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Towards active patient involvement in hearing consultations

Exploring the potential of digital collaborative technology

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Abstract

This master thesis addresses the problem of how patients can be actively involved in hearing aid consultations. The purpose of this thesis is to provide a better understanding of benefits and challenges related to patient-practitioner interactions in collocated settings for the purpose on how collaborative technology can support active patient involvement. I followed a qualitative approach which include field observations of audiological consultation in hearing clinics and focus group interviews with relevant stakeholders. The results of the conducted research show how audiologists use empathy and adaption of information in order to develop a relationship. Based on these findings I discussed the benefits and challenges with conceptualized scenarios. This thesis concludes that a audiologists abilities in a same time-same place interaction is difficult to replace with technology, but technology can instead be a supportive tool in hearing rehabilitation and patient-practitioner interaction.

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A.M.S.

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Chapter 1

Introduction

Healthcare services have gone through a major digitization over the past 20 years. New technology provides new collaborative methods for patient-practitioner interactions and enables patients to take an active role in their own treatment. The traditional patient-practitioner relationship is changing as a result of the rapid development of information systems in healthcare practices. Digitization is facilitating new forms of patient-practitioner interaction and the usage of technological aids.

Technology is affecting every aspect of healthcare, and enables new interaction methods between practitioners and patients. Remote patient-practitioner interactions are now possible by using smartphones, virtual reality and digital wearables. This means that patients have the opportunity to become more engaged in their own treatments than ever before. Patients have the choice to be actively involved in this process, and this patient involvement is influencing traditional consultations. For example, remote communication technology has for example helped overcome the physical distance that may separate a patient and his or her healthcare provider.

Today, a typical consultation takes place face-to-face, at the same time and at the same place. Consequently, there may be efficiency and cost challenges. Patients may experience a long waiting period before receiving a consultation date, and som epatients may require several consultations during a treatment period. Recent research suggests that collaborative technology may add value to collocated face-to-face interactions between a patient and practitioner. However, far less attention has been given in research literature to the role

technology can play in such situations. Technology can equally be either a hinder or a helpful tool in treatment, and thus create a loss of emotional presence and support [Chen et al. (2013)].

This thesis investigates a specific type of collocated patient-practitioner encounter: audiological (hearing) consultations. The intention is to explore challenges and barriers connected to communication in patient-centered care, and investigate how technology can potentially bridge the communication gap between patient and practitioner. A consultation between an audiologist and a patient normally proceeds as follows:

1. A hearing test that generates an audiogram that shows the status of the patients hearing quality.

2. A conversation between the practitioner and the patient about the results from the hearing test.

3. Hearing aid tuning and configuration.

4. A dialogue between the patient and the audiologist about what further actions need to be taken in order to achieve the best possible listening experience for the patient.

During the consultation, the patient is informed, educated and motivated by the practitioner throughout the hearing aid process. Studies have shown how active patient involvement can make a difference regarding user satisfaction [Lee et al. (2015)]. In order to obtain optimal user satisfaction, the patient and audiologist must find common ground, agree on a mutual assumption for the best possible treatment [Clark et al. (1991)].

Communication and digitization in audiology is an human-computer-interaction (HCI) challenge because it concerns how digitization and technological aids affect the interaction between patient and practitioner. It affects the interaction between humans, but also how they interact with technology. This case study is interesting both from an interaction design perspective and a collaborative work perspective. The topic addressed in this thesis requires an in-depth understanding of the challenges that can prevent active patient involvement and improved patient-practitioner collaboration. By understanding the nature of the communicative challenges between the involved parties, this could provide better conditions

for designing technology which successfully can build a shared understanding between patient and practitioner.

The topic for this thesis is the active involvement of patients in hearing consultations and understanding the role of digital technology to promote active involvement. This thesis will address the following research questions:

- Research question 1 (RQ1): What qualities do collocated face-to-face interactions offer in terms of active patient involvement in today's audiological consultation practices?
- Research question 2 (RQ2): What challenges or barriers do collocated face-to-face interactions offer in terms of active patient involvement in today's audiological consultation practices?
- Research question 3 (RQ3): What are the key lessons we can learn from the findings related to the role digital technology can play in promoting active involvement of patients in their own hearing rehabilitation?

To answer the above research questions, I have followed a qualitative, user-centered approach. Relevant data has been collected for RQ1 and RQ2 through a set of field observations of consultations in hearing clinics, in addition to a focus group. The insights from these research strategies have been used in the discussion of RQ3 where I discuss the technologies role based on two conceptual scenarios.

The main contribution of this thesis is (1) a qualitative understanding of current practice and challenges related to active involvement of patients in hearing consultations, and (2) reflections on how such an understanding may shape design of digital collaborative technology for such situations.

In chapter 2, the relevant theory is presented. Chapter 3 gives an in-depth presentation of the case study, where the audiological consultation is put into context. Chapter 4 describes how the research was conducted and presents the field observations and focus group in detail. Chapter 5 explains the data collection process with examples. Chapter 6 gives an overview of my findings analyzed from the collected data, and the most important findings are discussed in chapter 7 in addition to methodological reflections. Finally, chapter 8 summarizes and concludes the thesis.

Chapter 2

Background

In this chapter, I will present relevant research literature that lays the foundation for my study. The chapter introduces relevant key concepts such as patient-centered care and patient involvement that enhance the importance of the relationship between patients and practitioners. Then the term computer-supported cooperative work will be presented and will give an introduction of the different collaboration scenarios, and the importance of establishing a common ground between patient and practitioner.

2.1 Patient-Centered Care

Patient-centered approaches to healthcare provision have gained considerable attention in healthcare literature over recent years. Nevertheless, some ambiguity exists about its meaning. No definition for patient-centered care is officially accepted, but there are some common terms that recur which attempt to explain the term: information, education, communication, care coordination, engagement and accessibility. "Understanding the patient as a unique human being" [Balint (1969)] is one way to describe patient-centered care. There is a focus on the patients' relationship with their own health, and their relationship with the practitioner. In other words, a type of consulting where the practitioner uses the patient's knowledge and experience to guide the interaction [Byrne and Long (1976)]. The patient-centered clinical method includes the six following components [Brown (1998)]:

1. Exploring both the disease and the illness experience

2. Understanding the whole person
3. Finding common ground regarding management
4. Incorporating prevention and health promotion
5. Enhancing the doctor-patient relationship
6. Being realistic about personal limitations and issues such as the availability of time and resources.

For this thesis, "Finding common ground regarding management" and "enhancing the doctor-patient relationship" are the most important items on this list, and will be recurring topics throughout.

There has been a shift in patient-practitioner relationships, going from the cooperation-guidance model to a mutual participation model[Mead and Bower (2000)]. Power and control are not longer in the hands of the practitioner, but rather are shared with the patient. The patient can now be involved in medical consultations through shared decision-making. A patient-centered approach should invite the patient to participate and encourage this type of behaviour. In this thesis, the term practitioner will describe a person with a high level of expertise in a certain domain.

The role of the patient has changed from being a "sick person" to a "client", and patient satisfaction is now an important factor in order to measure the quality of healthcare [Rozenblum et al. (2015)]. The patient's role is now one where the patient is more involved in the whole process. The modern patient will most likely try to diagnose him or herself before a consultation. Using the internet and pages such as www.diagnose-me.com, and symptoms.webmd, patients retrieve information on symptoms they might be experiencing. This is not recommended as the patient can interpret information wrongly because of lack of knowledge and necessary expertise. To open up for patient involvement, there has to be a balance and a common understanding between the patient and practitioner. By using technology platforms and tools, this gap can be filled and therefore allow for better patient-centered care in audiological consultations.

Patient-centered care calls for the implementation of infrastructural changes [Epstein et al. (2010)]. The implementation itself will not automatically be patient-centered. E.g introducing electronic health records will not solely create patient-centered care. Patient-centered care is dependent on strengthening the patient-practitioners relationship, and has to facilitate patient involvement in own care. It is the patient that is the best judge of whether an interaction is patient-centered. However, what the patient wants does not always correlate with what the patient needs.

The outcomes of patient-centered care impacts patient satisfaction, patient adherence and health outcomes, and practitioner outcomes [Grenness et al. (2014)]. Patient-centered interactions are linked to improved patient satisfaction. Research shows that by motivating patients into action by involving them in decisions leads to improved adherence, and results in a positive impact on health outcomes [Michie et al. (2003)]. Also the practitioner benefits from patient-centered care in terms of higher job satisfaction, as practitioners have rated patient-practitioner interactions as more satisfying [INTO (1997)].

Patient-centered care is the opposite of evidence-based medicine. Evidence-based medicine is a disease-oriented approach and relies on using the "gold standard" of finding evidence for the most adequate treatment [Bensing (2000)]. Instead of being patient-centered, it focuses on the doctor's interpretation of evidence and diminishes the patient. Patient-centered medicine believes that the patient is more than his or her disease. Social and psychological elements are valued as important as the bio-medical elements [Smith and Hoppe (1991)]. Both approaches affect the process for clinical decision-making during a consultation, but focus on different aspects.

Patient involvement is a complex, multi-faceted and dynamic concept. Not all patients want to be actively involved in every step of their treatment, but rather they appreciate optional involvement, with different degrees of involvement depending on context [Thompson (2007)]. In other words, it differs as to how active patients wants to be involved in own treatment. In order for a patient to be involved in decision-making regarding their own health, this requires an understanding of complex health information. There are even differences as to how the patient wants to be involved based on different levels of education [Smith et al. (2009)]. Patients with higher education want to be treated as equals, while patients with lower

education value the practitioners empathy and genuine interest for their well-being.

2.2 Computer-Supported Cooperative Work (CSCW)

With the changes occurring in the healthcare environment, a transformation of its delivery practices and business models follows[Reddy et al. (2010)]. New information technologies can help address these challenges that arise [Reddy et al. (2010)]. The need to understand collaboration in heathcare is increasing, and technologies must be designed to support collaborative work in patient-centered care. The concept was introduced for the first time in 1984, and researchers in the CSCW field have worked in the healthcare domain ever since.

Researchers in the CSCW field have worked in the healthcare domain for decades and this is therefore relevant for further research [Clear and Basole (2014)]. CSCW consists of software tools and technology that supports a group of individuals working on projects at different sites. The goal is to provide identical improvements for multiple individuals working on the same or different production processes [(Techopedia, 2018)].

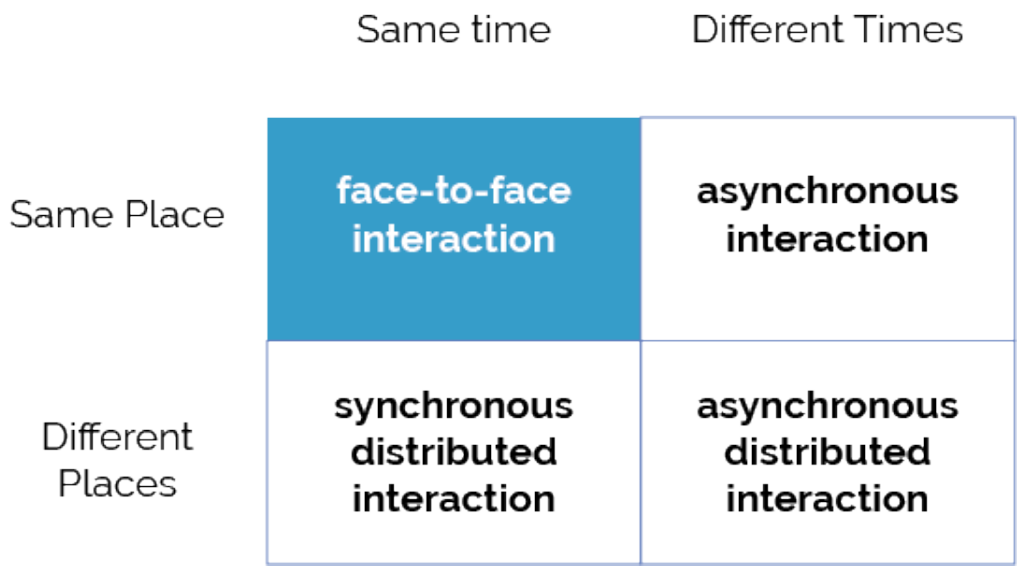


Figure 2.1: The Time/Space Taxonomy (adapted from Ellis 1991)

Figure 2.1 gives an overview over different scenarios where ***Computer-Supported Cooperative Work (CSCW)*** can be used. Collaboration is here classified according to whether the participants are interacting at the same time or different times, and at the same place or

different places [Ellis et al. (1991)]. The matrix shows the four types of collaboration: same place and same time, same place and different time, different place and same time, and different place and different time. A traditional patient-practitioner consultation is classified as a same time-same place collaboration, and is the main collaboration type we will focus on. This means that the participants' communication to each other is immediately processed by the other party as soon as they receive it [Dewan, (1997)], a face-to-face interaction. Examples of CSCW are smart phones, digital whiteboards, electronic meeting systems, and other varieties of roomware. These types of technologies impact the face-to-face interactions and are conceived to enhance communication and collaboration within a real-time interaction (Ellis 1997). The computer systems used in CSCW rely on user interface that support multiple users.

CSCW in healthcare is a challenge as it involves many different stakeholders across different sectors. "healthcare requires collaboration, as does system implementation, yet there is difficulty in translating among specialties, stakeholders, clinicians, and implementers, sometimes to the point of a seeming 'culture clash'"[Kaplan and Harris-Salamone (2009)]. Research regarding CSCW in healthcare underlines the importance of understanding existing practice and explore how this can be improved by using electronic systems.

2.2.1 Common Ground

Common Ground is a concept proposed by Herbert Clark and Susan Brennan [Clark et al. (1991)], and refers to mutual knowledge, belief and assumptions that are essential for successful communication between people. In the same time-same place scenario, the face-to-face interaction is a joint action with shared intention. The shared intention is to reach a shared understanding. This is easier to reach when sitting in the same place as the person you are communicating with. When computers communicate, there is a common code that is shared and translated into bits which is then translated back to sensible information. Human communication does not have this common code. Research suggests that we must use this common ground theory in order to achieve meaningful human-to-computer interaction [Monk (2003)]. Face-to-face interaction involves more than just words, but also our hands, facial expressions, body language and tone of voice. All of these factors contribute in how the participant receives the message.

In a consultation setting, it is crucial to secure, common ground between patient and practitioner. For this to happen, the practitioner has to be an active listener, display an understanding for the patient's situation, and structure the interaction providing information and summaries (Egbert 2012). This shared understanding is complex and not always easy to agree upon. One reason for this is the asymmetry that will be described more detailed in Chapter 3.3. There are different levels of knowledge, power, motivation and experience between the patient and practitioner.

2.2.2 Technology Use in Medical Consultations

Several different researches have been conducted in the use of collaborative technology in a medical context. Although technology offers a wide range of benefits, research shows that technological aids can be a barrier during a medical consultation. A study compared paper charts with digital information devices and found out that technology lacked visibility of actions, gesturing and good verbal contact [Alsos et al. (2012)]. E.g when stationary computers were introduced into the consultation room, research suggests that they impaired the interaction and became a third party in the dialogue between patient and practitioner. "Physicians spent close to one-quarter of visit time gazing at the computer screen, and in some cases as much as 42% heavy keyboarding throughout the visit was evident in 24% of studies visits" [Margalit et al. (2006)]. This suggests that the computer affects the socio-emotional relationship between the participants as the practitioner appears to be disinterested or disengaged with more focus on the screen than on the patient. The screen gaze disrupts the building of trust between patient and practitioner and therefore can act more as an obstacle than a collaboration tool.

Another study looked at how "Computer-on-Wheels" could help transform the computer from being an obstacle and instead encourage patient participation [Chen et al. (2011)]. The computer is usually a static, non-movable artifact and lacks the flexibility that the paper charts have. In the study they discovered that collaborative viewing is used when the practitioner educates the patient on how to manage symptoms and further progression. The patient shares the desire to get better and therefore wants to better understand the disease and treatment. The computer screen becomes the "common information space" where the parties can discuss

the disease. Results showed that patients were curious to know what the practitioner was doing on their computer, rather than wanting to read the text on the screen word for word. This curiosity caused a barrier in the patient-practitioner interaction and blocked human contact physically.

Technology can also enable effective communication between patient and practitioner. A study was conducted in 2014 to see how "BodyDiagrams", an online interface for expressing symptoms via drawings and text, would impact communicative efficacy [Jang et al. (2014)]. In this study they compare textual symptom descriptions to visual symptom descriptions. Textual descriptions tend to be ineffective, vague and confusing. The reader must interpret and translate the description. This can lead to incorrect interpretation and diagnosis. By using BodyDiagrams to describe symptoms, the diagram was rated as more likely to be correctly interpreted, more detailed described, and are preferred to use by patients. The diagram acted like a communication tool for patients and practitioners and is an example of how technology can support and promote collaboration in medical consultations.

Chapter 3

Case Description

This chapter presents a detailed description of the case, explaining what happens in a typical consultation, the patient-practitioner interaction in audiological consultations and current relevant research related to the case.

3.1 Hearing Impairments and Rehabilitation

Hearing aids are a device to help amplify and change sound. This is helpful to those with sensorineural hearing loss. This type of hearing loss is caused by damaged hair cells in the inner ear or damaged hearing nerve. The hearing aid's microphone receives sound as sound waves, and then converts these waves into electrical signals. The amplifier then increases the strength of the digital signal and the speaker produces the amplified sound in the ear. After the doctor refers the patient to an audiologist, a hearing test is completed. The results from this test decides how the hearing aids should be programmed.

Hearing problems differ from for example sight problems. If a patient has poor eyesight, the right pair of glasses will correct your vision. Hearing problems are much more complicated. Poor eyesight may be corrected back to normal vision, but hearing aids cannot repair damage to hair cells in the inner ear because they do not regenerate. Hearing aids provide a different kind of help than glasses, and people tend to have unrealistic expectations as to how it will improve hearing. This can create frustration and cause disappointment from a patient perspective. The device can only help a limited amount, by amplifying sound around the user. Patients need

some time for their brains to adjust to the hearing aids at the start of the treatment. A patient's brain can normally target its hearing and filter out unwanted sounds (R, L. Martin, 2004).

Figure 3.1: Evolution of hearing aids

Hearing aid technology has advanced significantly since the 19th century (Figure 3.1). Digital hearing aid technology is what is used today. These aids use Digital Signal Processing (DSP), which has allowed the design of the aid to be reduced in size, higher sound quality, noise filtering and amplification capabilities. Bluetooth technology makes it possible to connect a hearing aid to devices like smartphones, televisions and laptops. This has enabled hearing aids to help people improve their life quality worldwide. However, more than over 60 per cent of users are dissatisfied with their hearing aids [Kochkin (2000)] with the number one reason being "Poor benefit". Poor benefit could mean a number of things, for example, the hearing aid did not as not live up to the user's expectations, they were not fully trained to operate the hearing aids, the hearing aid was not programmed correctly and so on.

3.2 The Hearing Aid Adjustment Process

If patients are to maximize the benefit from hearing aids, the hearing aids need to be adjusted and tuned individually to fit the patient's needs and preferences. The hearing aid adjustment takes place in a clinical environment, and is performed by an audiologist who has knowledge of how the hearing aids works. The first consultation involves a hearing test which produces an audiogram that visualizes the patient's hearing in form of a graph of different frequencies. The

results from the hearing test are then communicated and discussed with the patient, and a hearing aid is suggested. A basic adjustment of the aid is then done with the patient, and tuned according to the patient's preferences and audiologist's recommendations. After the patient has been informed about how to use the hearing aid, the patient has to use the aid for some time, before returning to the audiologist for a re-adjustment. The re-adjustments are done continuously until the patient is satisfied. Figure 3.2 gives a visualization of the hearing aid tuning process.

Figure 3.2: The tuning process (adapted from Dahl, Hansen 2016)

Even though technology has made hearing aids advanced with many new features, there seems to be a problem. Patients are dissatisfied with their hearing aids, and even 16.2% do not even use them [Kochkin (2000)]. The number one reason for not using aids according to Kochkin's research is poor benefit. Poor benefit is a result of an unsuccessful consultation. An unsuccessful consultation is a result of poor communication. This is a challenge for both the patients and the practitioners. The patients has to learn a whole new domain and possibly change his/her lifestyle. In addition they have to master the ability to communicate their own

hearing experience. The practitioner has to interpret this information, and at the same time educate and inform the patient about hearing and hearing aids. This information needs to be customized and presented in an understandable way. Then the two parties must find common ground and agree upon a solution that benefits the patient. The challenge is to be understood. Technology can help bridge this communication gap, but there is still not sufficient research on how digital collaborative technology can improve communication between a patient and an audiologist during a hearing consultation.

3.3 Challenges With Patient-Practitioner-Interactions in Audiological Consultations

A crucial part of patient-centered care, and specifically the consultation, are patient-practitioner interactions (PPI). PPIs differ from a normal conversation in many ways. The general characteristics of a PPI are the following [Egbert and Deppermann (2014)]:

- The relevance of institutional conditions for interaction. This involves legal requirements, time restraints, financial concerns, and the necessity for a two-way communication and written documentation.

- Asymmetries between the participants. How the communication between the doctor and the patient is characterized. A doctor and a patient have different roles, motivations and knowledge. There are different things at stake for both parties [Egbert and Deppermann (2014)]. For the doctor this is routine, a normal day's work. For the patient on the other hand, he or she could be affected by illness, the future could be uncertain, and patients may feel vulnerable. There is also an unequal balance of power. The doctor is responsible for decision-making regarding treatment and assessing the right diagnosis. The patient relies on the knowledge of the doctor, thereby making the doctor powerful, owing to the responsibility.

- Goal-orientation. The goal of the doctor-patient interaction is to reach the common goal of a correct diagnosis, and consequently recommend the correct treatment.

- Specific conditions of trust. It is important for the patient to trust their doctor with sensitive information, and feel like that they are being heard, respected and are in good hands.

An asymmetrical relationship between patient and practitioner is a consequence of a competence gap between a medical expert with authority and control and a patient [Mead and Bower (2000)]. As a consequence this can influence patient outcomes. Conflicts and disagreements between the parties do arise, and it can be difficult to reach a common understanding or solution to the problem. This interpersonal interaction between a patient and a practitioner affects the power balance. This power originates from force, material resources or knowledge [Goodyear-Smith and Buetow (2001)]. The power is usually in the favour of the practitioner and comes with the ability to influence decision-making. Good patient-practitioner communication is important, as it has positive effects for patients' emotional health, symptom resolution, and function of patients with ongoing health concerns [Stewart (1995)]. In order to achieve a better relationship, patient-centered care helps create power-balance and therapeutic relationship for patients with their practitioner [Grenness et al. (2014)].

The different phases in the DPI process are illustrated in Figure 3.3: The two arrows indicate how during a consultation, a relationship is being built at the same time as structure is provided. The session begins, information is gathered, a physical examination is conducted, symptoms are explained and further actions are planned, before closing the session.

When discussing problems with hearing, it is important that the patient and the doctor have a mutual understanding of the problem, a ***common ground***. Audiologists may have years of experience regarding patients with hearing difficulties, but communication regarding hearing is still a complicated and subjective topic. As opposed to bad vision, hearing problems are harder to explain and everyone experiences hearing problems differently. This challenge is common in many medical consultations, such as consultations with dentists, opticians and general practitioner. As long as an imbalance of knowledge exists, there will be a challenge to establish trust and agreeing upon a shared reality for both parties. Patient involvement is one of the most crucial factors towards ensuring patient satisfaction and compliance [Matthews and Heinemann (2009)] and can be challenging for several reasons. Research shows that the

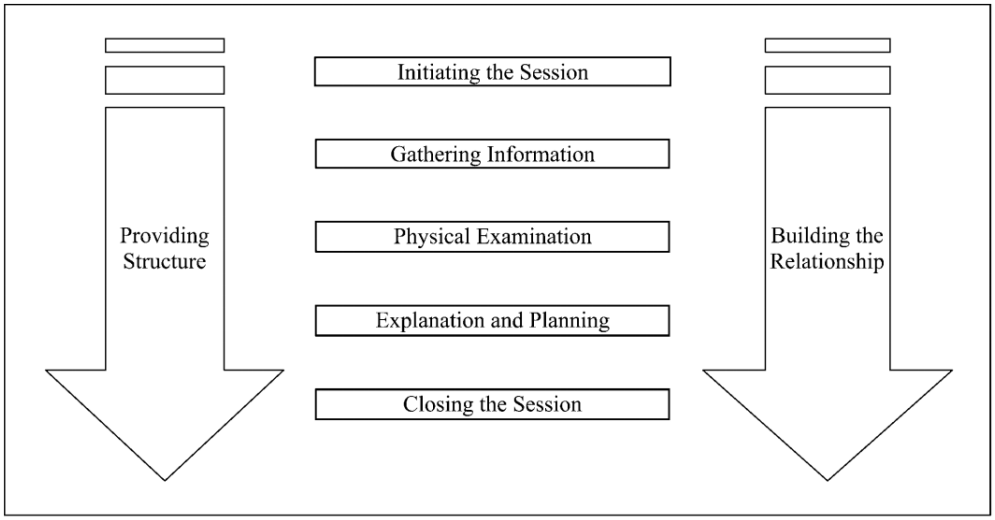


Figure 3.3: Figure describing the flow in a consultation (reprint from Silverman 2003)

patient finds the consultation room an unnatural setting for hearing aid tuning, the patient finds it difficult to talk about sound and hearing experiences, and the conventional tools are designed only for the expert [Dahl and Hanssen (2016)]. This affects the interaction between the patient and practitioner.

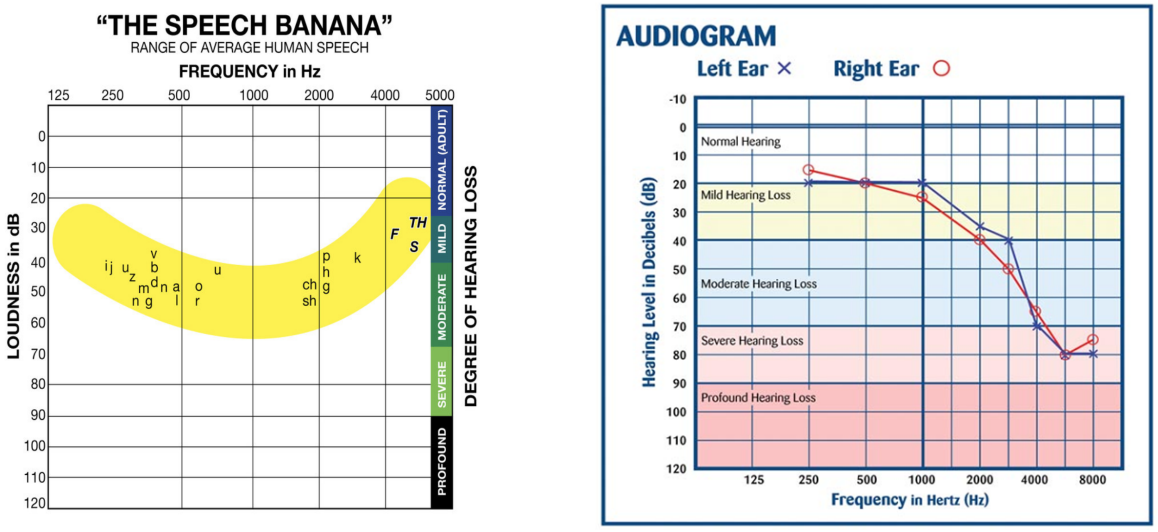
For patients who want to get an accurate diagnosis that cannot be settled by medical tests, they are dependent on the ability to communicate their own symptoms [Egbert and Deppermann (2014)]. Problems with hearing are perceived subjectively. The audiologist is dependent on the patient's description of these problems. With this description comes the need for a certain vocabulary, and the audiologist has to interpret the patient's description and from that form a diagnosis. In a hearing consultation, the words chosen by the patient will affect the audiologist's diagnosis and treatment. If patients have a lack of descriptive words, patients can also use non-verbal approaches such as mimicking, imitating sounds and hand movements. A common understanding between patient and audiologist is therefore a crucial part of the hearing consultations. This is also known as the common ground.

Technology can help overcome communication barriers and encourage active patient involvement. A sound simulator system was designed to help patients engage in own hearing aid tuning, by selecting and playing different sound recordings from everyday situations [Dahl and Hanssen (2016)]. Here the prototype worked as a supplementary aid and improved communication in order to explain hearing problems and how to overcome it. By giving the

patient and the practitioner a common technological tool, this encouraged a patient-driven approach that promoted patient reflection and information in-take. Instead of being an obstacle between the participants, it created a common point of reference that enabled patient involvement.

3.4 Communication Support Tools

In an audiological consultation today, audiologists have different ways of communicating how hearing problems and hearing aids work. A common way to explain the results of a hearing test is with an audiogram or a "speech banana" (figure 3.4). An audiogram shows what sounds a person can hear at different pitches or frequencies. The audiogram contains terminology that may not likely be familiar to the patient such as "decibel" and "frequency". The speech banana refers to the placement of sounds in an audiogram. Both are visualizations of how hearing works, and help the patient to understand why certain sounds are difficult to hear.



(a) Hearing Banana

(b) Audiogram

Figure 3.4: Communication support tools

Chapter 4

Research Design

This chapter presents how the research was conducted and which methods were used. For the purpose of this thesis, two different qualitative data collection techniques were used: field observation and a focus group.

4.1 Qualitative Approach

When researching and gathering information, two general approaches are typically used. These are known as qualitative and quantitative approaches. The key purpose of both these methods is to gather information on a specific subject or field. The two approaches differ in many ways:

- A quantitative approach is data gathering in a numerical form. This can be helpful when you want to categorize, measure or rank data. By analyzing this data, the researcher can use statistics, and construct graphs and tables to demonstrate his/her findings. Typical methods used with this approach are experiments where a theory is tested or surveys that reach a large number of people. This approach is beneficial for accurate and scientific objective results.

- A qualitative approach is not data in form of numbers, but rather a naturalistic approach where the research is done in a natural setting. Quantitative research attempts to understand, gain insight, and describe human meaning making, behaviors and beliefs [Knudsen et al. (2012)]. The aim is to understand and be familiar with the studied

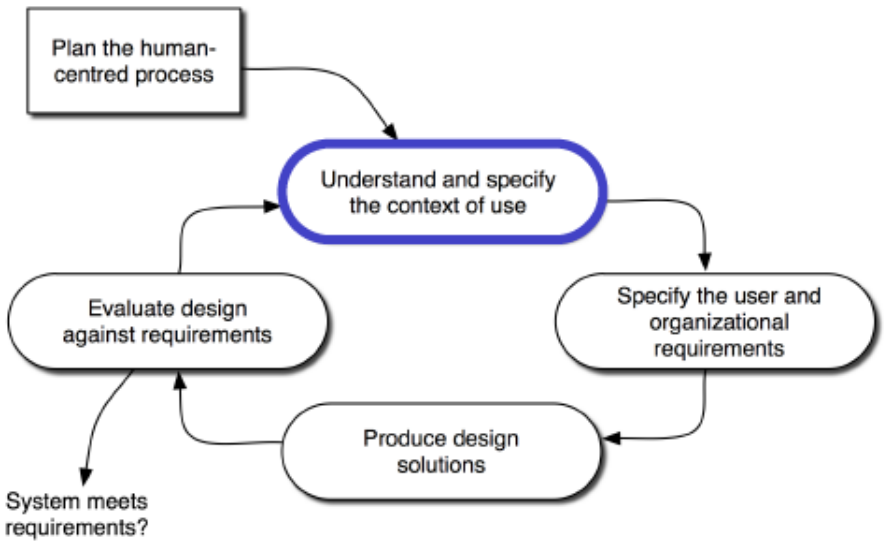


Figure 4.1: The human-centered design process, ISO-13407

phenomenon. This is done by studying how things are done, and also why things are done a certain way. Qualitative data lacks the reliability that quantitative data offers, but instead offers a trustworthiness [Bryman (2016)] where decisions and considerations are documented, so that the study appears thorough and easily understood. The benefits of this approach is the deep understanding of experiences, intentions, and evaluations relevant to people with a hearing impairment [Knudsen et al. (2012)].

For my research in this thesis, a qualitative method was chosen because an in-depth understanding of audiological consultation was necessary. Methods used with this approach include field observations, unstructured interviews, and focus groups. For the research conducted in this thesis, a focus group and field observations were used and these provide the basis for all findings.

4.2 Field Observation

In a user-centered process, the main focus is on the user. The exact definition of user-centered design is to incorporate the users perspective in all the stages of the process. Thus, the user's needs and interests are being safeguarded throughout the process. Figure 4.1 explains the iterative design process which has five different stages. The focus in this thesis is the first stage

Location	Public Sector	Private Sector	Total
Participants	7	5	12
Number of consultations	7	7	14
Number of minutes recorded	281.40	365.37	647.40

Table 4.1: Field observation characteristics

of the iterative part of the design process, understanding and specifying the context of use. This was especially important for this research as a thorough understanding of patients involvement in today's practice was necessary in order to get a basic understanding of the problem.

The field observation method was chosen because this method made it possible to obtain an inside view of the field of audiology. This was necessary to gain an understanding of the audiology field, but also get an impression of how a real life consultation was conducted in a natural setting. An unstructured observation technique was used to collect data. An unstructured observation does not follow a guided checklist of what to observe, but instead observes the field just as it is. The observations started with some ideas in mind of what to observe, but this changed gradually as more data was gathered and more experience of the field was gained. For this specific field observation, it was important not only to listen, but to see. Details such as body language, the use of technology and other tools that were used during the consultation were also important artifacts that needed to be addressed. For this specific reason, all consultations were video recorded, but important notices were noted to easier review the most important events for the coding process.

There are a number of reasons why field observation is a relevant research method for this case.

- The observation reveals how the physical environment influences the setting.
- The researcher gets an authentic experience in a natural setting of the researched domain.
- Field observation creates highly detailed observation descriptions.

For the observations, a private and a public clinic was used. Figure 4.2 illustrates one of the hearing consultation observed, and Figure 4.3 illustrates where in the room the researcher was located in the room. Observations were conducted in both places with five different audiologists over a period of 10 days. A total of 20 unique consultations were observed, and 14 of these

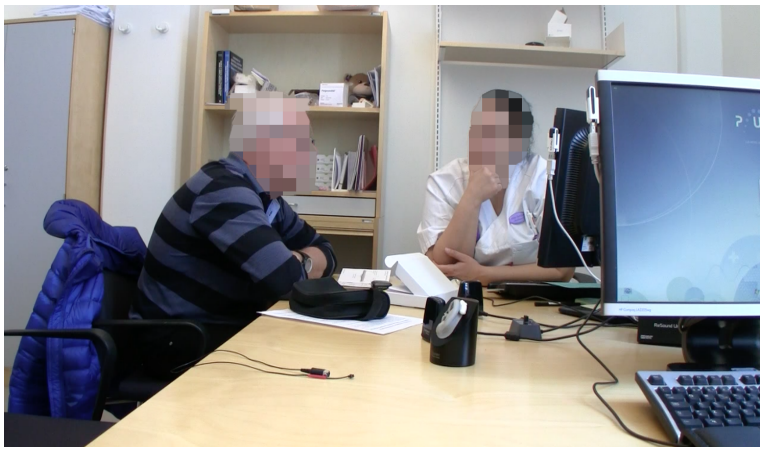
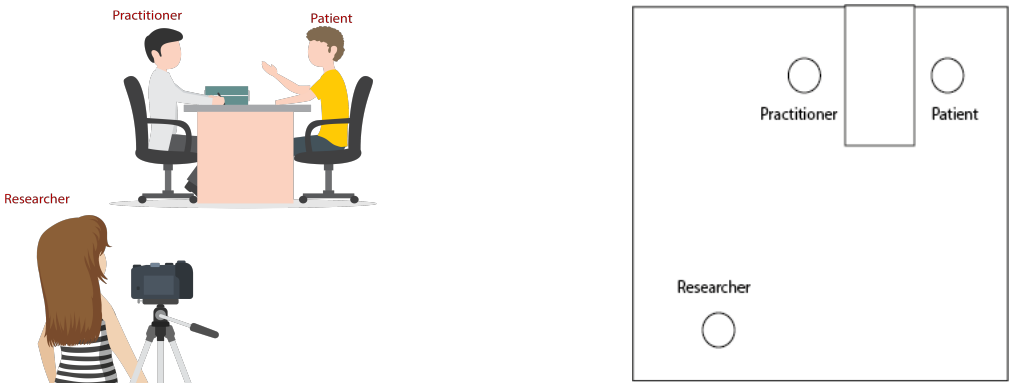


Figure 4.2: Consultation between patient and audiologist

were video recorded. Each consultation lasted approximately 20-60 minutes. This resulted in a total of 647 minutes and 40 seconds worth of recorded video footage (Table 4.1). All of the 14 consultations were transcribed, in addition to important details and relevant information that were noted during the consultations. How the transcriptions were processed and analyzed is explained in detail in Chapter 5.



(a) Animation (b) Overview perspective

Figure 4.3: Location of the researcher in a consultation

The age span ranged from 8 to 90 years old and the patients had a variety of experiences and motivation related to the use of hearing aids. The only restriction in the research was patients with cognitive hearing impairment.

4.3 Focus Group

Focus groups are as mentioned above another qualitative research method where a group of people in the research field assemble and form a focus group to create a discussion. This is to obtain insight from either experts within a specific field or from users of a specific product or process. The organizer of the focus group should not ask leading questions that will force a desired answer, but instead create an open discussion where the participants can exchange experiences and thoughts. A focus group was a relevant research method for this case due to the following factors:

- It was possible to receive input from audiologists without any restrictions on their opinions.
- Conversations could be observed between a patient and an audiologist outside the consultation setting.
- An open discussion was facilitated to highlight the most common challenges related to a hearing aids client journey.

For this focus group, there were two audiologists and one hearing aid user present. The focus group took place in a user experience lab at NTNU. On the wall there was a timeline explaining the client journey for a user of hearing aids. The three participants sat around a table where everyone could see this timeline. How the focus group was facilitated:

1. The focus group started with everyone introducing themselves. The audiologists presented work experience in the field, and the hearing aid user presented in brief her experience with hearing aids and when these aids were first used.
2. The methodology of the focus group was presented. The timeline was introduced (Figure 4.4) and each phase was explained. The first phase, "Discovery", when the user discovers a hearing disability for the first time, "Consultation" when the first meeting with the audiologist takes place, "Adaption" when the user has to learn how to become a hearing aid user, and the final phase "Experienced", when the user has become familiar with the aids and is referred to as an "experienced user".

Figure 4.4: Timeline of a customer journey in hearing rehabilitation

3. The participants were then instructed to individually think of challenges that comes with every phase from their own perspective. They were given approximately 5-10 minutes for this task.

4. After this, the participants presented each challenge and these were written on Post-It notes and posted it on the timeline under the correct phase.

5. After all the Post-Its had been presented, the discussion could start. The discussion started with the notes that had reoccurred in each phase, or if a specific note had caught the organizer's attention. Both parties contributed with opinions and own experiences.

6. When there was no more time left, it was time for the "solutions" phase. The participants had to think of solutions to these challenges with technology as a keyword. After five-to 10 minutes of individual thinking, the notes were then presented (Figure 4.5) and a new discussion followed.

Figure 4.5: Challenges and solutions presented during the focus group.

Chapter 5

Data Collection Methods and Analysis

This chapter presents the data collection methods used in the research. The data was collected using video recordings with additional notes, that were subsequently transcribed, coded and structured using a method by Solveig Osborg Ose using Excel and Word.

5.1 The Coding Process

Video recorded field observation creates a large number of data, and must be structured and organized systematically in order to better analyze. For this project, a method using Microsoft Excel and Word was used. All the video recordings are first transcribed and coded, and then placed in a separate Word document where all the data is organized into logical chapters. This method ensures that all the data is coded, and this method is recommended when dealing with a large data set with interviews of four or more. For this project, an interview equals one video recorded consultation. This method is a simple way to structure data for a qualitative data analysis.

The following steps were followed [Ose (2016)]:

1. Collection of data
2. Transcription of files
3. Transfer of text from Word to Excel

4. Preparation of Excel document for coding
5. Coding in Excel
6. Preparation of coded interviews for sorting
7. Sorting data
8. Transfer of quotes and references from Excel to Word
9. Sorting of text into a logical structure based on the coding
10. Analysis of data

Step 1 - Collection of Data

For the purpose of this research, the consultations were video recorded. This was to capture not only the conversation word by word, but also to enable visual elements of the conversation. The role of the researcher in this setting was to be a passive observer and not influence the consultation in any way. This is also known as unstructured observation, which is used to understand and interpret cultural behavior [Mulhall (2003)]. Important events were noted during the consultation specifying the exact time of the event.

Step 2 - Transcription of Files

The transcription is a time-consuming part of this method. Every consultation lasted approximately 30 minutes to over one hour. Transcribing time is five times longer than the actual recordings. All dialogue was transcribed except for non-relevant topics such as the weather, sensitive information and discussions about when to schedule a new appointment. When transcribing, it is essential to choose a certain level of detail in order to decide what to include in the transcriptions. Details such as the dialogue's pace, stresses, volume and spaces are not specified in this research. On the other hand, visual information has been added, such as "The audiologist turns towards his computer. The patient looks at the screen", (Figur 5.1). To distinguish between the different participants in the consultation, every sentence was labeled

with a letter. In the example below "D" is for doctor and "P" is for patient. This specific labeling was important for further formatting and structuring.

There are both benefits and drawbacks when using transcriptions for data analysis. The transcript can distance the researcher from the field by transcribing physically in another place and also by transforming participants into fragmented text [Hamo (2004)]. Video recordings provide a detailed description of movements and dialogue, but still do not ensure their absolute naturalness [Ashmore and Reed (2000)]. There is also a risk of an objective truth, as the researcher is biased and can interpret certain situations in a way that will favor a theory and as a result overlook other important occurrences.

1	D	Hvis du har trykket to hakk opp da og to hakk ned, at du da har fått et eget varsel om at du er tilbake på normal styrke. If you have pressed the upper button two times, and the lower button two times, you will get a notice that you are back on normal level.
2	P	Åh sånn ja. Ah, okay.
3	D	Men er du i tvil så bare åpne og lukk batteriet. But if you're ever in doubt, just open and close the battery.
4	P	Så enkelt (Stille mens audiografen ser på datamaskinen. Pasienten ser også på skjermen) So easy (quiet as the audiologist looks at the computer screen. The patient looks on the screen as well)
5	P	Ja, vi kan godt prøve å sette opp litt. Yes, we could try to turn up the volume a bit.
6	D	Ja, skal gjøre det..(Audiograf går ut av rommet for å hjelpe en annen kunde) Yes, I will. (the audiologist steps out of the room to help another customer).
7	D	Må vente litt på dataen. We'll have to wait for the computer a bit.
8	P	Ja (flytter blikket mellom bordet og skjermen). Yes. (moves his eyes from the table to the screen)

Figure 5.1: Transcript excerpt

Step 3 - Transfer of text from Word to Excel

For this step, all comments and time-notes were edited out, and each consultation was pasted into its own Excel sheet. The text was then organized separating the labels from the sentence attached to it into its own column (figure 5.2).

Step 4- Preparation of Document for Coding

This step is to make the document easier for the researcher to read. Every sentence where the doctor/practitioner spoke, was highlighted with bold.

Step 5 - Coding in excel

In a separate Excel sheet, a sheet called "Codes" is created. This list is created as the interviews proceed. The first column is the topic of the sentence, and the second column is the number of the code. An example of a code is "Technical issues with hearing aid" or "Fitting of the hearing aid". The challenge is the coding-process, as its hard to know how one should categorize each text field. Especially when it is not yet clear what kind of result will be obtained. This research used a total of 51 codes. After the first round of coding all the consultations, it's important to go over them again and see if the newest codes are also relevant for the first consultations. Coding in iterations results in a more thorough analysis, as you discover important themes during the process. This allows the researcher to look at the first transcriptions with "new eyes" and new discoveries can be made.

This technique was developed to solve researchers' problems and distinguish which data is important. It also reduces the fear of focusing on the wrong things. There are many ways of interpreting data and there is not just one correct way to analyze data. The essential goal of the coding process is to find a theory that describes a pattern in your data [Auerbach and Silverstein (2003)].

Step 6 - Preparation of Coded Consultations before Sorting

For this step, each text field needs an ID in order to be subsequently identified during the process. A consultation number is added as a separate column (P1, P2 etc), where P stands for

patient. It is also necessary to have a sequence variable to keep track of which point in the consultation certain things were said. Then all of these columns are combined into one column. This new column is then pasted in a separate sheet together with the other consultations. The codes were then pasted below, so all the data was in one place.

Step 7 - Sorting of Data

When everything is gathered in one place, the data can be sorted. This is done with a Excel sorting function, where the text is coded based on the codes used.

Step 8 - Transfer of Quotes and References from Excel to Word

The next step is to transfer all the text into a Word document. First the document needs to be converted into text format, and then all the codes are given headings.

Step 9 - Sorting of Text into a Logical Structure Based on the Coding

For the last step, the text is sorted into logical headings. The final document totalled 97 pages comprising 51368 words.

5.2 Conversation Analysis

Conversation Analysis (CA) is a research approach used to study the communication between people. The approach is used in the study of the orders of talk-in-interaction, whatever its character or setting [Ten Have (2007)]. This includes any study of people communicating. Using CA offers several different approaches such as capturing “naturally occurring data”, because the goal is not to provoke a specific situation or achieve a personal goal, but simply to observe a natural conversation itself. CA as a research approach is also thorough and detail-oriented. It is possible that important findings could be lost if methods are used that do not operate as close to the actions as CA does.

There are three main principles connected to conversation analytic research: the data, the transcription, and the analysis and theoretical assumptions [Egbert and Deppermann (2014)].

The data used in CA are authentic and natural conversations, which are not arranged for any scientific purposes. This is then either video or audio recorded. The data is then transcribed in detail. This includes who speaks when, non-verbal gestures, the use of technology and etc. During hearing consultations, details about how the audiogram is placed and explained should also be present. The transcription is then analyzed with the goal of finding an order in the interaction. The most common way to analyze the transcription is sequential analysis, where the data is seen in the context that it occurs.

CA introduces four types of interactional organization:

- Turn-taking organization: Naturally, during a conversation there is one speaker speaking at a time. The speaker change can happen in different ways: the previous speaker selects the next speaker, a speaker can self-select, or the speaker speaking can continue to speak (Have P, 2008). This is an interesting aspect to pay attention to when analyzing the conversation during a consultation, because a turn taking can be initiated because of a problem in hearing, rather than understanding.

- Sequence organization: Turns are connected with one another in systematically organized patterns or sequences (Humaira 2015). This happens when one thing in the conversation leads to another. The concept of adjacency pair explains how talk occurs in responsive pairs, e.g when someone greets you, you greet back.

- Repair organization: The various ways of dealing with different kinds of trouble in the interaction process. A repair must be initiated by a complaint or a question e.g "Can you repeat that?" or "I did not understand".

- Organization of turn-design: A speaker builds an utterance so it will fit its recipient. Paul Have explains how turn can be packaged or formulated in ways to show their relative preference status.

These organizations are examples of how any conversational action can be performed in different ways. There are different ways of designing a turn, and how this is done is a result of the speakers knowledge of the situation.

Conversation analysis does not just focus on interactional practices between participants and how problems arise, but also on how problems are solved. This method can be applied to research in audiology, as the focus is on the communication and conversation during a consultation. Dealing with and solving hearing problems is a collaborative project that requires contributions from both patient and practitioner [Egbert and Deppermann (2014)]. It is the interaction between the patient and practitioner that lays the foundation for the patient's treatment satisfaction. Research within this particular field is necessary for realistic innovation and rehabilitation [Egbert and Deppermann (2014)]. Although interaction between patient and practitioner and problem solving is an important aspect of medical care, it is most definitive a difficult aspect to study and measure [Drew et al. (2001)]. Using CA as an approach to hearing impairment will provide a detailed description from actual occurrences in audiology practice where real life problems arise and are being dealt with.

	A	B	C
1	P	Jeg har ikke noe i øret	
2	D	**Du har ikke noe i øret?**	
3	P	Nei, det har jeg i lomma.	
4	D	**Det har du i lomma. Ja, jeg leste littegranne om det du og *** har holdt på med. Fikk jo forklaring. Det er noe som ikke fungerer med det å ha det i øret såvidt jeg forstår.**	
5	P	Han fikk jo tak i en propp.	
6	D	**Ja**	
7	P	Det funket ikke.	
8	D	**Nei**	
9	P	For den var for tett, så den stengte ut den vanlige lyden. Den normale lyden.	
10	D	**Så da var det satt på sånn dome?**	
11	P	Da fikk jeg en sånn en. Og jeg bruker den ikke hele tiden, men jeg bruker spesielt hvis det er møter og det er mye folk som prater litt sånn (vifter med armene). Men ellers når jeg sitter inne på kontoret	
12	D	**Ja, og det er uten apparat ikke sant?**	
13	P	Ja.	
14	D	**Og det er ikke så rart, for det er de litt lyse tonene som du har problemer med. Men syns du...**	
15	P	Men det er en fordel med det og da.	
16	D	**Ja?**	
17	P	Om natta da. Når jeg skal legge meg og sove. Hvis det er litt mye, noe støy, så legger jeg godsiden ned og da blir det stille.	
18	D	**Ja ikke sant. Er viktig å finne fordeler med det her og.**	
19	P	Ja.	
20	D	**Men du sier du bruker dem i møter og i viktige samtaler, om jeg kan kalle det det. Vil det si at du bruker dem hver dag?**	
21	P	Nei, det gjør jeg ikke.	
22	D	**Nei. Hvor ofte vil du si at du bruker dem?**	
23	P	Nei, vil si at jeg bruker dem 3-4-5 ganger i uken, det kan jeg gjøre. Men ikke hver dag. Det er det ikke. Og enkelte ganger, hvis det er noe spesielt jeg skal få med så gjør jeg det. Grunnen til det.. Det hje	
24	D	**På øresus ja?**	
25	P	Ja.	
26	D	**Ja, men det er sant det. Så godt observert. Det er veldig mange som sliter med øresus eller tinnitus, som, hvis de har høreselstap så er det første vi anbefaler å prøve høreapparat. Så uansett om d**	
27	P	Tenker ikke så mye på susen, må si det. Men likevel så hjelper det. Og at det er forstyrrende i samtaler det hører ikke jeg.	
28	D	**Skal vi se her. Nå skal jeg koble meg på. Er et nytt batteri?**	
29	P	Nei, var ikke det skjønner du. Jeg skulle ta det med men så var det tomt. Og jeg synes det var rart, for jeg hadde nesten ikke brukt det siden jeg byttet batteri sist. Så jeg lurte på om det bruker strøm se	
30	D	**Ja, men det gjør det. Men ikke like mye som om du ikke bruker det.**	
31	P	Men hvis du drar ut et kneppe så bruker det ikke noe strøm?	
32	D	**Jo det gjør det skjønner du. Det her er luft-sink batteri. Så det vil si med en gang jeg tar av lappen her nå så aktiveres det. Så lenge det får tilgang på luft så vil det dra litt strøm. Men selvfølgelig brul**	
33	D	**Skal vi se. (kobler opp til dataen). Du har den mobilen og appen på mobilen ikke sant? Kan du ta og sette mobilen din i flightmode eller slå av bluetoothen?**	
34	P	Setter den i flightmode så blir det stille på alt.	
35	D	**Ja, det kan du gjøre.**	
36	P	Det er ikke så dumt.	
37	D	**Der vet du. Da får jeg vel kontakt her.**	
38	D	**Ser at forsterkninga i apparatet står littegranne lavere enn det det egentlig skal være. Hva synes du om styrken på lyden?**	
39	P	Nei, jeg justerer litt på den og selv innimellom.	
40	D	**Stiller du helst opp eller helst ned?**	
41	P	Kan variere det.	

Figure 5.2: Transcribed text in Excel

Chapter 6

Results and Findings

This chapter presents the results discovered during the research for this thesis. First, the results from the field observations are presented, the results from the focus group, and lastly a summary of the main findings from these two. In this chapter all transcription excerpts are in the original language. English translation can be found in Appendix.

6.1 Observed Qualities in Same Time-Same Place Interactions

This section presents qualities of same time-same place interaction that were discovered in the conversation analysis. These include empathic relations, the audiologist's ability to adapt information, and the use of tacit knowledge. The following subsections will elaborate on these findings more detailed.

6.1.1 Empathic Relations

A key observation made was that audiologists took initiatives in order to develop a closer relationship with their patients. In a consultation setting, the patient is vulnerable and might be anxious or concerned. Empathic relations is about how the audiologist and the patient's relationship evolves and enables better communication flow. In the field observations there are several examples of different techniques used where the audiologist establishes this kind of relationship during a consultation.

Transcript excerpt 6.1

1	P	Nei, men da. Jeg synes du har en veldig fin vinkling på problemet, og jeg synes det du foreslår høres veldig fornuftig og riktig ut.
2	D	Bra. Det er fint at vi er enig.
3	P	Vi blir det vet du.
4	D	Skal vi se nå lagrer jeg her så da kan det hende du forsvinner litt. Så skal jeg notere ned og bestille nytt apparat. Der her skal vi få orden på vet du.
5	P	Ja, det er hyggelig at du sier det. Det er jo klart jeg er plaget, har vært her mange ganger, og jeg føler meg ivaretatt.
6	D	Nei det skal du ikke tenke på.
7	P	Det er hyggelig at du sier det.
8	D	Av og til så må man bruke lenger tid. Noen ganger går det fort gjennom, andre ganger trenger man mer tid og sånn er det. Og da er det jo fint at du også har tid til at vi skal bruke den tida.

Transcript 6.1 shows an example of an end of an consultation. The patient and practitioner have discussed back and forth and together agreed on a solution. We see how using the word "we" instead of "you" and "me" in order to change the hearing problem from being an issue for the patient, it becomes a collaboration and a team effort to solve the problem. "It is nice that we agree" in line 2 the audiologist establishes an agreement with the patient that they are on the same page. In line 4 the audiologist continues: "We will sort this, you know", and encourages the patient that they will together solve this problem that the patient is experiencing. As a result of this, the patient feels "taken care of" (line 5). This is an example of a successful consultation where the patient and practitioner have established a level of trust.

Transcript 6.2 shows another example of how the audiologist focuses on making the decision process a collaborative effort. The patient has in this scenario just explained that she uses her hearing aids everyday since the last adjustment. Line 1 shows how the audiologist praises the fact that they have been used and asks if *we* found the right noise level. The conversation continues to talk about tinnitus and how hearing aids have helped significantly to reduce tinnitus. The audiologist responds in line 7: "Yes! Then we are on the right track". Here, two things are communicated. Firstly, that the audiologist is happy with the patient and

Transcript excerpt 6.2

1	D	Så bra. Traff vi rett på styrken?
2	P	Jaja.
3	D	Husker du vi snakka om å ikke overdøve den susen du har?
4	P	Nei, den er mer enn.. nei for den tinnitusgreia den er annerledes.
5	D	Ja.
6	P	Så jeg hører den når jeg tar den av meg på kveldene og før jeg har fått det på meg igjen da kan du si. Men så lenge jeg har høreapparatet på så er det ikke noe problem i det hele tatt. Rart, snedig altså.
7	D	Yes, tenker jeg da! Da er vi på rett vei.

expresses joy over the fact that the hearing aids are helping. Secondly, the audiologist says that "*we* are on the right track" and therefore motivates the patient and emphasizes the fact that it is a team effort. This creates a personal connection by achieving something together.

In transcript 6.3 the audiologist says explicitly in line 1: "I would like you to come back for a check so that we. I'm saying we, but before *you* change your mind". The audiologist is empathizing the importance of patient involvement and that the patient has to be the one to make the final call on which hearing aids he wants to use. Even though the patient agrees in line 2, the audiologist continues to explain how important user satisfaction is, and that there are a number of hearing aid types that can be tested. The patient responds in line 4 "From my point of view it's hard to know what to say when I haven't yet tried it". The audiologist agrees with the patient in line 5 and suggests that maybe it could be a good idea to try another pair of hearing aids from another supplier and repeats in line 7: "You have to be certain about your decision". The patient decides to try another supplier and says in line 8: "Should we do it?" as it is a shared task for the patient and the practitioner. "If you want to, I can do it" the audiologist responds in line 9 and therefore acknowledges and supports the patients decision. In line 11 the audiologist tells the patient that she is sceptical that the patient gets enough sound in on the left ear. The patient appreciates the honesty of the audiologist and states in line 12: "Yes, and it's good that you are sceptical, I appreciate that". This example illustrates a shared decision-making where the audiologist makes the patient feel in control of his own treatment.

Transcript excerpt 6.3

1	D	Jeg kunne tenkt meg at du kom tilbake hit på en kontroll til, før vi. Nå sier jeg vi, men før du bestemmer deg.
2	P	Jojo, men jeg vil gjerne det.
3	D	For det er sånn at når du bestemmer deg for høreapparat er det viktig at du er sikker på at det er de riktige apparatene for deg. Når jeg sender inn papiret skal det gå 6 år før du får nye. Så da er det viktig at du føler deg sikker. Vi har også flere typer apparat hvis det skulle være behov å prøve et sett til. For å se om det kan være noe annet. Men det kan ikke jeg love deg.
4	P	Nei, det er klart du kan ikke det. Og sett fra min synsvinkel så er det litt vanskelig å vite hva jeg skal svare for jeg har ikke prøvd det enda.
5	D	Nei, det har du ikke. Er det noe du kunne tenkt deg å ha gjort? Prøvd et annet sett fra en annen leverandør bare for å se om..
6	P	Ja hvis det er mulig å prøve.
7	D	Jaja, jeg anbefaler alle å prøve minst to sett for å ha noe å sammenligne med. Fordi at som sagt, når du bestemmer deg må du være sikker.
8	P	Nei, men skal vi gjøre det?
9	D	Hvis du vil så kan jeg gjerne gjøre det jeg altså.
10	P	Men da gjør vi det.
11	D	Men du bruker de du har nå, og du bruker dem hver dag sånn som du har gjort. Nå er det da med de doman i stedet for proppene. Ikke stress med dem her nå (peker på apparatet på bordet). Nå frem til neste time bruker du dem her (peker på de han har i øret). Også må du være litt obs på å få nok lyd inn i venstre øret. For den er jeg litt skeptisk på.
12	P	Ja, og det er fint at du er det. Setter pris på det. Det er klart jeg kan justere litt høyde på appen og, men det er jo begrenset.

A level of trust is established between the two, so that the patient trusts the the audiologist's recommendations.

6.1.2 "Packaging" of information

Packaging of information is about the ability and flexibility the audiologist has to adapt information to each individual patient. Ten Have explains the term packaging as "the form

chosen to produce the action" [Ten Have (2007)]. It is not just what kind of information that the audiologist chooses to convey, but also how the information is conveyed.

Transcript excerpt 6.4

1	P	Da kjenner jeg at nå hører jeg alt på høyre øret, også er det en og annen lyd som kommer gjennom på venstre. Men det er ikke så mange, men det kommer noen.
2	D	Men du, det er ganske bra sammenligning. For jeg pleier å sammenligne denne her taleoppfattelsen, men den gode gamle FM-radioen. Hvis du stilte en FM-radio litt utenfor stasjon, da får du skurringen ikke sant. Du oppfatter et og annet ord, og du oppfatter kanskje hva det blir snakket om også, men du klarer ikke å få tak i alt. Akkurat som om du er litt utenfor. Og sånn er det litt med den her taleoppfattelsen også, at du hører et og annet ord eller en og annen lyd, men du klarer ikke få den rene, tydelige talen. Og nå har du det på ett øre. Da må vi passe på at vi ikke får det på begge ørene.
3	P	Ja, man må prøve å ta vare på det som er, det er det ikke noe tvil om.
4	D	Sånn at. Jeg tror ikke vi skal ha som mål at disse apparatene skal være på ørene dine fra tidlig til sent. Det tror jeg ikke. Men kunne vi prøvd å ha som mål at de brukes litt hver dag?
5	P	Det går an å prøve ja. Ser ingen grunn til at det ikke skal gå. For jeg er jo inne jeg og ser på tv og.

In transcript 6.4 we see an example of a re-occurring phenomenon. The fact that the audiologist uses metaphors from real life situations to explain how hearing works. In line 1 the patient explains his hearing as there are some sounds in the left ear, not a lot of sounds, but some. The audiologist acknowledges this explanation and reminds the audiologist of an old fashioned radio. The audiologist explains in line 2 that when trying to tune the radio between stations, and some words are picked up but not whole sentences, can be compared to how this patient is experiencing certain sounds. The patient's response is positive and solution-oriented. In line 4 the audiologist suggests that the goal should be to not wear the hearing aids all day every day, but instead to try to use the hearing aids for a little while each day. This advice suggests the audiologist's ability to read and analyze the patient during the consultation and based on this, concludes that the patient needs to take things gradually. In line 5 the patient expresses a will to use the hearing aids for a little while every day. This shows how the audiologist adapted the explanation of how hearing works to fit the explanation of how the patient experienced it.

Transcript excerpt 6.5

1	P	Ja, nei jeg tror nok jeg vil fortsette å bruke det. Og bør kanskje prøvd å bruke det mer.
2	D	Jeg hører jo på deg at du er ikke klar for å bruke det fra morgen til kveld hver dag. Det er du ikke. Men jeg anbefaler deg veldig å bruke apparatene mer enn det du gjør nå. Om du prøver å bruke det littegrann hver dag.
3	P	Ja, hvis jeg putter det inn i ørene hver morgen så blir det jo værende der til jeg kommer hjem.

Transcript 6.5 illustrates the same situation as transcript 6.6. This example is from the end of a consultation where the audiologist has asked several question about the patient's hearing and experiences with hearing aids. The patient says in line 1: "Yes, no, I think I will continue to use it. And I should maybe try to use it more". Based on this statement and the conversation during the whole consultation, the audiologist understands that the patient is not ready to use the hearing aids all day from morning to night. The advice from the audiologist is therefore to use them for a little while everyday instead.

Transcript excerpt 6.6

1	D	Skal vi se. Ser nå sånn ut hørselen din. (peker på et ark). Så den er sikkert ganske stabil med det den har vært fra før. Bruker å si at normalen minstehørsel ligger i det området her. (peker igjen på arket)
2	P	Hva var det du sa nå?
3	D	Normal minstehørsel
4	P	Det er som du eller? Er du normal? (ler)
5	D	Ja, nei, du har vel ikke på noe apparat nå. For vi har jo mellom 0 og 20, det er der vi hører de svakeste lydene. 20 desibel. Så det er jo det vi måler når vi måler de pipelydene. Det er det svakeste du klarer å oppfatte. Da kommer kurven din her sånn (peker). På høyre øre, også er det litt bedre på venstre øre faktisk. Et døvt øre hadde ligget nede på her for eksempel (peker). Så sånn sett har du ganske bra hørsel på venstre.

In transcript 6.6 we see an example of how the audiologist explains the results from a hearing test. In this example the audiologist shows the audiogram on a piece of paper instead of on the computer screen. In line 2 the patient asks "What did you just say?". This could be

either because the patient did not hear the audiologist, or the fact that the expression "Average minimal hearing" was an unfamiliar term for the patient. The audiologist repeats the phrase in line 3, but the patient still does not understand what the audiologist is saying. The patient replies in line 4: "and that's something that you are? Are you normal?". It is now clear that the patient did hear, but did not understand. This is an example of repair organization in CA, where the patient initiates a repair where the unknown term is the trouble source. The audiologist then has to adapt the information to the patient by making it easier to understand. The audiologist then uses the audiogram to visualize the test results and compares it to a "normal" hearing and a deaf ear. This way the audiologist adapts to the patient's level of knowledge and presents the information in a different way.

6.1.3 Use of Tacit Knowledge

Tacit knowledge, or experience based knowledge, is characterized as a skill that we have, but it is transparent to us. It becomes a tool that is an extension to our bodies [Ehn (1988)]. The individual is not directly aware of what is involved in their skillful practice [Zappavigna-Lee and Patrick (2005)]. It says something about how the audiologist uses former experiences and knowledge about the audiology to steer the conversation in certain directions. This type of knowledge is hard to transfer to another person as it cannot be verbalized, and is revealed through practice in a particular context. By asking the right kind of questions, the audiologist will get the information he or she needs in order to give the right advice.

Transcript 6.7 shows an example of communication flow and how the audiologist asks questions. Here we see how every question is an open-ended question that gives simply just yes or no as an answer. The audiologist is then forced to ask several questions to get an understanding of the patient's hearing. The transcript ends in line 15 with the audiologist by saying "maybe it is better now. Maybe you can hear a little bit better now". This is based on the short patient's short answers. The patient responds in line 16 with "That might be", therefore the adjustment for this patient's hearing aids are based on the guesses of the audiologist. Although it might seem like guesses, there is a reason why these exact questions have been asked. The audiologist uses prior knowledge and past experiences in addition to the responses from the patient to conclude that the adjustments have helped to give the patient a better

Transcript excerpt 6.7

1	D	Var det ubehagelig da jeg satt opp lyden?
2	K	Nei.
3	D	Da fortsetter jeg litt til også ser vi hvordan det går.
4	D	Skal prøve å snakke igjen nå da. Nå er det enda litt kraftigere
5	K	(nikker) Ja.
6	D	Var det for mye?
7	K	(drar på ordene) neeeei (ser på mannen sin) Kunne ha dempa littegranne da.
8	D	Littegrann?
9	K	Ja.
10	D	Jeg kan snakke litt mer først, så du hører litt hvordan det kjennes ut.
11	M	Hører du bra når jeg snakker nå da?
12	K	Ja. (ler og ser på mannen sin)
13	D	Du gjør det?
14	K	Ja.
15	D	Det var kanskje litt bedre da. Du hører kanskje litt mer.
16	K	Ja, det kan være ja.

listening experience. In this particular transcript excerpt there is a turn-taking where the audiologist selects the patient to be the next speaker, by asking continuing to ask questions directly.

Transcript 6.8 shows an example were the audiologist wants the opinion of the patient and adds in line 3: "What do you think? You are the boss." By giving the patient the idea that he is in control seems to force the patient to reflect around their conversation. In line 4 the patient expresses an understanding for why he has to use the hearing aids more. It is important for the audiologist to know that the patient has understood the information that has been presented during the consultation.

Transcript excerpt 6.8

1	D	Ja, hva tenker du selv når du hører jeg forklarer, når jeg sier mine tanker.
2	P	Jo, jeg skjønner den biten der.
3	D	Har du lyst til å gi det et forsøk til? Eller hva tenker du? Er jo du som er sjefen her.
4	P	Ja, jeg må jo det. Det vil jo være helt fryktelig dumt å koble ut noe som til en viss grad er, må regne med at blir mer brukt fremover. For det er jo en ting å høre nå, men alder setter jo litt preg på det. Det må man jo regne med.
5	D	Det gjør jo det. Etterhvert vil du jo merke den også.

6.2 Observed Challenges in Same Time-Same Place Interactions

This section presents challenges of same time-same place that were discovered in the conversation analysis. These include the description of the hearing problem and how it is solved and patient's perceived challenges. The following subsections will elaborate on these topics.

6.2.1 Describing Hearing Problems

A common theme in a consultation is problem description. Here the patient has to communicate how they are experiencing their hearing, and how they are experiencing their hearing aids. The audiologist then has to try to understand their explanation and then suggest helpful solutions. Transcript 6.9 shows an example of a consultation where the patient has not been using his hearing aids. The audiologist tries to make the patient understand the importance of using hearing aids. In line 1 the audiologist explains that she understands where the patient is coming from. The patient states that the reason for not wearing hearing aids is because he is mostly alone and does then not feel the need to hear sounds. The audiologist responds in line 3 that it is important to stimulate the ears and auditory nerve, if not the hearing loss will worsen faster. Then the audiologist compares ears to legs. "If you have to stay in bed and don't get to use your legs for months, you have to train them. It's the same thing with your ears, if they are not used, the resources are used on something else". The patient

responds in line 4: "I haven't heard it put like that before", and by hearing the metaphor seems to understand more of why it is important to use a hearing aid. In line 7 the audiologist asks if there is anything with the hearing aid that the patient needs help with in order to help him use the hearing aid more often. Then the patient explains why he is not wearing the hearing aid in line 8: "It is pointless to use it when you are alone". This again reflects miscommunication, as the audiologist just explained that it is not pointless. The patient continues describing more reasons for not using his hearing aid in line 10: the process of putting them on, cleaning them and no longer being in work. At this point the audiologist needs to turn the conversation around. This time, the audiologist states more clearly in line 11: "Your brain needs to hear sounds even if you are alone". As a response to this the patient continues to describe certain sounds as "useless". This example illustrates how hard it can be for the audiologist to illustrate a point and make sure that the patient understands the message. In this case the patient was not susceptible to the information being given.

6.2.2 The Consultation Environment

In transcript 6.10 an example of an adjustment situation is presented. In line 1 the audiologist explains the adjustment, that the sharp sounds have been lowered by 1 decibel. In line 5 the audiologist continues by saying that it can be adjusted more if it is too loud. On line 6 the patient says that it is hard to tell how the hearing aids should be adjusted when they are sitting in the consultation office. "It is almost impossible". The audiologist tries to simulate a more realistic experience by turning on the radio on the computer's speakers.

Transcript 6.11 shows another patient that has a hard time trying to find the words to explain their hearing. The audiologist asks in line 1: "how does your own voice sound like now?" and the patient struggles to answer "My voice doesn't sound so.." before the audiologist interrupts in line 3 "Because the big question is if it is too much treble, or if you need more bass". The patient has to concentrate on what kind of sounds needs to be enhanced and responds "I don't know. It's hard to tell just like this. The way you're sitting now. It's just too fake!". The consultation room creates a communication barrier and frustration arises.

6.2.3 Patient-Perceived Challenges

In transcript 6.12 and 6.13 we see examples of how two separate patients express their desire to self-adjust their hearing aids. Transcript 6.12, line 3: "This is what we want more and more", the ability to adjust own hearing aids.

In transcript 6.13 we see how another patient is expressing the same desire to adjust his own hearing aids. He already has an app where he can adjust basic settings, but he explains in line 1 that he hopes to be able to adjust as much as possible so that he does not have to have it pre-programmed by the audiologist. Another wish is to be able to communicate easier with the audiologist if he needs adjustment in between consultations. This shows an example of the consequence of not having an instant communication between patient and practitioner. In line 7 the patient says that the current app works, but that he would like the opportunity to have online communication with his audiologist.

6.2.4 Availability

In transcript 6.14 we see an example of how important availability is in audiology. This patient has had problems with her hearing aid for approximately 6 months (line 2), but has not been dealt with.

Transcript 6.15 and 6.16 shows the challenge of scheduling a consultation that will benefit both parties. The first example illustrates how long the wait can be at the audiologist working for the public sector. The patient has to wait minimum five weeks for the next consultation. Transcript 6.16 illustrates how inconvenient the commute is for this patient, as the public transportation allows time for a consultation only a couple of hours in the middle of the day. The hearing clinic is located in the town centre, but for many elderly patients living outside the city, is can be a long and tiresome journey.

6.2.5 Summary

After analyzing all the transcriptions, there are three qualities and four challenges of same time-same place interaction. Firstly, we see how the audiologist uses compassion and empathy in order to establish trust with the patient. There is an emphasis on collaborative

communication during a consultation. Secondly, the audiologist is flexible in the sense of adapting information that is presented to each individual patient. Lastly, the audiologist uses prior knowledge and experiences to understand the patient and to give fair and accurate advice. There are also challenges connected to interactions of same time-same place. These include the patient's problem description and how the problem is solved, and for both the patient and practitioner to reach a common understanding. The adjustment context is for many patients a challenge, as it creates a communication barrier which makes it harder to accurately adjust the hearing aids. It has been observed that several patients want to be able to self-adjust their hearing aids, but the technology is not yet available to support such a function. Lastly, patients struggle with the availability of the audiologist, as it can be difficult to book a consultation that fits both the patients and the practitioners schedule. In addition to this, the commute can be long and tiresome.

Transcript excerpt 6.9

1	D	Så da tenker jeg, at jeg håper at du skulle ha fått til å bruke apparatene litt mer. Jeg forstår jo argumentene du har med at når du er alene så bruker du dem ikke så mye.
2	P	Nei, jeg gjør ikke det.
3	D	Men en annen ting jeg vil at du skal tenke over er at nå har du ganske store hørselstap på begge ørene. Hvis du ikke stimulerer ørene, hvis du ikke stimulerer hørselsnerven din med lyd, hvis du ikke stimulerer hjernen med lyd, så vil hørselstapet du har forfalle fortere, enn om du nå bruker apparat og får lyd inn. Ørene er jo som alle andre kroppsdeler vi har, hvis du blir sengeliggende og ikke bruker føttene på mange måneder, så må du trene opp de og. Og sånn er det med ørene, hvis de ikke blir brukt så brukes de ressursene på noe annet.
4	P	Det kan godt hende. Den varianten har jeg ikke hørt før. Begge deler er skummelt med for mye lyd for ørene.
5	D	Ja, det også. Men det er ikke for mye lyd du får inn her nå.
6	P	Nei, den lyden som er nå den er jo grei.
7	D	Ja. Er det noe med apparatene her eller noe rundt bruk av apparatene som du kunne ha tenkt deg å ha hjulpet deg til å brukt de litt mer?
8	P	Nei, grunnen til at jeg bruker de så lite er jo livssituasjonen. Det er jo ikke noe annet. Bruker jo ikke noe uten at man føler man har behov for det. Det er sånt rent logisk. Men jeg bruker det jo når det er sånne spesielle situasjoner, og da er dem til god hjelp. Men det blir litt sånn meningsløst å bruke dem når man sitter alene.
9	D	Ja.
10	P	Det er noe med å ha dem på og legge dem bort, og rengjøre dem, og hele den prosessen hvis du ikke trenger det, så gjør du det ikke. Det er jo det som er årsaken. Og spesielt nå som jeg er ut i fra arbeid og alt det der, så.. er det jo ikke nødvendig som det var før.
11	D	Nei jeg skjønner den. Og du er ikke alene om å føle det sånn som det der. Men hjernen din trenger å høre lyder selv om du er alene. Og den trenger å høre alle de små ubetydelige lydene vi egentlig har rundt oss. Å være borti ting, ark, fottrinnene dine, det finnes jo ikke stillhet. Det er alltid lyd rundt oss. Og det er sånne små omgivelseslyder vi ikke tenker over til vanlig for de er bare der.
12	P	Jeg tenker jo det at det er det som er hovedsaken, det kommer ikke mange andre nye lyder som jeg ikke har hørt før. Det er jo en del lyder som er helt meningsløs for meg. Jeg har aldri hørt på bil. Det har vært bare el-biler. Hele tiden! De dype basslydene, det instrumentet der, det ser veldig dumt ut, det kommer jo aldri lyd ut av det. Også har jo lydbilde endret seg voldsomt i forbindelse med operasjonen nå, før så hørte jeg de diskantlydene veldig godt, på kjempelang avstand. Men det er ikke bra nå. Det forsvant i runden.

Transcript excerpt 6.10

1 D Da kan vi gjøre den litt mykere. Til å begynne med. (endrer på dataen). Da har jeg tatt litt ned på de skarpe lydene, det er snakk om 1 decibel. Men det utgjør egentlig ganske mye.

2 P Det gjorde det. Det var litt bedre.

3 D Ja, sånn at det ikke var for

4 P Skralling.

5 D Men jeg kan fortsatt justere mer ned hvis det er for sterkt da.

6 P Litt vanskelig å si da, når man sitter på kontoret her med propper i ørene og si at det her er bra. Det er nesten umulig.

7 D (Setter på radioen på pcn) Da setter jeg på litt musikk, hvis man kan kalle det det. Så nå står det på som bakgrunnslyd i tillegg til at jeg snakker, og da er jo hensikten at du skal klare å høre stemmen min, selv om det står på støy da.

8 P Ja, gjør det. Hvis jeg bruker mye energi, hører jeg deg.

Transcript excerpt 6.11

1 D Men det var sånn at, hvordan høres stemmen din selv ut nå?

2 P Stemmen min høres ikke så..

3 D For det store spørsmålet er om det er for mye diskant på det, eller om du skulle hatt mer bass da.

4 P Vet ikke. Vanskelig å si bare på sånn. Sånn du sitter nå. Det blir så kunstig alt!

Transcript excerpt 6.12

1	M	Du føler det er hjelpsomt å ha en sånn app?
2	P	Ja. Det gjør jo det. For da kan jeg justere støy mye mer. Men jeg er enda ikke fornøyd med meg selv altså. (snur seg mot audiografen). Du må hjelpe meg! (snur seg tilbake mot meg) Men denne er snedig i forskjellige settinger, at du kan både justere til det du syns er best. Selv.
3	M	Stilig. Styre selv.
4	P	Ja, og det er det vi vil mer og mer.
5	D	Ja, det er mange som vil styre mer og mer selv altså, enn hva dem får til.

Transcript excerpt 6.13

1	P	Altså jeg har jo drevet og.. det som jeg hadde håpet på var at det programmet på mobilen kunne justeres så mye av meg selv, at jeg slapp å ha det forhåndsprogrammert fra dere. Eller at jeg kunne ha en mulighet for å kontakte dere når jeg ville gjøre en endring. Da hvis det ikke går an det første alternativet.
2	D	Eh ja. Det er jo ikke noe mer enn det på appen der du kan justere selv, så hvis du har vært inne der og sett så ser du jo.
3	P	Jaja, så appen er fin den. Jeg har flere..
4	D	Så du kunne tenkt deg å hatt..
5	P	Ja altså at du kunne endre på.. det er jo ikke så mye du kan få endret i appen. Grunninnstillingene får jeg jo fra dere, så jeg har laget meg noen grunninnstillinger som jeg visstnok ikke, ikke blir endra, om dere endra her, hvis jeg har forstått det riktig. Så det fungerer greit det altså. Og dette er ut i fra de forskjellige sinnsstemningene skulle jeg til å si, så du ser det er veldig forskjellige. Så det fungerer veldig bra, ellers så fungerer, jeg var på en konsert i kirken før jul, og da brukte jeg den og da hadde jeg disse proppene, og det var en veldig god opplevelse.
6	D	Så bra!
7	P	Så det fungerer det altså, det gjør det. Men det var den muligheten for online kommunikasjon på et eller annet nivå.

Transcript excerpt 6.14

1 D Har det vært sånn lenge eller?

2 P Eh. Ja. Halvår kanskje. Skulle ha vært hos audiograf for lenge siden men.

3 D Ja ikke sant.

4 P Han som leverte meg apparatet, han vet jeg ikke hvor han blitt av.

5 D Hva er det han heter han da?

6 P Nei..

7 D Ja det er jo 6-7 år siden.

8 P Han var i industribygget da jeg fikk apparatet. Stor og kraftig en. Men så flytta han.

Transcript excerpt 6.15

D Da blir det sikkert en sånn 5 uker å vente til neste time tenker jeg, så ny time blir uti april. Litt senere på dagen.

Transcript excerpt 6.16

D Da får du en ny time, da kommer du tilbake til meg, neste gang du kommer. Så sender jeg deg en time i posten hvis det er greit.

P Nå er jeg litt avhengig om jeg skal reise kollektivt, hvis jeg må være inn i samfunnet. Jeg bor langt uti geografien. Jeg tar buss om formiddagen, kommer frem i 11-tiden omtrent. Også må jeg dra igjen i 2-tida. Så du må få meg imellom der.

6.3 Results Focus Group

The workshop was audio recorded in addition to important details that were noted during the research period. The most important quotes were transcribed and then subsequently analyzed. The challenges were presented in short headings on Post-It notes and placed on the timeline to indicate where the heading was appropriate. These challenges are based on the personal experiences of each participator.

Discovery Phase

The audiologist started presenting first and came up with the following challenges: information, stigma, availability, motivation, recognition and knowledge. The patient had one challenge, realization. The challenge is to realize that there is a hearing issue. The patient explained that she realized that she had a hearing problem accidentally, because this was not a typical thing you get examined for. This is because of lack of information about hearing impairment. The audiologists commented that most people do not recognize that they have a problem until family or friends tell them. Another reason why realizing and recognizing a hearing problem is the stigma linked to it. The audiologists explain that this is most common for the elderly patient group, as they have an outdated view and are prejudiced against having an hearing impairment. Hearing impairment is related to an old man with a hat and a cane. It is not until their first consultation that they see how far technology has come, and their prejudices are contradicted.

Consultation Phase

For the consultation phase, the following challenges were presented from the audiologists: customization, motivation, communication and availability. The patient had experienced challenges with basic knowledge regarding hearing loss. When attempting to explain what she already knew about the topic, the knowledge was limited. It was not until after a couple of consultations she felt that she now had enough knowledge and information. Answering why this was the case, she explained that there was so much new information at once that it became overwhelming. The audiologists respond that they have to customize each consultation to

every patient, and that they highlight the most important information. They also have a brochure with some basic information, but not everything there is relevant for every patient. There is such a large variation of different types of hearing loss, and every patient is different. This is something that audiologists find hard to communicate. Even the exact same hearing loss can be experienced differently, and then they have to explain that you do not hear with your ear, but with your brain. How this information is received depends on the patient's motivation and personality. A challenge for both parties is to deliver and receive the right information. Another challenge is how an expert of a certain domain can explain concepts and denominations to someone with no experience from the domain. The audiologists explain how they use phrases from the audiological domain, but that they use an audiogram to visualize their explanations. They add that it is important to use the audiogram to explain the patient's hearing loss. They also use something called "The speech banana", which is a visual tool for describing the sounds used in everyday human speech occuring on an audiogram (clearvaluehearing.com). This is an efficient communication tool to help explain hearing loss and how hearing works in general. The patient adds that she found it hard to relate to the audiologist's explanations. This leaded to her not remembering the information presented to her. It was not until she received an explanation about how her hearing problem was related to a loss of high frequency sounds that she understood why she found certain sounds sharp and shrill. The patient adds that by relating information to a certain situation the patient has experienced, it will be much easier to remember.

Adaption/adjustment Phase

The adaption/adjustment phase represents the following challenges from the audiologist's perspective: expectations, patient involvement, hearing aid technique, information, communication and availability. The patient adds identifying and remembering problems, verbalizing sounds and also information on how own hearing can be improved. It is difficult for the patient to know what to expect, and whether his/her expectations are realistic. After an hearing aid adjustment, the patient has to see for themselves how the hearing aid suit them. After a while they have the opportunity to get a new adjustment, but it is hard to know what a good enough reason for this is. If the expectations are too high, subsequent adjustment may

not provide any improvement. The audiologist compares hearing impairment with glasses and explains that they are two completely different things. The patient is not always guaranteed perfect hearing from hearing aids, as glasses provide perfect sight for a person with poor eyesight. They explain that the patient's expectations needs to be lowered.

Modern hearing aids make it possible to change between different programs depending on what kind of listening environment you are in. The patient explains that she would much rather use an app to configure the programs, than use the buttons on the hearing aid. An app gives more freedom to the patient, the audiologist adds. And this is actively used by most patients. The app is used to adjust the volume, changing programs and so on. The patients find it more convenient to use their phone, than any other extra gadget. However, there are some cases where the patient is constantly adjusting and striving for the optimal sound experience. The audiologist's responsibility is to guide them through how to use the app and how to connect it to their hearing aids, but after this guidance it is the patient who has to use the app and its features.

Experienced Phase

The audiologists present the following challenges for the last phase: future progression, hearing aid service, rights, motivation, communication and availability. The patient adds the use of extra equipment as a challenge. The patient is asked to describe her level of experience and answers "I have experienced a lot of usage, but I'm not an experienced user. She uses her hearing aid's, but not any extra equipment. Learning about the hearing aids possibilities has not been prioritized. The audiologists have also experienced patients that have found a pair of hearing aids they like and then they are satisfied with the aids. The patient agrees with this theory and explains that after being satisfied with a pair of hearing aids, she forgot the other equipment because she didn't understand the usefulness of these products. Maybe her hearing could have been even better using these tools, but she felt unsure of how good she could expect her hearing to be. "I have information, but I don't have knowledge", she explains.

Solutions

The group was asked to identify technological solutions related to the previous presented challenges. One audiologist explains that even that a lot of new technology exists for hearing aids, there are restrictions on security, financial support and so on. An example of this is remote hearing aid adjusting, where the patient can connect directly to the audiologist regardless of location. This is possible, but the resources are not yet present in Norway. However, an audiologist on demand is a possible solution for the problem with availability. The problem with identifying and remembering problems can be solved with an app that can log specific situations, which the patient can then later present to his/her audiologist. To solve the problem with information, the idea of e-learning was proposed. Compulsory courses in order to learn about how hearing and hearing aids work, and how to get the best out of their hearing aids. Another solution that will help to improve communication and information exchange is a simulator for different listening environments. Audiologists have been using the same technology for testing hearing for about 150 years. The problem is not that it does not exist, but that it is not available. Patients want information to be more available to the public and this is not only applicable to hearing aid users. This will help normalize hearing aids and prevent prejudice.

6.3.1 Summary

The group agrees that there are many aspects of the hearing consultation process that cannot be replaced by technology. Information needs to be tailored to the patient's needs, history and personality. Active choices need to be made by the practitioner with the patient. Every hearing loss is experienced differently, and it is hard to understand why that is. The actual adaption of the hearing aid has experienced a great advantage on account of technological development, and this is the most likely step of the process that can replace audiologists. It is important not to lose the compassionate part of the consultation. Communicating with a computer will make it harder to acknowledge and accept hearing loss, as this is an emotional process. Compassion and body language are key factors.

Challenges that were common for every aspect of the hearing consultation process were

knowledge, information, motivation, communication and availability. Lack of knowledge about hearing loss and hearing aids, too much information to exchange, lack of motivation to use the hearing aids, communication between patient and practitioner, and the audiologist's availability.

Chapter 7

Discussion

The results presented in this thesis indicate the benefits and challenges regarding same time-same place interactions. Giving this framework, I will now turn to the role of technology in this context and focus on how technology can highlight problematic issues and provide solutions. I will present two scenarios. One scenario that explores remote consultations, and how patients can communicate with audiologists using technological aids. The second scenario explores self-fitting of hearing aids and how the entire consultation process can be automated. With the support of my findings, the role of technology will be highlighted in the discussion of these two scenarios, and this will provide the foundation for several interesting arising issues. The last section will reflect on the work conducted in this thesis.

7.1 Scenario 1: Remote Consultations

Scenario 1 represents a case where the patients and audiologists can communicate in real-time, no matter where they are located. This is also known as remote consultations. This enables greater accessibility, as patients are then given immediate access with their audiologist. Their audiologist would then be available through an app, for the purpose of this scenario called "MyAudiologist". Through this app, patients can adjust their own hearing aids and communicate with their audiologist. This scenario explores the negative and positive outcomes of not being located in the same place and communicating with each other at the same time.

This example is based on a paper where the use of televisions and telephones was compared for remote medical consultations [Moore et al. (1975)]. The patients surveyed spent an average of 50 minutes for a television consultation, and 40 minutes for telephone consultations. Although television consultations lasted longer, they resulted in fewer immediate referrals of patients to hospital physicians than telephone consultations [Moore et al. (1975)]. The patients in the research chose television over telephone, as it allowed for more social interaction. In this case, I will discuss the benefits and challenges regarding screen-to-screen communication versus face-to-face. Figure 7.1 illustrates how a user can communicate directly with an audiologist through a laptop, tablet or smartphone.

Figure 7.1: Remote medical consultation

In the previous chapter, several examples of benefits of being located together in the same room were presented. If we remove the face-to-face interaction and replace it with an app, there are some important elements that are lost. For example there is a non-verbal cue reduction that can end up affecting the final result of the hearing aid adjustment. The usage of a screen-to-screen interaction does enable faster and effective communication, but there is a fear of depersonalizing the patient and lowering the quality of care given. The patients are also

forced to actively use MyAudiologist in order to gain maximum benefit from the service. The app relies on patient involvement in order to work properly.

Research suggests that practitioners have lower expectations from web-based consultations than from face-to-face consultations [Agha et al. (2009)]. This might affect the outcome of the consultation, as audiologists enter each consultation with certain preconceived assumptions. At the same time, the audiologist's attitude is adapted to the new setting. Even though there is a reduction of nonverbal cues, the audiologist has to compensate. Information has to be exchanged in a different way. A study examined the difference between information exchange, interpersonal relationship building and shared decision-making between practitioners and patients in web-based and face-to-face consultations [Tates et al. (2017)]. They found that no significant differences existed between the two, and that patients and practitioners perceive communication during a consultation the same way. This tells us that same time-different place interactions can be equally beneficial as same time-same place interactions. Nevertheless, it is important to remember that there is a difference between instant communication between consultations and online communication during consultations.

Even though replacing certain parts of the consultation with technology may be challenging, there are many ways that technology can be a supportive tool and thus facilitate better audiological services for patients. One such example is hearing aid technology. Advanced technology has made hearing aids more available and personalized, and it is now possible to buy a perfectly functioning hearing aid at your local pharmacy without any hearing test. A mobile app called BioAid which uses advanced knowledge of biological processes that occur in the ear. The app has fine-tune settings that allow users to find the most accurate setting to match their impairment. This type of app puts users in control, and as observed in my results, there are several patients that have requested this level of control. Younger generations of users are used to having immediate access of information. Looking ahead, future patients will be more online, connected and wanting to have more control of their own treatment, and thus it is likely that this will be reflected in future hearing aid technologies.

By automating the fitting of hearing aids, patients will have improved access to fitting assessments. As presented in the results, some patients rarely visit their audiologist, and the commute to their audiologist's may be inconvenient and take too much time. This may be due

to the difficulties of obtaining an appointment at a time and date which suits the patient. By using remote consultations this problem will be diminished. The results also state that several patients expressed the need for online communication with their audiologists. Remote consultations will enable online communication and give the patients the possibility to adjust their own hearing aids.

7.2 Scenario 2: Automated Hearing Aid Fitting

Scenario 2 represents a case where the entire consultation process is digitized, thus making self-fitting possible. A self-fitting hearing aid can be fitted and managed entirely by the user, and is not dependent on assistance from a practitioner. This scenario will address a real example. America Hears, Australia Hears, and DIY Hearing Aids are all companies that offer self-fitting hearing aids (SFHA)[Keidser and Convery (2016)]. The SFHAs are pre-programmed, but user-programmable. The pre-programming was based on a user-supplied audiogram. The aids could be purchased online and adjusted by using tablets or smartphones. This scenario cannot be classified as a part of the CSCW-taxonomy, as it removes the human-to-human interaction completely. The question is not whether or not the audiologists can be replaced, but if they should be replaced by technology. Figure 7.2 illustrates how a patient would communicate with a machine/robot instead of an audiologist.

In this scenario, a fictional patient will help illustrate self-fitting challenges. For this example, the patient has already become aware of the fact that he has a hearing problem. Instead of booking an appointment with an audiologist, all contact is through either an app or for example a robot. The patient is first given information about hearing aids. Instead of an audiologist explaining and educating the patient, this will be automated by a machine. Then the patient will undergo a hearing test. These results will also be presented digitally. Lastly, the patient will receive information and advice regarding the further use of the hearing aid.

Let us presume that the patient is younger than the typical hearing aid user, and that the hearing problems were caused by an unforeseen accident. This was a traumatic experience, and the patient is struggling to comprehend the new life situation. By automating the first consultation, the patient would not receive the same level of compassion and understanding

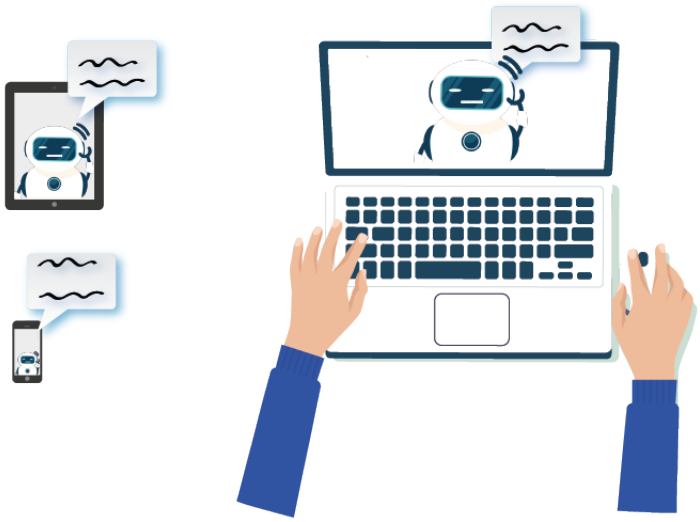


Figure 7.2: Automated hearing consultation

from a machine. The hearing test itself would most likely be successfully digitized, as it is an objective test that involves no form of communication with the patient. On the other hand, the conversation explaining the hearing test is more complicated. As previously mentioned, the results from the field observations showed how audiologists use tacit knowledge in order to give an accurate diagnosis. While this might be translated into advanced AI technology and machine learning, the audiologist has to be able to read and interpret the patient. This is not just by interpreting the words the patient chooses when explaining the hearing problem, but also the tone of voice, eye gazing, body language and so on. The challenge is to look at all the input as a whole and be able to interpret which details are important. Another observation from the field research is the ability of audiologists to adapt information to each individual patient. In order for a machine to do this, it would have to understand the psychological aspect of humans and acquire the same level of flexibility as the audiologist.

In this scenario, the patient is having a hard time understanding the importance of hearing aids. He does not see the benefits and is convinced that he can hear just enough without having to use a hearing aid. Then it becomes the machine's task to convince the patient of the

importance of hearing aids, and turn the patient's attitude from negative to positive. The machine also needs to understand if and when the patient understands what is being informed. The patient can easily say the right words so that it seems that they have understood the information conveyed, but other aspects may reveal that this is not in fact the case. The audiologist's ability to reveal this and tell whether or not the patient is taking in the information is also hard to translate. As mentioned earlier, the goal of the consultation is for the patient and practitioner to reach a common ground.

Even though this scenario lacks many of the emotional and psychological elements of a consultation, it does diminish the challenges of availability and the patient's need for self-fitting. The patient is more empowered and more in control of his/her health. One of the qualities of face-to-face interactions that was observed in the field was the benefits of empathic relations. The question is whether the patient and machine can develop a similar form of trust and relationship.

McKinsey presents a diagram explaining the technical feasibility in different sectors that looks at the automation of the following activities: managing others, applying expertise, stakeholder interactions, unpredictable physical work, data collection, processing data, and predictable physical work. The healthcare sector scores a low technical potential for automation for the first four activities. Data collection and processing data are the activities that are the most technically feasible. In order for machines to replace the audiologists, machines would have to develop an understanding of natural language and the concepts in everyday communication between people.

7.3 Technological Supported Solutions

The presented solutions suggested by the focus group are examples of how technology can support audiological consultations.

- E-learning: automating the educational part of the consultation by replacing it with e-learning is an example of how technology can contribute to an efficient learning curve.
- Situation Simulator: a simulator will allow for a more realistic adjusting environment. As

stated in the results, this was a challenge when adjusting hearing aids, and the patients found it hard to answer the audiologist's questions about adjustment because the listening environment was too unrealistic.

- Log Problem Areas: an example of different place - different time. Patients would be able to use technology to log a specific listening environment at a certain time, and be able to use this information in a consultation at a later date.

7.4 Methodological Reflections

This study has provided an in-depth understanding of collaborative interactions in hearing consultations, and how technology can support better communication between patient and practitioner. The physical aspects of collaborative communication is already a topic that has been discussed and analysed, but a conceptual approach to the problem has not been given as much attention. The purpose of this thesis is to provide a contribution to support further research on the topic. The research methods used in this thesis include field observations and a focus group that can be evaluated based on the following criteria: objectivity, reliability, validity and transferability.

Objectivity: The role as the researcher has been a part of every aspect of the research. It is impossible for the researcher not to influence any part of the study. This is especially relevant for the transcriptions and analysis. Different researchers focus on different things, and one challenge with this study was that there was only one researcher, resulting in only one perspective on the problem.

Reliability and Validity: The results in this thesis are based on a dataset totalling more than 647 hours of records of hearing consultations. This amount of data strengthens the reliability of the results, but there are still some important aspects of the research that needs to be considered. The participants in the hearing consultations were aware that they were being filmed, and there was an external researcher sitting in the room with them. This may have affected the way they communicated and acted towards each other. On the other hand, several audiologists who work in both the private and public sector participated in the research. Therefore, the scope of the research project is not limited to just one sector or to just one

audiologist. On the other hand, the research was conducted in only one city in Norway, and the results only apply to this geographical area.

One additional remark is the order of the different research methodologies. The focus group could have been conducted at the very beginning of the research, giving the researcher an introduction and this would have been enabled the research to become familiar with the challenges related to both a patient and practitioner's perspective. In addition, conversations could have been affected if there was an equal number of patients and audiologists, as there was only one patient and two audiologists.

Transferability: This study can undoubtedly be generalized and applicable in other contexts. The results from the qualitative analysis can be transferred to other contexts involving medical consultation. This includes general practitioners, opticians, physiotherapists etc.

Chapter 8

Conclusion

In this chapter, a conclusion is drawn based on the findings of this project. Each research question will be presented with an answer based on my findings.

8.1 Conclusion

This thesis has investigated hearing consultations with the intention of informing design of technology that can support active patient involvement in such encounters and improve patient-practitioner collaboration. Patient-centered care is an essential concept regarding interactions between patient and practitioner. It is through these interactions that patients and practitioners can reach a common understanding of a patients hearing problem and how they can be treated. Hearing consultations typically take place face-to-face in collocated settings. This is observed to have several advantages through the qualitative methods employed as part of my investigation.

The field observations particularly showed how empathic relations, the audiologist's ability to "package" or convey medical information in a manner that would be understandable for the individual patient, is a key quality. The use of tacit knowledge is also a skill that the audiologist uses to know what questions should be asked to the patient in order to steer the consultation in the right direction. Nevertheless, challenges exist, such as the ability of patients to describe their hearing problem and how the consultation environment creates a communication barrier. The focus group concluded that the audiologist cannot be replaced by technology, as

audiologists acquire the ability to tailor information to the patients need, and give the patients the necessary compassion and emotional support. Findings from both field observations and focus group illustrates in many ways how face-to-face interaction enhances the quality of the communication in a hearing consultation, but at the same time opens up for challenges.

8.1.1 Research Question 1

What qualities do collocated face-to-face interactions offer in terms of active patient involvement in today's audiological consultation practices?

One of the most important aspects of the consultation process is the establishment of trust and the building of a good relationship between the patient and practitioner. The audiologist uses tacit knowledge based on prior experiences and audiological knowledge in order to enable a connection with each patient, and thereby allowing for active patient involvement.

8.1.2 Research Question 2

What challenges or barriers do collocated face-to-face interactions offer in terms of active patient involvement in today's audiological consultation practices?

Active patient involvement in hearing consultations can not be taken for granted. Observations from the field study suggest several challenges that prevent this. The patients generally find it difficult to explain their hearing problem, which makes it hard for the patients to contribute to the consultation process. In addition to this, patients perceived the consultation environment to be challenging. The consultation environment was perceived to be an unrealistic adjustment environment, which created a barrier for the patients when responding to the audiologist's adjustments.

8.1.3 Research Question 3

What are the key lessons we can learn from the findings related to the role digital technology can play in promoting active involvement of patients in their own hearing rehabilitation?

We see a clear link between face-to-face interactions and patient satisfaction. The ability of audiologists qualities to relate to the patient is hard to translate to technological devices. A

machine does not, at least not yet, have the ability to develop trust and establish a relationship with the patient. Technological aids have many benefits where they replace certain parts of a consultation, but a complete automation and digitization will not be able to replace the human qualities that the audiologists brings to each consultation.

Same-time same-place has been proved to be valuable for patient-practitioner interaction and the findings from the research in this thesis will provide valuable background material for further research on design of new technological communication tools.

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Appendix A

Transcriptions

In this chapter all the transcript excerpts that are mentioned in Chapter 6 are listed. The black font is the original transcription, and the blue is translated into English.

Transcription Excerpt 6.1

1 P Nei, men da. Jeg synes du har en veldig fin vinkling på problemet, og jeg synes det du foreslår høres veldig fornuftig og riktig ut.
No, but. I think you have a really nice perspective on the problem, and what you suggest sounds reasonable and right.

2 D Bra. Det er fint at vi er enig.
Good. It is nice that we agree.

3 P Vi blir det vet du.
Of course

4 D Skal vi se, nå lagrer jeg her så da kan det hende du forsvinner litt. Så skal jeg notere ned og bestille nytt apparat. Der her skal vi få orden på vet du.
I'll just see when I save her, you might disappear for a bit. Then I'll write it down and order a new aid. We will sort this, you know.

5 P Ja, det er hyggelig at du sier det. Det er jo klart jeg er plaget, har vært her mange ganger, og jeg føler meg ivaretatt.
Yes, it's nice of you to say that. Surely, this is a pain for me, I have been here a lot of times, and I do feel taken care of.

6 D Nei det skal du ikke tenke på.
Don't worry about it.

7 P Det er hyggelig at du sier det.
Nice of you to say that.

8 D Av og til så må man bruke lenger tid. Noen ganger går det fort gjennom, andre ganger trenger man mer tid og sånn er det. Og da er det jo fint at du også har tid til at vi skal bruke den tida.
Sometimes you need more time. Sometimes it goes quicker, other times you need time and that's just how it is. And then it's nice that you have the time to use that time.

Transcription Excerpt 6.2

1 D Så bra. Traff vi rett på styrken?
Great. Is it loud enough?

2 P Jaja.
Yes.

3 D Husker du vi snakka om å ikke overdøve den susen du har?

Do you remember we talked about not to drown out the ringing in your ears?

4 P Nei, den er mer enn.. nei for den tinnitus-greia den er annerledes.
No, but it's more than.. no, because the tinnitus is different.

5 D Ja.
Yes.

6 P Så jeg hører den når jeg tar den av meg på kveldene og før jeg har fått det på meg igjen da kan du si. Men så lenge jeg har høreapparatet på så er det ikke noe problem i det hele tatt. Rart, snedig altså.
So I hear it when I take it off in the evenings, and before I put it on again. But as long as I have the hearing aids on, there's not a problem at all. Weird.

7 D Yes, tenker jeg da! Da er vi på rett vei.
Yes! We are on the right track.

Transcription Excerpt 6.3

1 D Jeg kunne tenkt meg at du kom tilbake hit på en kontroll til, før vi. Nå sier jeg vi, men før du bestemmer deg.
I would like you come back for another check before we.. I say we, but until you make up your mind.

2 P Jojo, men jeg vil gjerne det.
Yes, I would like that.

3 D For det er sånn at når du bestemmer deg for høreapparat er det viktig at du er sikker på at det er de riktige apparatene for deg. Når jeg sender inn papiret skal det gå 6 år før du får nye. Så da er det viktig at du føler deg sikker. Vi har også flere typer apparat hvis det skulle være behov å prøve et sett til. For å se om det kan være noe annet. Men det kan ikke jeg love deg.
Because before you make up your mind, it is important that you are sure that this is the right aids for you. When I send in the papers it will take 6 years until you get new ones. So it's important that you feel certain. We also have different types of aids if you want to try another pair. To see if it would be different. But I can't promise anything.

4 P Nei, det er klart du kan ikke det. Og sett fra min synsvinkel så er det litt vanskelig å vite hva jeg skal svare for jeg har ikke prøvd det enda.
No, of course. And from my point of view it's hard to know what to answer when I haven't tried any yet.

5 D Nei, det har du ikke. Er det noe du kunne tenkt deg å ha gjort? Prøvd et annet sett

fra en annen leverandør bare for å se om..
No, you haven't. Is that something you would like to do? Try a different pair from another vendor just to see if..

6 P Ja hvis det er mulig å prøve.
Yes, if it's possible.

7 D Jaja, jeg anbefaler alle å prøve minst to sett for å ha noe å sammenligne med. Fordi at som sagt, når du bestemmer deg må du være sikker.
Of course, I recommend everyone to try at least two pairs to have something to compare. Because as I said, you have to be certain when you choose a final pair.

8 P Nei, men skal vi gjøre det?
Should we do it?

9 D Hvis du vil så kan jeg gjerne gjøre det jeg altså.
If you want to, I'll do it.

10 P Men da gjør vi det.
Let's do it.

11 D Men du bruker de du har nå, og du bruker dem hver dag sånn som du har gjort. Nå er det da med de doman i stedet for proppene. Ikke stress med dem her nå (peker på apparatet på bordet). Nå frem til neste time bruker du dem her (peker på de han har i øret). Også må du være litt obs på å få nok lyd inn i venstre øret. For den er jeg litt skeptisk på.
But if you use the once you have now, and you use them everyday as you have. Now it's the ones with the domain instead of the earplugs. Don't stress with them now (points towards the aids on the table). You have to make sure you get enough sound in your left ear. I'm skeptical that you do.

12 P Ja, og det er fint at du er det. Setter pris på det. Det er klart jeg kan justere litt høyde på appen og, men det er jo begrenset.
It's good that you are skeptical. I appreciate that. I can also adjust the loudness on the app, but it is limited.

Transcription Excerpt 6.4

1 P Da kjenner jeg at nå hører jeg alt på høyre øret, også er det en og annen lyd som kommer gjennom på venstre. Men det er ikke så mange, men det kommer noen.
I feel like I can hear everything on my right ear, and then there are some sounds that get through on the left. Not many sounds, but some.

2 D Men du, det er ganske bra sammenligning. For jeg pleier å sammenligne denne

her taleoppfattelsen, men den gode gamle FM-radioen. Hvis du stilte en FM-radio litt utenfor stasjon, da får du skurringen ikke sant. Du oppfatter et og annet ord, og du oppfatter kanskje hva det blir snakket om også, men du klarer ikke å få tak i alt. Akkurat som om du er litt utenfor. Og sånn er det litt med den her taleoppfattelsen også, at du hører et og annet ord eller en og annen lyd, men du klarer ikke få den rene, tydelige talen. Og nå har du det på ett øre. Da må vi passe på at vi ikke får det på begge ørene.
That's a good comparison. Because I tend to compare this speech perception, with the good old FM radio. If you adjust a FM-radio outside of a station you will hear a muffled sound. You comprehend some words, but not everything. It's the same with speech perception, you can hear some words and some sounds, but you can't hear clear speech. And this is what you have on one ear. We have to make sure we don't get it on both ears.

3 P Ja, man må prøve å ta vare på det som er, det er det ikke noe tvil om.
Yes, we have to take care of what's there, there's no doubt about that.

4 D Sånn at. Jeg tror ikke vi skal ha som mål at disse apparatene skal være på ørene dine fra tidlig til sent. Det tror jeg ikke. Men kunne vi prøvd å ha som mål at de brukes litt hver dag?
So, I don't think we should have a goal as to use the aids from early to late. But we could try a little everyday?

5 P Det går an å prøve ja. Ser ingen grunn til at det ikke skal gå. For jeg er jo inne jeg og ser på tv og.
That's possible to try. I don't see why that shouldn't work. Because I'm inside and watching TV.

Transcription Excerpt 6.5

1 P Ja, nei jeg tror nok jeg vil fortsette å bruke det. Og bør kanskje prøvd å bruke det mer.
I think I will continue to use it. And I should maybe try to use it more.

2 D Jeg hører jo på deg at du er ikke klar for å bruke det fra morgen til kveld hver dag. Det er du ikke. Men jeg anbefaler deg veldig å bruke apparatene mer enn det du gjør nå. Om du prøver å bruke det littegrann hver dag.
I can hear that you're not ready to use it from morning to evening everyday. You're not. But I strongly recommend you to use the aids more than you do now. If you try to use in a little while everyday.

3 P Ja, hvis jeg putter det inn i ørene hver morgen så blir det jo værende der til jeg kommer hjem.
Yes, if I put them in the ears every morning, they will stay there until I come home.

Transcription Excerpt 6.6

1 D Skal vi se. Ser nå sånn ut hørselen din. (peker på et ark). Så den er sikkert ganske stabil med det den har vært fra før. Bruker å si at normalen minstehørsel ligger i det området her. (peker igjen på arket)
Let's take a look. This is what your hearing looks like (points on a sheet of paper). So it's pretty stable regarding your previous hearing. I normally say at average minimal hearing is in this area (points again to the sheet).

2 P Hva var det du sa nå?
What did you just say?

3 D Normal minstehørsel
Average minimal hearing.

4 P Det er som du eller? Er du normal? (ler)
And that's something you are? Are you normal? (laughs).

5 D Ja, nei, du har vel ikke på noe apparat nå. For vi har jo mellom 0 og 20, det er der vi hører de svakeste lydene. 20 desibel. Så det er jo det vi måler når vi måler de pipelydene. Det er det svakeste du klarer å oppfatte. Da kommer kurven din her sånn (peker). På høyre øre, også er det litt bedre på venstre øre faktisk. Et døvt øre hadde ligget nede på her for eksempel (peker). Så sånn sett har du ganske bra hørsel på venstre.
Well, you're not wearing any aids now. Because we have the numbers between 0 and 20 where we hear the weakest sounds. 20 decibel. So this is what is measured in the hearing test. Your right ear is a little bit better than your left ear actually. A deaf ear would have been down here for example (points). So your hearing is actually quite good on the left ear.

Transcription Excerpt 6.7

1 D Var det ubehagelig da jeg satt opp lyden?
Was it uncomfortable when I turned up the volume?

2 K Nei.
No

3 D Da fortsetter jeg litt til også ser vi hvordan det går.
Then I'll continue a bit more and see how it goes.

4 D Skal prøve å snakke igjen nå da. Nå er det enda litt kraftigere

I'll try to speak again now. A little bit stronger.

5 K (nikker) Ja.
(Nods) yes.

6 D Var det for mye?
Too much?

7 K (drar på ordene) neeeei (ser på mannen sin) Kunne ha dempa littegranne da.
Well, (looks at her husband). Could maybe lower it a bit.

8 D Littegrann?
A bit?

9 K Ja.
Yes.

10 D Jeg kan snakke litt mer først, så du hører litt hvordan det kjennes ut.
I'll talk some more first, so you can hear how it feels.

11 M Hører du bra når jeg snakker nå da?
Can you hear me when I talk then?

12 K Ja. (ler og ser på mannen sin)
Yes (laughs and looks at her husband).

13 D Du gjør det?
You can?

14 K Ja.
Yes.

15 D Det var kanskje litt bedre da. Du hører kanskje litt mer.
Maybe it is better now. Maybe you can hear a little bit better now.

16 K Ja, det kan være ja.
That might be.

Transcription Excerpt 6.8

1 D Ja, hva tenker du selv når du hører jeg forklarer, når jeg sier mine tanker.
What do you think when you hear me explaining, when I say my thoughts.

2 P Jo, jeg skjønner den biten der.
Yes, I understand that part.

3 D Har du lyst til å gi det et forsøk til? Eller hva tenker du? Er jo du som er sjefen her.
Do you want to give it another try? Or what do you think? You're the boss.

4 P Ja, jeg må jo det. Det vil jo være helt fryktelig dumt å koble ut noe som til en viss grad er, må regne med at blir mer brukt fremover. For det er jo en ting å høre nå, men alder setter jo litt preg på det. Det må man jo regne med.
Yes, I have to. It would be terrible stupid to remove something that to a certain extent, I would have to count on using it more often. Because one thing is to hear now, but age does add to it. But that's a given.

5 D Det gjør jo det. Etterhvert vil du jo merke den også.
It does. Eventually, you'll notice it as well.

Transcription Excerpt 6.9

1 D Så da tenker jeg, at jeg håper at du skulle ha fått til å bruke apparatene litt mer. Jeg forstår jo argumentene du har med at når du er alene så bruker du dem ikke så mye.
So i'm thinking, I hoped you would have used the aids a little more. I understand your arguments that when you're alone and you don't use them much.

2 P Nei, jeg gjør ikke det.
No, I don't.

3 D Men en annen ting jeg vil at du skal tenke over er at nå har du ganske store hørselstap på begge ørene. Hvis du ikke stimulerer ørene, hvis du ikke stimulerer hørselsnerven din med lyd, hvis du ikke stimulerer hjernen med lyd, så vil hørselstapet du har forfalle fortere, enn om du nå bruker apparat og får lyd inn. Ørene er jo som alle andre kroppsdeler vi har, hvis du blir sengeliggende og ikke bruker føttene på mange måneder, så må du trene opp de og. Og sånn er det med ørene, hvis de ikke blir brukt så brukes de ressursene på noe annet.
But another thing I want you to think about, is that now you have big hearing losses on both ears. If you don't stimulate the ears, if you don't stimulate the auditory nerve, the hearing loss will worsen faster than if you use the aids and get enough sound in. If you have to stay in bed and don't get to use your legs for months, you have to train them. It's the same thing with your ears, if they are not used, the resources are used on something else.

4 P Det kan godt hende. Den varianten har jeg ikke hørt før. Begge deler er skummelt med for mye lyd for ørene.
That might be. I haven't heard it put like that before. Both scenarios are scary, with

too much sound too.

5 D Ja, det også. Men det er ikke for mye lyd du får inn her nå.
Yes, that too. But you're not getting much sound now.

6 P Nei, den lyden som er nå den er jo grei.
No, the sound as it is now is okay.

7 D Ja. Er det noe med apparatene her eller noe rundt bruk av apparatene som du kunne ha tenkt deg å ha hjulpet deg til å brukt de litt mer?
Yes. Is it something with the aids or something around the use of aids you think would help you or helped you to use them more?

8 P Nei, grunnen til at jeg bruker de så lite er jo livssituasjonen. Det er jo ikke noe annet. Bruker jo ikke noe uten at man føler man har behov for det. Det er sånt rent logisk. Men jeg bruker det jo når det er sånne spesielle situasjoner, og da er dem til god hjelp. Men det blir litt sånn meningsløst å bruke dem når man sitter alene.
No, because the reason I don't use them is my life situation. Nothing else. You don't use something unless you feel like you need to, logically. But I use them in certain situations, and then they are very helpful. But it is pointless to use it when you are alone.

9 D Ja.
Yes.

10 P Det er noe med å ha dem på og legge dem bort, og rengjøre dem, og hele den prosessen hvis du ikke trenger det, så gjør du det ikke. Det er jo det som er årsaken. Og spesielt nå som jeg er ut i fra arbeid og alt det der, så.. er det jo ikke nødvendig som det var før.
It's something with putting them on and putting them away, clean them and the whole process if you don't need to, you don't. That's the reason. And especially now that I'm out of work and all that. It's not as necessary as before.

11 D Nei jeg skjønner den. Og du er ikke alene om å føle det sånn som det der. Men hjernen din trenger å høre lyder selv om du er alene. Og den trenger å høre alle de små ubetydelige lydene vi egentlig har rundt oss. Å være borti ting, ark, fottrinnene dine, det finnes jo ikke stillhet. Det er alltid lyd rundt oss. Og det er sånne små omgivelseslyder vi ikke tenker over til vanlig for de er bare der.
I get that. You're not alone about feeling it this way. But your brain needs to hear sounds even if you are alone. It needs to hear all the insignificant sounds around us. To touch things, papers, footsteps, there is no such thing as silence. And its these types of sound vi don't think about in our everyday, because they're just there.

12 P Jeg tenker jo det at det er det som er hovedsaken, det kommer ikke mange andre nye lyder som jeg ikke har hørt før. Det er jo en del lyder som er helt meningsløs for meg.
I feel like that's the main cause, there's not many new sounds I haven't heard

before. Some sounds are pointless to me.

Transcription Excerpt 6.10

1 D Da kan vi gjøre den litt mykere. Til å begynne med. (endrer på dataen). Da har jeg tatt litt ned på de skarpe lydene, det er snakk om 1 decibel. Men det utgjør egentlig ganske mye.
We can make it a bit softer. To begin with (adjusts on the computer). Now I have lowered the sharp sounds, about 1 decibel. But that actually does a lot.

2 P Det gjorde det. Det var litt bedre.
It did. That was a little better.

3 D Ja, sånn at det ikke var for..
Yes, so it's not too..

4 P Skralling.
Shrieking.

5 D Men jeg kan fortsatt justere mer ned hvis det er for sterkt da.
But I can lower it more if it's too loud.

6 P Litt vanskelig å si da, når man sitter på kontoret her med propper i ørene og si at det her er bra. Det er nesten umulig.
It's hard to say, when one is sitting in this office with earplugs in the ears and say that this is good. It's almost impossible.

7 D (Setter på radioen på pcn) Da setter jeg på litt musikk, hvis man kan kalle det det. Så nå står det på som bakgrunnslyd i tillegg til at jeg snakker, og da er jo hensikten at du skal klare å høre stemmen min, selv om det står på støy da.
(Turns on the radio on the computer). I'm turning on some music, if you can call it that. Now it's on in the background, in addition to me speaking, and the idea is that you are able to hear me even if there's sounds in the background.

8 P Ja, gjør det. Hvis jeg bruker mye energi, hører jeg deg.
Yes, I do. If I use a lot of energy, I can hear you.

Transcription Excerpt 6.11

1 D Men det var sånn at, hvordan høres stemmen din selv ut nå?
But it's like, how does your own voice sound like now?

2 P Stemmen min høres ikke så..
My voice doesn't sound so..

3 D For det store spørsmålet er om det er for mye diskant på det, eller om du skulle hatt mer bass da.
Because the big question is if it is too much treble, or if you need more bass.

4 P Vet ikke. Vanskelig å si bare på sånn. Sånn du sitter nå. Det blir så kunstig alt!
I don't know. It's hard to tell just like this. The way you're sitting now. It's just too fake!

Transcription Excerpt 6.12

1 M Du føler det er hjelpsomt å ha en sånn app?
Do you feel it's helpful to have an app like this?

2 P Ja. Det gjør jo det. For da kan jeg justere støy mye mer. Men jeg er enda ikke fornøyd med meg selv altså. (snur seg mot audiografen). Du må hjelpe meg! (snur seg tilbake mot meg) Men denne er snedig i forskjellige settinger, at du kan både justere til det du syns er best. Selv.
Yes. I do. Because then I can adjust noise much more. But I'm still not happy with myself (turns towards the audiologist). You have to help me! (turns back to me). But this thing is nice in different settings, you can adjust it to what you think is best. Yourself.

3 P Ja, og det er det vi vil mer og mer.
This is what we want more and more.

5 D Ja, det er mange som vil styre mer og mer selv altså, enn hva dem får til.
Yes, many want to adjust more and more themselves than what they are able to.

Transcription Excerpt 6.13

1 P Altså jeg har jo drevet og.. det som jeg hadde håpet på var at det programmet på

mobilen kunne justeres så mye av meg selv, at jeg slapp å ha det forhåndsprogrammert fra dere. Eller at jeg kunne ha en mulighet for å kontakte dere når jeg ville gjøre en endring. Da hvis det ikke går an det første alternativet.
Well, I have.. what I hoped for was that the program on my phone could be adjusted more by me, so I didn't't have to have it preprogrammed by you guys. Or, that I could have the ability to contact you when I wanted to change something. If the first alternative doesn't work.

2 D Eh ja. Det er jo ikke noe mer enn det på appen der du kan justere selv, så hvis du har vært inne der og sett så ser du jo.
Well, there's not more in the app you can adjust, if you have seen the app you know.

3 P Jaja, så appen er fin den. Jeg har flere..
Yes, well the app is nice. I have more..

4 D Så du kunne tenkt deg å hatt..
So you would like to have..

5 P Ja altså at du kunne endre på.. det er jo ikke så mye du kan få endret i appen. Grunninnstillingene får jeg jo fra dere, så jeg har laget meg noen grunninnstillinger som jeg visstnok ikke, ikke blir endra, om dere endra her, hvis jeg har forstått det riktig. Så det fungerer greit det altså. Så det fungerer veldig bra, ellers så fungerer, jeg var på en konsert i kirken før jul, og da brukte jeg den og da hadde jeg disse proppene, og det var en veldig god opplevelse.
Well, if you could change.. there's not much in the app you can change. The basic setting I get from you, so I have made some settings that aren't being changed, if you change it here, if I have understood it correctly. So it works fine. I went to a concert in the church before christmas and then I used it and had these ear plugs, and it was a very good experience.

6 D Så bra!
That's good!

7 P Så det fungerer det altså, det gjør det. Men det var den muligheten for online kommunikasjon på et eller annet nivå.
So it works, it does. But it's just that possibility of online communication on some level.

Transcription Excerpt 6.14

1 D Har det vært sånn lenge eller?
Has it been like this a long time?

2 P Eh. Ja. Halvår kanskje. Skulle ha vært hos audiograf for lenge siden men.
Well, yes. 6 months maybe. I should have visited an audiologist a long time ago

but.

3 D Ja ikke sant.
Yes, right.

4 P Han som leverte meg apparatet, han vet jeg ikke hvor han blitt av.
The guy who gave me this hearing aid, I don't know where he went.

5 D Hva er det han heter han da?
What was his name?

6 P Nei..
No..

7 D Ja det er jo 6-7 år siden.
Yes, it's 6-7 years ago.

8 P Han var i industribygget da jeg fikk apparatet. Stor og kraftig en. Men så flytta han.
He was in the industry building when I got the aids. Big and tall one. But then he moved.

Transcription Excerpt 6.15

D Da blir det sikkert en sånn 5 uker å vente til neste time tenker jeg, så ny time blir uti april. Litt senere på dagen.
Then it will probably be about 5 weeks to wait for a new appointment I think, so a new appointments will be late in April. Later in the day.

Transcription Excerpt 6.16

D Da får du en ny time, da kommer du tilbake til meg, neste gang du kommer. Så sender jeg deg en time i posten hvis det er greit.
Then you will get an appointment, and you will come back to me the next time you're here. And I'll send you a new appointment in the mail if that's okay.

P Nå er jeg litt avhengig om jeg skal reise kollektivt, hvis jeg må være inn i samfunnet. Jeg bor langt uti geografien. Jeg tar buss om formiddagen, kommer frem i 11-tiden omtrent. Også må jeg dra igjen i 2-tida. Så du må få meg imellom der.
Now I'm dependent on public transport to get here, if I have to be in town. I live far away. I take the bus in the morning and arrive around 11am. Then I have to leave

again around 2pm. So it would have to be somewhere in that time slot.

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