A Qualitative Study About Users Becoming Non-users

Toni Joseph Abboud (20172026)

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Techno-Anthropology, Aalborg University, Copenhagen

Supervisor: Tom Børsen

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DANSK RESUME

Denne opgave tager udgangspunkt i hvordan bruger af teknologier bliver til ikke-bruger. Opgaven er lavet i samarbejde med Rehfeld Medical som har udviklet en app til pacemaker patienter, hvor opgaven belyser hvorfor brugerne bliver til ikke-bruger.

Opgaven gør brug af Don Ihde og Peter-Paul Verbeeks meditation teori som sætter fokus på relationer mellem mennesker, teknologier og verden.
Derudover bliver der præsenteret en ny teori ved navn problematic mediation som jeg har udviklet. Denne problematisk mediation tager udgangspunkt i problematiske relationer mellem mennesker, teknologier og verden.

Problemformulering for denne opgave er:
Hvorfor er SCAUT app brugerne ved at blive ikke-bruger.
Hvordan kan meditations teorien belyse relation mellem appen og hospitalet og hvordan kan brugen af problematisk mediation fremme en bedre forståelse af problemerne i relationerne.

Metoden for belysning af problemformulering var ved udførelse af interviews med 17 patienter. Der derefter blev transskriberet og kodet i programmet Nvivo. Dette var med til at belyse hvilken kategorier patienterne identificerede som årsagen til at blive ikke-bruger af appen.

Der kan konkluderes at appen mediere forskellige relationer mellem patienten og hospitalet. Derudover kan der også konkluderes at der forekommer en problematisk relation mellem patient, appen og hospitalet grundet en ikke færdig udviklet app.

ABSTRACT

Background: Telecare technologies have throughout the years been implemented in different settings and are now a huge part of the healthcare system. This project investigates how technology can mediate the experience of pacemaker patients, thus understanding the relation between humans, technology and the world.

Methods: This master thesis was made in collaboration with the company Rehfeld Medical, which develops an app for pacemaker patients. The study was conducted with the appliance of ethnographic interviews. I conducted 17 interviews with non-users of the app from February 2019 until June 2019. The purpose of using the semi structured interviews was to gain a patient insight of how the relation to technology has mediated the experience to the hospital. By applying ethnographic methods I produced insights into how the relation of the technology was mediated through the patient experience.

Results: The study shows that the technology was experienced in different ways, depending on individual experiences with the app. The usage of Don Ihde and Peter-Paul Verbeek's mediation theory aided to the understanding of the relations between the patients, the technology and the hospital. Furthermore, the results also indicate that some of those relations were problematic. As a result of these indications I have developed the outset of a new theory called problematic mediation.

Conclusion:
I conclude that the technology is mediating different experiences for the patients, and help shaping the relation between the individual patient and the hospital. In addition I conclude that these relations can be problematic which affects the perception of the hospital by the patients. As the perception changes the patients start becoming non-users of the technology this results in a non-existing interaction.

ACKNOWLEDGMENT

Firstly, I want to thank Rehfeld Medical for being very supportive and helpful with this project. The team at Rehfeld Medical had a huge part with finding participants and made it possible to interview them. Besides that, the team at Rehfeld Medical was very good at listening, giving ideas and constructive criticism.

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Last, I want to thank all the patient that has taken their time to answer my questions in the interview. The whole study is based on their knowledge and use of the technology and I appreciate the effort they used to answer all my questions.

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MOTIVATION

This thesis illuminates the topic of non-users and was chosen because of an increasing interest in understanding the relation between humans, technology and the world they live in. Understanding these relations makes it possible to investigate where challenges and barriers occur.
I have a personal motivation towards this topic as well, as I have a background as a nurse and have been interacting professionally with patients for years.

This thesis provides a deeper understanding of why patients become non-users of technological devices in healthcare.
My bachelor thesis was to understand if standardized patient plans would provide an improved healthcare process. This thesis will further improve my knowledge of users and non-users.

Based on my prior experience working with patients, interviewing the non-users was a priority as to gain a better understanding of their experience of the technology. Throughout my studies, an important phrase was always emphasised when conducting interviews which was “the patients know better than anyone how they feel." This phrase illustrates how vital it is for non-users or users to use their own experience of the technology. Their experience needs to become a collaboration between the users and the researcher/designer, in order to create a better insight and optimising the experience.

Non-users are not a new phenomenon for me, since I have been working with them from the start of my nursing education. Many patients become non-users for many different reasons and an example from my own experience, is when new devices are used to promote better healthcare, but end up being too complex for the users and forcing them to become non-users. This has become a passion for me to understand why and how the relations between patient,technology and hospital can be changed for the better.

INTRODUCTION

The usage of telecare technologies has increased in the healthcare system the last decades. The ability to treat patients at a distance, has evolved to be a central element in medical care. Physicians in The United States of America spend 17.4 minutes on average on each patient (DiBattista, J. 2018). The usage of the telecare has reduced that time from 17.4 minutes to 12 minutes. The reduction is 5.4 minutes on each patient, which can help time pressured physicians to tend to more patients, as the result is a more time efficient treatment process (Ibid.). The reason for the usage of an American research is that Denmark or Sweden have not done a study on the advantage of using telecare yet, since it has only been implemented between 2018-2019. Telecare opens for the possibility to reduce the number of out-patient visits for patients, since telecare is mediated by communication technologies and information. Throughout the years the healthcare sector has adapted to modern society and follows technological progress (Oudshoorn, N, 2011). Many new devices are being implemented and tested, with the intention of creating a better environment for the patients, relatives and healthcare professionals. However in spite of being implemented with the intention to do good, a new device can still have major consequences for healthcare. The positive effects of implementing new devices are as mentioned earlier, a possible time reduction for patients and clinicians, which can lead to cost minimization. The negative sides of implementing new medtech devices can create drastics changes, that involve a change of work practices (ibid.).

An ethnographic study was made within the homes of the elder in England, Spain, the Netherlands and Norway. The study was made in 2008-2011, later published in 2013 (Mort, M, et.al, 2013). The focus of the study was ethical implications of telecare for the elderly. The researchers conducted interviews and the results were major concerns of the elderly: "*They were concerned that telecare would replace physical contact with the hospital due to cutbacks (ibid.)*". The study also revealed that elder people are often excluded from the telecare design process, and the telecare devices have different intentions depending on the designers. Some of the telecare devices enhances the elderly patients' self-care by increasing self-awareness, and other devices introduces new forms of dependency (ibid.). The study concludes that the telecare has care limitations and is not viewed as a complete solution, but a change in networks of the people and responsibilities. This can be seen in the example in the study:

"You know a lot of the [people living with] Alzheimer's, things like that where their memory's going… I mean we've got gas detectors in and you go through and you're talking to them and you say 'Can you smell any gas? Can you check your cooker for me?' [They say] 'I haven't got a gas cooker' and they have, you know… So you just have to get someone [to go out]… I've always said

telecare is only as good as the contacts we've got. If you can't get somebody to go and check on that, you know, you're really struggling, because the police don't want to know every few minutes [or] to be going. So the more contacts we can get with the telecare the better, because that's what we have to rely on you see (ibid.)*.”*

The quote explains that even with technology that can detect gas leaks, some patients, such as patients with Alzheimer’s disease that will completely forget if they have a gas cooker and have to rely on relatives, friends or the hospital, are excluded.
Furthermore, the study shows that telecare projects are using the ideal active patients. The active patient is one that can follow instructions and be active with the device, and ask questions about it, which is not possible in some cases and can cause ethical problems (Ibid.).

In 2016 a new healthcare platform was implemented in two regions in Denmark. The new healthcare platform was enrolled within one year and was released on August 2017 (Hult, C, 2019). The new platform created a transformation in the order of care and was the center of attention in the media due to various reasons. The Health Platform was met with resistance from different actors such as patients and healthcare professionals. The media even portrayed the platform as being the worst decision ever made by the region capital and the region of Zealand (Brejner, M, 2018).

Some telecare devices force the patients to be active and conduct their own health examination. This can have a positive effect for the patients since they know better than anyone else how they feel, however, the negative effect can be that some patients might not have the power or need to conduct their own examination. If that is the case then the implementation of a new healthcare device can result in patients becoming non-users, since it now requires an active patient. The patient playing an active role in the telecare industry is based on different factors. One example might be if the patient is in a situation where the sickness becomes too overwhelming, and the patient is so exhausted that the usage of telecare becomes more of a burden than relief.
Today technology is developed at such a rate, that young patients are more likely to understand how the technology should be used, as it has played an integral part of their upbringing. At the same time, older patients may have a more challenging time understanding the technology and find it easier to not interact with the technology or pass the task on to somebody around them, who are more capable to interact with the technology.

PROBLEM FIELD

Multiple sites of care: From home to hospital and back home again?

The implementation of telecare technologies has resulted in a relocation of treatment. One huge change of location is the different places outside of the hospital, now patients are receiving treatment in their homes.

Throughout the 1800s healthcare treatment was defined as “bedside medicine” which required doctors to visit the patients in their homes to diagnose and provide treatment (Oudshoorn, N, 2011). The home of the patient was considered as a good location to treat the patients, since it provides safety and comfort, though it was time consuming and the physicians did not have the right equipment at hand.
In the 1840s patient treatment was increasingly being moved to the hospital. Technologies played a huge role in the paradigm shift from home to hospital (ibid.). This resulted in a great investment of money and time in technology and throughout the 1850s-1890s, new industries and businesses were developed, in order to further develop and manufacture healthcare devices.
Medical technologies and laboratory equipments started to become a dominant factor in the healthcare industry. The companies and new business ideas were increasing the number of healthcare devices, thus replacing the physical examinations. With medical devices such as blood pressure monitors, stethoscopes, and thermometers, combined with the help of laboratory tests, such as urine and blood tests, in order to increase quality and accuracy within treatment and diagnostic work (ibid.). These new initiatives made the doctors rely on new healthcare devices, which contributed to the rise of the modern hospital and bringing the hospital to be a key location again, instead of the patients home.
Bringing the patient to the hospital resulted in longer waiting lists and increased hospital admissions. This pressure on the hospitals enticed the medical device companies to move the treatment back home to the patients, with the use of telecare (ibid.).

The major difference between in-hospital treatment and telecare treatment, is that the surveillance and monitoring systems are now placed at a new key location, the patient’s home. Moving technologies and expanding the telecare, demands a more engaged and active patient, and as Langstrup expresses that patients have to “*gazing into their own bodies* (Oudshoorn, N, 2011, p.7-8)”. This means that the patients now need to understand their own bodies and conditions and be active towards treatment.

Before the year 1990, medical devices were only restricted to be used by medical experts such as doctors, nurses, and other healthcare professionals. However in 1990, the patients got access to medical devices, and were expected to use these devices to assist healthcare professionals in their own treatment and diagnostic journey (ibid.).

Throughout the years, different locations have been changed and different actors have been more involved in the infrastructure change of the healthcare (Oudshoorn, N, 2011). Bringing the treatment back to the home of the patients, is becoming more relevant with time. This is due the expanding development of telecare, overwhelming hospitals. A new requirement in the 21st century is the size and mobility of medical devices, as patients are more mobile now and are bringing devices to work and on holidays (ibid.). Being in the 21st century, telecare mobility has become an important factor since the locations now are holidays, workplace, homes, and restaurants.

Telecare in Denmark

Telecare has been a very helpful tool for the Danish doctors. An example of this is the telecare treatment of Chronic obstructive pulmonary disease (COPD) as the devices in figure 1 illustrates.

Figure 1 shows how the COPD box looks like.

The COPD devices are distributed as a set and contain a home monitoring box, which helps patients to communicate with the hospital through video calls. The box also contains different telecare devices so the patient can keep track of their own vital measurements (Region Nordjylland, 2012). The purpose of this set of devices is to create a more independent patient, increased quality of life and ultimately reduce the number of hospital admissions.
The device allows the hospitals to follow the patient's vital measurements and if the hospital notices significant changes in the vital measurements, they are able to act quickly and assist the patient through a video call (ibid.). The COPD box can be very helpful for many patients, but it requires a lot of attention and a good understanding of the technological devices. Many patients have no idea what the definition of a "good" or "bad" blood pressure is (Graubæk, A, 2010). When they use the device and it shows the blood pressure is 80/130, it will only be a number for them, without them knowing if it is either good or bad. A strong patient is defined as being a well-informed patient or having relatives with knowledge about the different subjects (Barbot, J, 2005). Professor and doctor Jens Søndergaard expresses his vision of the telecare:

"*As a general practitioner, you can immediately think that it is nice that we do not have to go out on a medical visit more, but before we can implement such a solution, we must investigate telemedicine more, so we know which patients it should be, when and how it must be, and how, we use the telemedicine solutions for the current patients.*
We need to think carefully so that we implement some solutions that are user-friendly for all players. Both for the patients and for the doctor (Brejne, M, 2019)".

Jens Søndergaard criticizes telecare technologies, for not being ready for implementation, as it can result in the opposite of a good experience for the patients, especially for the vulnerable patients. He explains that vulnerable patients should still have the opportunity to seek help at the hospital instead of a tablet. According to Jens Søndergaard, a gap between patients and doctors will appear, since the contact through a screen will never replace the feeling of sitting in the same room (Brejne, M, 2019) .

Virginia Henderson (1897-1996) is an American nurse and professor and is considered as being the "First lady in nursing". She developed 14 basic needs to provide the best possible treatment. One of the 14 basic needs is stated as follows:

"Communicating by expressing feelings, needs, concerns, or opinions (meaningful contact) (Henderson, V, 1997).*"*

The meaningful contact can be done through telecare, however, as Professor Henderson explains, the term “hand on the shoulder” is vital in order to provide good nursing. The “hand on the shoulder” is defined as:

“Many patients can feel sick, but sometimes a hand on their shoulder and a voice telling them everything is going to be alright can help the patient (Henderson, V, 1997)*”.*

The physical contact that will help many patients to feel safe, will be removed if telecare gets implemented (ibid.).

The intentions of using telecare are good, but the understanding of how it can affect patients that are vulnerable, non informed patients or the hospital staff, is missing. This is where Techno-Anthropology can help bridging the gap between technology and actors, thus creating a better understanding of key factors that need to be considered when implementing new devices (Børsen, T & Botin, L 2016). The prerequisite for success is that the technology is developed with an understanding for the actors (Oudshoorn, N, 2011).

The SCAUT Platform

The company that I am cooperating with is called Rehfeld Medical. They have developed a software platform named SCAUT. In my ninth semester, I did my project with Rehfeld Medical, where I gathered my information about the SCAUT project.
SCAUT is a short of “ Self-, Collaborative- and AUTo-detection of signs and symptoms of deterioration” (SCAUT, 2017). The SCAUT platform is based on a research project, between the University of Copenhagen, Rigshospitalet in Copenhagen and Medtronic, an American medical device manufacturer.
The project was launched because of the need for supporting technological communication for heart patients, with implanted devices and the healthcare professionals at the Heart Center in Rigshospitalet. The focus of the SCAUT project was to create an app to provide improving healthcare through digital support. Throughout the years the two main researchers of the project decided to use their findings to start a company, that would focus on continuing the work of improving remote care of pacemaker patients. The SCAUT app is a mobile app for patients and a web-based platform for clinicians. The platform provides patients with the opportunity to connect patient-generated data, to their device transmitted data, acting as a CDS (clinical-decision-support) tool for clinicians. The SCAUT platform has the aim of reducing time-consuming work, instead of

redistributing it, which is done through close collaboration between clinicians and patients. The task is to gain a full understanding of the patient's needs.

Functionalities of the SCAUT platform

The primary function of the SCAUT platform is to increase patient satisfaction and comfort in relation to data transmission. The patients are used to exist in a world, where they are unsure of whether their device transmission is properly received by the clinic. If they are curious regarding what the data might contain, their only option is to call the out-patient clinic. Furthermore, clinicians often need further input from patients to make clinical decisions.

With the introduction of the SCAUT platform, patients are presented a questionnaire with every transmission, where they can answer questions regarding symptoms or activity in the moment of the transmission. Clinicians are provided with the necessary patient-generated input, in order for them to make a clinical decision.

The fundamental part of the SCAUT platform, is that is has been developed on close connection with patients and clinicians, and it provides value for both patients and clinicians.

With the introduction of the SCAUT platform, the same problem as described earlier arises. How do patients accept the new technology, and what steps are taken in order to ensure technological compliance and understanding?

PROBLEM FORMULATION

Why are the users of the SCAUT app becoming non-users?

How can mediation theory illuminate the relation to the app and the hospital and how can the usage of problematic mediation create a better understanding of the problems within the relations.

METHODOLOGY AND THEORETICAL FRAMEWORK

Gathering of empirical data

In order to achieve further insights in the transformation of non-user to user, the empirical data was collected through interviews. The participants of the interviews were selected through SCAUT's database. Data from the SCAUT database provides insights into the usage of the app of the patients. Patient activity is logged and it is possible for researchers to know when patients last were online. Prior to be segmented into non-users, patients were logged as 'never logged in'. This behaviour would result in the patient being segmented as a non-user.

Last login
2 April 2019 20:06 (2 months ago)
4 December 2018 11:28 (6 months ago)
4 May 2019 14:57 (a month ago)
Never logged in
14 January 2019 13:20 (5 months ago)
2 October 2018 23:03 (8 months ago)
19 November 2018 13:53 (7 months ago)
21 January 2019 00:24 (4 months ago)
1 June 2019 13:45 (3 days ago)

Figure 2 illustrates patient activity on the SCAUT platform.

Patients

17 patients were included in this study, all of whom were interviewed about their level of activity after being onboarded to the app. The patients who were excluded in this research, were patients who had been contacted prior by other employees of Rehfeld Medical.

The main purpose of conducting the interviews, was to gain insights into the understanding and interpretations of the patients in relation to their usage of the SCAUT app.

The conducted interviews were based on a semi-structured approach (Brinkmann & Tanggaard, 2015, p31*)*. The reason for using Brinkmann and Tanggaard, is that they both are phenomenologists. Furthermore, the two authors have developed a handbook focusing on how to do phenomenological studies through interviews and observations. The usage of a phenomenological approach, supports the use of postphenomenology, which is being used in this project.

The post-phenomenological approach takes a phenomenological position, as it examines how humans experience the world they live in through technology. The understanding of human experiences has a big part in phenomenology and by applying Brinkmann and Tanggaards methods on interviews, it provides a better foundation of understanding how and why humans experiences the technology (ibid.).

The use of semi-structured interviews involves using an interview guide beforehand, based on predetermined open-ended questions (Brinkmann & Tanggaard, 2015). The predetermined questions were constructed with the help of research employees of Rehfeld Medical. I sat down with the researchers and determined different topics and research questions for when people become non-users. We wanted the patient to elaborate on from their own perspective. In table 1 the interview guide can be seen:

Research Questions	**Interview Questions**
Intro: What is the app and why do the users need to use it?	• How do you understand the purpose of the app? • Have it been sufficient knowledge, if not how would it have been done better?
The usage of the app	• Has the app provided more or less time to other routines ? • Why don't you use the app? • What has been unsatisfying in the usage of the app?
What is your take on the app?	• Can you express with your own words what the app did mean to? • How was the onboarding process for you?
Becoming a non-user	• What was the reason to become a non-user of the app? • Is there any way that reason can be redone so you could use the app for your needs? • When did you decide that the app was not for made for your needs?

Table 1 illustrates a example of the interview guide

The interview guide was made, in order to create a guide through the conversation, with a semi-structured approach. The reason for using a semi-structured approach, was to give the patient an opportunity to elaborate on the subjects of being a non-user, whilst still allowing the interviewer to provide a structural component. To provide a high degree of validity of the interviews, the questions were made as open-ended question, ensuring that the informants and the interviewers had the opportunity to do follow-up questions (Brinkmann & Tanggaard, 2015).
An example of the open-ended questions could be; " *Why do you not use the app?*" or "*How can we make the app better for you?*".
Using this method of conducting interviews, forces the informant to present an elaborating response instead of leading questions, which can be answered with a simple yes or no. Leading questions can affect the authentic responses from the informants, since they would not have the ability to elaborate on a leading question.
The interviews were conducted in Danish, in order to create a natural setting for informants. This helped the informants to be able to formulate themselves freely. Creating a natural setting, provides a huge advantage to capture the closest understanding of the patients' individual interpretations of their reality and the usage of the SCAUT app (Rossman & Rallis,2012; p.177).

Transcription

The empirical data was gathered through interviews, all interviews were recorded with the consent of the patients, and later transcribed in order for me to be able to code and analyse the empirical data. The transcription process started shortly after each interview was conducted, in order to better recall the situation and create the most realistic transcription. In the Danish language, many words and sentences can have a double meaning; where the meaning of the sentence can vary by the pronunciation and therefore it was important to transcribe the interviews right after they have been conducted (Brinkmann & Tanggaard,2015; p43-45). The transcription was produced with the usage of a verbatim approach, this approach produces the transcription to be as close as the spoken words. To reduce the amount of filler words such as "eh" and "uhm", I decided to use improved language transcription, which removes filler words, since these words were not contributing to anything beneficial for the outcome of the transcription and the empirical data (ibid).
The interviews were transcribed in Danish, before being translated to English, in order to to adapt the data for this master thesis. The average length of the interviews were one page, so the translation from Danish to English was not time consuming. The purpose of translating the transcription to English, was to be able to see similarities within the English texts that was used in the desk research.

Coding

The interviews provided a lot empirical data, but before the data can be useful for the report it needs to be coded. The purpose of coding the data is to classify it and understand the deeper meaning of the transcribed data (Brinkmann & Tanggaard, 2015). An important feature in coding, is that it is done from the researchers preexisting -understanding and decision. My perspective will help me define the analysis and what data will be extracted to define the different categories. This means that it is only my perspective on the data, and if the data was handled by another researcher, different perspective might be highlighted compared to mine, neither of them being wrong. When conducting the interviews it was important to escape my own presumptions to the field, and the same when coding the interviews. When coding the data it is important to let the data speak for itself instead of trying to make the data fit the usage of the projects theory (ibid.).
This project uses two different types of coding, an open coding and selective coding. The usage of open coding, pinpoints what the data and problem analysis is and helps the researcher to identify themes, concepts, abilities and dimensions. The usage of open coding in this project provided different categories that clarifies what the different transcriptions are about. After accomplishing the first open coding, it is not unusual to change the previous coding with a new coding, since the data can be read more thoroughly and different paths are revealed (Brinkmann & Tanggaard, 2015). The next step will be analyzing the data and letting the researcher find similarities and differences in the dataset. When the categories and concepts have been identified it became clear that the use of postphenomenology was needed to look into the relation between patient and technology.

Selective coding

Now that the categories and concepts have been identified, the usage of selective coding begins. The selective coding makes it possible to select different parts of the text which helps narrowing down and changing the problem formulation (ibid.). The first problem formulation was made from the open coding and was “How can the different categories be reduced”. The selective coding helped to look deeper into the categories and find similarities and was part of changing and narrowing the problem formulation to “why are the technology forcing patient to become non-users”. A continuously selective coding was made to achieve the final problem formulation, in this case, the main category is non-users. By applying the selective coding throughout the interviews it makes it possible to illuminate the core of the category non-users and the similarities in the other categories.
Many programs have been developed to provide an easy overview for the researcher. When acquiring a lot of data it can create confusion for the researcher and can cause missing out of important data. In this thesis a tool called Nvivo is used to reduce the chances of missing out on

important data. The tool allows the researcher to add the dataset and look thoroughly through it, while adding comments (Bazeley, P & Jackson, K. 2013). After the comments are added it is possible to define and add categories. Figure 4 is an illustration of how the categories look like when coded;

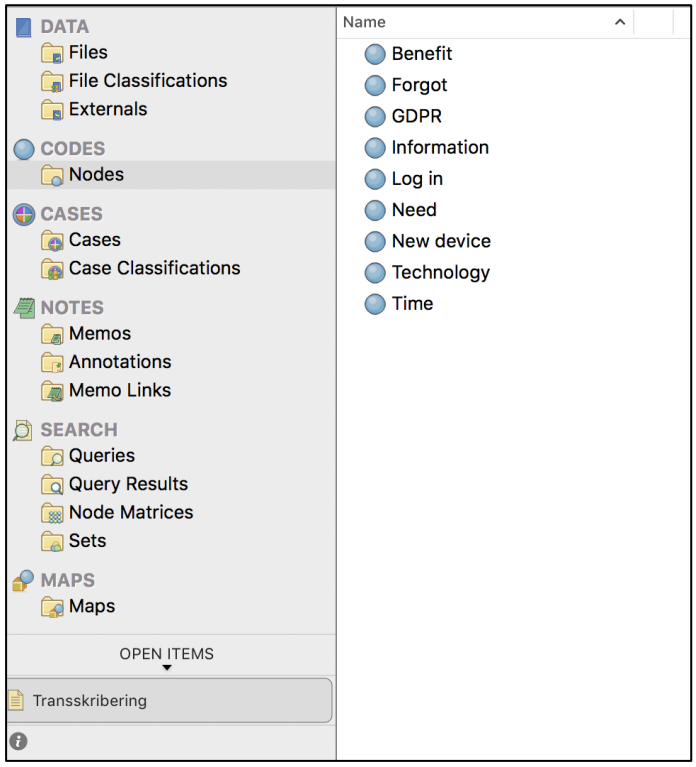

Figure 3 shows the program Nvivo and the categories.

Figure 3 illustrates the different categories that have been selected through an examination of the multiple interviews. A short introduction to the categories are:

- Benefit: Users that do not see any benefit in using the app
- Forgot: Users that have forgotten to use the app because other things were prioritized more than the app.
- GDPR: Users that are worried that their information is being passed on to different parties.
- Log in: Users that has been onboarded but have never logged in or have lost their password and forgot how to log in.
- Need: Users that do not have the need to use the app because they feel fine and do not want to use a device which can cause more work.
- New Device: When a user gets a new device that do not collaborate with the app.
- Technology: Users that have an old phone that do not collaborate with the app system or users that do not want to learn new technologies.

- Time: Users that expresses that the usage of the app is to time consuming or their daily routines are time consuming.

These categories has been developed by me and my examination of the interviews.

The coding was based on 17 patients who were interviewed, with the focus of unpacking why the usage of the app has been decreased or removed. Conducting the interviews turned out different than expected, since many of the conversations turned out to be short explanations, even with open questions. Some of the patients expressed the usage of the app was not needed, but could not explain why they stopped using it. The interview could have turned out differently, if it was a physical interview, instead of a phone interview. To provide safety for the patient and the GDPR rules, it was not possible to request a physical interview. At the beginning of the project, I suggested to make a focus group of non-users to gather data and opinions about the app, but rules about being anonymous and GDPR was blocking that idea.
After the coding I recognized many human, technology and world relations within the patients description. When using the selected coding, it was clear to use the mediation theory on the different descriptions and look into how the patient experience the technology. The coding identified why the patients became non-users of the app and have a big involvement within the relation to the technology, which is the focus of postphenomenology.

Theoretical approach

The following section will highlight the usage of post-phenomenology, being the main theory for this thesis. This chapter will give an overview of post-phenomenology with a focus on Don Ihde and Peter-Paul Verbeek's mediation theory. This section will touch upon the theory of non-users becoming users, as well as describe central elements that have a huge impact on the transformation of non-users to users. The decision of combining these two theories is based on how well the theories complement each other. Ihde and Verbeek's mediation theory creates an understanding of the relations between humans and technology, in this case, the relations between patients and the SCAUT app. Using the theory of non-users to users creates an understanding of how the non-user patients are mediating the SCAUT app, and reverse that to develop an understanding of why the patients are non-users and how they will become users.

THEORY

From phenomenology to postphenomenology

The term phenomenology was first introduced in the 18th century by the Swiss German mathematician and philosopher, Johann Heinrich Lambert (1728-1777). The term was introduced in Neues Organon that was published in 1764 by Lambert, and was defined as "*Designation for an empirical description of human experience devoid of all metaphysical presuppositions* (Lambert, J, 1764)" .

In the 20th century, the term phenomenology started to grow its roots in the philosophical world. The term phenomenology was defined as the study of "phenomena", which was how objects appear in the human experience or how humans experience the object (Verbeek, PP, 2011). Phenomenology studies how the subject or first person experiences the view on objects.

A german philosopher Martin Heidegger(1889-1976), used traditional phenomenological analysis of technology in his studies. He studied technological artifacts as a broad, social and cultural phenomena (Verbeek, PP, 2005). Heidegger's studies illuminates the different ways technology divides humans from themselves and the world they live in. The studies brought a lot of insights, to the understanding of technology in human existence. Heidegger was against technology being interactive with humans. He argued that the equation should only be human-world, where technology can be used as an object and is seen as a disturbance between the human and the world (ibid.).

Don Ihde(1934 -) believed that the analysis in the studies of Heidegger, was started to be non-existent in the humans actual experience with the technology. Don Ihde explains that it is problematic, that technology is always understood as a disturbing element, instead suggesting that the technology should be understood with a different role. Don Ihde gave technology a different role, which was to understand the relation between the human-technology-world (Verbeek, PP, 2015).

The studies that have been done from Peter-Paul Verbeek(1970-) and Don Ihde have at least two things in common. The first thing they have in common is that the studies all investigates technology and how the relation affects human, and how technological artifacts help shaping humans and reality. The main focus is how the philosopher approaches the technologies as a mediator of human experience and practice and not only being instrumental objects.

The second thing the studies have in common, is that they do not apply philosophical theories to technology, but are part of an empirical investigation. The phenomenological approach uses actual technological development, as a basic principle for philosophical analysis. The postphenomenology philosophers explain, that there is no strict methodology that should be followed to achieve a postphenomenological approach. this is because of the many different views

on technological artifacts, and some approaches explores some of the same features and characteristics (ibid.). To get a better understanding of postphenomenology, it is important to understand where the term “post” is developed from.

The field of technology studies does not give a genuine response to the absence of association, and do not always help to understand what role technology plays in humans and their understanding of the world. This was the start of the “new” phenomenon of the postphenomenological approach. The reason why the word “post” is used in the phenomenological approach is to create a distance from the original phenomenology which had a more romantic focus, functioning as opposition to technology. Postphenomenology believed that in order to understand the relation between humans and the world, technology needs to be integrated into the analysis of relations. The classical phenomenological approach works with the thinking of separation between technology and humans, while postphenomenology operates with the term mediation. Technology is not meant to distance us from the human understanding of the world, but rather it should help humans in shaping their understanding and relation to the world they exist in. Different thinkers of phenomenology such as Husserl (1859-1938) and Heidegger, have all created ways to see the world, but postphenomenology have taken their concepts and rebuilt the way to think, by making it possible to understand the relation to the world. It is now possible to understand how technology can mediate relation between humans and the world instead of dividing them, thus making the relation merely impoverishing (Verbeek, PP, 2005, 99–119).

A postphenomenological approach does not seek knowledge about the objective facts or the subjective ideas, but looks upon the understanding of how the relation is between the subject and object. The approach does not believe that subject and objects can be separated, since humans do not just “see” or “hear”, but there is always “something” that they hear or see. In addition to the subject, the objects do exist, but are still related to the subject, since the thinking of the objects automatically makes the object to be a thing for us. This means that it is not that simple to just put a human-world relation, but a human-technology-world relation (Verbeek, PP, 2011). The use of a postphenomenological approach makes it possible to investigate, how technology is mediating the human-world relations. It allows the technological artifact to be looked upon through a philosophical approach since it is entangled with the human-world relation. To understand the technology through a postphenomenological approach, the starting point is to understand the relation in the human-technology. Thus, before understanding the world, it is important to understand the relation between technology and humans. Humans can merge with technologies, integrate them, read them and since the human can merge with technologies it is a part of how humans experience the world. Technologies should not be seen as opposed to human but a way to mediate the world (ibid.).

Human-Technology Relations

To understand the human-technology-world relation, a very influential thinker is Don Ihde, who created various ways to understand the relation. Ihde has developed four ways to understand how technology mediates the world. The four ways are embodiment relations, hermeneutic relations, alterity relations, and background relations. Ihde uses different equations to explain how different parts are mediating the relationship between humans, technology, and the world, the equations are (Verbeek, PP, 2015):

Embodiment relations:	(Human-Technology) -> World	(1)
Hermeneutic relations:	Human -> (Technology-World)	(2)
Alterity relations:	Human -> Technology (-World)	(3)
Background relations:	Human - (Technology/World)	(4)

(Verbeek, PP, 2015, p. 125-133)

To understand the equations provided by Ihde, a symbol list will be shown in table 2, below

Symbols	Definition
“-”	The “-” symbol is understood as being a bridge to form a unity.
“->”	The “->” is used as how the human or the human trough technology perceive the world.
“()”	The “()” is used to unite the parts that are interacting.

Table 2 illustrates a symbol list.

Embodiment relation

Ihde characterizes the notion of “embodiment relations“, as being a mediation of the technology which converts the humans actional and perceptual bond with the world. Ihde defines embodiment as a technology, that can reshape the humans experience through a device. The device can somehow be taken into human bodily awareness (Verbeek, PP, 2015). The embodiment relation can be presented in this appearance (human-technology)->world. Ihde uses a simple example of a pair of eyeglasses, since they are one of the many things in the world that the human may identify as a simple object. The embodiment relation happens, when the human looks through the

eyeglasses and the world suddenly transform and works as a part of the human perceptual experience. The glasses are part of mediating the bodily-perceptual relationship, with the human and the world. As a human, we try to maintain a “double desire” regarding the usage and design of the technology (ibid.). The double desire explains that the technology should optimally transform the human's relationship, to the world but at the same time letting the technology remain transparent so it becomes nearly unnoticeable.

Hermeneutic Relations

Ihde describes the notion of “hermeneutic relations” as being technologies, which act of perceiving and interpreting the device's readout. As mentioned earlier the embodiment relation experience the world through technology, while in the hermeneutic relation the users experience a transformed confrontation with the world through direct experience and interpretation of the technology (Verbeek, PP, 2015). Ihde describes hermeneutic relations as being human->(technology-world). Ihde uses the example of a wristwatch, to understand the hermeneutic relation. When a human uses his wristwatch to interpret the display, the human gets an understanding of the precise time of the day. Another example that Ihde presents is the usage of the MRI scanner which can show the brain activity, the technology is looked upon and presented to the human. The technology is forming a unity with the world instead of just human using the technology. It allows humans to be in unity the technology that represents the world (ibid.).

Alterity Relations

Ihde brings the notion of “alterity relations” which is described as being the human->technology -(-world). Ihde attributes technology to act as similar to how humans interact with each other (Verbeek, PP, 2015).

Ihde uses the example of an ATM machine that “asks” questions through the screen, such as “*Do you want to see your bank account withdrawals*” or “*do you want to make a withdrawal*”. This technology is acting as a human-robot, asking questions to the person, but it is essential, that as humans we know that we are interacting with a computer screen but simply that the interface of the technology takes an analogous form. Ihde predicts that in the future, more sophisticated computers can interact in different ways with the human, as the technology is designed with an alterity-style interface. The alterity-style interface has already followed the technology development, it can be seen in GPS devices that reads the human driving direction, customer service calls and SIRI that can understand questions and answers them (ibid.).

Background Relations

Ihde explains that not all technology affects the human directly, while still being a part of shaping the understanding of the world. The equation used to define the background relation is, human - (technology/world). The technology can have a background relation to the human and an example that Ihde uses is the refrigerator or the air condition that can automatically change the heating system on and off when needed (Verbeek, PP, 2015). Ihde explains that it can be very tempting to try to understand why these technologies have a lack of attention and why technology can become transparent. Ihde points out "The 'withdraw' of this technological function is phenomenologically distinct as a kind of 'absence.' The technology is "*as it were, 'off to the side.' Yet as a present absence, it nevertheless becomes part of the experienced field of the inhabitants, a piece of the immediate environment"* (ibid.). The technology remains in the background and does not receive the same amount of attention like technologies that human has to interact with. This is not because the technology has now become habituated to use, but they form the scenery of the human experience. It helps to shape the human experience, protecting them from the heat or keeping the food cold meaning that the temperature will lower the reproduction of bacteria and keep the food safe. This technology does not require a direct connection which gives the effect of a background relation, it does not need the same amount of attention but still serves as a technology helping to shape the human experience of the world (Verbeek, PP, 2015).

As mentioned earlier, Don Ihde has had a huge impact on the postphenomenological thinkers today and has inspired many to understand how technology mediates. One that has been inspired by the work of Don Ihde, is the Dutch philosopher in technology, Peter-Paul Verbeek. Peter-Paul Verbeek believed that Ihdes four relation point did not capture how technology is represented in modern society. Peter-Paul Verbeek developed three different relations that serve the progression of technology and gives an understanding of how technology is in the modern configuration. The three relations that Peter-Paul Verbeek presents are;

Cyborg relations: Human/Technology -> World (5)
Interactive context: Human <> Technology/World (6)
Augmentation: (Human-Technology) -> World + Human -> (Technology-World) (7)

(Verbeek, 2015, p.29-30)

Peter-Paul Verbeek uses different symbols than Ihde in his equations, a symbol list will provide a better understanding to his equations.

Symbols	Definition
“/”	The “/” symbol is used to explain that there is a bridge between two different entities. The human and technology are so connected that it cannot be separated.
“<>”	The “<>” symbol indicates a two fold relation, which means that both relations are needed to explain the relation between the two entities.
“+”	The “+” symbol indicates that there is two different relations.

Table 3, Symbol list of equations

Cyborg relations

The term cyborg is defined as being a hybrid between human and technology. This is the case where technology is not seen as an external technology, but a part of the human, Human/Technology -> World (Verbeek, PP, 2015). Verbeek uses the example of neuro-implants, that can stimulate the brain such as implants that can help deaf people to hear or pacemakers that can bring the heart rhythm back to a normal pace. The technology is not just embodied like wearing a pair of eyeglasses as Ihde illustrates, but becomes more intimate with the human, creating a hybrid between human and technology (ibid.).

Interactive context

Peter-Paul Verbeek points out that this relation does not just work as a background technology for the human, but is defined as being, Human <> Technology/World (Verbeek, PP, 2015). The technology in this relation merges with the environment and together it creates a relation to the human. An example that Peter-Paul Verbeek uses is the “smart toilets”, that are made to analyze the human excrements with the focus of delivering a medical report. The human can now experience how the smart toilet “experience” them, while making it possible to be involved in how the smart toilet perceives and act on human behavior (ibid.).

Augmentation

The augmentation provides the human with two relations to the world instead of one, it can be an embodied relation joined with a hermeneutic relation, (Human-Technology) -> World + Human -> (Technology-World) (Verbeek, PP, 2015). An example to understand this is the usage of Google smart glasses. When the human uses the glasses they can perceive information of their surroundings, take pictures, read messages and use the internet. The Google Glasses provides an embodiment relation with the glass but also a hermeneutic relation with the screen that can present the world in a certain way (ibid.).

Multistability

Technology are designed and used by humans but how can the technology still influence and control the humans and their world?

To understand this question through a postphenomenological approach, the notion of "multistability" is used (Verbeek, PP, 2015). The notion of multistability implies that technology can be used with multiple purposes and still be meaningful depending on the users. Ihde uses the example of the Necker cube to give a visual illustration of "multistability" (ibid.).

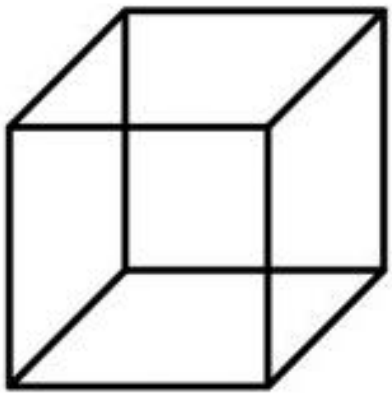

Figure 4 illustrates the Necker cube

The Necker cube in figure 4 illustrates that the cube can be interpreted in multiple ways. The cube can either been seen as a three-dimensional box with different surfaces, or it can be seen two-dimensional and only be lines that are connected to each other. Ihde uses figure 4 to illuminate that different users have different or multiple perceptions and ever perception can be implied as a separate stability. The notion of multistability is applied to understand the human-technology-world relations, since technological devices can have multiple stabilities depending on the user perception of the technology (ibid.). The technological devices can be supported by multiple stable

relations, such as embodiment and background relation or with other relations that will transform the users perception of the world.

USERS AND NON-USERS

This chapter is an introduction of how the user and non user will be portrayed in this project. This will provide the reader a better understanding of how the term users and non-users are being used and will define what a user and non-user is before and after the SCAUT app (Graubæk, A, 2010). Before the SCAUT app, patients used another technology to mediate the communication with the hospital. The patients had to contact the hospital through their hotline and wait in que, in order to get guidance and the opportunity to ask questions. The embodiment relation will define this relation as (human-hotline)->hospital. Don Ihde uses the same example in the embodiment relation where humans speak with each other through the phone and not to the phone (Verbeek, PP, 2015).
The chairman of the Danish Nursing Council, Grete Christensen has stated:

*"We have to stop the screw that for years has had to make it cheaper and cheaper in an attempt to create more efficiency in the health service. We do not want it to go so badly that patients lie in the beds without getting food and water, and that there is no time to talk to patients and relatives (*Kjedsen,S 2015)*"*.

Time and economy has become a huge factor in providing good healthcare for the users. According to Grete Christensen it will have huge consequences for the patients healthcare progress if no action is taken.
Another survey was done among patients who had been hospitalized throughout 2017/2018, they have the same experience as Grete Christensen explains. Every fifth patient has replied that getting the time to speak with healthcare professionals was "not possible" or " in a lesser degree (ibid.)."
No statistics have been made on how often patients refuses to call the hospital hotline to wait in line. As Grete Christensen explains, that time, is a key factor to provide the best healthcare which affects the users time spent waiting on the hospital hotline (ibid.). Since no statistics have been done, I will use my own healthcare background. I have been working as a nurse at Rigshospitalet for two years and many patients feel overlooked, when there is no time to answer the phone. The users that refuse waiting in line at the hospital hotline, become non-users and are forced to physically meet up at the hospital, creating a larger time pressure when the patients meets up unexpected.

A new sociotechnical technology is implemented, the SCAUT app. The new technology creates a new definition of users and non-users since it has replaced the old technology. The transition from the old technology to the new technology can be a reason why users becomes non-users, which this report will illuminate with the help of mediation theory. The usage of the mediation theory will illuminate how the users use the app to mediate the world, the equation will be: Users-app-> world. The mediation theory is part of achieving a complete app that can successfully mediate the relation between the human-technology-world. But the successful mediation is not always seen when working with technology where problems can occur and affect the relation between the human-technology-world.

PROBLEMATIC MEDIATION

The mediation theory only looks on technologies that are fully developed and implemented, such as eyeglasses, refrigerator etc. This means that technologies that are still in the implementing and development phase are not being considered. I have developed a expansion of the mediation theory called *problematic meditation*, it is defined as being:

Problematic Embodiment relations (Human│Technology) -> World (8)

Problematic Hermeneutic relations Human -> (Technology │World) (9)

Problematic Alterity relations Human -> Technology (│World) (10)

Problematic Background relations Human│(Technology │World) (11)

Problematic Cyborg relations: Human/(│)Technology -> World (12)

Problematic Interactive context: Human│ <>│ Technology/World (13)

Problematic Augmentation: (Human│Technology) -> World + Human -> (Technology│World) (14)

A new symbol will be introduced in the symbol list below:

Symbols	Definition
"│"	The "│" is a new symbol used in problematic mediation. The symbol is defined as a wall that contains a problem between subject and object.

Table 4 illustrates the problematic mediation symbol list.

Problematic embodiment relations

The term problematic embodiment, is defined as being a problem in the technology, meaning that the technology is not seen as fully functional for the users. Don Ihde and Peter-Paul Verbeek use examples, where the technology are fully developed such as the eyeglasses, refrigerator etc (Verbeek, PP, 2015). The problematic embodiment highlights that if the relation between the human and the technology is problematic, the mediation to the world will be problematic, which can cause users to become non-users. An example of the problematic embodiment could be the SCAUT app, since it is not fully developed. The human will use a semi functional app which can affect the human perception of how the world is mediated through the app. The app has a communication function where the patient can contact the hospital directly but if an error occurs and the contact is not successful, it will change the human perception of the world, since the relation between the human and technology is problematic. The usage of problematic embodiment can as well be used in Don Ihdes example with the eyeglasses. Don Ihde explains that the usage of eyeglasses will change the human perception of the world. Don Ihde uses a fully developed technology, but imagine if the eyeglasses has a lower or higher prescription which will blur the human vision, this will change the human perception of the world in a problematic matter.

Problematic hermeneutic relations

The second term is the problematic hermeneutic, defined as the users experiencing a problematic confrontation with the world, through direct experience and interpretation of the technology. This means that technology which act of perceiving and interpreting the devices readout can be problematic. According to Don Ihde, the technology will form a unity with the world which allows the human to be in unity with technology that represents the world. However, if the technology do not represent the world correctly it will cause a problematic relation to the world. Ihde brings in the example of an MRI scanner, that can show the brain activity and be presented to the human (Verbeek, PP, 2015). A study was made to test the accuracy of the MRI examination, this was done with one patient that got an MRI examination of the lumbar spine at ten different MRI centers (Herzog, R, et.al, 2013) . The study showed that in the radiologist reports, there was a variability and interpretive errors but the authors concluded that the reports outcome depended on which radiologist that interprets the examination. The MRI scanning might have displayed the same at the ten different hospitals but errors still occurred, which means that the display can be understood in many different ways and can cause a problematic user experience with the world through technology (ibid.). Another example is taken from my own experience at the hospital, working as a nurse, while using a blood pressure/pulse monitor. Using a blood pressure/pulse monitor will show on a display whether the patient has a low or high blood pressure and pulse. The problem occurs if

the patient has been out for a walk and the display alerts that the patient has a high pulse and needs urgent treatment, or if the patient is an athlete the blood pressure are usually lower than regular but the display will still alert for urgent treatment. The technology is forming a problematic unity with the world which affect the users experience.

Problematic alterity relations

The third term in problematic mediation is the problematic alterity that is defined by technology, that are supposed to act as similar to how humans interact with each other, but different factors can interfere with that. Don Ihde uses the example of an ATM machine that acts like a human asking questions through the screen (Verbeek, PP, 2015). The problematic alterity focuses on the machine questions, that can be misleading or comprehensive to the needs of the human. The questions that are provided from the ATM are most frequently asked questions, but many different questions are not provided such as the kurtage of the withdrawals or what to do if the ATM does not work. Ihde uses the a technology that is “flawless” but with the problematic alterity it is possible to understand how the technology can lead to frustration when not knowing what to do. A personal experience with the ATM in different countries is when the ATM asks “*Do you want the money in your own currency rate or the traveled country rate*”. This leads to choosing either one of the questions, because no knowledge is given about the consequences. Don Ihde predicts that the technology in the future, will be more sophisticated and can interact with different ways when it is designed with a alterity design. A more sophisticated technology will provide more answers to the human but this can as well bring problems if the technology is too sophisticated and might become non-user friendly.

Problematic background relations

The fifth term in the problematic mediation is the problematic background. The problematic background looks at problematic technology that affects human indirectly which is a part of changing the understanding of the world. Don Ihde uses the example of a refrigerator that works as a cooling and protecting technology for the food, it helps the human to shape the experience of the world without needing to be active with the technology (Verbeek, PP, 2015). The problematic background gives an understanding of how the relation can be changed if the technology is not functioning as expected. The refrigerator instruction explains that the temperature needs to be between 3-5 celsius but as the weather changes, the temperature in the refrigerator will decrease and the food will not be cold or protected from bacteria. This will result in a non fully-functional refrigerator which will change the human understanding of the world.

The *problematic mediation* illuminates that a relation problem can occur between the human and the technology or the relation between technology and the world. The problematic mediation can be used in more problematic environments, such as no fully-functional or implemented technology where problems occur more often.

Problematic cyborg relations

Peter-Paul Verbeek provides some good examples of how the technology is not seen as being external but a part of the human, such as pacemakers (Verbeek, PP, 2015). The problematic cyborg brings the attention to unsuccessful technology enhancement, the equation is Human/(|)Technology -> World.

"In Denmark, approx. 8,000 hip operations per year. The research, which is funded by the Danish Council for Independent Research, aims to improve the artificial hips (Ringgaard, A 2013)."

The quote above explains that 8000 patients in Denmark gets a hip operation every year, and according to Peter-Paul Verbeek cyborg relation, the technology is not seen as an external part of the patient, making them cyborgs. A hip implant has shown to last between 15-20 years because the hip implants gets worn fast due to physical activity (ibid.).

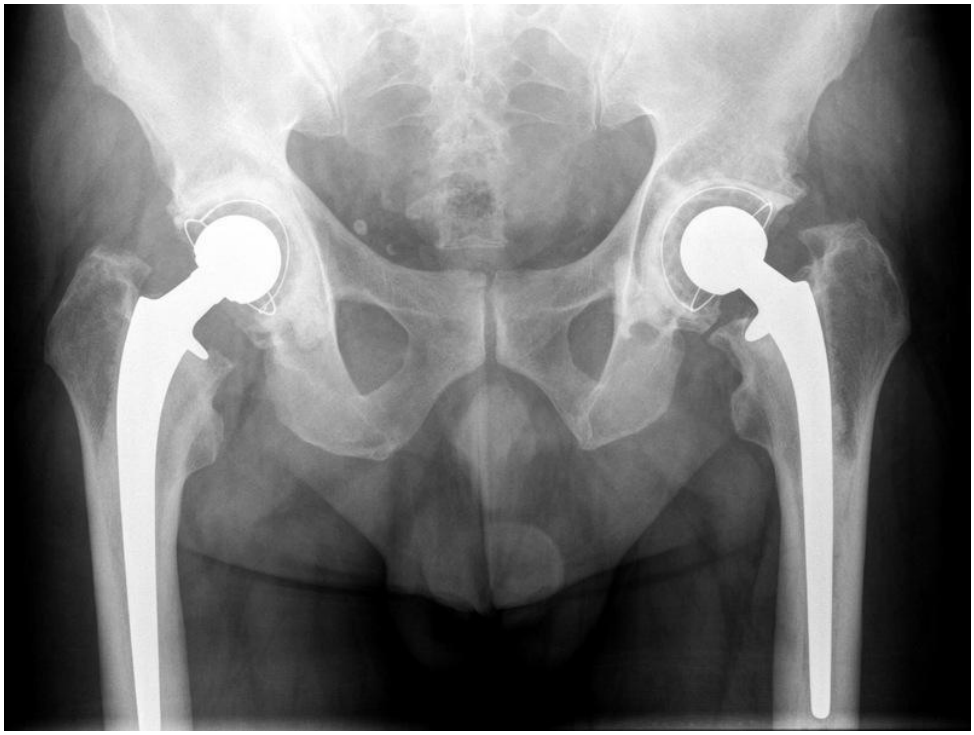

Figure 5 shows an x-ray of a patient hip implant (Ringgaard, A 2013).

In figure 5 it can be seen that the patient left hip implant has been worn, this can cause a lot of pain to the patient. In this case the problematic cyborg equation is Patient/(|)Hip implant -> World, the patient will see the technology as external since the technology is problematic. The technology can only be enhanced with the human if the technology is fully developed, but if the hip implant needs to be changed every 15-20 years, it creates a problematic experience of the world now that the patient knows that physical activity can cause a new operation.

Problematic interactive context

The problematic interactive context can been seen with two problematic mediations. This is based upon Peter-Paul Verbeek's example with the "smart toilet" that can analyze human excrements (Verbeek, PP, 2015).The first is problematic interactive context is within the patient | <> smart toilet/hospital. The "smart toilet" delivers a medical report but the analysis of the excrements contains numbers and text only a healthcare professional can understand, which can cause a wrong experience of the "smart toilet"/hospital. The second problematic interactive context is patient <> |smart toilet/hospital. At the hospital many samples are taken to analyze excrements, because some bacteria grows faster than others, which will cause a wrong perception of the patient.

Problematic augmentation

The last term in the problematic mediation is the problematic augmentation, the equation is (Human|Technology) -> World + Human -> (Technology|World). The problematic augmentation is applying two problematic relations instead of one. An example is not needed to illustrate the problematic augmentation since the different problematic relations has been described how they cause a problematic mediation. An equation could be the problematic hermeneutic relation and the problematic alterity, Human -> (Technology |World) + Human -> Technology (|World).

Negative perception

The problematic mediation is no critic to Don Ihde or Peter-Paul Verbeek, because they have been pathing the way on how meditation changes the perception in a positive way. The term negative perception explains that not all mediation can be positive, as it depends on the user of the technology. The mediation theory uses technology that are fully developed, illuminating a positive perception for the human meaning that the relation is always stable or multi stable if there is more than one relation (Verbeek, PP, 2015). The negative perception brings a different view on the

stable relations, since the relations originates from the positive technologies. The technology that are not fully developed, but still implemented in the society, are part of giving the human a negative perception of the world. An example to the negative perception is the healthcare platform that was implemented in the Danish hospitals, in the region Zealand. The healthcare platform was implemented in 2016 and the reaction from the healthcare professionals and the patients was negative. Many mistakes and errors are shown in the healthcare platform and the mistakes are part of making the perception negative for the users (Mirzaei-Fard, M & Baun, L, 2019).

"*Since Christmas, hospitals have reviewed all 334 patients who might be affected by the error. And it turns out that 46 patients have received the wrong dose of the beta blocker while they were hospitalized in one of the two hospitals* (Mirzaei-Fard, M & Baun, L, 2019)."

This quote represent some of the mistakes that can occur within the healthcare platform, it shows that 46 patients have received the wrong dose of blood pressure medicine, which can have fatal consequences. The spokesman for the chief physicians in Region Zealand states:

"*There are not two different professionals who can work in this system at the same time, which gives a lot of clutter. There is a lot of clutter between our various system* (Mortensen, H & Würst, J, 2018)"

This illustrates that the system is not working in the expected way, when different healthcare professionals can not use the platform at the same time, and the reaction from the chief physicians is *"there is only one thing to do: Remove the Healthcare platform and buy the Central Jutland electronic" (ibid.).* The quote illuminates a negative perception of the technology and the solution is to remove the technology, as it has created a negative perception of the environment and the world. The negative perception transforms users to non-users, if the implementation or the technology are not fully developed and ready for implementation. The negative perception can be avoided, however, the relation to the technology still needs attention instead of generalising all technologies to be positive perceptions.

ANALYSIS

The usage of the empirical data that has been produced through interviewing non-users from the SCAUT platform, as well as the use of extensive literature search during the preliminary research. The preliminary research was done through books, reports, articles, all of which playing a part in supporting a better understanding of the categories non-users and users. The interviews were transcribed and coded through the visualising program Nvivo, which helped generating the categories, resulting in a more straightforward approach to identify the different relations. The analysis will illuminate this thesis problem formulation:

Why are the users of the SCAUT app becoming non-users?
How can the mediation theory illuminate the relation to the app and the hospital, and how can the usage of problematic mediation create a better understanding of the problems within the relations.

The analysis will provide the basis for a discussion.

Mediation theory

In this part of the analysis, the usage of Peter-Paul Verbeek and Don Ihde mediation theory will be applied. The usage of embodiment relations, hermeneutic relations, alterity relations, background relations, cyborg relations, interactive context and augmentation, will provide an understanding of the various relations within the interviews.

Embodiment relations

The first part of the mediation theory is the embodiment relations, defined as being a mediation of the technology, converting the humans actional and perceptual bond with the world (Verbeek, PP, 2015). Don Ihde equation for the embodiment relations is (human-technology)->world, to use Don Ihde equation it needs to be adjusted to this project, the equation will be (patient-app appointment)->hospital.
This equation can be seen in the coding of the interview:

Informant 1: “I use the app to see when I have appointments but i never use the other functions, I don't even know what other functions the app provides”

Figure 6 illustrates the frontpage of the app that shows when the next appointment is.

Don Ihde uses the glasses as a technology, to see how the relation to the world is transformed when using the glasses (ibid.). This quote shows that the patient uses the app to transform their perception of the world, by using the app they can see when the next appointment is. The app converts the patient actional and perceptual bond with the hospital. The app reshapes the patient experience and is part of the patient bodily awareness, since the patient now can use the app to know when to seek hospital care.

Informant 1: "I did not know the app could track all these kind of things, this will have a huge advantage when I want to contact the hospital and ask them questions about my heartrate"

In the quote it is seen that the patient is not using the different functions in the app, due to of the lack of knowledge about the app. Through the conversation with the patient, it was clear that some information about the app was missing or lost. After explaining what the different functions was in the app, the technology reshaped the patient experience and helped shaping the relation between the patient and the hospital. Ihde uses the example of the phone, where people speak through the phone rather than speaking to the phone as a technology (Verbeek, PP, 2015). The patient now

understand the app is a technology that mediates communication between the patient and the hospital, rather than just looking at the technology as only being a technology.

Informant 2: " I once used the travel function in the app so the hospital knew that I was traveling"

Figure 7 illustrates the travel function

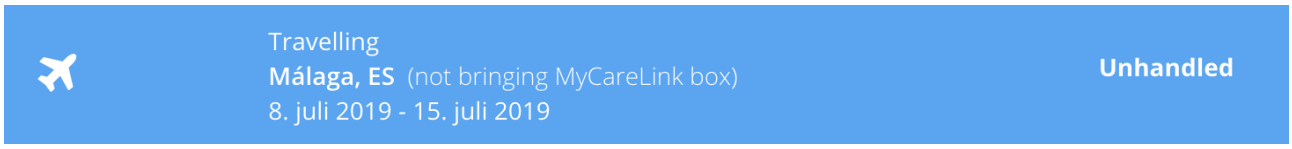

Figure 8 illustrates when the patient has informed the hospital of the travel.

In figure 7 a red circle has been put around the word "rejse" which translates to "travel" in Danish. The function is made to notify the hospital that the patient is traveling and the registration of the heart rhythm will not be active. In figure 8 it can be seen that the patient is traveling to Málaga and the transmission is unhandled, but when the transmission is handled, the equation will be (patient-app travel)->hospital. The patient now uses the app travel function to "speak" through it, and form a unity with the app, which mediates the relation to the hospital.

Hermeneutic Relations

Don Ihde explains the hermeneutic relation as being technologies that act of perceiving and interpreting the devices readout, Ihde equation is human->(technology-world). The example that Ihde uses is the MRI scanner that displays the brain activity and when the human looks at the technology it will represent the world (Verbeek, PP, 2015). The hermeneutic relations is seen in the coding process of the interviews:

Informant 3: "When I get a message from the hospital on the app, that usually means that my heart rhythms has shown something"

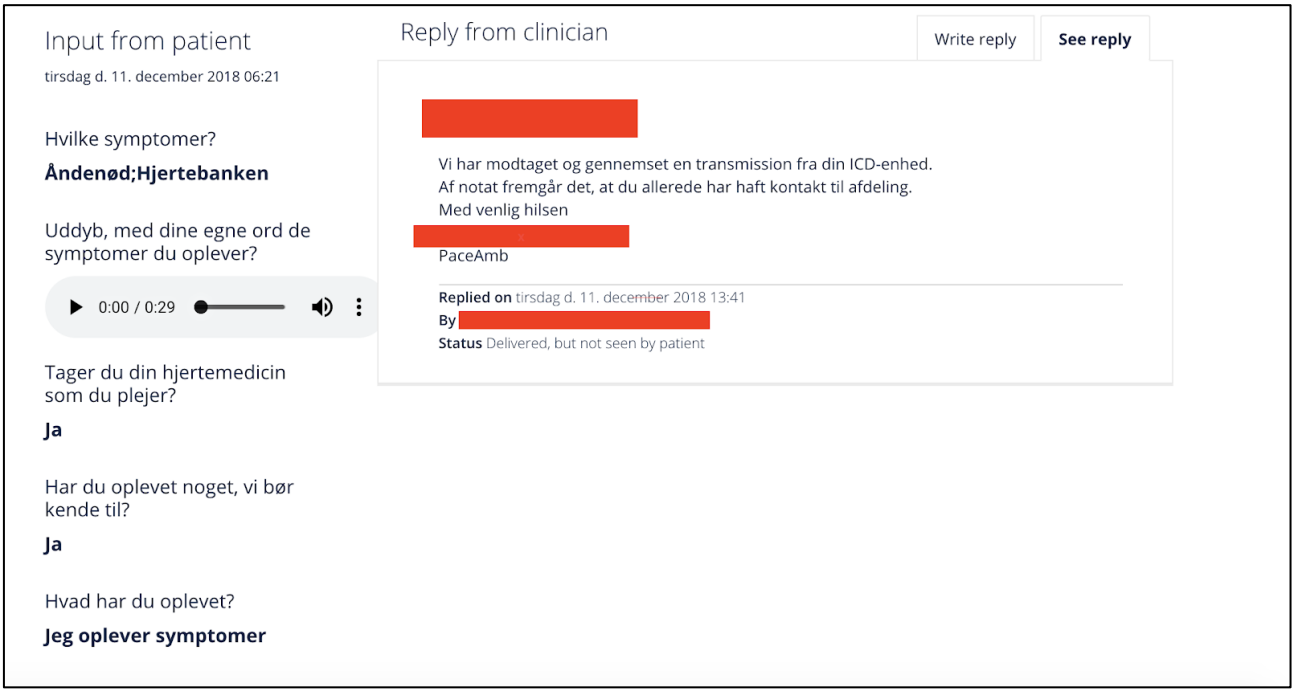

Figure 9 shows a reply from the hospital

When the patient looks at the display of the app and there is a message from the hospital, it means that the hospital wants to see the patient because of some disturbance in the heart rhythm. To put this in the equation of Ihde, it will be patient -> (app display-hospital), the hermeneutic relation explains when the patient looks at the display of the app the message from the hospital will represent the world. In Rehfeld Medical, the employees work every day in order to supply the patient with new updates and integrate different needs for the patients. A patient requested:

Informant 3 "I run and work out a lot and I have been using different kinds of wearables such as fitbit and smartwatches to track my running. I was wondering if it will be possible in the near future

to use the data of the ICD or pacemaker for tracking, since many wearables are not that accurate and close to the heart like the ICD and pacemaker device."

The request to use the ICD and pacemaker as a tracking device, will be an option in the future. When that option gets implemented the hermeneutic relation can be seen. If the app provides data to track the pulse, blood pressure and activity, the display can provide the patient an understanding and transform the perception of the world.

Alterity Relations

The alterity relation is technologies acting like humans, by asking questions to the person using the technology, the equation Ihde uses is human->technology -(-world). Ihde uses the example of an ATM machine that can ask questions about the bank balance and withdrawal (Verbeek, PP, 2015). The app has similar functions, when the patient feels discomfort, it is possible to press on a home monitor box that will trigger a survey, the survey is shown in figure 10.

Figure 10 illustrates the survey.

Figure 10 illustrates the survey that the patients receive, when they feel discomfort. The technology acts as a human-robot asking questions about the patient discomfort. Using Ihde equation of alterity relation it would be patient->survey-(-hospital). In the coding dataset a patient explains:

Informant 4: "When i used the app, I received a survey and when I was done with it, the hospitaled reacted to the answers I provided them"

Figure 11 shows a message from the hospital, that the patient transmission is received.

The message in figure 11 explains "Dear xxx, we have received your planned transmission. We will contact you if there is something to notice within our technical examination."
In the quote it is clear to see how the technology is part of the hospital as shown in Don Ihdes equation. The app is interacting with the patient by asking questions about the discomfort while the hospital is in the background interacting with the technology.

Background Relations

The background relation that Don Ihde presents in the mediation theory, is the technology that do not have direct contact with the human but still has a part of shaping and understanding the world (Verbeek, PP, 2015). Ihde equation for the background relation is, human - (Technology/World). ihde uses the example of the refrigerator, that can keep the food cold and prevent the food becoming rotten, the technology is present but it still remains in the background. This is not seen

often in the app, as the patient needs to be active with the technology. Many patients received notification but they need to actively see or remove the notification.

Informant 5: "Every night my heart monitor makes a sound and when i open my app i see that my heart rhythm have transmitted a diagram to the hospital"

A part of the app that functions as a background mediator, is when the patient heart rhythm is automatically transmitted to the hospital every night. This function of the app can be used in Ihde equation, patient->(transmission/hospital). The transmission is functioning with the hospital without the patient being informed every night that a transmission has been sent. The transmission is habituated for the patient while still changing the experience of the patient.
The postphenomenological approach is not separating the technology and the human, but looks upon the understanding of how the relation is between the subject and object (Verbeek, PP, 2015). Don Ihde four relations are all seen in the coding and are a part of the relations between the human-technology-world. This part of the analysis shows the app is similar to the Necker cube in figure 6, as the app can be interpreted in multiple ways. The app is shown to be a multiple stability because it can be applied to understand the human-technology-world relations from different stable relations, depending on how the patients are using the app. The next part of the analysis will provide Peter-Paul Verbeek's expansion of the mediation theory.

Cyborg relations

The first part of Peter-Paul Verbeeks expansion of the mediation theory is the cyborg relation. The Cyborg relation is defined as being a hybrid between human and technology, and is a part of the human, the equation is Human/Technology -> World (Verbeek, PP, 2015). Peter-Paul Verbeek uses the example of pacemakers, that can bring the heart rhythm back to a normal pace. In this case the used patient group all belongs to the cyborg relation, as they all have implanted a pacemaker and the patient are merged with the technology. The pacemaker can be used in Peter-Paul Verbeek equation patient/pacemaker -> world. The patient merge with the pacemaker changes the relation and experience to the world. In the coding dataset it is not possible to see the cyborg relation and how the pacemaker helps to mediate the world, due to the patients being interviewed about the app, knowing they have a pacemaker implanted.

Patient		**Device**	
CPR	[redacted]	Type	**ICD**
Monitoring reason	**primary prevention**	Model	**Protecta XT DR D354DRM**
Symptom tracking	**On**	Last implant	**7 years ago** (April 10, 2012)
Next transmission	**November 3, 2019**	Original implant	**7 years ago** (April 10, 2012)

Figure 12 shows pacemaker stats

Figure 12 shows what kind of pacemaker the patient has and when it was implanted. Conducting the interviews was patients who have been onboarded to the SCAUT database, and the only way to be onboarded is by having a pacemaker. The interviews and problem formulation would be another approach, if the focus was how the pacemaker affected their daily life or if they have had any problems after the pacemaker implant.

Interactive context

Peter-Paul Verbeek uses the interactive context, to create an understanding that technology merges with the environment and together it will create a relation to the human, the equation used is Human <> Technology/World. Peter-Paul Verbeek uses the example of a “smart toilet” that can analyze the human excrement and deliver a medical report (Verbeek, PP, 2015). The pacemaker and the app works in the same way, by analyzing the patient heart rhythm and delivering a medical report to the hospital.

Informant 6: “Sometimes I receive a message from the nurse that they have seen my heart rhythm and everything looks fine, and sometimes I receive a message saying that I need to seek hospital care because something is wrong with my heart rhythm.”

This quote from the patient illuminates the notion of interactive context, since the app and pacemaker are merging with the hospital and creating a relation to the patient. The equation is patient <> app transmission/hospital The patients are now experiencing how the pacemaker and app are experiencing and perceiving them.

Augmentation

The last part of Peter-Paul Verbeek's mediation theory is the augmentation which is defined as being human with two relations to the world, the equation is (Human-Technology) -> World + Human -> (Technology-World). Peter-Paul Verbeek uses the example of Google glasses that can

read messages, take pictures and use the internet as an embodiment relation but still has the hermeneutic relation with the screen that can present the world in a certain way (Verbeek, PP, 2015). An example seen in the coding is:

Informant 7: "When I used to use the app and I feel unpleasant in some situations I received a survey to answer and the hospital could see if my heart rhythm was normal or not."

This is an example of how the patient has two different relations to the app, the relations in this example is embodiment and alterity relation. The embodiment relation is shown in the usage of the app to reshape the patients experience through the app now that the patient can see if hospital care is needed. The alterity relation is seen within the app acting like a human by sending a survey asking different questions about the situation. The equation for this is (patient-app(message))->hospital + patient -> survey (-hospital), the patient has two different relations to the app.
In this part of the analysis the usage of problematic mediation will create a better understanding of the theory and why users becomes non-users. The whole idea behind using the problematic mediation is based on the problems within the technology which Don Ihde mediation theory does not illuminate.

Problematic Embodiment relations

The first term in the problematic meditation is the problematic embodiment relations, that is defined as using a technology that is not fully functional for users, which forces them to become non-users of the technology. The app is a perfect example of how technology that is in the development phase can have errors and cause a problematic mediation between users, technology and the world.

Informant 8: " I downloaded the app and everything went fine but then I tried to login to the app, which did not work, after a couple of times I decided to delete the app."

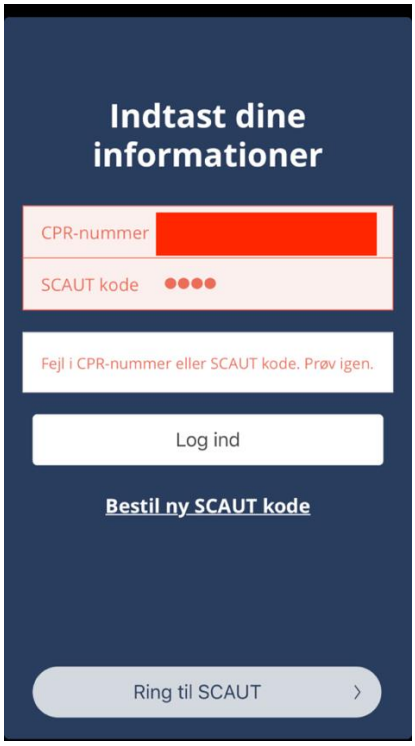

Figure 13 shows a problem has occurred within the login phase.

The quote from the patient shows that a problem has occurred within the technology, which has caused a problematic relation to the technology. This can be seen in figure 13 that the login phase was not completed because of an error, the app explains the error as being a mistake within the CPR number or the password. Through the conversation with the patient a new password was given but the same error kept occuring.

The equation in problematic embodiment is (Human│Technology) -> World, the problem is between the human and the technology. In this case the login phase was problematic which will change the equation to (Patient│Login) -> Hospital. The patient is using a semi functional app which will change the perception of the hospital when being used since the usage of the technology will be mediating the relation to the hospital in a problematic matter.

Informant 9: "I have a very old phone which do not support the usage of the SCAUT app"

The quote is another example of how patient and technology can have a problematic relation. The patient is using an old technology that does not support the SCAUT app, this means that the user automatically will be categorized as a non-user, until the SCAUT app can be used on older. If the phone is older than an iphone 5, which was released in 2012, it is defined as an older phone, thus, not supporting the SCAUT app.

The equation of the problematic embodiment relation will be changed to (Patient│Old Technology) -> Hospital. In this equation the relation to the hospital is not successful since the patient and the old technology can not mediate the relation to the hospital. The perception of the hospital is non-existing and this will become a problem for the patient and is forced to create a relation to the hospital another way.
Don Ihde uses the example of eyeglasses and the relation to the world happens when the human looks through the eyeglasses. Using the example within this case the eyeglasses would be representing an old pair of eyeglasses that do not have the correct prescription, so the world relation will transform to something that can't be seen affecting the human perception of the world, (Human│Old Eyeglasses) -> World.

Problematic Hermeneutic relations

The equation of the problematic hermeneutic relation is, Human -> (Technology │World). This is defined as users experiencing a problematic confrontation with the world through technology. Don Ihde uses the example of the MRI scanner that can show brain activity and represent the world to the human through that scanning.
The problematic hermeneutic relation is identifying a problem in the technology, that will transform the world wrongly for the human. An example for the coding is:

Informant 9: "I keep getting messages on the app that something is wrong with my pacemaker, but when i call the hospital they say that my heart rhythm looks fine. I deleted the app because I got tired of all the wrong messages."

The quote illuminates a problem in the app and the way it transforms the human perception of the world. The patient uses the message on the app display to create a relation to the hospital, since the messages shows a problem in the heart rhythm. In this case the patient looks at the wrong messages and the perception of the hospital transforms to a negative perception. The equation in this case is Patient -> (Messages│Hospital), the patient uses the technology as it supposed, but the problem is within the technology, which affects the patients relation to the hospital.
A patient mentioned in the coding:

Informant 3 "I train a lot and have many different tracking devices and I was wondering in the future would it be possible to use the pacemaker as a tracking device to see how my heart rate and blood pressure is?"

This will be a very good feature and since it has not been made yet, I can only bring in my own presumptions about it. In this case the patient trains a lot and already has an idea of how tracking devices works and how a normal heart rate would be. The technology will be working perfectly like Don Ihde equation of hermeneutic relation, Patient -> (device-world). Let's imagine a case where the patient has no clue of what a normal heart rate or blood pressure is, and while walking suddenly the display shows a heart rate on 70. A heart rate 70 is normal but the display might transform his perception of the world if the patient believes that 70 is too high or low.

Problematic Alterity relations

The problematic alterity is defined as technology that are designed to act as human and interacting with other humans. Don Ihde uses the ATM as an example of interaction with human and asking questions about the bankaccount (Verbeek, PP, 2015). The problematic alterity illuminates that the ATM displays the most frequently asked questions, but sometimes the human wants to experience different questions, such as the kurtage of withdrawals.

Informant 10: “I receive some surveys sometimes and i don't really know why but i get some questions that are not relevant at that point and some of them I do not understand”

The quote illuminate the problematic alterity relation, the patient receives surveys from the app, but some of the questions are defined as problematic. this is due to the patient not understanding them or finding them relevant for the treatment. To apply this to the problematic alterity equation, Patient -> Survey (│Hospital). The survey acts as a human interacting with the patient, asking questions that are supposed to help the patient to create a relation to the hospital. The survey has an opposite affect and creates a problem for the patient which leads to a wrong mediation of the hospital. The survey acting as human is causing the patient to become a non-user of the app because the survey are problematic mediating the hospital. The perception of the world is transformed to a problematic perception, due to the survey not fulfilling the patient expectations of the technology. The patient do not understand some of the questions and this is a true problematic alterity, because it is hard to define how and when are questions easy understood by different patient groups with different education levels. Don Ihde uses the fully developed technology, but If the patient suffers of dyslectic or has a poor education, the relation to the technology will become problematic causing a wrong mediation to the hospital.

Problematic Background relations

The last term in the problematic mediation is the problematic background relation, the equation is Human│(Technology │World). The term is defined as background technology that are problematic, the technology interferes indirectly with the human and changing the understanding of the world.

Informant 11: "I was not at home that night so the hospital has not received my heart rhythm, and I do not know what to do now"

As mentioned earlier the app sends the heart rhythm of the patient every night, but in the quote the patient is concerned about not being at home that night. The transmission of the heart rhythm every night functions as a background technology, where no interaction is needed from the patient. The problematic background relation equation shows that there can appear a problem in the background technology, affecting the mediation of the world. The equation in this case is, Patient│(App transmission│Hospital).

Informant 12: "I do not use the app actively, it is in the background working as it is supposed to but now it can not update and I have gotten some problems with it so I decided to delete it."

Another quote from the coding shows that the app was functioning as a background technology, until a problem appeared. The app needed to be updated which caused a problem in the background technology, forcing the patient to interact with the technology. If the patient is forced to be active and interact with the technology, the whole concept of a background technology is not existing. When the app functions as a background technology the patient will not notice if the technology does not work, and the understanding of the technology and the world will be transformed to a negative perception.

Problematic cyborg relation

In the coding dataset Peter-Paul Verbeek's cyborg relation was not identified, since the question was about how the app is mediating the hospital. The problematic cyborg relation is neither shown in the coding dataset. The interviews were focusing on the pros and cons about the app. A change or more questions about the pacemaker will be needed to highlight the problematic cyborg relation or cyborg relation.

Problematic interactive context

Peter-Paul Verbeek uses the example with the “smart toilet”, that can analyze excrements (Verbeek, PP, 2015). The app has the same function by analyzing the heart rhythm of the patient but does not account for the problematic relation it can cause.

Informant 13: “I receive messages all the time, and most of them are telling me that my heart rhythm looks fine but this makes it annoying every time I open my phone I see 12 notifications, which worries me, because it can be a bad message. Why don't I just get a message that tells me your heart rhythm is not stable contact the hospital?”

The app notifies the patient every night that everything looks fine, but the patient explains it causes worries, when the app sends notifications all the time, a fear of a bad message appears. The equation for this is: patient| <> app notifications /hospital messages, the equation illuminates that a problem is between the app notifications that can cause worries and the amount of hospital messages. The perception of the app notifications transforms the experience of the hospital message to a patient fear causing the patient to become a non-user of the app. The second problematic interactive context shows how the app perceive the patient. If the patient sees the amount of messages from the hospital and nothing “important” is shown, the messages will not be first priority for the patient and the focus will be removed from the messages. The app will not perceive the patient because interaction is not needed, the equation is patient <> |app notifications/hospital messages.

Problematic augmentation

The last term in the problematic mediation is the problematic augmentation, which is defined as being two problematic relations. In the dataset it is shown two problematic relations:

Informant 14: “I have forgotten my pin code to the app and I feel it was time consuming to resolve that problem”

Researcher “ Okay, I am going to send you a new code so you can login again.”

Informant 14: “ I am logged into the app now, and I can see there is some unanswered surveys and I do not know what I should answer or why I received them”

The quote illustrates two problematic relations appears within the app, the first is the problematic embodiment. The problem appears between the patient and the app login phase, since the patient has forgotten the password to the app. The perception of the hospital transforms to a negative perception since the patient feels that the login problems is time consuming. The equation for this is (patient│app login) -> hospital, when the problem appears within the app, it will be mediating the relation to hospital in a problematic matter causing the patient to become a non-user. The second problematic relation within the app is the problematic alterity relation, since the survey is acting as a human trying to interact with the patient. As shown in the quote the patient do not understand the survey, creating a problematic experience of the app and hospital. The equation is patient -> survey (│hospital), the survey is supposed to act as a human and help the patient to explain problems that has been experienced within the pacemaker. The patient expectation of the app is transformed to a misleading and misunderstood app. The final equation is (patient│app login) -> hospital+patient -> survey (│hospital), showing two problematic relations within the app.

The table 5 will highlight the findings and problems within the mediation theory.

Relations	**Findings**	**Problems**
Embodiment relation	The app appointment function changes the perception of the hospital.	Error with login to the app changes the perception to a problematic perception to the hospital.
Hermeneutic relation	When the patient receives a message in app, it means that the hospital has analyzed the heart rhythm of the patient. The message creates a representation of the hospital.	The patient started to receive many messages that explained that the heart rhythm was fine. The problem occured when the messages represented something different that the patients experience.
Alterity relation	The app sends out a survey to the patient. The survey acts like a human that can ask questions.	The problem within the survey is when the patient does not understand the questions or why they received a survey.
Background relation	Every night the app sends out a heart rhythm chart to the hospital.	If the patient is not at home the hospital will not receive the heart rhythm chart. This functions as a background relation and if the patient does not know an update is available, the heart rhythm will not be transmitted to the hospital

Cyborg relation	All the patients has a pacemaker making the patient hybrid between human and technology. The technology is a part of the patients and not seen as an external technology.	No problems have been seen in the coding dataset since the questions was concerning the app and not the pacemaker.
Interactive context	The app analyses the patient heart rhythm and delivers a medical report to the hospital.	The problem occurs when the patient keeps receiving a lot “useless” messages, that tells the heart rhythm looks fine. The messages gives a concern to the patient because it can contain a serious message about the heart rhythm.
Augmentation	Two relations have been seen within the app. Using the app is reshaping the experience of the world and receiving surveys that acts like a human.	The two relations has each a problem. If the usage of the app is not working such as the login and if the patient does not understand the questions of the survey.

Table 5, findings and problems within the mediation theory.

DISCUSSION

The study of telecare has been introduced in the beginning of the project and explains that telecare can reduce doctor visits and time spent on each patient. The study has proven an improvement in the before mentioned, due to the introduction of video technology in healthcare (DiBattista, J. 2018). The mediation between the patient, technology and hospital is successful in transforming the experience of the hospital. This can be applied in the mediation theory as an embodiment relation, as the patient uses a video technology to reshape the experience of the hospital (Verbeek, PP, 2015). Whether the study has applied the usage of mediation theory and studied the patient-technology-hospital relation, is up to debate. The study shows no clear indication of the intended use of mediation theory, but only focuses on the reduction of doctor visits and time. The study does not highlight any problematic relation between the patient and the video technology, assuming that the relation is successful. Working as a nurse and using telecare to “reduce” time, turned out to be more time consuming at times, due to the laptop needing an update or the internet was too slow. The study would be more reliable if it had involved the usage of the problematic mediation, to highlight different problematic relations within the video technology.

The analysis has studied the usage of the mediation theory by Don Ihde and Peter-Paul Verbeek. The mediation theory illuminates different types of relations between human-technology-world and the usage of Peter-Paul Verbeek expansion with cyborg, interactive and augmentation relations

(Verbeek, PP, 2015). The usage of the mediation theory was not chosen beforehand. After reviewing the coding multiple times it was clear that a relation was present between the patient, app and the hospital. The mediation theory provided by Don Ihde and Peter-Paul Verbeek has many different aspects of how the experience of the world is transformed, depending on the relation between the patient, technology and the hospital. The mediation theory can be applied in many situations but all the technologies that has been used by Don Ihde and Peter-Paul Verbeek has all been successfully developed and implemented to the world.

Figure 14 shows the position of this report.

The position in this report is between the postphenomenology and phenomenology. Postphenomenology takes a positive position towards the technology mediating the world, but no critical aspects have been involved within the mediation theory. The phenomenology takes a critical aspects towards technology, as technology is dividing the human and the world. The problematic mediation has a critical postphenomenological position, it illuminates that a relation can be established within the human and technology but in contrary to postphenomenology the technology can create a problematic relation.

As mentioned in the introduction, technology has taken a huge leap in society and within the healthcare. Using the healthcare platform as an example, the phenomenological approach would consider the platform as an object that healthcare professionals can use for their needs. A postphenomenological approach would define the platform as being a successful technology that helps the healthcare professionals to transform the experience of the world and patients, in a positive perception. The problem with the two different approaches is that the healthcare platform is part of creating a relation to the patient and the world but in a problematic way, since the healthcare platform is not working as intended (Mirzaei-Fard, M & Baun, L, 2019). The problematic mediation illuminates the problem between the relations, and gives an understanding of the problem that needs to be solved before a successful relation can be mediated.

The problematic mediation has arisen from postphenomenology and phenomenology but the approach can be perspectivated to critical theory.

The critical theory was designated from the Frankfurt School in 1930, the critical theory was directed towards critiquing and transforming the society. The use of the critical theory creates an interest in a socio-technical configuration with a presence of a vulnerable group that is oppressed

by a socio-technical configuration (Feenberg, A, 2002 p.13). This can be perspectivated to the problematic mediation that has a focus on problematic technologies that mediates the world in a wrongful way, creating an oppressed group which in this case is the non-users of the app. The critical theory provides a desire to transform the socio-technical configuration to remove the oppression (ibid.). The traditional theory are explanatory, it has the focus to explain or at set out the condition to explain for a certain event, as seen in the mediation theory explaining what relations are seen between the human-technology-world. The critical theory seeks emancipation which is referred to the theoretical investigation that can lead to emancipation (Feenberg, A, 2005). According to Andrew Feenberg the technology is identified as:

"Technology is a two-sided phenomenon: on the one hand the operator, on the other object. Where both operator and object are human beings, technical action is an exercise of power (Feenberg, A, 2005).*"*

Feenberg present that society is formed from technology, and the societal is the fundamental form of technological power in society. The technological power is realized within the design that reduce the technology normal functioning. The reduction has a big part in affecting the technological experience and according to Feenberg "*human suffering and damage to the natural environment (Feenberg, A, 2005, p.49)."* When the human suffers from the technology a certain resistance appearance against the technology, this is the outcome of not involving all groups in the design phase. Introducing the technology to a wider group of interest and concerns will result in redesign the technology for a graters compatibility (ibid.). The usage of a democratic transformation towards the design will illuminate the negative feedback and bring a focus on a broader interest causing a less resistance to the redesigned technology.
The analysis illuminates that a problem can be within the design of the technology causing a resistance to the technology, creating non-users of the app. The group that are not accepting the technology can be seen as the oppressed group, the critical theory would help to highlight that group and be a part of the solution.

CONCLUSION

This project has investigated how users becomes non-users within the usage of the SCAUT app, and understanding the relation to the technology from a non-users perspective. I have investigated patient interactions with the app and how it has affected them in a certain way to become non-users. The patient interactions with the app has been explored with telephone interviews based on a semi-structured approach. The interviews has to be done as a telephone interview to secure patient safety and comply with GDPR rules, making the informants anonymous in this project. The dataset consist of 17 patients that has become non-users of the app for different reasons. The interviews were transcribed and coded with the program Nvivo to create an overview of the patient statements, which formed the base for how the patient mediates the app and the hospital. It can be concluded that the app mediated different experience for the patient which in some cases created a problematic relation to the app and the hospital.

The dataset was analysed with the use of Don Ihde and Peter-Paul Verbeeks mediation theory. The analysis illuminates the different relations between the patient, app and the hospital, which created an understanding of how the technology is mediating the world for the patients. The relations that is presented in the mediation theory was all shown within the patient statements about the app. The analysis also provides another perspective on the mediation theory that was created, called problematic mediation. The problematic meditation originates from the mediation theory but has a critical aspect towards it. The problematic mediation illuminates how a problem within the technology can cause a problem to the relation affecting the mediation, which was seen in the coding dataset. The problematic mediation concludes that the patient perception to the hospital is changed, due to problematic mediation with the technology. When the perception changes the users starts becoming non-users and the interaction with the technology gets discarded. It is important to understand the relation from two perspectives that contradicts each other to create a better understanding of how the world is mediated, and how to change that mediation. The problem with technology is that it has unforeseen effects, the technology does not always as it's intentions. The postphenomenology assumes that the technology is always multistable and it always finds another stable function that works perfectly, which the problematic mediation has proven to be a wrong.

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