Perspectives of D/HH-Students on Mainstream Higher Education: A Qualitative Study

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Abstract

Social, contextual, and technological changes affected the educational context for students who are deaf or hard of hearing (D/HH) in higher education in many countries. Although, several barriers to academic success already have been identified, the perspectives of D/HH-students on inclusion, educational facilities, and support are important to overcome them. This interview-based qualitative study describes the perspectives of 32 D/HH-students in mainstream higher education in The Netherlands. Within the dichotomy of environmental factors and personal factors, data have been analysed. Students experienced social acceptance by others with typical hearing, although participating in social events sometimes caused feelings of loneliness or separation. Access arrangements and adjustments in educational programs were necessary to cope with the experienced fatigue, participate during lectures or increase speech intelligibility of the lecturer. Especially poor classroom acoustics and limited intelligibility of speech hampered students during lectures. Students expressed their dissatisfaction about the way access arrangements and adjustments were arranged, yet at the same time, they do not know what the requested help should look like. A co-created policy in which D/HH-students, student support officers, and institutional policy makers are involved, would support D/HH-students in mainstream higher education in The Netherlands and abroad in their needs.

Improvements in early detection and diagnosis increased the identification and early intervention of hearing loss and deafness in infants over the past decades. Early intervention with cochlear implants (CI) or hearing aids (HA) gives young children access to the auditory signal in the beginning of their speech and language development. As a consequence, many children who are deaf or hard of hearing (D/HH) can develop substantial receptive and expressive spoken language skills (e.g., Geers & Sedey, 2011; Moeller, 2000; Nicholas & Geers, 2006; Yoshinaga-Itano, 2003). Research has shown that early intervention positively effects children’s auditory receptive abilities and their possibility to integrate into a mainstream school (Govaerts et al., 2002; Krijger, Coene, Govaerts, & Dhooge, 2020). In the Netherlands, like in most countries, there has been a shift toward the enrolment of children who are D/HH, into mainstream schools, rather than in segregated special schools or special classes (Stinson & Antia, 1999). Special elementary or secondary schools are still optional for children who are D/HH; however, most children wearing CIs are educated in mainstream schools (Huber, Wolfgang, & Klaus, 2008).

Children who are D/HH and without additional disabilities seem to integrate easily in mainstream elementary and secondary schools and they often achieve educational levels similar to those of their peers with typical hearing (TH; Venail, Vieu, Artieres, Mondain, & Uziel, 2010). Although the facilitation of participation of children who are D/HH in mainstream education requires effort and skills of the teacher and peers with TH (Stinson & Liu, 1999), in general, teachers show a positive attitude toward the inclusion of children who are D/HH in classrooms (Avramidis & Norris, 2002). Children who are D/HH are generally socially accepted by their peers with TH (Cambra, 2002); however, the study of Theunissen et al. (2011) outlined that the social and emotional development of children who are D/HH in mainstream schools can be at risk, as they reported more depressive symptoms than children with TH. Furthermore, acoustic and auditory factors have been identified as problematic for children who are D/HH in mainstream primary and secondary education. Poor classroom acoustics negatively affects their performance and well-being (e.g., Crandell & Smallino, 2000; Klatte, Hellbruck, Seidel, & Leistner, 2010) and the limited access to or disturbance of the auditory signal cause more listening difficulties for students with CI (Krijger et al., 2020).

Also for students who are D/HH in postsecondary education, the accessibility to spoken instructions can be limited, as acoustic barriers disrupt the speech signal (Van den Heuij, Neijenhuis, & Coene, 2018). Listening to academic language, which is sometimes a non-native
instruction language (for students as well as for teachers), sets high demands on the classroom acoustics and speech intelligibility for students (Van den Heuij, Goverts, Neijenhuis, & Coene, 2021). However, the majority of the classrooms do not meet the recommended standards for good acoustic performance (Knecht et al., 2002; Rabelo et al., 2014; Van den Heuij et al., 2021). Support services such as tutoring, interpreting, real-time captioning, and academic advising can be useful for students who are D/HH to (partly) overcome these problems (Lang, 2002).

In The Netherlands, at university or college level, mainstream education is for students who are D/HH the only option, as there are no special colleges and universities available. A questionnaire study by Richardson, Marschalk, Sarchet, and Sapere (2010) compared the experiences of higher educational students who are D/HH enrolled in mainstream programs (without peers who are D/HH) versus separate programs (with peers who are D/HH) at the National Technical Institute for the Deaf (USA). Both programs had their advantages and disadvantages as students who are D/HH in separate programs were more positive about the workload expectations, whereas students who are D/HH in mainstream programs rate their programs more favorably in terms of their acquisition of analytic skills. Based on a survey Hyde et al. (2009) concluded that higher educational students in mainstream programs (without specialist services and with fewer peers who are D/HH) would experience greater difficulties than those in settings with designated for students who are D/HH.

Recent postsecondary enrolment rates for students who are D/HH are comparable to their peers with TH at the start of their higher educational career (e.g., Lang, 2002; Newman et al., 2011). However, in the general population, approximately two thirds of the students who began as full-time freshmen in a university program receive a degree within 6 years (Berkner, He, & Forrest Cataldi, 2002); for students who are D/HH in postsecondary education Newman et al. (2011) reported a 53% completion rate. Once students who are D/HH are enrolled in mainstream higher education both the individuals must be academically prepared, with appropriate “soft skills,” and the institution must be prepared to fully include students in their programs to support successful retention and program completion (Cawthon, Schoffstall, & Garberoglio, 2014). What types of support and services students who are D/HH in mainstream higher education require, and if those can be offered by the institution, are often assessed on a case by case basis. The necessity of this tailor-made approach is often caused by a lack of institutional policies and/or the relatively small numbers of students who are D/HH per year or per faculty.

Over the past years, many barriers to academic success in higher education programs have been identified. The study of Lang (2002) provides valuable insights about the potential solutions to overcome the barriers these students face in mainstream higher education. Things have moved on since and potential solutions are (partly) implemented (Cawthon & Garberoglio, 2017). Due to innovations in technology, the access to communication led to more independence (Pilling & Barrett, 2008) and greater information access (Shoham & Heber, 2012; Valentine, Skelton, & Levy, 2006) for students who are D/HH. Nevertheless, there are still (new) barriers as students who are D/HH continue to experience limited access to social opportunities and inclusion (Hopper, 2011). The perspectives of the students who are D/HH themselves on the inclusion, educational facilities, and support are important if we want to know how students who are D/HH in a mainstream university environment can be supported. Using self-report outcome measures, surveys, or questionnaires, several studies report on the perspectives of the university students who are D/HH (e.g., Hyde et al., 2009; Richardson et al., 2010). To provide an in-depth understanding of individuals’ experiences, behaviors, and gain insight into the perspectives of this population in great detail, an interview-based qualitative approach is appropriate (Taylor, Bogdan, & DeVault, 2015). Powell, Hyde, and Punch (2014) combined both methods in their study to gain insight into students’ perspectives on learning and participation in postsecondary education in New Zealand. Based on 64 surveys and 8 interviews, the results show that most postsecondary institutions provide services and accommodations to students who are D/HH. However, students’ social inclusion in the mainstream university environment is not self-evident as institutions mostly deal with small numbers of students who are D/HH. Similar results were found by Kersting (1997) who interviewed 10 deaf mainstreamed college students at the Rochester Institute of Technology (USA) and reported that the first few years of college were characterized by loneliness and isolation, caused by experiences of rejection and discrimination. Based on interviews Dalton (2013) described the classroom experiences of three Canadian students with mild and moderate hearing loss during their mainstream school careers. The results show that it is evident that teachers should not only pay attention to the academic and communication needs of the students, also the social–emotional needs and disability identity development facilitates the inclusion of students who are D/HH in mainstream education.

This article specifically addresses the perspectives and experiences of students who are D/HH in mainstream higher education in The Netherlands. Given the educational system in The Netherlands and the inclusion of students who are D/HH in mainstream classes are in many ways comparable to other developed countries, the outcomes of this study will be beneficial for a wide variety of countries. To our knowledge, there is no systematic interview-based qualitative research on the experiences of Dutch students who are D/HH in mainstream higher education. However, given the social, contextual, and technological changes (e.g., more children with CI’s, advanced HA technology, enrolment in mainstream...
education) over the past years in most countries, equally applicable for The Netherlands, it is time to investigate how students who are D/HH experience their participation in mainstream higher education nowadays. Therefore, the aim of this study is to explore the perspectives of Dutch students who are deaf of have a mild, moderate, or severe hearing loss in mainstream higher education. We will address the following research questions:

1) How do students who are D/HH experience participation in higher education?
2) What support do they need from their social and academic environment?
3) Which coping strategies do they apply in order to reach academic success?

Method
Design

In order to explore the everyday impact of hearing loss on the participation in higher education, it is necessary to probe people’s experiences. A qualitative study was adopted as the most appropriate way to collect and analyze data about students’ experiences of participation in higher education. It offers the opportunity to provide an in-depth understanding of individuals’ perceptions and attitudes and to gain insight into the underlying thoughts. We esteemed that using statistical or quantitative measures would not properly reflect the great versatility in the data. Semi-structured interviews were chosen as the best way of obtaining insightful responses from participants.

All interviews were conducted face-to-face by the first author (K.M.L.v.d.H.), who was a female PhD student as well as a research lecturer in the department of Health Care Studies at the Rotterdam University of Applied Sciences and VU University at the time of the research study. The interviewer holds a degree in linguistics and is an expert in the field of research and education. The interviewer was hearing and understands Sign Supported Dutch.1 There was no clinical or educational involvement between the interviewer and the participants. All interviews took place in a quiet room with no observers, at an institution for higher education. Participants were invited at the Rotterdam University of Applied Sciences or VU University or, when they preferred not to travel, the interviewer visited the students at their own higher education institution. None of the participants used sign language as their everyday language. A few participants used some Sign Supported Dutch during the interview as their natural way of talking. However, all participants were fluent users of spoken Dutch as well. The interviews were recorded using a digital voice recorder. An interview protocol (Appendix A) was used to ensure the coverage of all relevant topics. The interviews were transcribed verbatim and these interview transcripts provided the database for this study. The transcriptions were conducted by author K.M.L.v.d.H. for the first three interviews and by student assistants for the rest. The interviews ranged in duration from 15:58 to 54:08 min (average 28:19).

Participants

Participants were students who are D/HH and were included in the study if they met the following criteria: (1) being Dutch speaking students attending mainstream higher education or having graduated less than 5 years ago and (2) having a clinically diagnosed unilateral or bilateral hearing loss (>25 dBHL). All participants were students attending regular, mainstream classes with hearing peers. Purposeful sampling was applied as participants were chosen for their ability to provide the researcher with information. This is a common technique to get specific information from a particular subset of the population of interest. Especially in the case of a small population of interest (Patton, 2002). Participants were being recruited via sending networking e-mails to patients associations, students associations, universities and their support centers and placing advertisements in social media. In total 32 students who are D/HH, 8 male and 24 female, took part in this study. They were between 19 and 32 years old (mean age = 23 years). One participant graduated less than five years ago, the other 31 participants were enrolled in eighteen different institutions for higher education (seven universities and ten universities of applied sciences in the Netherlands, and one university in Belgium) at the time of the interview. Deaf students and students with various degrees of hearing loss (mild, moderate or severe hearing loss) were included. No attempt was made to select on the basis of communication skills or academic skill levels. However, by definition, students enrolled into bachelor or master level programs must demonstrate competencies required for admission to that level of study. 28 participants were wearing one or two HAs or an HA and/or a CI. Four participants did not wear a HA (any more). Table 1 outlines the characteristics of the participants in this study. Participation in the study was on a voluntary basis and no reward was given. All participants were informed that the study would form part of a PhD thesis into the communicative-linguistic profile of students who are D/HH in mainstream higher education. Besides the interview, a set of language proficiency tests and speech-in-noise hearing tests have been conducted. No follow-up for further interviews or input regarding transcripts or findings took place; however, all subjects received feedback on their test results. All participants filled out a form containing brief questions about sociodemographic information and some details regarding their hearing loss. All participants signed informed consent to participate in this study and to collect data. Ethical approval of this study was given by the Ethical Committee FGW—VU University (ref. EC17.01).

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1 Sign Supported Dutch uses Dutch Sign Language signs but uses them in the order they are used in spoken Dutch.
Table 1. Participant characteristics.

<table>
<thead>
<tr>
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<th>Number of participants</th>
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<tbody>
<tr>
<td>n</td>
<td>32</td>
</tr>
<tr>
<td>Gender (male: female)</td>
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<tr>
<td>Age (years):</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>23</td>
</tr>
<tr>
<td>(Range)</td>
<td>(19–32)</td>
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<tr>
<td>Hearing device (n):</td>
<td></td>
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<td>None</td>
<td>4</td>
</tr>
<tr>
<td>One HA</td>
<td>5</td>
</tr>
<tr>
<td>Two HAs</td>
<td>19</td>
</tr>
<tr>
<td>One CI</td>
<td>1</td>
</tr>
<tr>
<td>CI and HA</td>
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</tr>
<tr>
<td>Level of study (n):</td>
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</tr>
<tr>
<td>Bachelor</td>
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</tr>
<tr>
<td>Master</td>
<td>5</td>
</tr>
<tr>
<td>Year of study (n):</td>
<td></td>
</tr>
<tr>
<td>Freshmen</td>
<td>8</td>
</tr>
<tr>
<td>Senior student</td>
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</tr>
<tr>
<td>Graduated</td>
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</tr>
<tr>
<td>Former education (n)</td>
<td></td>
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<td>22</td>
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<tr>
<td>Mainstream and special education</td>
<td>10</td>
</tr>
<tr>
<td>Subject area (n):</td>
<td></td>
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<td>Architecture</td>
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<tr>
<td>Behavioral and Social Sciences</td>
<td>10</td>
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<td>Communication</td>
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<td>Law and Economics</td>
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<tr>
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<td>4</td>
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<tr>
<td>Medical Sciences &amp; Health</td>
<td>7</td>
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<td>Sport</td>
<td>1</td>
</tr>
<tr>
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</table>

CI = Cochlear implant, HA = hearing aid.

Interview Protocol

An interview protocol was used for the semi-structured interviews. The questions were divided into three main topics, covering experiences related to: (1) the institution and the education program, (2) the acoustic environment in higher education, and (3) the support from lecturers, professors and fellow students. Each area was further divided into questions and possible follow-up questions. Depending on the subject’s answer, relevant follow-up questions were posed by the interviewer. This allowed the interviewer the opportunity to ask for clarification or specification on the subject’s response. The question guide went through several stages of development, beginning with one to one discussions between the first (K.M.L.v.d.H.) and the second (K.N.) author. A first testing of the question guide was done as part of a student research project by a student with severe hearing loss to ensure clarity and comprehensiveness. This resulted in a final question guide (Appendix A).

Data-Analysis

Data analysis for recurring patterns and themes followed guidelines for qualitative research (Braun & Clarke, 2006). The anonymized, verbatim transcripts were uploaded for analysis using ATLAS.ti Scientific Software Development GmbH (version 8). After familiarization with the data, initial codes were generated by authors K.M.L.v.d.H. and K.N. within the dichotomy of “environmental factors” and “personal factors,” derived from the framework of the International Classification of Functioning, Disability and Health (ICF) (WHO, 2001). The agreed codes—essence-capturing words or short phrases—were assigned to portions of data as a link between data collection and their explanation of meaning. A coding manual (Appendix B) was created in order to maintain the validity and reliability of the results of the thematic analysis (Joffe & Yardley, 2003). The coding manual explains each of the themes, using definitions and examples.

This manual was used independently by K.M.L.v.d.H. and K.N. to analyze a random selection of three transcripts. Any issues with the coding manual were discussed and a final version of the manual was then created, taking into account the suggested changes. After coding five more random transcripts independently, a cross check was conducted to ensure similar coding between the coders K.M.L.v.d.H. and K.N., before coding the rest of the interviews.

Results

Within the dichotomy environmental factors and personal factors, six themes with corresponding subthemes were derived to structure the data analysis (Figure 1). The themes and subthemes are described in the following sections to describe students’ perspectives on academic success in higher education.

Environmental Factors

Attitude

The attitude from others with TH toward the students who are D/HH in mainstream higher education dominates as a subtheme. This section examines the stories of students who are D/HH about their interactions with classmates with TH, lecturers, and the professionals at the student support centers.

Classmates

Almost all of the students interviewed, described the attitude of classmates with TH as “helpful,” “interested,” and “involved.” They felt a sense of belonging with their peers. Classmates were curious about the daily experiences of the students who are D/HH and were willing to learn some signs. Learning and using signs is not necessary for the communication with the students who are D/HH, but classmates learned these for fun. As one student put it: “Everyone is really normal and curious and wanted to know everything (ID24).” Another commented: “All my classmates can tell [in sign language] how to go to
Figure 1. Hierarchy of themes and subthemes arising from transcripts.

the bathroom, order a beer, or tell they fancy someone (ID31).” Most students mentioned that they can rely on classmates during classes. These classmates are usually friends of the student who are D/HH. As one student recalled: “I have my friends sitting next to me. If I miss something, they’ll watch out for me in class (ID40).” Most students described working together with classmates with TH as “easy” and “normal.” A few students mentioned that during classroom interactions classmates “tried to avoid talking at the same time, face each other when speaking and try to speak clearly (ID42).” A student explained: “When we need to work in pairs for example, I work in the hallway with one of my classmates. Everyone knows that. They already propose it themselves (ID48).” Some students expressed dissatisfaction with the way classmates with TH behaved in a classroom. One student reported that for classmates with TH “having fun is more important than working in quiet (ID43).” The fact that working together with classmates with TH is not always easy, is described by a student explaining the difficulties while working together with classmates with TH: “During a brainstorm with the group, I am only focused on what was said instead of thinking along. Really, I did hear the students, but I could not understand what they said and thinking along at the same time (ID48).”

Lecturers
Students talked about the lecturers’ attitude as “understanding” and “willing.” Most of the students reported that they told at least a few lecturers about their hearing loss. Generally because of practical reasons to keep up in class. One student put it as: “They often can’t do very much for you, but they are very nice. They try to pay attention, especially if it is a small group course. They are always willing to give extra help (ID40).” Another student reported: “They know about my hearing loss, but they don’t know what they can do to make it easier for me (ID49).” Even though lecturers were understanding, students had the impression that support for students who are D/HH is not their top priority, and therefore, they constantly needed to be reminded. “They have forgotten it the lesson afterwards. Then I will tell it again, so I am not sure if they are really aware of my hearing loss (ID44).”

Professional student support
All students mentioned the student support center at their institution for higher education. Student support officers provide professional information, advice, and support to meet the student’s needs. The vast majority of the students knew about the role and function of the student support officer. At some institutions, a meeting between the student and the student support officer is standard procedure for all freshmen. Others had to go to the student service center at their own initiative. Several students were not satisfied about the first contact with the student service center: “I mentioned the hearing loss in the application form, but I was never contacted afterwards. I had to go after it myself and I had the first meeting [with the student support officer] two months after I started (ID24).” In general, students reported the attitude of the student support officers as “helpful,” “understanding,” and to some extent “ignorant.” One student mentioned: “They told me, if there is anything you need, please come to me (ID25),” while some others were disappointed and negative about the attitude of the student support officer: “They [student support officers] don’t know what to offer you and they don’t get it. They first ask for your student number, they enter it. ‘Your grades are very good. What is going on?’ ‘Yeah, well, it’s a bit tricky with noise and stuff’. Then they suggest that I should study in the library (ID8).”
Adjustments
This subtheme encompasses the experiences of the students related to the arrangements or accommodations and adjustments at their department and institution for higher education, related to their hearing loss. All students were enrolled in mainstream higher education and studied with or without various additional support, services, and arrangements. For the most part, students spoke about general access arrangements, hearing loss-specific adjustments and receiving appropriate adjustments. While for the majority of the students (some) adjustments were made, some students explicitly preferred not to, for various reasons. Some students expressed that they did not want to be “an exception” or mentioned that adjustments were “exaggerated” or “irrelevant” for them. It was also mentioned by students that they “did not feel like arranging the adjustments (ID44).” In the absence of knowledge about the possible adjustments, a student mentioned: “I don’t know what can be arranged, because I have no idea what they could do (ID27).”

General access arrangements
Adjustments to exams are called access arrangements. Students who did make use of arrangements most frequently reported extra time or the opportunity use a separate room while taking exams as an access arrangement. Furthermore, students mentioned the use of a dictionary, captions or Communication Access Realtime Translation (CART) services. One student talked about an extra check during the exams: “all spoken instructions they [invigilators or lecturers] give before the exams start, are written down for me. And if they provide additional information during the exam, for example about a question or additional information that is not on the exam paper, they come to me and check if I’ve heard that too and explain it again if necessary (ID33).”

Hearing loss-specific adjustments
Most students described hearing loss-specific adjustments although the individual experiences and type of adjustments showed a great variety. Students mentioned the use of an interpreter or CART-service, the use of FM-systems, the possibility to watch a recorded class in silence afterwards, and receiving handouts of the class presentation in advance. All students who made use of the CART-services were very satisfied with this service. The word-for-word transcription of speech to text enabled students to read what was said during lectures on their laptop. The CART-services were either provided on-site or remotely. Students explained is was less tiring and easier for them to keep up in class, especially in big lecture halls. About the handouts of the class presentation, one student explained: “I need those handouts... Because reading the PowerPoint slide and simultaneously keeping an eye on who is talking, that doesn’t work for me, because I can’t write and listen the same time (ID22).” Students repeatedly mentioned adjustments with regard to the experienced fatigue, as a direct result of the extra listening effort that is required. Although the experience of hearing loss-related fatigue across students varied, a significant number of students explained that this was a major issue that they faced. As one student put it: “I cannot take two lectures in a row. I absolutely cannot. After the first lecture I am completely devastated (ID51).” Furthermore, taking a limited number of classes per day or taking a break during or after classes was mentioned by students as an adjustment. A student explained: “I just leave the class for a while, when I’m done with intense listening. Of course, I have to mention it, but the lecturers understand and it’s in my Individual Learning Plan (ID32).” Having the opportunity to switch classes because of the intelligibility of the lecturer was mentioned by a few students as an easy and quick adjustment. One of the students reported that the speech intelligibility of her thesis supervisor played a role in selecting him. “Out of the twenty thesis supervisors, two of them were native Dutch... The level of English is not a problem for me, it is the foreign accent of the professor that makes it difficult for me to understand. So I just choose a professor with not such a heavy accent, then my problem was solved (ID22).”

Arranging appropriate adjustments
All institutions for higher education had a system in place through which students’ needs were identified and documented. They used Learning Support Plans (LSPs) or Individual Learning Plans (ILPs); a tailor-made document that clearly explains what impact a disability and/or long-term or serious medical or psychological condition have on a student’s studies. These plans set out specific support and any reasonable adjustments to help students to succeed. LSPs (or ILPs) are drawn up in consultation with the student and the student support officer. Although the plans document how courses and exams will be made accessible for a student, each individual lecturer will play his or her own role in how those recommendations are implemented. Students underlined their dissatisfaction about by the way the application procedure and the adjustments in teaching and assessments were arranged. Many students experienced difficulties in the procedure and the way “the paperwork” was handled. As one student put it: “It took me months getting the right letters stating that I could get adjustments for my hearing loss (ID22).” Another student gave up because of the lengthy procedure: “I had to put in so much effort and time to get through all those administrative procedures. So then I thought, ‘yeah, it’s fine. I’ll see what happens [without arrangements]’ (ID34).” Although students reported positively about the attitude of the student support officer, sometimes, they came across to the students as ignorant when it came to actual adjustments. A student mentioned that although he spoke to a professional, “I had to figure it out myself (ID25).” One student brought up: “... but for a student with dyslexia everyone knows what to do (ID34).” Students were asked about what they
thought were the appropriate adjustments and support for them. This question caused irritation among some students as they said: “I can’t really answer that question. Yeah, ’what do I need?’ (ID38)” or “don’t ask me (ID40).” A few students mentioned that they were used as a source of information for other students who are D/HH by the student support center: “I am now the person everyone is sent to (ID31).”

**Learning environment**

The learning environment in the higher education context prevailed as a subtheme in the interviews with the students. This section examines the student’s perspective on the classroom acoustics, the technological support they use to overcome intelligibility problems, and the learning infrastructure at their institutions.

**Classroom acoustics**

Students described that the classroom acoustics had a major impact on the intelligibility of speech during lectures. How well students could understand the lecturers was dependent on the type of building and the size and interior of the classroom. In “new buildings,” “small classrooms,” or classrooms with acoustic absorbing materials as “carpets or curtains,” students had less problems to hear the lecturer. Regarding big lecture halls a student explained: “Some big lecture halls which can accommodate 500 to 600 students are acoustically excellent because they were made to play a piano in it, while other lecture halls are a real acoustic disaster (ID22).” The relation between classroom acoustics and students’ academic success became clear as it hampered students to understand what was said in class. “I took classes in an old monastery. I really couldn’t understand the lecturer. Could as well not go to those lectures (ID49).” A student expounded: “The acoustics are so bad in there, that I have a headache after ten minutes and it takes so much energy that I fall asleep afterwards. So that is not feasible for me, but because of that I missed so much information in the first three modules that I did not get my credits (ID45).” To overcome intelligibility problems, students consciously chose their position in a lecture hall or classroom. Students preferred to sit “in the front” or “in the front half,” “right in front of the lecturer” or “at the front right”; however, the majority did not wanted to sit in the first row. Students had several reasons to choose for a specific position in a classroom: “three-four rows to the back, because then I can read and see the lecturer’s face and I can look around (ID29)” or “I prefer not to have students sitting behind me because the microphone [of the hearing aid] is at the back, so when two people behind me whisper a little in class, it feels like they are doing that, say, next to me (ID27).” Yet, it was not always possible to get the position of choice: “I have had lectures in halls that were packed. If I was a little late, I had to sit in the back. Then I cannot make use of lip reading (ID51).” Whereas sitting in the front was for most students the wise choice to make, it was not always what they wanted. As one student put it: “it is a consideration you have to make. Do you sit with your friends or do you sit in the front? (ID34).” Another student proudly mentioned: “In the new buildings, I can even sit in the back (ID45).”

**Technology**

Three technological support systems were mentioned by the students to overcome intelligibility problems in classrooms and lecture halls, namely the use of a microphone by the lecturer, an induction loop, and a personal FM-system. The use of a microphone by the lecturer was always cited as beneficial. Most students mentioned that using a microphone in lecture halls was a standard procedure during lectures. “Generally they [lecturers] do use a microphone in a lecture hall. But sometimes it [the microphone] does not work (ID28)” or “except for one lecturer who thinks he can be understood very well (ID33).” In some lecture halls, an induction loop was installed. An induction loop transfers the lecturer’s voice from the audio system microphone to an HA using an electromagnetic field, allowing the student with the HA to hear the sound without any interference from internal acoustics or the environment. When available and operational in the lecture hall and compatible with the students’ HA, an induction loop was helpful for the students. As one student put it: “That is an invisible thing... There is a sign ‘induction loop available’ and then you know that you can switch to the induction loop setting (ID44).” A personal FM-system was used by a number of students. Students gave the microphone to the lecturer or put it on the table when working in small groups so they could hear the speaker’s voice directly. Some students were satisfied with the way lecturers handled the use of the FM-system and it perfectly helped them to understand speech in class. Others tried the FM-system but concluded “it is such a hassle every time (ID47).” Some students felt shame to use an FM-system. ”The fact that you have to walk to the front every time, in front of three hundred people, to give that thing to the professor ... Sorry, but who wants that? Because people are looking at you (ID22).” Another student described: “Everyone walks upstairs to exit the lecture hall, but I have to walk downstairs to get my FM-equipment. And then the next group of students already enters the lecture hall. That is very difficult and causes a lot of stress (ID24).”

**Study environment**

Apart from classrooms and lecture halls, students spoke about places to study or have lunch at their institution. Students preferred to study in the library or at home, because they liked the quiet acoustics there. Although students were not keen to use the common study areas, sometimes students had to make use of these areas in the building. “I really have to do my schoolwork at home, but that is difficult with group projects. Then you sit there [the computer area] anyway, but I didn’t hear anything (ID8).” When students spoke about the
(lunch) breaks during the day, it became clear that they made other choices than their hearing peers. One student explained: “I really had to find out where I could sit quietly, because the canteen and the main building are really busy and there is a lot of noise (ID24).” Another said: “I don’t often sit in the canteen with my classmates. I can’t hear anyone there. Then I’ll sit somewhere else (ID51).” When students joined their classmates with TH during lunch, they did not feel part of the group: “During the break I sit in the main building with my group. Then three conversations are going on at the same time. Sometimes I don’t understand any conversation at all and then I feel lonely. Look, I am there, but very often I just can’t participate in a conversation (ID49).” One student arranged access to a quiet room in the ILP. “I can make a reservation for a classroom, to relax during the breaks (ID35).”

**Personal support**

All of the interviewed students had (some) interactions with hearing peers; nevertheless, some students were more successful than others in establishing relationships with them. The majority of the students explained that they were the only student who is D/HH at their department. Three students were aware of perhaps one other student who is D/HH at their institution for higher education, but they did not interact with them.

**Friends**

Most students became friends with classmates and peers with TH and they described this relationships as equal, although sometimes their friends “had to help me when I couldn’t understand (ID40).” Some students preferred not to meet with friends (from school) for fun, because they “don’t need it (ID35),” “don’t like to go to a bar (ID8),” or as one student put it: “I’m not a party type myself, so I don’t go to parties (ID42).” Meeting new people or talking to people in noisy places was described as “difficult” and “tiring.” As one student put it: “When I am with people who I don’t know, I find it more difficult to read their lips... so after two or three hours I want to leave because it is just too tiring (ID26).” Another student explained: “I don’t like places with loud music. I don’t understand anything and that I don’t like. I prefer to talk to people and that is not possible there (ID38).” Other students indicated that they were able to meet with friends, but only when scheduled in advance. “I have to plan social events, so maybe I’m not as spontaneous as others. I need to have a specific time and then I can look for a place to have a drink, somewhere a bit quiet (ID40).” One student talked about her experience meeting hearing friends and put it as follows: “I force myself to do it, because I want to be part of it. Actually I don’t like that, because there are eight people at a table and it is super busy in there. I can’t understand the conversations and don’t know what it’s about. So I’m just pretending. Not pretending I’m enjoying it, but pretending I understand the conversations. I can manage to talk to the people sitting next to me, but if something happens behind me, a joke for example, I always hear them later. Then I think: ‘yes, now I can laugh about it, but it is already over’. It’s all going too fast. So then I just pretend (ID39).”

**Associations**

Some students reported joining a study or student association for predominantly hearing students, others expressed preferences for joining a deaf or hard-of-hearing (D/HH) organization. The majority of these students attended events organized by the study association “a few times per year (ID34)” or “only when the program appeals to me (ID26).” One student explained why he consciously chose to join the hearing fraternity: “I think it is the most important thing, because you have to have a social network. It is more important than your study... You shouldn’t want to hear everything [in a group], because if you want to hear everything, then you are...”
also afraid of missing something and as a consequence more afraid to speak up (ID50).” Some students joined a national D/HH-organization who focused on “young people.” Through this organization, students met other students who are D/HH. “First I did not meet other people with a hearing loss, it just started two years ago, after I contacted this DHH-organisation (ID33).” Students mentioned the importance of this organization for them: “There, I did build real friendships (ID35)” or “It is just so much easier. You can understand each other, even if you don’t understand each other. I don’t know, it’s just different (ID8).”

Family
When students spoke about their family, they described these relationships as supportive and caring. Parents mainly played a role in choosing a study program and sometimes students visited study orientation days together with their parents. Students explained: “It is my choice, but my father helped me a bit (ID23)” or “once I decided I wanted to study, they were very supportive. They [the parents] also thought this study suited me very well (ID24).” Some students explained the supportive attitude of their parents helped them through hard times: “I was urged by my mother to go to the orientation week at the university. I found it difficult to make new friends and talk to people. But it was the right thing to do (ID43).” One student recalled: “Thanks to the support of my mother, I have started to see that it [making new friends] is not too bad (ID39).”

Fatigue
A reoccurring topic of conversation during the interviews was the experienced fatigue. Students spoke about it in relation to their participation in the classroom environment, but it clearly also had an impact on the students’ personal life and well-being. A lot of students mentioned that they were very tired after a school day. A student explained: “normally I come home after school, then I lie down on the couch till dinner, eat something, and go back to the couch until I go to bed (ID49).” Someone else clarified: “When I come home after a day at school, I immediately take off my hearing aid and cochlear implant to get some rest (ID48).” The effort it took to listen and participate in higher education was mentioned by a student as: “Sometimes I think: ‘What have I done? Just listening!’ Listening takes a lot of energy (ID36).” Another student concluded: “I have extra hurdles to overcome and an extra effort to make, that’s tiring, only it is not seen (ID8).”

Discussion and Conclusion
This qualitative analysis identified commonalities of responses and themes across students who are D/HH and provided insight into the experiences and perceptions of these students in mainstream higher education. This study addresses three research questions, which will be discussed in this section.
some positions or areas, had repercussions to the social interactions of the students. The experiences of the students who are D/HH in this study support the view that classroom acoustics affects students well-being and performances in schools (e.g., Crandell & Smaldino, 2000; Klatte et al., 2010; Shield & Dockrell, 2003) and had an adverse effect in the recognition of speech in noisy situations (Crandell, 1993; Hall, Grose, Buss, & Dev, 2002; Koopmans, Goverts, & Smits, 2018).

(2) What support do they need (from their social and academic environment)?

Access arrangements and adjustments in the educational program were needed for the majority of the students to cope with the experienced fatigue, participate during lectures or increase speech intelligibility of the lecturer. To reduce the experienced fatigue, a limited number of classes during the day or the possibility to take breaks (in quiet) is preferable for many students who are D/HH. Research has shown that, to different extents, hearing loss-related fatigue is experienced by many people (Holman, Drummond, Hughes, & Naylor, 2019) and cannot be predicted by the severity of hearing loss (Alhanbali, Dawes, Lloyd, & Munro, 2017). To overcome intelligibility problems, technological support (use of a microphone by the lecturer, induction loop, FM-system) was cited as beneficial by the students who are D/HH in this study; however, because of practical or social reasons, these were not always the preferred or possible option. The social reasons students mentioned for not using the FM-system might be related to the hearing aid effect (Blood, 1997), the stigma associated with wearing HAs, as the use of HAs can be associated with negative perceptions of others about the person who wears them (Polat, 2003). Although using technological support for hearing can be useful, young adults might chose not to, as the perception of others is (more) important for them (Cienkowski & Pimentel, 2001; Kent, 2003). Furthermore, the students who are D/HH in this study encountered a complex and lengthy procedure when it comes to arranging appropriate adjustments. They expected a more proactive approach coming from the student support officers to facilitate the possible and appropriate arrangements or adjustments for students who are D/HH. At this point, there seems to be a deadlock, because on the one hand, students do not (always) know what they need and on the other hand lectures and student support officers do not (always) know what to offer to the students who are D/HH. Protocols, as available for university students with dyslexia for example (Kirkland, 2009), are not that obvious for students who are D/HH but might be profitable for this group of students or at least can be a starting point to break the deadlock at this point. Mullins and Preyde (2013) concluded that university students with invisible disabilities require different types of adjustments. Nevertheless, these adjustments have received less attention in the field of evaluating the needs of students. Additionally, an implication for practice can be to provide additional training and support from other professionals (e.g., speech language therapists, social workers, Educational Need teachers) to lecturers and student support officers about the needs of students who are D/HH. To support students, it might be beneficial for lecturers to experience more self-efficacy in teaching students who are D/HH (Keith & Ross, 1998; Polat, 2003). The social support during college years for the students who are D/HH in this study mainly came from friends and family as they played an important role in the life of the students. Students felt that they were encouraged, supported, and motivated by them. These findings are consistent with several studies reporting that social support is of crucial importance for a student’s educational career (e.g., Antonson, Danermark, & Lundström, 2006; Seničar & Kobal Grum, 2012; West, 2017).

(3) Which coping strategies do they apply in order to reach academic success?

Most of the students who are D/HH in this study had (developed) a proactive attitude to get what they need to study in higher education, a finding that is consistent with the study of Powell et al. (2014). In general, they did not want to stand out in the group, and therefore, “invisible” arrangements or adjustments (e.g., induction loop, mutual agreements between students and classmates or lecturers) were preferred. Yet, students spoke openly about the hearing loss with others with TH and to some extent they were actively involved in social interactions. However, participating in social events took quite some effort for the majority of the students and sometimes causes a feeling of loneliness or separation. Similar to the results described by Kersting (1997), the students who are D/HH in this study found some degree of social satisfaction within the hearing community, the deaf community, or both. However, they consciously had to choose the events, the timing, and the setting as they experienced hearing loss-related fatigue. Some students who are D/HH in this study joined events organized by the study association. Oliva (2004) described that conversations in a canteen area or pub are unstructured, could be about any topic and topic changes happens fast. In an extracurricular setting as organized by a study association, however, the conversation will center around the activity, and thus, participating might be easier for students who are D/HH as they know what linguistic content can be expected.

The findings of this study have to be seen in light of some limitations. The perspectives of the interviewed students in this study represent the experiences of a small group of students who are D/HH in mainstream higher education, whose perspectives on academic success were viewed from environmental factors and personal factors. The way the participants in this study were recruited might have skewed the findings as sampling bias could have occurred. By using a non-random sampling technique in which students who are D/HH applied voluntarily, students who are not willing to share
information are missed. However, this study requires specific information from a particular subset of the general higher educational student population. Purposive sampling was the only way to get to this relatively small population of interest, as students who are D/HH are not registered as such at universities. For the purpose of this study, no criteria were set to the spoken language proficiency of the participants. However, as a result of the entrance requirements to the university, all participants were able to comprehend and express themselves in spoken Dutch. As a consequence, the perspectives of the interviewed students represent only a subgroup of postsecondary students who are D/HH. The students who participated in this study differed in severity of the hearing loss as a heterogenous group of deaf students and students with mild, moderate, severe, and profound hearing loss were included. Although hearing loss-related fatigue cannot be predicted by the severity of hearing loss (Alhanbali et al., 2017), it is not clear whether the severity of the hearing loss differentiates them in any other significant way from each other. Some students with a mild hearing loss might need a lot of support from their social and academic environment, whereas others with profound hearing loss do not need or want access arrangements or adjustments in their educational program. Perhaps, it is not (only) the severity of the hearing loss that determines what these students need to achieve academic success. A variety of factors, including audiological, communicative, family factors, and academic preparation, are related to the academic success for students who are D/HH (Convertino, Marschark, Sapere, Sarchet, & Zupan, 2009). Further research should look into the quality of the support, as well as the effort is taken to get what the students need, might also impacts students’ academic success.

In general, the results in this study are consistent with comparable studies conducted in the past decade. However, there are still (new) barriers to academic success for students who are D/HH in mainstream education in The Netherlands and in countries with similar inclusive educational systems. Based on the insights from this study, an implication for practice would be to invite students who are D/HH to co-create a policy for students who are D/HH in mainstream higher education. By sharing wishes, needs and ideas students who are D/HH together with policy makers at student support centers can create a menu of possible arrangements and adjustments. It is important to leave room for individual differences; however, having options makes it easier for students who are D/HH to find out what they need.

Conflicts of Interest
No conflicts of interest were reported.

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References


A. Appendix

Interview Protocol

Prior to the interview, set up the room with two chairs facing each other (check if there is enough light), a table and a drink for the participant. There will be one audio recorder on the table. When participant arrives, take time for and introduction and thank them for coming.

I will introduce myself as the researcher and explain, again, the purpose of the interview and the study, what will happen during the interview, and ensure confidentiality. I will also give the participants a bit of background about myself and my interest in this topic and the study. Ask them if they have any questions before we start.

The questions will be open-ended questions designed to elicit lengthy responses about their experiences. The interviewer’s role is to listen to the participants and ask questions that encourage the participant to expand upon their responses and to clarify as needed. The interviewer will sometimes paraphrase their words back to them during the interview to ensure clarity and understanding of their experiences.

Question #1. You told me that you attend (name of university). Tell me a bit about your reasons to attend this specific university and what made you decide to apply to this university. Possible follow-up questions: How did you get your information about this university? Did you get any help in the process of making your decision for this university, from who and how? What expectations did you have prior to your start at this university? To what extent did your hearing loss impact your decision for this specific university? Describe your feelings and thoughts as time to enroll became closer and on your first day arriving at the university. How do you feel about your decision to attend this university now?

Question #2. Describe how you experience the acoustic environment at this university in general and in the classrooms specific. Possible follow-up questions: What were your thoughts about the acoustics in lecture halls/labs/regular classrooms? What impact did the acoustics have on you learning experiences (practical and social)? If so, what is the type of noise that bothers you during class?

Question #3. You are a student with a hearing impairment at a mainstream university. Tell me about your experiences with the professionals around you (lecturers, student support officers). Possible follow-up questions: Did you make any adjustments or arrangements in your learning plan related to the hearing loss? Can you tell me about the process of getting the right support? How did you tell your lecturers or student support officer about your hearing loss? What experiences have shaped or influenced your thinking about being a student with a hearing loss in a mainstream university environment?

Question #4. Describe your experience integrating into the academic and social culture of this university. Tell me about your experiences in and outside the classroom (your first few weeks, your first semester). Possible follow-up questions: What was your experience adjusting to the academic environment? Of participating in the classroom, interacting with your lecturers, and being involved in the learning experiences? How did you address your hearing loss at your classmates/lecturers/ student support officer? What was your experience adjusting to the social environment? And the interaction with your peers? What experiences in terms of your academic and social integration stand out the most for you?

B. Appendix

Coding Manual

Technology

Technological facilities and products that can be used in the educational context by students who are D/HH. This includes the following: (1) Equipment, products, and technology used by the students in daily activities; (2) Equipment, products, and technology used by the students in the transmission and reception of information, including those that have been modified or specially designed, such as HAs, audio recorders and receivers, television and video equipment, and sound transmission systems.

Support in transition

Support and relationships: activities of people who provide practical, physical, or emotional support in the transition to higher education. For example: offering support in making a choice for further education.

Social network

Factors related to social (emotional) functioning and participation in social interaction that influence the student’s experiences. These can be people in the educational context or non-school related peers/friends but do not concern the professional relationship such as student versus teacher/study career coach or student support officer.

Personal

Personal experiences of students with regard to the educational context; lifestyle and mental personal factors: living situation, experience of illness, coping style, expectations of studying, degree of independence, attitude, motivation, self-disclosure of hearing impairment, knowledge about support options, mental health, travel.

Educational environment

Physical space, design, and organization of education. For example: number of students in the study program, number of students per class, classroom type, language of education, information facilities, internships, daily study routine.

Professional support

Professionals who offer support in terms of practical, physical, or emotional support, care, protection and assistance in the context of facilities for students who are D/HH.

Needs

Wishes and needs expressed by the students who are D/HH. Students indicate what they would like to see changed in their studies, possible solutions, and how that should be offered by the university.