the archival dataset indicate that the national deaf NGO, SDR, and one of the parents' organizations (DHB) were fundamentally against most kinds of integration because such school placements were seen as being negative for the pupils. Several

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[12]    Swedish original: -Individualintegrering i normalhörande klass på hemorten. Denna skolplacering innebär ofta att eleven till stor del får undervisning i klinikform. Ofta förekommer personlig assistent.

- Gruppintegrering i hörselklass. Hörselklassen är i allmänhet placerad i vanliga skolor inom länet.

- Gruppintegrering i specialskoleklass i hörande skolor, s.k. extern klass. Dessa är placerade antingen på specialskoleorten eller på annan plats inom upptagningsområdet.

- Gruppsegregering på specialskola. Landet är uppdelat i fem upptagningsområden med specialskolor i Lund, Vänersborg, Örebro, Stockholm och Härnösand.

articles across two decades (1970s-1980s), suggest this. For instance in SDR 3/1973, a heading reads: "What may look like integration can be experienced as isolation"[13] and in SDR 12/1974, a deaf school principal writes that his professional experience of twenty years shows that the idea of integration is overrated because "the gap between the deaf and the hearing is so infinitely great and communication is slow"[14]. Such ideas and thoughts bear resemblance to fundamental assumptions that relate to a sociocultural perspective on learning. Social interaction provides rich possibilities to develop and construct new knowledge when participants share a common language, ways-of-being and have mutual interests. Also, the identity-positions in such settings (potentially) enable full membership in a community. The latter is important for self-esteem and shapes development through interaction with more competent peers.

Similar to the previous two themes (1 and 2 above), an integration conceptualization can be understood as the majority society's attempts to create diversity and equality on the basis of dominant epistemologies and value systems; such a point of departure does not consider the minority community's needs and experiences, and an article from 1977 illustrates such a position:

What identity do we want to give deaf and hearing-impaired children? Is it the identity of being alone and different, or the identity of belonging to the hearing-impaired and deaf group, where one can be included as a full member? (SDR 19–20/1977)[15]

The discussion in the periodicals about mainstream education and the challenges that are noted give rise to strong protests during the 1980s. This results in that many external classes move into the segregated deaf school campuses, even though other school forms continue to exist in parallel.

The analysis presented so far shows that two NGOs' support the idea that the deaf school is a community of practice that provides deaf (and hard-of-hearing) pupils spaces where common communication forms and experiences can be nurtured and where all pupils can participate as full members. Integrated school placement gets framed during this phase as difficult and problematic, and is portrayed in terms of a school community of practice where pupils with a hearing loss only have access to peripheral participation and end up being lonely. Seen from a decolonial view, such a stance by these two NGO's can be understood as a reaction against the majority society's efforts to normalize what is deemed as different (and a defect); they consider that this does not result in the expected participation, but rather in loneliness and alienation.

Once again we see that when a group is oppressed, it often closes ranks and allows for the emergence of a stronger "us" as compared to "them" dichotomy. The previous increasing placement of pupils in mainstream schools can therefore be understood as significant for the emergence of the clear-cut "us" position in the dataset. Moreover, the discussions and protests that emerge in the 1980s can be understood as responses to an unequal power relation where hearing "others" (e.g., politicians and principals) determine school placement policies for deaf and hard-of-hearing pupils, and thus also the latter's possibilities to participate in alternative communities of practice.

While the focus of the discussions vis-à-vis school placement is upon deaf and hard-of-hearing pupils until the mid-1990s, the latter part of the 1990s sees the first deaf children with CIs enter the school arena in the nation-state of Sweden. The analysis of the periodicals from this time period shows that the segregated deaf schools are seen as being open to the enrollment of children with CIs. Several segregated deaf schools publish articles in the NGO periodicals during this phase and highlight that parents who chose the segregated deaf schools as options for their CI operated children have opted for bilingual teaching.

Here it is important to note that the five special segregated schools differ with regards to the instruction that they offer this group of pupils. The school in Lund maintains that it offers SSL and written Swedish instruction in all its classes, while the school in Härnösand offers a choice between SSL classrooms and hard-of-hearing classrooms (in the latter instruction is provided in oral Swedish). The third NGO (parents of children with CIs) emerges during this phase and maintains that the segregated deaf schools need to offer different language options and create classrooms where "spoken Swedish is supported by signs". They argue that children with CIs need to benefit from their hearing devices and thus are in need of using their hearing.

However, the dataset suggests that little space is created for oral communication in the segregated deaf schools during the late 1990s, and therefore the third NGO argues that these schools are not an obvious school placement option for pupils with CIs. In one article (Barnplantorna 1/1997) an author claims that the deaf school is a "quiet school" where all instruction is given in SSL only and thus do not provide optimal learning spaces for pupils with CIs. This points to a language ideology preference in (at least some of the segregated deaf schools) for SSL and written Swedish, as described under theme 2 above.

However no satisfactory alternative exists since the remaining forms of mainstream school placements (Figure 2) only provide oral communication. In the latter types of schools, the author highlights, the hearing-technology of CI is not always adequate for pupils to keep up with the all-hearing environment. The analysis presented in the remaining four themes below in fact supports this authors concern. The polylingual approach of the 1970s or the more open bilingual approach of the 1980s that pupils with CIs could benefit from thus do not seem to be available in any existing schools in the late 1990s and early 2000s.

The articles in our dataset indicate a turn to mainstream public schools that provide group or space integration possibilities (Figure 2). Such arrangements are present at the municipal school Kannebäcksskolan in Gothenburg and Silviaskolan, a school with hard-of-hearing classes in Hässleholm. The articles describe and present these schools as offering varied and adapted instruction, where children with CIs are also welcome. Later during the 2000s, an increasing interest in individual mainstream school placements for children with CIs can be noted. Unlike the gloomy picture that exists vis-à-vis individual mainstream schooling for deaf and hard-of-hearing pupils in the dataset from the 1970s and 1980s, several articles from the third NGO now present a positive picture of individual integrated schooling. In this dataset, pupils with CIs are positioned as

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[13]  Swedish original: Det som kan se ut som integrering kan upplevas som isolering.
[14]  Swedish original: Klyftan mellan döva och hörande är så oändligt stor och kommunikationen går trögt.
[15]  Swedish original: Vilken identitet vill vi ge de döva och hörselskadade barnen? Är det identiteten att vara ensam och annorlunda eller identiteten att tillhöra gruppen hörselskadade och döva där man kan ingå som en fullvärdig medlem?

real participants in the mainstream classroom community of practice, where hearing-technology is a natural part of the environment. These settings are envisaged as welcoming and accommodating for this pupil group.

Such individual integrated placement in mainstream schools increases at the end of the first decade of the 2000s, and the number of pupils in the deaf segregated schools decreases. The Swedish National Agency for Education's statistics also endorses this trend. During the academic year 2000/01 the deaf segregated schools (including schools for the deaf with additional disabilities e.g. deaf blindness and language disorders) had 807 pupils enrolled. Ten years later (during the school year 2010/11), the aggregate number of pupils in these schools was down to 501. This is a 38 percent reduction and can be compared to the situation in the public compulsory schools (for children aged between 7 and 16), which reports a 16% decrease for the same time period (4,45). Although this reduction is not analyzed by the national agency, our dataset and analysis indicate that parent's choice of a mainstream public school placement for children with CIs constitutes a major contributing factor here.

In summary, the analysis of the three NGOs' periodicals in the CIT project dataset across time shows two important trends: (i) until the late 1990s, deaf pupils in Sweden across time receive their education in segregated schools irrespective of the language ideology in place during specific time periods, and (ii) there is a shift in focus during the mid-1990s: from a segregated school placement for children with (and without) CIs to various kinds of group and space integrated placements for pupils with CIs in public schools in the late 1990s and early 2000s to an increasingly individual integrated school placement in the latter part of the 2000s for deaf pupils with CIs. Our analysis suggests that the change in school placement patterns arise in the late 1990s because the segregated deaf schools do not shift to a polylingual approach or a more open bilingual approach during this period. In other words, the segregated deaf schools were not immediately open to different (and previously acceptable) forms of communication. These schools require time to adapt their communicative provision, and parents of children with CIs turn elsewhere to access education for their children. They turn to public schools with the hope that their children's needs could be met there and it appears that they increasingly view the mainstream schools as the only viable option.

The most recent school placement trends however suggest that an increasing number of pupils with CIs are shifting back to the segregated deaf schools after studying in mainstream public schools for a few or many years. As far as we are aware, currently no systematic tracking of these pupil's trajectories across different school forms is taking place.[16] Furthermore, we have very little systematic research-based insight in the technologically enriched lives of deaf pupils with CIs (as well as other differently-abled pupils) in mainstream settings in the nation-state of Sweden. The remaining four themes in this analytical section focuses upon these gaps by zooming into the classroom datasets.

### Range of technologies in classrooms where differently-abled pupils are members

Our fourth analytical theme highlights the large numbers of technologies that are deployed in both mainstream and segregated classroom settings where pupils with a continuum of abilities are members. In other words, this section presents an overview of technologies deployed in classrooms from our different projects. Such an overview allows for a deeper understanding of the ways in which various technologies enable (or limit) the deaf pupils' with and without CIs or blind pupils participation in classroom interaction (further analyzed and presented under themes 5, 6 and 7 below).



**Figure 3:** Microphone placed on a table in the middle of the classroom.

Several studies have highlighted the important roles that different technologies play in contexts where people with hearing loss are members (5,50,57,58). Technologies also play an important role in classroom settings where pupils are blind [50,57-60]. The following key types of technologies have been identified in our mainstream classroom datasets from projects CIT and JC: i) audiologically-oriented, including hearing-technologies, ii) visually-oriented, including literacy-technologies, iii) tactile-technologies and iv) communicative-link technologies (see also Bagga-Gupta 2012, Bagga-Gupta et al 2016 in press, Holmström and Bagga-Gupta 2016 in press, Winther 2000, Winther and Bagga-Gupta 2007).



**Figure 4:** Literacy-tools: Wall posters of pictures of objects, the alphabet and the SSL hand alphabet.

Hearing-technologies facilitate sound perception in the mainstream classrooms and some classrooms in the segregated schools. They include microphones (Figure 3), the CIs, adjunct noise-reducing technology such as school desks with self-closing lids, voice

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[16] We have been awarded a four year national project, 2016-2019, by the Swedish Research Council recently that will, among other issues, attempt to track the schooling trajectories of deaf pupils with and without CIs in the country. Bagga-Gupta is the PI of this new project.

synthesizers, record-players, etc. The classroom ceiling may also be fitted with acoustic tiles to create a good acoustic environment.[17] Visually-oriented technologies include projectors, televisions, and include literacy-related technologies or literacy tools [43,46] and range from smartboards, pictures of the alphabet combined with the SSL hand-alphabet for each letter (Figure 4), braille texts, pictures, pens, books, computers, etc. Tactile-technologies include braille texts, braille machines, etc.

Communicative-link technologies include human beings or textual artifacts. These include interpreters or RPs who relay spoken communication into SSL or support blind pupils navigate school spaces as well as find relevant reading materials etc. Communicative-link technologies also include posters with the SSL hand-alphabet, or words and phrases in English or braille texts, etc in the classrooms. The latter support and give status to communicative resources in the environment. Deaf pupils are, for instance, supported in their learning by visual aids posted in the classroom and the hearing pupils at the same time gain access to important resources from SSL. Blind pupils are supported through computer software and the presence of an assistant or RP.

The data from projects SS, LISA-21 and RGD highlight that a large range of visually-oriented, including literacy-technologies are present and many (not all) of these are deployed to mediate communication and teaching in the segregated deaf schools. These settings have technologies like computers, video players, video-cameras and "language-boxes" (small cubicles equipped with for example TV, video-camera, video player etc. for recording individual SSL tasks) since at least the mid-1990s [11,42]. In the segregated classrooms for deaf pupils, visually-oriented technologies dominate and hearing-technologies take a back-seat. In mainstream school settings where deaf pupils with CIs are enrolled, it is instead hearing-technologies that dominate.

As the remaining themes below highlight, different types of technologies frame the interaction in the different school settings and enable/disable specific identity-positions for the pupils in different ways. In the segregated schools, all pupils rely on the same tools, i.e. the same language varieties (SSL and Swedish) and primarily visually-oriented technologies; classroom instruction here flows spontaneously between the members. Deaf pupils with CIs in mainstream classrooms, for the most, rely on the same tools as their hearing classmates. In addition they use hearing-technologies and visually mediated communication – both of which provides them, as we will see, with identity-positions of peripheral members in the classrooms.

## Communicative strategies in mainstream classrooms where differently-abled pupils are members

Analysis of the video-recordings in the project CIT dataset give rise to specific recurring interactional patterns in classroom communication [55,61]. As we have argued in section "Theoretical-methodological framings and previous research", identifying and understanding such recurring patterns is significant given the gaps in knowledge about the mundane nature of everyday life inside mainstream educational settings where children with CIs are enrolled. Our analysis highlights several common strategies that get played out in the mundane pupil-pupil and pupil-adult interactions in these settings; these strategies are related to participation in the oral modality.

### Differently-abled pupils' communicative strategies

Pupils with CIs draw upon a range of strategies to keep up with mainstream classroom teaching and everyday interaction. For example, Maja often was particularly visually-oriented, and requested mediation through SSL in several different contexts. The following vignette illustrates her visually-oriented behavior (Figure 5).



**Maja asks the RP to use SSL; she appears not to be able to follow the teacher's reading aloud activity from a book. Although Maja wants to concentrate on the book's story, the RP replies that she will not sign, and says that Maja should only listen. Maja is not satisfied with this response and asks the RP again to mediate the teacher's oral reading into SSL. The RP again declines this request. At this point Maja directs her request for SSL interpretation to the CIT project interpreter instead, asking her to sign what the teacher is reading.**

**Figure 5:** Pupil with CIs' requests for visually mediated communication in mainstream classrooms.

Maja's repeated requests and her strategy to access what the teacher is reading orally illustrate a recurring theme in the data: pupils with CIs are almost always required to participate through oral Swedish in classroom settings, despite the presence of a RP who can sign. Here, we also see how the pupil with CIs is involved in a parallel interaction with two adults in the classroom, while the teacher leads a whole class activity (see also theme 7 below). Maja's learning space here differs from that of her hearing classmates because their focus and interaction orders have different starting points and develop in different directions.

Maja would not have been in a position to use this strategy if the researcher in the field was not deaf or the fact that project CIT had its own SSL interpreter in the classroom. After her repeated requests directed to the RP are turned down, Maja ultimately turns to the project CIT interpreter, repeats her request for SSL interpretation of what the teacher is reading aloud and settles down finally to following the teachers reading through SSL. Maja would of course not have been in a position to use this strategy if the project did not have its own SSL interpreter in the field.

Maja has a "special" identity-position that allows her to interact with the RP and the project interpreter while the instructional whole class activity is taking place. Pupils with CIs are allowed to regularly bypass an explicit classroom rule that officially does not allow pupils to interrupt instructional activities by spontaneously interacting with others in the classroom. Classroom rules require pupils to raise their hands and wait until an adult gives them the floor.

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[17] For more information about how the classrooms can be adjusted to support pupils with CI, see e.g. An educator's guide to the Nucleus Cochlear Implant System, http://hope.cochlearamericas.com/educators/early-interventionists/educators-guide.

Maja is never chided or reprimanded, as are her other classmates when they interrupt ongoing teaching. This atypical norm where Maja does not need to follow an important classroom rule affords her a specific identity-position in this setting. Furthermore, Maja is also afforded another position in the vignette presented in Figure 5. She is required to rely on hearing-technologies and concentrate to perceive the oral talk; as such she is not allowed to merely concentrate on the story being read aloud like her classmates. Her opportunities to participate thus differ from those of her hearing classmates.

Jonny who is blind, too is offered a "special" identity-position in a mainstream classroom, even though this is based upon interactional trajectories that differ from those illustrated above. His technology-rich classroom space – with a special large computer, a braille reading machine and a RP who sits next to him in itself makes him special. The presence of the RP by his side and the teachers recurring oral attention (for instance, "are you on the same page as us", "you can stop reading and just listen") marks him as special. Jonny is often not allowed to break classroom rules (for instance, returning to the class in time after recess or the lunch break) since he is required to follow his RP and the RP has to sanction his movements with other pupils [59,60]. At the same time Jonny's special position gets doubly marked since he is not expected to stand in line to get his lunch, and instead is required to follow his RP to get his lunch ahead of his classmates.

Another common communication strategy relates to explicit requests that pupils with CIs direct to the adults in mainstream settings, asking for what other pupils have expressed orally. As mentioned above, an important classroom rule is that pupils need to wait with their responses to a question posed by the teacher until one of them is specifically selected. Pupils with CIs commonly self-select themselves, especially when they need clarifications or oral repetitions. Often, this type of breaking-in occurs in the form of "what did he/she say-questions" [62]. Such clarification requests far outnumber those made by hearing pupils.

In addition, hearing pupils almost always direct such occasional requests to the classmate or adult whose oral talk they have not been able to follow. Pupils with CIs instead direct their requests for clarifications and relayed-repetitions overridingly to an adult in the classroom. This can perhaps be explained by the fact that the teacher (unlike the hearing pupils) has her own microphone into which she talks directly. Pupils with CIs perhaps receive the teacher's oral talk more clearly. Furthermore the adults in these settings (as compared to pupils) communicate in a clam and clear voice. These could account for this specific interactional pattern. The vignette presented in Figure 6 represents, in part, a routine classroom interaction order. The adult initiates a turn by posing a query, one or more pupils reply and the adult evaluates their responses. Such IRE, Initiation-Response-Evaluation sequences are recognized as characterizing mundane life in institutional learning settings. What makes the interaction order special here is Ella's request for clarification of the response that her classmate Victor has provided to the teacher's initial query.

What is furthermore interesting is the fact that she does not ask Victor to repeat his response and instead asks the teacher to relay what Victor has said. The interaction order here thus is IRE + "what did he/she-question" by the pupil with CI + relay response by the adult. This request and salient relay function of the teacher and RP is a routine part of the interaction order in our dataset from classrooms A and B.



All the pupils are sitting in the classroom, listening to the teacher, who holds up a large picture with an animal. The teacher asks if anyone recognizes the animal, and several children, including Ella, raise their hands. The teacher once again asks if anyone recognizes the animal, and turns towards Victor and requests a response. Viktor answers "roe deer". The teacher orally replies that one could think so but that it was not the correct answer. Ella breaks in, asking "what did he say". The teacher turns towards Ella and relays what Viktor has said: "he said it was a roe deer".

**Figure 6:** A "what did he/she say-question."

In activities outside the main classroom, for example during swimming or wood-work lessons, pupils with CIs face specific challenges. Here the noise level is high and the CIs cannot always be used. These pupils are completely deaf in situations where they cannot use their CIs. The vignette presented in Figure 7 illustrates a recurring interaction order in such settings.



Ella sits together with her classmates at a bench in the public bath, while the swimming-instructor orally instructs the pupils what they are expected to do. Ella is not wearing her CIs and cannot hear the instructions. She has her gaze fixed on her RP while the instructor is orally addressing the class. The RP however watches the ongoing instruction and does not relay this instruction through SSL to Ella. After the instructional phase and after her classmates have moved to the pool, Ella walks over to her RP. She enquires as to what she is expected to do. The RP gives her brief instructions in SSL and gestures towards her classmates. Shortly thereafter, both of them go to the side of the pool, where Ella observes what her classmates are doing. She then joins them.

**Figure 7:** Participation strategies when pupils with CIs cannot use their CIs.

The vignette presented in Figure 7 illustrates Ella's peripheral marginalized position in the instructional activity. She is completely deaf without her CIs and cannot participate as a full-fledged member of the class when the RP does not mediate the oral instructions through SSL. Ella's strategy here is to wait until her classmates move into the pool. She then walks over to her RP and it is at this point that the RP relays a summary of the swimming-instructors' instructions to her. Here, Ella takes the initiative to get access to the information in a visual modality (see also Figure 8) and it is in this manner that the RP becomes a communicative-link technology.

**Figure 8:** Pupil with CIs "special" access to participation during a swimming lesson.
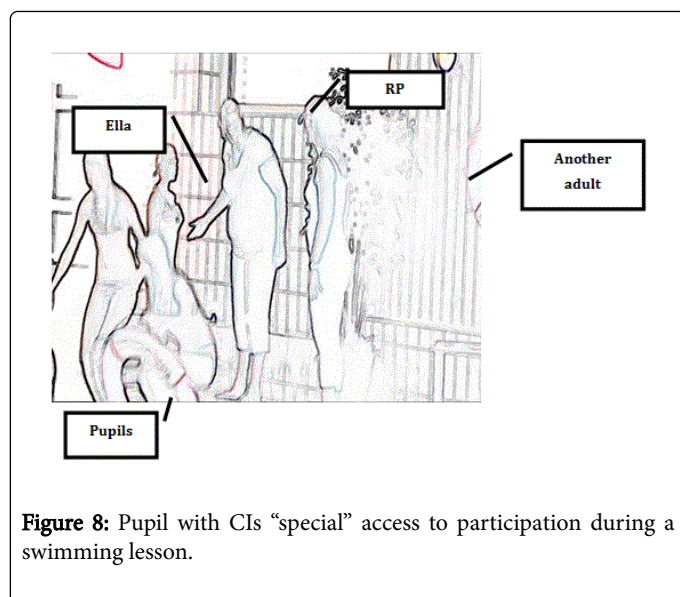
The analysis of communicative strategies used by pupils with CIs shows that they are active members in instructional settings. It is, as we can see in Figure 7, their explicit actions that shape their access to communication and learning. They are, one can claim, held responsible for their own participation [63,64]. The presence of a RP or the use of advanced hearing technologies do not in themselves guarantee access to oral communication in mainstream environments for pupils with CIs.

Similar issues can be seen in mainstream classroom settings where a blind pupil is a member and where communicative-link technologies (i.e. RPs) as well as literacy-technologies like braille reading machines are used. Jonny too is explicitly dependent on his RP as well as his literacy-technologies to access participation in instructional and social activities both inside and outside classrooms [50,59]. However, here too the presence of a RP or advanced technologies do not in themselves guarantee access to participation in mainstream environments.

### Adults' communicative strategies in mainstream settings

The teachers also use a variety of communication strategies in the classrooms that are significant for creating inclusive environments in mainstream settings. As highlighted earlier, teachers who have pupils with CIs in their classrooms often use a quiet, well-articulated and clear voice during classroom instruction. They also reinforce a classroom rule that requires pupils to raise their hands and wait for their turn before taking the floor. Adults also occasionally check if all the pupils have understood what is being said, and they sometimes ask hearing pupils to repeat their oral contributions. Adults also routinely repeat oral contributions by hearing pupils, as well as respond to "what did he/she say-questions" from pupils with CIs (Figure 6). Other routine communicative strategies deployed by adults are associated with the use and handling of technologies per se. This is specifically related to regulating the sound environment and the volume of the pupils' CIs (see theme 6 below). These strategies are significant for enabling the participation of pupils with CIs in the mainstream classroom interaction.

Adults' communicative strategies in classrooms where a blind pupil is present differ in some significant ways but also overlap with the strategies we have identified in the CIT project classrooms. Jonny always has his RP present close to him in the classroom and the teacher routinely uses the RP to relay her messages to Jonny. For instance, when Jonny has not completed his homework or has forgotten to bring his study materials to the classroom, the teacher (in the presence of Jonny) highlights this to the RP instead of to Jonny directly. The RP then relays the teachers question to Jonny (in the presence of the teacher). Accessing the curriculum in the classroom is highly technologically mediated i.e. all written texts are mediated through tactile-technologies and communicative-link technologies where braille and oral renditions by the teacher, the RP or in recorded version are routine. The RP has a crucial role for Jonny in the realm of navigating the school campus but also for Jonny's access of interactional spaces outside instructional time. Our analysis of the dataset in project JC indicates for instance that Jonny's classmates are at times denied access to Jonny during the lunch break or recess time [59,60].

### Handling hearing-technologies in mainstream classroom settings where one pupil has CIs

As themes 4 and 5 discussed above illustrate, mainstream classrooms where one pupil is differently-abled are technologically rich and several strategies are used by both the adults and the differently-abled pupils to facilitate participation. Under theme 4, we have illustrated different common technologies in the classrooms, and under theme 5, we have pointed to the recurring strategies deployed by members during classroom communication. Here, we bring these themes together and focus explicitly on the handling and usage of technologies in classroom interaction, by both adults as well as pupils with CIs. Furthermore, we focus upon how the handling and usage of technologies themselves create special identity-positions, and both enable and disable participation for the pupils with CIs.

### Interaction order where adults are in control

A dominant theme in classrooms where a pupil with CIs is a member relates to the control of hearing-technologies and their usage by adults. In other words, pupils with CIs have a subordinate role in the regulation of their own hearing-technologies in mainstream classrooms. Previous research has shown that children with CIs generally are more disturbed by a noisy environment in comparison to their hearing peers [65]. Adults in the CIT project classrooms appear to be aware of this issue. For example, they explicitly attempt to create quiet and calm learning environments for pupils with CIs through the use and non-use of microphones. Thus, during whole-class instruction, microphones are used, but when the pupils work on their own, the microphones are usually turned off. However, in such situations, our analysis illustrates that the pupils with CIs are usually neither asked nor informed about the adults' explicit control of their hearing. This, we argue, is a form of erasure that explicitly excludes pupils with CIs from the ongoing oral talk in the classroom. In such situations pupils with CIs are unable to listen to the teachers' explanations directed to other pupils or the small talk among the classmates. This type of mundane "over-hearing" of classroom discourse is significant for facilitating pupils' passive learning. What we can see here is a tension between adults' well-intentioned support that they provide by reducing surrounding sounds and an audiologically-oriented language ideology where pupils with CIs are supposed to be rescued from silence.

Another example of how adults control hearing-technologies in mainstream classrooms relates to their regulation of the volume of the

pupils' CIs with the help of remote controls. Here too adults routinely adjust the volume without involving the pupils in this technological regulation. Thus, the adults can, through their handling of microphones and remote controls, manipulate the pupils' with CIs hearing in ways that are striking and that contrast with what is (im)possible to achieve in the case of hearing pupils [61]. Such handling of hearing-technologies marks the special position of pupils with CIs as compared to their hearing peers.

In classroom A, the pupil microphone is routinely placed on a table in the middle of the room (Figure 3). Its placement is related to an attempt at efficiently capturing all the pupils' oral talk in the classroom. The teacher in this classroom wears a body-microphone attached to her clothes. While the placement of the room-microphone and the teacher's body-microphone allow adults to regulate these hearing-technologies easily, there is no way we can access information vis-à-vis the amount and quality of the oral classroom communication that the room-microphone is able to mediate to Ella. In classroom B, the microphones are arranged differently. Here too the teacher wears a body-microphone with a headset. However, instead of the room-microphone, hand-held microphones are used by the adults. These are taken around to the pupil who has been given the floor (Figure 9). The pupils are aware that they have to wait for the adults to reach them with the hand-held microphone before they can start talking. The adults immediately remind pupils to wait if they start talking before the hand-held microphone reaches them. Such an arrangement of classroom interaction illustrates how hearing pupils' language-use too is shaped by various technical requirements. This also illustrates how classroom communication rules whose goal is to include pupils with CIs within whole classroom interaction shapes all pupils' learning spaces.

This analysis furthermore illustrates the nature of embodied human-technological mobility in instructional settings. The embodied mobility frames the interaction order in classroom B and thereby structures the official interactional floor and classroom communication. It regulates and makes clear for both Maja and the pupils (i) who have the oral floor and (ii) how long one can keep it. However, the analysis also shows that Maja routinely prefers to access meaning-making visually through SSL, rather than through hearing-technologies (an example of this is presented in Figure 5 above). The handling of microphones and the mobility related to it however create obstacles in that visually-oriented communication becomes obstructed. Obstruction of visual resources (i.e. lip-movements) has communicative relevance for pupils like Maja who are left to rely upon what they can perceive through their implants. In sum, we see that the technologies in use here shape inclusion on the basis of sounds, and that pupils with CIs become disadvantaged by an aural bias.

### Interaction order where children with CI are in control

In contrast to how adults control pupils' hearing-technologies without including the pupils themselves, there are situations when the pupils themselves control these hearing-technologies and make their own decisions about their usage. An example from a wood-craft lesson in school A, where the environment was very noisy illustrates this (Figure 10). In these settings many pupils and adults wear ear protectors. Interestingly, here everyone in the classroom is more or less visually-oriented in their approaches to communication with one another. Members in these settings seek eye contact with one another when they initiate conversations and maintain eye-contact during interactions.
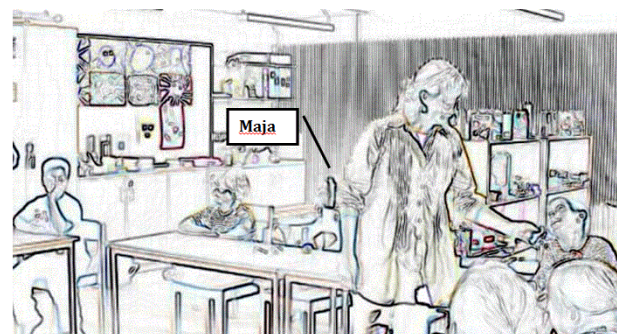


**Figure 9:** Teacher-technology mobility, hand-held microphones and obstruction of Maja's visual access to lip-reading.

In addition, they appear to speak more clearly and in a well-articulated manner. This visual-orientation of all members, together with the non-presence of hearing-technologies in these classrooms, makes it possible for Ella to participate in a more equal manner than is the case in her primary classroom setting. Ella sometimes also wears ear-protectors. However, often she takes them off and loosens her CI magnetic headpieces from her head, letting them dangle from the hearing aids behind her ears. Ella is completely deaf when she loosens the headpieces from her head and thus monitors her own learning situation in the noisy environment of the wood-craft setting (Figure 10).



All pupils are working or walking around in the noisy wood-craft lesson. Ella stands looking at her teacher and some of her classmates with her CI headpieces dangling behind her ears. One of the classmates comes up to her and starts talking. Ella quickly picks up one of the CI headpieces, and holds it up to her head, with her gaze fixed on the classmate. She seems to ask: "huh what did you say". The classmate repeats his query and Ella asks "why I don't have them on me". The classmate nods, and Ella continues: "because it is too noisy here". Then Ella loosens the headpiece and lets it dangle again. The classmate once again starts to talk and Ella picks it up and places it back on her head. She smiles and replies. Shortly thereafter, Ella loosens the headpiece again.

**Figure 10:** Pupils with CIs control of hearing-technologies in a wood-craft lesson.

The vignette presented in Figure 10 illustrates how pupils with CIs monitor usage of their hearing-technologies in noisy settings like that of a wood-craft lesson. When a pupil comes up to talk to Ella, she picks up one headpiece (that she has herself loosened previously in the noisy setting) and holds it against the CI magnet in order to hear her interlocutors oral talk. In these settings the noise level makes it difficult for everyone to hear. This in itself paradoxically weakens the dominant

classroom language ideology and visually-oriented communication becomes the default mode. This not only has important consequences for accessibility for pupils with CIs participation, but it also gives them control over their usage of their hearing-technologies.

### Role of RPs attached to differently-abled pupils in mainstream settings

As argued for and illustrated in the themes above, we regard RPs in terms of communicative-link technologies. They are, to a high degree, responsible for supporting the communication between the differently-abled pupils, like those with CI or those who are blind, and the other members of the mainstream classrooms to which they are attached. Here, we specifically focus upon the RPs actions in the classrooms, in their work with differently-abled pupils and how they manage the latter's participation.

RPs in the CIT project classrooms are experienced users of SSL. The other adults and the hearing pupils do not know SSL. Therefore, any SSL-based communication between the pupils with CIs and the RPs becomes private talk even though it takes place in public spaces. The datasets have numerous examples of parallel dialogues between the RPs and pupils with CIs during the ongoing teaching in classrooms (Figure 11). Sometimes these parallel dialogues focus school-related topics, while at other times non-classroom related topics are in focus. As the vignette presented in Figure 11 illustrates, the topic of a parallel dialogue can relate to whether a pupil should speak up orally and inform the teacher that she cannot follow the latter's oral talk, since the teacher was positioned in a manner that does not allow the pupil to lip-read (see also a representation of this issue in the floor-map presented in Figure 12).

> During an ongoing whole class instructional phase, the RP waves at Ella, trying to catch her attention. After several attempts, she makes eye contact with Ella and asks her in SSL if it is difficult to see the music teacher's lip-movements. Ella does not respond clearly, so the RP repeats her question again. Ella shifts gaze towards the music teacher, returns her gaze to the RP and nods. The RP screws up her mouth and nods back while signing that she understands. After a while, the RP leans forward and waves her hand again to catch Ella's attention. She signs to Ella saying in SSL that Ella must tell the teacher to stand further back so she can see her lip-movements.

**Figure 11:** Parallel dialogues between RP and differently-abled pupil during whole class instruction.

While RPs support pupils with CIs when they mediate ongoing oral talk into SSL, they also give additional explanations for executing a task or add their own comments to what other participants have said, or as we see in Figure 11, ask pupils with CIs to take responsibility for their own participation. In such situations the classroom interaction appears smooth and well-structured to the other classroom members. However, given that teachers and the hearing pupils have no knowledge about the nature or content of the dialogues between the RP and the pupils with CIs, teachers are obliged to leave responsibility vis-à-vis these pupils to the RPs. However, RPs, as we have already seen above, in turn, hand over a high degree of responsibility to the pupils with CIs themselves (Figures 5, 7 and 11).

Furthermore, their support varies to a large extent. Sometimes, as we have seen under the previous themes, they refuse to mediate the oral communication visually in SSL (Figures 5 and 7). Sometimes they speak up or interrupt the ongoing instructional activity to help the pupils with CIs to participate (Figure 11). Sometimes, for example in the public bath when Ella could not use her CIs, RPs remain inactive or interact orally with the other pupils, excluding the deaf pupil from ongoing dialogues. Pupils with CIs thus have access to a subordinate position in mundane interactions in instructional settings and as a result are vulnerable and dependent upon the support that is forthcoming from the RPs.
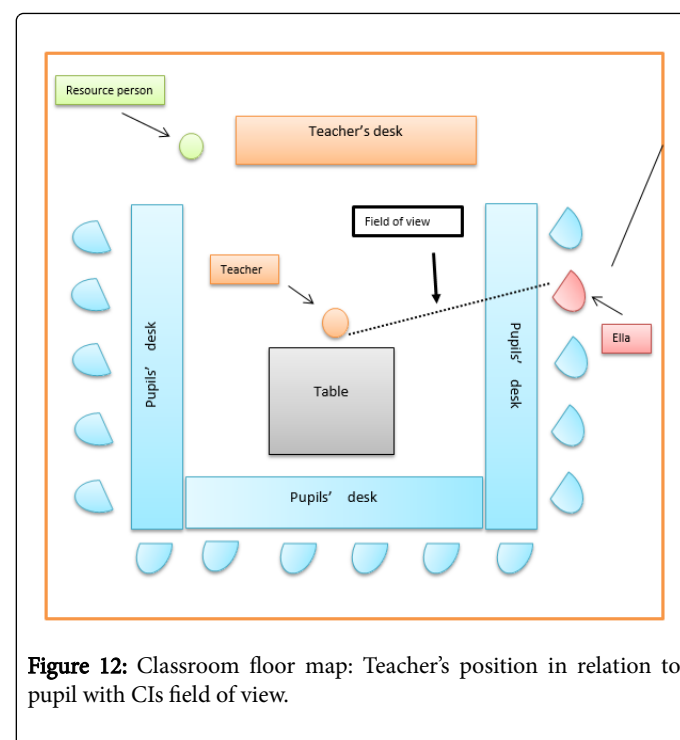


**Figure 12:** Classroom floor map: Teacher's position in relation to pupil with CIs field of view.

As has already been mentioned, RPs mediate the spatial classroom and school arrangements in significant ways for blind pupils in mainstream settings. Similar to the roles and functions of RPs in classrooms where one pupil has CIs, the RP supports Jonny's participation in classroom life by fixing technological glitches. His positioning next to Jonny inside the classroom (as well as in school spaces more generally) creates a symbiotic presence whereby the teacher as well as the seeing pupils have curtailed direct access to Jonny. During lessons when the RP is absent or the activity in focus is pupil-pupil focused, the interaction order is socially different. Our analysis shows that often other pupils take the place of the RP when the latter is not present. A more collaborative communicative interaction order can be seen when Jonny works with a peer as compared to when he is assisted by his RP [59,60].

RPs have a key position in that they support differently-abled pupils in mainstream settings. However, their very presence seems to mark the differently-abled pupils as being special. Furthermore, the RPs actions' facilitates the differently-abled pupil's participation in classroom and school life, but also places them in marginalized positions. RPs in the project CIT classrooms paradoxically place demands on the pupils with CI for keeping up with the ongoing communication and instruction.

## Discussion and Conclusions

Going beyond single project reporting, the study presented in this paper highlights the relevance of ethnographic analysis of two different types of empirical data – archival materials and data pertaining to everyday life inside and outside classroom settings. Such analysis is significant for revisiting the ways in which identity-positions get signed-talked-and-written-into-being, framed in and through social practices in primarily mainstream but also segregated school settings where differently-abled pupils are members. While the study presented in this paper puts the spot-light upon the situation of deaf children who cochlear implants in mainstream schools in Sweden currently, it does so by framing the usage of hearing-technologies against the backdrop of technologies used in the DH world across time as well as technologies used in segregated schools for the deaf and mainstream settings where a blind pupil is a member. We thus call attention to the participatory patterns that emerge in technologically-rich mainstream classroom settings where differently-abled pupils are members as well as the work that institutions and its members do to mainstream differently-abled pupils in the 21st century.

Our work not only makes available new perspectives on issues related to "communication dis/orders", "hearing dis/abilities", but also highlights the need to privilege analysis of mundane human interaction as well as archive materials in order to understand the role of tools in social activities across time and space as well as how and why shifts in school placement and identity-positions can be understood. Our study furthermore contributes to the young multidisciplinary field of Deaf Studies with a new empirical focus in the Educational Sciences; here a specific interest relates to dimensions of marginalization processes in a broad sense.

As our previous and ongoing studies in project CIT, as well as the analysis presented in this study show, technologies have shaped the DH world for over a century. Although the deaf and hearing members in this world have shown an openness and curiosity for a range of mediating technologies – audiologically-oriented, visually-oriented, tactile-oriented and other-technologies, and have attempted to appropriate them to enhance their everyday lives as well as participate in societal arenas, members of the general majority society seem to have, in parallel, privileged primarily specific technologies that normalize participation possibilities through audiologically-oriented and communicative-link technologies. Our analysis suggests that this narrower focus on the types of technologies that are privileged by mainstream society seems to unwittingly marginalize deaf adults generally and deaf pupils with and without CIs particularly in different ways.

Technologies that are deployed in mainstream schools where deaf pupils with CIs are members have been developed with the aim to "save the deaf from silence". Here a "reparative" and "caring" perspective on the human (disabled) being is privileged, and a "compensative" perspective deployed by deaf adults and pupils

themselves (for instance, monitoring of their own hearing, as our examples have illustrated) are ignored.

Thus, technologies can be understood in terms of a double-edged sword; they are used to control the hearing as well as the participation of deaf individuals in a range of settings, including school arenas, and they at the same time provide marginalizing positions to the receivers of the support that they provide. The technological support provides the care-givers (like the RPs and teachers in our datasets) dominating and privileged positions, while deaf pupils as well as adults get access to spaces that give them a submissive, powerless and vulnerable position. The underlying ideology-framed norm that we have identified across time as well as in our interactional classroom data relates to an audiologically-oriented one, where oral communication, hearing-technologies and integration with able-bodied people have and are being pursued. Our analysis significantly illustrates that differently-abled pupils are seldom consulted in the mundane flow of social practices in classroom settings with regards to how and when hearing-technologies should be deployed. Going beyond a democratic issue, we have shown that such mundane actions shape and influence the participation and positions of differently-abled pupils in learning arenas in significant ways. Hearing professionals, teachers, RPs and parents, understandably have privileged positions in children's lives – disabled or abled. However, making visible the power and control that able-bodied adults have when it comes to differently-abled children, as well as differently-abled adults, highlights a screwed domination that is problematic (see also Bagga-Gupta et al 2016 in press). Such power differentials are furthermore underpinned by the medical profession and hearing-technology companies. Such an ethical dimension is in need of further exploration and in-depth discussion.

A telling example with regards to this type of power differential can be illustrated by a norm explicated in recurring advertisements that are common in the general media and also popular in one of the NGO's periodicals in the CIT project archival dataset (Figure 13). Here a hearing-technology company sends out a loud-and-clear message (SIC) to parents of deaf children by promising that parents can, with the use of its hearing-devices, control their cochlear implanted children's hearing without "disturbing them", for instance when their children are playing.



**Figure 13:** Selling a remote controlling product: an advertisement from a hearing-technology company

Deaf pupils are members of the DH world. They cannot themselves choose a visually-oriented communication form they prefer in school settings. Instead, (oral) language ideologies shape interaction at different levels in the CIT project schools and as Figure 13 illustrates also in society at large. Efforts to "include" deaf people in mainstream society seems to take place in a manner wherein, they, at least on the surface, appear to participate, communicate and behave "normally"; such a superficial participation and behaviour makes their dis-abilities invisible. Paradoxically, our analysis also illustrates that pupils with CIs are expected to take responsibility for their own participation and interaction. Thus, we argue, that after the privileged (hearing) majority members (teachers, RPs) set the norms and conditions for how communication and participation should work, the differently-abled pupils are, for the most, left to themselves to meet the complex demands of mainstream classroom life.

Hearing-technologies shape classroom communication and interaction in different ways in a variety of situations in mainstream settings where deaf pupils with CIs or a blind pupil are members [61,62]. In contrast to situations where a blind pupil is a member, adults and pupils with CIs rely on hearing-technologies almost all the time in orally mediated settings. Such technologies can control, slow down, or interrupt ongoing teaching. Here it is important to contextualize how hearing- as well as other technologies are handled in different situations. This, as we have shown, is important in that different technologies and particularly their applications shape classroom participation in mainstream settings where pupils with CIs (or a blind pupil) are members and in segregated settings where deaf pupils without CIs are members. Focusing naturally occurring activities reveals recurrent classroom patterns that are significant in that they make visible the routine nature of support or obstacles that differently-abled pupils receive across settings. Identifying recurring patterns also highlights the ways in which identity-positions are enabled/disabled. There is a scarcity of research that takes mundane interactional data as points of departure in order to make visible such patterns. This is an area that needs to be augmented in future research.

The increasing placement of deaf pupils with CIs and those who use other hearing aids in mainstream public schools during the 2000s seem to have created an illusion of normalcy and both representatives of the medical profession as well as hearing-technology companies make claims that deafness will soon be "wiped out". Government agencies take such projections seriously. For instance, The Swedish Agency for Public Management (Swedish: Statskontoret), recently suggested that the education of SSL interpreters needs to be halved in the country. It presents this proposal based upon the following: "In the future the need for SSL interpreters will be reduced, thanks to the fact that almost all new born deaf babies receive CI which makes it possible for them to hear" (ibid).[18] There is need to highlight the gap in our understandings of how CIs support hearing and also the fact that CIs do not make deaf individuals into hearing human beings. The study presented in this paper, including our previous studies in project CIT, present important contributions to the field of hearing generally and Deaf Studies and deaf education specifically. While acknowledging the place of technologies in the lives of members in the DH world, we present a more nuanced picture of what technologies in general and hearing-technologies in particular can achieve. Such a perspective is needed in order to go beyond the "Great Divide" in deafness research where an oral-signing dichotomy has shaped deaf education for over a century (7,29).

A further significant issue lies in the fact that despite the near-total population implantation of very young deaf children in Sweden since the turn of the century, no official statistics are available on where these children attend school in Sweden, or how their schooling trajectories look like across their school careers. Furthermore, there is a gap in knowledge about how mainstream school placement shapes children's language and communication, their achievements of school goals and their social experiences and wellbeing. The research that we are involved in at the CCD research network including the new four year national project, 2016-2019, awarded to us by the Swedish Research Council recently will, attempt to track the schooling trajectories of deaf pupils with and without CIs in the country as well as understand their post-school life opportunities in society.

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[18] Swedish original: Tack vare att nästan alla nyfödda döva får cochleaimplantat som möjliggör hörsel kommer behoven av teckenspråkstolk att minska.

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