How perspectives of e-health shape the future

A study into the future perspectives regarding the design and use of e-health for diabetes care

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Preface

In front of you lies the thesis "How perspectives of e-health shape the future: a study into the future perspectives regarding the design and use of e-health for diabetes care." This thesis is part of my Master Organisational Design and Development at the Radboud University.

At the St Jansdal hospital in Harderwijk, I investigated the future perspectives regarding the design and use of e-health for diabetes care. This subject was, in my opinion, really interesting. It matched with my interests in healthcare, organisational transitions to meet the requirements and expectations of the 'new world', digitalisation innovations, and the way these innovations affects human actors. Furthermore, I liked the research subject since it is a topical subject. The unexpected COVID-19 outbreak and associated need for e-health made the subject even more interesting and pressing. I learned a lot from collecting data remotely and writing this thesis outside my beloved university library of the Radboud University. In addition, I learned a lot from performing a discourse analysis which I found both difficult and very educational.

I would like to express my gratitude to my supervisor Berber Pas for the constructive feedback, pleasant meetings, and guidance during the entire process. It felt like I could always ask her questions, no matter how busy she was. Furthermore, I would like to thank Martym Osinga for facilitating this research opportunity at the St Jansdal and for assisting in the data collection process. Also, I would like to thank Eddy Voogd for contributing to the realisation of this research, despite the COVID-19 outbreak and associated difficulties. I would like to thank all the interviewees that made conducting this research possible. To my family and friends, thank you for the unconditional support during this thesis and all the other previous academic years. Finally, Anne van Dam deserves a particular note of thanks: the advice and the conversion of your room into a home library certainly contributed to the final result of this thesis.

I hope you enjoy your reading.

Luca de Rijck.

Nijmegen, July 18, 2020

Abstract

This research explores the future perspectives of diabetic patients, healthcare specialists, diabetes nurses, the management, and epic team regarding the design and use of e-health for diabetes care. This exploration is executed via qualitative research, in which data was collected in the diabetes centre of the St Jansdal hospital in Harderwijk. By applying a discourse analysis, future perspectives that were expressed in discourse and formed by discourse could be extracted from the data. Four central discursive themes were identified that transcended individual texts and guided communicative actions about future e-health provision. These central themes were: (1) customised care, (2) digitalisation, (3) self-regulation, and (4) future care provision. Based on these central themes, the interpretations of the participants regarding these central themes could be examined. This resulted in two evident discourse groups, referred to as the optimists and the moderate-optimists, for which interpretive schemes could be drawn up. From these interpretive schemes, two future perspectives regarding the design and use of e-health for diabetes care derived.

The first future perspective foresees a customised e-health design, based on the wishes and abilities of patients regarding the use of e-health. In this e-health design, more e-health is used for simple diabetes cases, e-consultations are increasingly used, and patients prepare for consultations by delivering data and additional information in advance. The second future perspective foresees an e-health design in which more attention is paid to the individual goals and needs of patients, contact moments and consultations are both customised and simplified , and the need for self-regulations decreases due to automation innovations. These future perspectives both have similarities and differences on each of the four discursive central themes, based on their interpretive schemes. These similarities and differences will be exposed in this research, as well as the way they could contribute to the realisation of the future perspectives.

The theoretical contribution of this research is that it contributes to the structurational model of technology with future perspectives, by examining how discourses in the design mode of technology form future perspectives regarding the design and use of technology. It is a contribution to the current knowledge on the way technological expectations arise from discourse. The societal contribution of this research lies in the provided insights into the future perspectives of involved human actors about future e-health provision, to contribute to the development of an e-health design for diabetes care in the St Jansdal hospital.

Keywords: future perspectives; structurational model of technology; discourse; e-health provision

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1. Introduction

The medical environment is becoming increasingly technology oriented (Mallin et al., 2014). Care can be provided closer to people's homes by replacing physical care for e-health solutions (Taskforce Juiste Zorg op de Juiste plek, 2018). E-health includes different systems and devices that can identify and record ongoing bodily movements and functions (Lupton, 2013). Behavioural patterns and physiological signs can be developed out of the recorded patient data. These patterns and signs can be translated into accurate predictors of health risk, to enable appropriate action when necessary (Chan, Campo, Estève, & Fouriols, 2009).

Worldwide, there is a dramatic increase of people diagnosed with diabetes. This upward trend of diabetic patients is expected to impose an additional financial burden on the primary and secondary line of care. Technology-based alternatives, such as e-health, are therefore considered (Al-thaee, Sungoor, Abood, & Philip, 2013), since it could offer ways to effectively manage chronic diseases in the future (Ekroos & Jalonen, 2007). Remote interaction between patients and care providers might be improved and simplified by e-health use. These dialogue improvements could support the self-management of patients and facilitate long-term changes in the behaviour of patients (Al-thaee et al., 2013). Moreover, it may allow patients to participate more actively in the decision-making process of their treatment (Heisler et al., 2014). The patient could become the 'expert' and serve as a self-manager who is educated and has responsibility (Chan et al., 2009). Yet, concerns regarding the use of e-health are expressed as well, which are related to the safety and privacy of patients and the quality of care (Ossebaard, De Bruijn, van Gemert-Pijnen, & Geertsman, 2013). If an e-health design reveals more information than the patient desires, this could result in mistrust and withholding information. Besides, the use of e-health could affect the lifestyle of patients and with it, their psychological and emotional wellbeing (Chain et al., 2009). Withal, the cost-effectiveness of e-health is unclear and may be overrated, since time and effort are needed to learn how new technologies work (Van der Feltz-Cornelis, 2013).

The St Jansdal hospital in Harderwijk, where this research is conducted, has a diabetes centre with a specialised diabetes team. Treated patients are adults with type-1 or type-2 diabetes who use insulin injections, pumps, or sensors to control their blood sugar levels. E-health for diabetes care is already used for certain purposes: questions can be asked by patients via online patient records and those patients who use a pump or sensor can upload their data into their online patient profile. This data can be assessed from a distance by the diabetes team. Yet, e-health is not consistently used among the diabetes team or patients. Furthermore, these remote assessments of patient data are time consuming as the used pumps and sensors of

patients are from different brands which have their own websites and patient profiles. In addition, all patients are still required to visit the hospital regularly. In the near future, the St Jansdal intends to implement an e-health design that extends the current e-health possibilities and enables a consistent e-health use among the diabetes team and patients. However, it is unclear what the perceptions of the diabetes team and patients are regarding the use of e-health and therefore, how it should be designed (personal communication with Head of EPD team, St Jansdal hospital).

To furtherance the e-health design of the St Jansdal, an understanding of the *future perspectives* of the diabetes team and patients regarding e-health provision is needed. Future perspectives can be used to systematise the debate on future desires and prospects (Gavigan & Scapolo, 2001), for example by highlighting alternative futures (Havas & Schartinger, 2010). Future perspectives are related to the 'making of futures' in which human actors give meaning to the past and order the present by means of their perspectives of the future (Masini, 2006). To make sense of an upcoming technology and reduce the associated uncertainties concerning its design and use (Rosenberg, 1994), human actors who are going to engage with a technology form future expectations about it. These expectations become part of a future perspective (Clark, 1985). An understanding of future perspectives is important, since it can bring about a new paradigm of the way diabetes care is organised and delivered in the future (Wiederhold, 2012).

To allow for the investigation of future perspectives, the 'design' and 'use' modes, as described by the *structurational model of technology* (Orlikowski, 1992), are used. This structurational model of technology serves as theoretical backbone of this research and will be further elaborated in Chapter two. In addition, discourses will be addressed since future perspectives are expressed *in* discourse, and formed *by* discourse (Alvesson & Kärreman, 2000). In this research, the emphasis is on the 'structurational view of discourse' of Heracleous and Barrett (2001) in which discourse is conceptualised as a duality of communicative actions and deep discursive structures, mediated by the interpretive schemes of human actors. Communicative actions take place in human interaction and are related to the subjective meanings that individuals attach to situations. Subjective meanings arise from the interpretive schemes of these individuals, either conscious or subconscious. In addition, the deeper discursive structures are related to the rules that humans enact upon in their daily communications. By means of interpretive schemes, communicative interactions can reproduce or change discursive structures.

To gain insight into the future perspectives of human actors, an exploratory research in the St Jansdal hospital is performed. The objective of this research is twofold, consisting of both a theoretical- and societal objective. Fist, this research seeks to strengthen the structurational model of technology with future perspectives as theoretical background, in which the focus is on discourses. This allows for a contribution to the structurational model of technology, as well as to the current knowledge on the way technological expectations occur through discourse. Further understanding of technological expectations regarding e-health provision is needed, since a major gap exist between the actual e-health delivery and the expected e-health solutions (Black et al., 2011). Overall, existing literature on the structurational model of technology demonstrate how technology is used and modified by human actors (Orlikowski, 1992; Orlikowski, 2000). Yet, the structurational model of technology requires augmentation to effectively account for ongoing changes in both the design and use of technology (Orlikowski, 2000). The study of Leonardi (2011) has made a start in the right direction by providing insights into the way both designers and users of technology actively interconnect with technology over time. However, that study mainly focuses on past interconnections between human actors and technology to explain future actions, instead of on future perspectives. In turn, the study of Swanson and Ramiller (1997) studied the way discourses serve as the 'engine' for the development and adoption of technologies, arguing for an institutional process in which human actors are engaged from the beginning. This research aims at further exploring how discourses in the design mode of technology shape future perspectives about the design and use of e-health technology. Furthermore, in current publications, literature can be found that examine e-health provision and future perspectives. Examples of these publications include the study of Hordern and colleagues (2011) who examined how consumers engage with e-health technology in order to come up with future e-health solutions, or the study of Chan and colleagues (2009) who investigated the use of e-health among consumers in different countries to develop future perspectives of e-health provision. However, little is known on the way future perspectives of human actors are guided and influenced, *prior* to the actual use of e-health. This research, therefore, adds to the current knowledge on e-health provision in relation to future perspectives, by examining how discourses in in the design mode of e-health technology form, and express future perspectives.

Second, the societal objective of this research is to contribute to the design of e-health for diabetes care in the St Jansdal hospital, by providing insights into the future perspectives of the involved human actors. The objective of this research can be formulated as follows:

"Based on an exploratory study in the St Jansdal hospital, gaining insights into the future perspectives of diabetic patients, healthcare specialists, diabetes nurses, the management, and epic team, in order to contribute to the development of e-health for diabetes care in the St Jansdal hospital.

To achieve the objective of this research, the following research question has been formulated:

"What are future users' perspectives regarding the design and use of e-health for diabetes care in the St Jansdal hospital?"

Sub-questions are formulated that, together, contribute to answering the main question. These sub-questions are the following:

1. *Which discursive central themes underlie and guide communicative actions of involved human actors about future e-health provision?*
2. *Which interpretative schemes construct the perspectives of involved human actors regarding the future e-health provision for diabetes care?*
3. *What are the similarities and differences between users' perspectives on future provision of e-health for diabetes care?*

In chapter two, the theoretical background of this research will be addressed in which the structurational model of technology, future perspectives, and their relation to discourse will be discussed. Chapter three will focus on the methodology of this research, in which the methods and decisions within this research will be elaborated. Chapter four will examine the research analysis, in which the sub-questions will be answered. In chapter five, successively the conclusion and discussion of this research will be addressed. In the conclusion, an answer to the main research question will be formulated. In the discussion, the focus will be on research reflections, limitations and practical implications, and recommendations. The structure of this research is displayed in Figure 1.
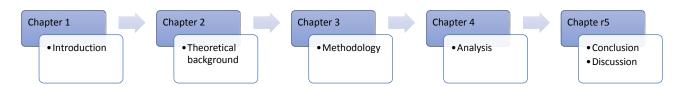

Figure 1 Research structure

2. Theoretical background

In this chapter, the theoretical background of this research will be further elaborated. First, the 'structurational model of technology' will be discussed, followed by an explanation of the connection of this model with future perspectives. Second, 'future perspectives' and the way these perspectives are formed in, and expressed by discourse, will be addressed. Third, the underlying relationship between these two central themes will be explained.

2.1. Central terms

2.1.1. Structurational model of technology

The structurational model of technology will serve as theoretical backbone of this research since it provides important insights into the interaction between organisations and technology and moreover, the design and use of technology. Orlikowski (1992) developed the structurational model of technology, based on the structuration point of view of Giddens (1984). The structuration point of view is related to the interaction between human actors and organisational structural properties (Whittington, 2010). This interaction is referred to as the 'duality of structure' (Staehr, Shanks & Seddon, 2002). Technology is an organisational property which is part of the organisational structure but, at the same time, is the product of human interaction. How human actors interact with technology is based on their personal point of view, interpretations, and goals (Orlikowski, 1992). Human actors and the organisational structure are, so to say, mutually dependent (Whittington, 2010). Since human actors are knowledgeable and reflexive creatures, they will always mediate the relationship of technology with organisations. Therefore, these ongoing interactions of technology with organisations need to be understood dialectically (Orlikowski, 1992).
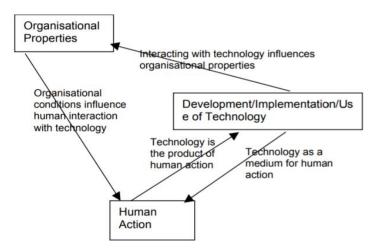

Figure 2 *The structurational model of technology (adopted from Staehr, Shanks, & Seddon, 2002, p. 2)*

The structurational model of technology, as displayed in Figure 2 (Staehr et al., 2002, p.2) shows how technology mediates between human actions and organisational properties. Orlikowski (1992) recognised two tightly coupled modes of interaction between human actors and technology: the design- and use mode. These interaction modes provide further understanding of the way human actions can both develop and alter technology (Staehr et al., 2002). In the design mode, human actors built certain rules, norms, and assumptions into the technology, which creates interpretive schemes. In the use mode, human actors assign shared meanings to technology, which either supports or changes the interpretive schemes (Orlikowski, 1992). These processes are highly interdependent in practice (Whittington, 2010), since technologies are not fixed objects but are rather flexible in the way they can be interpreted and used. In other words, technology is interpretively flexible (Staehr et al, 2002). This flexibility of technology is crucial for understanding 'technology-in-practice' (Orlikowski, 1992).

According to Leonardi (2011), human actors perceive technology as somethings that either affords the possibility of achieving certain goals, or as something that constrains this possibility. Perceptions of constraint lead to situations in which people change technology, while perceptions of affordance lead to situations in which not technology but routines are changed. As technology is embedded in a specific context in which workers can modify it to fit it to their needs, technology is flexible (Leonardi, 2011). This flexibility of technology enables goal-oriented actions by human actors, which could change the technologies with which they work (Pozzi, Pigni, & Vitari, 2014). The ongoing interaction of human actors with technology establishes organisational structures that shapes the use of technology and the way it is altered in a workplace (Orlikowski, 2000). Once a technology and human actors become interlocked with each other in a sequence, either routines or technologies are sustained, re-produced, or changed (Leonardi, 2011).

Points of tension or instability may occur if differences between the use of technology and the intended use of that technology, during its design, arise. These differences can undermine or transform organisational rules, resources, or strategic objectives. How human actors interact with a novel technology is based on their foreground interpretations regarding that technology (Orlikowski, 1992). These foreground interpretations can be problematic, especially if they are very speculative (Attewell, 1992). According to Orlikowski (2000), the current structurational model of technology has been valuable in explaining the use of technologies in different contexts but is less able to effectively account for ongoing changes in both the design and use of technologies. In saying so, she acknowledges that the model needs

refinement. In this research, the following definition of 'structurational model of technology' will be used since it highlights the interaction between human actors and technology in a particular social context, as well as the objective and socially constructed nature of technology. The structurational model of technology is defined as:

> *"An alternative theoretical conceptualization of technology which underscores its socio-historical context, and its dual nature as objective reality and as socially constructed product. . . . This model can inform our understanding and future investigations of how technology interacts with organizations." (Orlikowski, 1992, p. 423).*

This research, however, contributes to the structurtional model of technology by focusing on the design mode of technology in which future perspectives about the design and use of technology are constructed through discourses. According to Clark (1985), human actors form expectations of a technology, prior to its implementation, to deal with the associated uncertainties that come along with the technology. These human actors can chose how they are going to respond to the novel technology (Leonardi, 2011). The rapid increase of e-health use in healthcare reinforces the expectations in today's society that consumers will engage more with e-health technology in the future (Hordern et al., 2011). Yet, an e-health design must meet the expectations of all human actors involved in diabetes care, which can raise difficulties (NHS Confederation, 2011). By examining the discourses in the design mode of e-health technology, it can be examined how future perspectives and associated expectations of the design and use of the technology are developed and expressed. This is important since, according to Rosenberg (1982), human actors' expectations influence the further development of an emerging technology. An awareness of future perspectives could be used to influence present-day actions and decisions, as well as the expectations on technology of a wide range of human actors (Gavigan & Scapolo, 2001).

2.1.2. Future perspectives

In this research, future perspectives will be defined as *"imagines of the future, where technical and social aspects are tightly intertwined." (Borup et al., 2006, p. 286).* This definition is used since it highlights the connection of technical- and social aspects within future perspectives. Future perspectives are expressed in discourse and formed by discourse. Discourse could be defined as a connected set of expressions, statements, terms, and concepts that affect how people talk and write (Alvesson & Kärreman, 2000). Discourse frames how people understand and act regarding an issue (Watson, 1994), it constructs realities that can become incorporated (Whetherell & Potter, 1988). New technologies are often not understood immediately by human

actors. Hence, human actors can pursue a common interest, or engage with the interpretations of others, to be able to make sense of the new technology. Through discourse, a common vision of the future can be established (Swanson & Ramiller, 1997). Since discourse could work as a structuring force in which meaning, practice, and subjectivity are formed (Alvesson & Kärreman, 2000), it is of central importance in understanding future perspectives (Masini, 2006). There are, however, multiple versions and views on discourse (Alvesson & Kärreman, 2000). This research focuses on two views on discourse, as displayed in Table 1. The main emphasis is, in this research, on the structurational view on discourse of Heracleous and Barrett (2001), whereby the discourse view of Alvesson and Kärreman (2000) will be used to increase understanding of the way discourses shape future perspectives.

The first view on discourse is the 'structurational view of discourse' as described by Heracleous and Barret (2001). This view is mainly emphasised in this research as it is based on the structuration theory (Giddens, 1984) and therefore, is sensitive to the fact that structural aspects cannot be separated from the actions of human actors (Heracleous, 2006). Furthermore, this view on discourse is preferred because it has a clear focus on interpretive schemes, in relation to communicative actions and discursive structures. Interpretive schemes are of central importance for the identification of future perspectives as it constructs the social- and organisational reality of human actors. In this discourse view, discourses are perceived as (mostly) implicit structural properties, embedded in the communicative actions of human actors. Communicative actions take place on the surface level, discursive structures at the deeper level. However, discursive structures are manifested in the communicative actions in which they guide the actions and interpretations of human actors. The communicative actions and discursive structures are therefore interrelated to each other and, furthermore, are both linked to the interpretive schemes of human actors (Heracleous & Barrett, 2001). The generation of interpretive schemes enables collective actions as it allows human actors to make sense of the world (Goffman, 1974). Communicative actions can challenge interpretive schemes or reproduce them, which could enable discursive structures to become manifested (Crocker & Taylor, 1981).

The second view on discourse is described by Alvesson and Kärreman (2000). This discourse view is discussed in this research as it makes a clear and enlightening difference between two major discourse approaches, namely the one of the 'talked and textual', and the one in which language is considered as something that discursively construct social reality. This difference provide further understanding of the way future perspectives are both formed by, and

expressed in discourse. In the first approach, discourse is perceived as a local achievement without general content, referred to as 'discourse' with a small 'd' (Alvesson & Kärreman, 2000). These local achievements are important to consider, as negotiations within a community construct and modify the perspectives of human actors. This is done as different storytellers try to fit stories to their own interests. In addition, interpretive efforts can be performed on various participants by individuals, to create acceptance regarding a future version (Swanson & Ramiller, 1997). In the second approach, discourse is perceived as a structuring force that goes beyond texts, referred to as 'Discourse' with a capital 'D' (Alvesson & Kärreman, 2000). The products of discourses can become the 'reality' and emerge as a structure (Bastien, McPhee & Bolton, 1995).

Approach	Discourse is seen as:	Relation of discourse with the subject:	Motivation for approach:
'discourse' and 'Discourse'	The study of the 'talked and textual' which highlights the nature of interactions in an organisation. In addition, it examines the social reality, constituted by discursive moves.	Discourses are both local achievements and general, prevalent systems for the formulation and articulation of ideas	This conceptualisation moves beyond specific, empirical material. It enables the assessment of ordering forces beyond text.
Structurational view on discourse	Duality of surface communicative actions and deep discursive structures. Communicative actions also ratify the deep discursive structures.	Human actors are knowledgeable and purposeful. Discursive structures both enable and constrain them.	This framework bridges both actions of human actors involved and the organisational structure.

Table 1 Structurational view on discourse, adapted from Heracleous and Barrett (2001, p. 756), and 'discourse' and 'Discourse' view of Alvesson and Kärreman (2000)

The concept of future perspectives acknowledges that human actors have different 'future frames', with different 'futures in making' (Veenman, Sperling & Hvelplund, 2019). Analysing future perspectives is important for understanding technological changes. Real-time representations of a future technological situation with associated capabilities are formed by the perspectives human actors have about the future (Borup et al., 2006). Future perspectives enable forward-looking thinking that can help in picking up the 'weak signals' and 'early warnings', which are fundamental for the re-alignment of practices or policies (Havas & Schartinger, 2010). If human actors cooperate, one future perspective could become the dominant discourse (Veenman et al., 2019), which can create a self-fulfilling prophecy by aligning expectations. This is crucial in the process of shaping the future and will likely contribute to a shared mental framework and an improved coherence of decision making

between different human actors (Havas & Schartinger, 2010). Therefore, understanding future perspectives by analysing the patterns of socially organised action and representations towards future oriented developments is vital (Groves, 2017).

2.2. Linking the central themes

In this chapter, the two central themes of this research have been discussed, namely 'structurational model of technology' and 'future perspectives'. The structurational model of technology addresses the interaction between human actors and technology, as well as the way technology mediates between organisational properties and human actions. The two interaction modes between human actors and technology, the design- and use mode, provide further understanding of the way human actions both develop and alter technology (Orlikowski, 1992). However, this model was stated to be less effective for dealing with changes in the design and use of technology (Orlikowski, 2000). The second central theme, future perspectives, focuses on the future perspectives of human actors' in which social- and technical aspects are connected to each other (Borup et al., 2006). This research addresses future perspectives since the expectations of human actors about a future technology influences the further development of that technology (Rosenberg, 1982). These future perspectives are both constructed in discourse and expressed by discourse (Alvesson & Kärreman, 2000), since the human actors' perspectives are developed and modified through language (Swanson & Ramiller, 1997). By interacting with each other, meaning is constituted and communicated in which human actors draw on their interpretive schemes (Orlikowski, 1992). Discursive structures, manifested in the communications and interpretations of human actors, are also linked to their interpretive schemes (Heracleous & Barrett, 2001). To examine future perspectives, this research focuses therefore on communicative actions, discursive structures manifested in these communicative actions, and the interpretive schemes of human actors.

Based on the structurational model of technology, this research examines how future perspectives are discursively constructed and expressed in the design mode of technology. Doing so contributes to the structurational model of technology, and to the current knowledge on the way technological design and use expectations are formed by discourse. In addition, the St Jansdal hospital desires to introduce a consistent e-health design for diabetes care that is well received and used as intended by the human actors involved. Hence, it is important to understand how the involved human actors perceive future e-health provision for diabetes care. This understanding is crucial, since it can increase control over the way human actors interact with technology (Groves, 2016). Insights into the attachments and meanings that human actors

affix to a future technology are expected to enable rich predictions regarding their structural responses when engaging with the technology in practice (Orlikowski, 2000). These predictions may help the St Jansdal to better understand how and why human actors are likely to use a technology, and what the intended and unintended consequences of this use are in different future situations.

3. Methodology

In this chapter, the methodology of this research will be addressed. Different subjects will be discussed, such as the data collection- ana analysis, to explain which activities are carried out in this research and why these activities were chosen.

3.1. Case description

This research was executed in the diabetes centre of the St Jansdal hospital in Harderwijk, in which diabetes care is provided to type-1 and type-2 diabetic patients. Patients are physically seen in the hospital four times a year: twice by the internist (doctor) and twice by diabetes nurses. To regulate their diabetes, patients can use insulin injections, pumps, -or sensors. Pumps and sensors have their own online account, dependent on the brand. Patients can upload their pump or sensor data into their own online account, which can be linked to the clinic account in the hospital. This enables nurses and internists to assess the patient data from a distance. However, because of the many different pump- and sensor brands, it is time consuming for nurses or internists to open the patient data and assess it. If patients have a remote request for help, they can either call to the hospital or ask their question online to an internist or nurse. Momentarily, nurses treat patients physically in the morning and answer remote patient questions in the afternoon (personal communication with Head of EPD team, St Jansdal hospital).

The subject under investigation was future e-health provision for diabetes care. Some e-health options, such as remote data assessment, were already possible. Still, e-health was not consistently used among care providers and all patients were still physically seen in the hospital. The St Jansdal assumed that an increase of e-health use, combined with a consistent e-health design, could improve the quality and efficiency of diabetes care. However, it was unclear how this e-health design should look like to be able to comply to the preferences and capabilities of the various parties involved in diabetes care. Momentarily, the St Jansdal is exploring various e-health options for diabetes care (personal communication with Head of EPD, St Jansdal hospital).

The unit of analysis was the 'talk of future users' regarding e-health for diabetes care. Future users were diabetic patients and employees working in the diabetic team of the St Jansdal. Type-1 and type-2 diabetic patients were included as they are the ones receiving diabetes care. A doctor (internist), general practitioner, and diabetes nurses were included since they provide diabetes care. Members of the epic team were included since they work with Epic, which is an EPD (Electronic patient record EPR) software that enables the exchange of medical

data. Epic is, in other words, an information technology. Lastly, members of the management were included since they influence the design and implementation of new technologies.

3.2. Research method

This research was qualitative in nature for various reasons. Not all interviewees were yet confronted with e-health. Therefore, it could be the case that interviewees did not yet have any ideas, expectations, or opinions about it. By using qualitative research methods, follow-up questions were possible which enabled the exploration of underlying perspectives of interviewees. Moreover, qualitative research methods allowed for in-depth discussions with interviewees to 'distil' their essence, meaning, and sense-making patterns regarding the research subject (Silverman, 2016). By in-depth discussions with interviewees, interrelations between variables could be investigated to allow for statements about real life phenomena (Bleijenberg, 2015). Additionally, qualitative research methods allowed for the examination of communicative actions, discursive structures, and interpretive schemes by creating interviews transcripts that could be treated as texts (Heracleous & Barrett, 2001). It enabled investigation of discourse as something that has an effect and not something that is pure talk (Alvesson & Kärreman, 2000).

The qualitatively collected data were analysed to enable respective recommendations for an e-health design. As this research was grounded in scientific methodology and literature was used to construct recommendations, it was not purely inductive. Consequently, this research was an applied research (Guest, Namey, & Mitchell, 2013).

3.3. Sensitizing concepts

Sensitizing concepts were used to enable preliminary insights about ways to frame interview questions and interpret the replies of interviewees (Marsiglio, 2004). The sensitizing concepts were related to the future perspectives of the involved human actors regarding the design and use of e-health. Future perspectives were understood as images of the future (Borup et al., 2006). Sensitizing concepts were related to, among other things, the expectations, views, needs, wishes, and concerns about future e-health provision, the empowerment of patients, responsibility issues within a diabetes pathway, and the consequences of e-health. The aim was to allow for communicative actions in the interviews in which the structural features of discourses could be identified. Sensitizing concepts supported the development of follow-up questions, which enabled the examination of the 'taken for granted' and 'arguments-in-use' that were assumed, and/or located in the practical consciousness of the human actors. These beliefs or values underlie and legitimate the interpretations and communications of the human actors

(Heracleous & Barrett, 2001), and were of central importance for the investigation of future perspectives. Some examples: "What do you think of a situation in which patients get more insight into their own healthcare data?" "How do you think patients will experience this?" "What are your expectations for future diabetes care?" "How do you envision e-health use for diabetes care?"

3.4. Data collection

This research used primary data collection methods as data sources. Informal preliminary research was conducted, prior to the start of the formal research. This preliminary research contained several conversations with the head of the EPD team, who was the contact person for this research within the St Jansdal hospital. These conversations were either over the phone, by e-mail or in person. The goal of these conversations was to get a broad overview of the context, current situation, and associated problems. The second step within this research took place in the St Jansdal hospital in Harderwijk. A specialist epic clinical dossier presented the technological systems that the St Jansdal is currently using for diabetes care, as well as technological (change) plans that the epic team was working towards. These plans were based on the customised patient systems that the OLVG hospital in Amsterdam is using for diabetes care. The Epic Team recently visited the OLVG hospital. In the presentation, the obtained information from this visit was displayed. The presentation was followed by an unstructured interview.

In the third step, a semi-structured focus group was conducted in the St Jansdal hospital. The goal of this focus group was to gain deeper insights into the subject under study through a group discussion. A focus group was conducted since it allows for the identification of common knowledge and references (Guiver, 2007) about e-health provision. Furthermore, it allowed for participants to explore the issues around e-health in their own vocabulary, which provided insight into their forms of communication used in daily interactions (Kitzinger, 1995). This was useful for the investigation of discursive structures and interpretive schemes, since communicative actions are linked to the subjective meanings that individuals attach to situations, which arise from their interpretive scheme (Heracleous & Barrett, 2001). In addition, the focus group was used to initiate further appropriate action by making group agreements.

In the fourth step, semi-structured online interviews were conducted with diabetic patients, diabetes nurses, a general practitioner, and member of the management, to supplement the data that was already collected in the St Jansdal hospital. The aim was not to impose prior theoretical constructs on the informants as a way for understanding or explaining, important

was that answers could lead to follow up questions in order to pursue subjects of interest for this research (Gioia, Corley, & Hamilton, 2013).

Unfortunately, due to the COVID-19 virus outbreak and associated measures, the planned observations at the start of this research could not proceed. Visiting the hospital was no longer allowed and diabetes meetings, both physically and online, were suspended. The conducted unstructured interviews, focus group and semi-structured interviews were all transcribed. An overview of the collected data can be seen in Table 2.

3.4.1. Unstructured interviews

In the earlier stages of this research, unstructured interviews were conducted with the head of the EPD team and epic specialist. Aimed was at creating a thorough understanding of the way diabetes care was provided in the St Jansdal hospital, as well as the problems that were encountered or foreseen. Moreover, the formation of e-health strategies and interpretations, and expectations regarding e-health for diabetes care were, among other things, examined.

3.4.2. Semi-structured focus group

A semi-structured focus group was conducted in the St Jansdal hospital with a specialist epic clinical dossier, a specialist epic outpatient clinic, an internist (doctor) and the head of EPD team. These participants were chosen since it was a diverse group that could embody e-health from different angles and ways of working, and to encourage that the participants talked to each other (Kitzinger, 1995). In addition, two members of the epic team were included in the focus group to gain more insight into the technological situation of the St Jansdal from the start. It was assumed that this could increase understanding into e-health possibilities. Three themes were used to guide the discussion in the focus group. The themes were: patients, care providers, and e-health application. Each theme consisted of associated questions, based on newspaper reports and literature, as can be seen in Appendix 1. Each of the participants received a printed copy of the themes and associated questions prior to the focus group. This was done for ethical reasons as will be further discussed in 3.6. During the focus group, each theme was briefly discussed. Information obtained from the focus group increased understanding about the subject under study and was used for the development of the prompt sheets for the semi-structured interviews, as will be discussed in 3.4.3.

3.4.3. Semi-structured interviews

Eight semi-structured in-depth interviews were conducted over the phone, since the COVID-19 virus made interviews in the St Jansdal hospital impossible. To still enable face-to-face interviews, participants were asked if they agreed to participate in a video interview. In some

cases, however, it was preferred by the participants to call normally. This request was then granted. Discussions were stimulated around the meaning of diabetes care, the use of e-health, and their expectations towards e-health in the near future. Theretofore, prompt sheets with a dozen questions and associated sub-questions were used. Overarching prompt sheets were prepared for healthcare specialists, diabetic patients, and managers, displayed in Appendix 2. The prompt sheets addressed different topics, based on literature, newspapers, and information obtained in the orientation phase and focus group. The questions were used as a guide. The aim was that interviewees took the lead and spoke freely (Biggerstaff & Thompson, 2008).

As unstructured interviews and a focus group were already conducted with the head of the EPD team, a specialist epic clinical dossier, a specialist epic outpatient clinic and an internist, these participants were not interviewed again. The already collected data was supplemented with eight interviews. The diabetic patients consisted of both type-1 and type-2 diabetic patients and were of different age categories. This was made possible by a prior selection of patients, performed by an internist in the St Jansdal hospital. All interviews lasted for about forty minutes, except for the interview with the general practitioner, who was unable to provide a longer interview due to time constraints. This interview was partly conducted via e-mail. Prior to each interview, the interviewees were asked if they would accept the interview to be recorded. It was emphasised that they would become anonymised and that results would always be dealt with confidentiality . Therefore, all participants received a fictional number for confidentiality reasons, displayed in Table 3. These numbers will be used in the analysis of this research, which can be seen in Chapter 4. In addition, during each interview, interviewees were asked whether interpretations, made in the interview, were correct. This was done to prevent incorrect interpretations and to provide interviewees with the possibility to add information or modify their answers.

Participant	Form of data collection	Job description	How it was collected
1.	Preliminary research	Head of the EPD team	Over the phone, e-mail and in person
2.	Presentation of the technological systems of the St Jansdal + unstructured interview	Specialist epic clinical dossier	In person, in the St Jansdal hospital
3.		Specialist epic clinical dossier	In person, in the St Jansdal hospital

4.	Semi-structured focus group	Internist (doctor)	
5.		Head of EPD team	
6.		Specialist epic outpatient clinic	
7.	Semi-structured interview	Diabetes nurse	Over the phone
8.	Semi-structured interview	Diabetes nurse	Skype
9.	Semi-structured interview	Diabetes nurse	Skype
10.	Semi-structured interview	Diabetic patient	Skype
11.	Semi-structured interview	Diabetic patient	Over the phone
12.	Semi-structured interview	Diabetic patient	Over the phone
13.	Semi-structured interview	Manging director	Skype
14.	Semi-structured interview	General practitioner	Over the phone and via e-mail

Table 2 Data collection overview

Management member	1
Management member	2
Epic specialist	*3*
Epic specialist	*4*
Diabetes nurse	*5*
Diabetes nurse	*6*
Diabetes nurse	*7*
Diabetic patient	*8*
Diabetic patient	*9*
Diabetic patient	*10*
Healthcare specialist	*11*
Healthcare specialist	*12*

Table 3 Fictive numbers for confidentiality reasons

3.4. Data analysis

The aim of the analysis was to explore the nature of the discourses of involved human actors, to investigate how these discourses shaped future perspectives regarding the design and use of e-health. Discourse was conceptualized as a duality of communicative actions and deep

structures, mediated by the interpretive schemes of involved human actors (Heracleous & Barrett, 2001). An iterative discovery process was emphasized in which individual texts were (re)considered in light of all the texts, as well as social context in which they occurred.

First, texts were approached as collections consisting of communicative actions that were fixed in writing. Therefore, interview transcripts were treated as texts (Heracleous & Barrett, 2001). These texts were read and re-read while making notes of thoughts, questions, and reflections (Barry & Elmes, 1997).

Second, aimed was at the identification of the discursive structures that were manifested in the communicative actions in the interview texts and which guided the interpretations and actions of the participants (Heracleous & Barrett, 2001). Texts were re-read while keeping track of the 'taken for granted' argumentations, the rationality behind the argumentations that guided the communicative actions and interpretations in the texts (Giddens, 1984). By exploring individual texts, central themes were searched for that were explicitly assumed. Thereupon, the founded central themes were compared intertextually to find the themes that transcended individual texts and were present in all the texts. The connections between these central themes were analysed and, if possible, combined. This process was repeated until a final list of central themes was developed that represented the deep structures in the discourses (Heracleous & Barrett, 2001), as can be seen in Table 4 in short and in Appendix 3 in total.

1. Central themes, first attempt	2. Central themes, second attempt	3. Central themes, third attempt	4. Central themes, fourth attempt	5. Central themes, fifth attempt
Customisation Diversity Flexibility Network Connectedness Responsibility Efficiency Common interest Support Collective insight Consequence Consistency Changes in care provision Self-direction	Customisation Automation Lean Simplification of care Care relief Interactive care Treatment goals Regulation Self-management Stimulation Automation	Customisation Automation Lean Interactive care Treatment goal Self-regulation Care relief	Customisation Digitalisation Interactive care Treatment goal Self-regulation Care burden	Customised care Digitalisation Self-regulation Future care provision

Table 4 Discursive central themes

Third, the central themes were used as coding categories. Texts were highlighted in different colours, depending on the central theme to which it belonged (Schneider, 2013). This was done as the discursive structures were manifested in the communicative actions (Giddens, 1984). The coded sentences in the texts were systematised in tables, linked to the person who said. An example of these coding's can be seen in Table 5. To ensure the privacy of the participants, in this example it has not been stated which participant said it. This information is only provided to the supervisor of this research.

Who said it?	Customised care – Digitalisation – Future care provision – Self-regulation
Participant	Yes, before the Corona outbreak, we had made some progress, a bit more towards the profiles in which you move to customised care, so no more standard routines. You are then just going to look who do I have in front of me and what suits the patient. So, I think that's a very good development. A next step can of course be that a part of the information, that you want to receive, to send the patient these questions prior to the consultation uh to make sure that a part of the information is already available and you only have to supplement it or check it. If you look at the score, if the insulin values are passed on, then we can see remotely, for example, this is uhm a normal value, which falls within the limit, so that the first appointment doesn't have to take place, so that they can actually end up in a different route, so that they only have to end up with the general practitioner for example, while they are now actually seen unnecessarily in the hospital. Now it is often the case that a patient gives all the data and then it is 'goodluck with it', We want to give the patient more control over their own regulation. So, we also want to know what their actual questions for care help are, so that we can prepare the consultations better. And uhm, there is still an important development point for us.

Table 5 Codes applied to the texts

Fourth, the connection among the central themes were analysed, as well as the way they structured argumentation. First, it was identified which explicit terms transcended individual texts and were present in various argumentations. These explicit terms were connected to the central themes to which they belonged. This process of discovery increased the understanding of the terms the participants unconsciously used in their argumentations (Heracleous & Barrett, 2001). This resulted in an overview of the way the central themes were interconnected, as can be seen in Table 6.

Customised care	Digitalisation	Future care provision	Self-regulation
▪ Profile plan ▪ Regular appointments with e-consultations ▪ Consequences	▪ Automation ▪ Profile plan ▪ Patient preparation ▪ Time saving ▪ Consequences ▪ Responsibility	▪ Regular appointments with e-consultations ▪ Time saving ▪ Consequences ▪ Common interest ▪ Conversations	▪ Profile plan ▪ Information provision ▪ Patient preparation ▪ Responsibility ▪ Remote healthcare

▪ Common interest ▪ Remote healthcare ▪ Conversations ▪ Tasks ▪ Information provision	▪ Regular appointments with e-consultations ▪ Remote healthcare ▪ Conversations ▪ Connection ▪ Video calling ▪ Care simplification ▪ Control ▪ Information provision	▪ Remote healthcare ▪ Tasks ▪ Connection ▪ Video calling ▪ Control ▪ Information provision	▪ Care simplification ▪ Automation ▪ Control ▪ Time saving ▪ Consequences ▪ Remote healthcare

Table 6 Interconnectedness central themes

Fifth, it was investigated what the 'hidden' understandings, assumptions, and values were that guided the communicative actions. This was done to identify the interpretive schemes that cognitively structured the representations of the participants regarding future e-health provision. The explicit terms, as displayed in Table 7, were consistently used in the argumentations of the participants, either consciously or unconsciously (Heracleous & Barrett, 2001). The next step was to examine how these arguments-in-use guided the interpretations of the participants regarding the four discursive central themes. This was done to move beyond the written texts once more and enable a further investigation of the ordering forces in argumentations (Heracleous & Barrett, 2001). For example, the participants used 'patient preparations' and 'time savings' explicitly in their argumentations. Based on this, it could be investigated how these communicative actions were linked to, for example, the discursive central themes 'self-regulation' and 'future care provision', as can be seen in the example displayed in Table 7. The complete overview of the relation between the arguments-in-use and interpretations regarding the discursive central themes will only be provided to the supervisor of this research, to ensure the privacy of the participants.

Argumentations-in-use	Interpretations regarding the discursive central themes
Patient preparations: The patient must prepare for consultations. If not, consequences will follow.	**Self-regulation:** If patients transmit their values remotely, it can be assessed whether they need to be seen in the hospital, which can provide care relief for patients and caregivers.
Time savings: Patient preparations will save time. The same accounts for online insight into the values of the patients, since then appointments can be cancelled, or patients can be returned to the first line of care (efficiency)	**Future care provision**: It will save time for both the patient and healthcare provider

Table 7 Example of the relation between the arguments-in-use and the interpretations regarding the discursive central themes

Sixth, to enable for inferences at a higher level of analysis, discourse groups were made. These discourse groups were based on interpretations regarding the four central themes: customised care, digitalisation, self-regulation, and future care provision. All discourses dealt with the four discursive central themes, but interpretation differences could be found. Based on this, two discourse groups could be drawn up that consisted of the same interpretations regarding the central themes. These discourse groups were labelled as the 'optimists' and the 'moderate-optimists', based on their optimists and moderate-optimists' expectations regarding e-health technology. After a close examination of the interpretations of the two discourse groups, two interpretive schemes could be developed. From the interpretive schemes of the discourse groups, two future perspectives could be derived.

Seventh, it was investigated what the similarities and differences were between the future perspectives regarding the design and use of e-health. Additionally, the implicit underlying messages in the communicative actions related to these similarities and differences were searched for. This was done to examine how the communicative actions could potentially contribute to the realisation of the future perspectives, since communicative actions can either reproduce or change discursive structures. Implicit statements of actors were important to investigate as they could transform a current reality and create a new one (Heracleous & Barrett, 2001).

3.5. Research quality

To achieve the highest quality as possible, various decisions have been made during this research. Starting from December, several conversations were held with the head of EPD systems about the research subject. This was done to become familiar with the context, gain trust, and get to know the data by gathering sufficient information. Aimed was at going beyond superficial interviews. Moreover, ongoing informal discussions about this research subject were held with healthcare employees working in other hospitals, and healthcare specialists in training. Discussing this research with others encouraged reflexivity (Symon & Cassell, 2012).

Patients were purposively selected as respondents by an internist and management members. Aimed was at gathering multiple perspectives to enable representative results that could apply to the entire diabetic population of the St Jansdal. Moreover, during this research, a research diary has been kept that included notes, reflective thoughts, and decisions made during the research process. As this research was aimed at increasing understanding about how future perspectives were constructed through discourse, it was important that changes, shifts, and thoughts were trailed (Symon & Cassell, 2012). According to Koch (2006), keeping a

research diary increases transparency and dependability. Additionally, each interview was recorded to ensure that the interviews could be listened to again (Korstjens, Moser, 2018).

Details about the research setting were provided to create a 'thick' description of the context in which this research was embedded. Besides the subject under investigation, information about the current provision of diabetes care in the St Jansdal hospital was provided. This was done to provide the readers with the possibility to judge and decide whether the described situation is different, or the same, from other situations (Symon & Cassell, 2012). Insights were provided in the current provision of e-health in the St Jansdal, as well as the perspectives on future provision of e-health. According to Korstens and Moser (2018), providing information about a specific context, behaviour and experiences increases the transferability of a study. Additionally, it enabled this research to become meaningful to an outsider (Korstjens, Moser, 2018).

Lastly, to prove that the research contains the aspect of neutrality, it is made clear where the data came from. Even though the interviewees were made anonymous, statements have been incorporated into the results, to establish that the data, as well as the interpretations, were not invented (Symon & Cassell, 2012). Inter-subjectivity of the data was secured by grounded viewpoints in the data. The focus of the interpretation process was embedded in the analysis, which contributed to the confirmability of this research (Korstjens & Moser, 2018).

3.6. Ethics

In this research, careful considerations regarding ethics questions were given, to ensure ethical quality. In the design of this research, various scientific statements were considered to ensure that the content of this research was based on scientific insights. The scientific relevance of this research was discussed, as well as the societal relevance. Since the scientific relevance was related to a contribution to an existing model, different scientific insights were aligned. The societal relevance was developed in consultation with the St Jansdal hospital, where this research was conducted. This was done to create transparency and mutual agreement.

Before the data collection and analysis were performed, conversations with employees of the St Jansdal hospital and a meeting within the St Jansdal hospital took place. The first conversations with the contact person from the St Jansdal hospital were focused on talking the research through, to ensure that the aim of this research was clear. It also ensured that he could express his opinions and concerns and could suggest additions. Prior to the focus group in the St Jansdal, the research was sent to all the participants. This was done to enable

them to prepare for the focus group and come up with further thoughts or reflections. Moreover, it enabled them to withdraw from the research if the content did not appeal to them.

In consultation with the doctor (internist), the two Epic specialists and the Head of EPD systems, it was discussed how the data collection would proceed. We agreed upon two methods to select participants for the semi-structured interviews. In the first method, healthcare specialists and management members approached potential participants, provided them with information about this research and if they agreed, arranged an interview. In the second method, potential participants were also approached by either the internist or a management member but once they showed interest, their contact information was handed over to me, in order for me to approach them. These selection methods were chosen since the internist and management members had prior knowledge about the people they were going to approach and could, therefore, ensure that a diverse group of participants could be created. This was important as a different treatment plan applies to different type of diabetic patients. In addition, this research was focused on future perspectives and therefore, it was crucial that a diverse group of participants was selected. By using this selection method, diversification could be ensured.

Before each interview, it was explained what the research was about, why it was performed, how results would be analysed, that the interviews would be anonymised, and was asked whether it was all right if they were recorded. A format was used in which all information was written down. However, since the COVID-19 virus had made physical interviews and observations impossible, this information had to be read to the participants. The interviewees were asked whether they understood this information, or whether it was necessary to read it again. This was done to ensure that the participants really understood what the research was about. Additionally, to ensure correct interpretations of the provided answers, during- and after each interview, it was asked whether the answers of the participants were understood correctly. This was done by summarising what was said and asking if that was correct interpreted.

Analysing the collected data was done with accuracy and precision, by maintaining a list of code categories. Statements were described honestly since the interviews were transcribed meticulous and literal sentences and words were taken over. Confidentiality and anonymity were ensured by anonymising the interviews. In addition, the transcripts were not revealed to the St Jansdal hospital.

The results of this research included insights into the future perspectives of the participants. Besides the two future perspectives, also the similarities and differences between the perspectives were provided. This was done to create transparency about the data that could support other conclusions than the ones that were made.

Lastly, some ethical issues were encountered prior to the data collection. Due to the COVID-19 virus and the associated pressure in the hospital, only one doctor (internist) and one general practitioner could be interviewed. To ensure confidentiality and anonymity, the heading 'healthcare specialists' includes both the internist and general practitioner. Besides, the confidentiality numbers, used in the analysis of this research, were linked to umbrella labels, namely: 'healthcare specialist', 'management member', 'epic specialist', 'diabetic patient', and 'diabetes nurse'. This was done to ensure anonymity of the participants.

Another ethical issue was the one of neutrality, since I, as researcher, have a chronic illness myself. Because of this, I had my own ideas regarding care provision for chronically ill patients. However, neutrality was of utmost importance, particularly as this research was focused on discourse, meaning making and people's own perspectives of the future. Therefore, neutral interview questions were developed, and a constant attention was paid to this neutrality aspect so that an independent and impartial research could be performed.

Chapter 4

This chapter addresses the analysis of this research, in which three sub-questions will be answered. These sub-questions examine the nature of the two discourse groups and their relation to future perspectives regarding the design and use of e-health. The first sub-question, answered in 4.1., will address the discursive central themes that guided the communicative actions of the participants. The second sub-question, answered in 4.2., will analyse the interpretations of the two discourse groups, the 'optimists' and 'moderate-optimists', about the discursive central themes. For both discourse groups, an interpretive scheme will be developed. The third sub-question, answered in 4.3., will address the similarities and differences between the future perspectives, as well as the underlying implicit messages in the communicative actions related to these similarities and differences.

4.1. Which discursive central themes underlie and guide communicative actions of involved human actors about future e-health provision?

The discursive central themes that guided the communicative actions of the participants regarding future e-health provision were: customised care, digitalisation, self-regulation, and future care provision. First, 'customised care' was related to the idea that, in the future, customised e-health could be provided, based on individual patient's needs, capabilities, and preferences. An e-health design could contribute to this, by allowing for a differentiation between patients. Sub-themes within this central theme were about the combination between regular consultations and e-consultations, and the difference between complex- and simple diabetes care. Second, 'digitalisation' was related to the expected technological innovations and associated e-health possibilities for diabetes care. Sub-themes within this central theme were about automation, access to (online) information, and the simplification of care. Third, 'self-regulation' was related to responsibility issues regarding a right diabetes regulation. The focus was on the time and effort put in the regulation of diabetes by both care providers and patients. Sub-themes within this central theme were about responsibility issues, control over diabetes regulation, and consequences for non-compliance about agreements. Fourth, 'future care provision' was related to the expected content of future care. Sub-themes within this central theme were about time savings, information provision, and remote care.

Besides being manifested in the surface level of communicative actions, these central themes were related to the interpretive schemes of the involved human about future e-health provision.

4.2. Which interpretive schemes construct the perspectives of involved human actors regarding the design and use of e-health for diabetes care?

The interpretations of the two discourse groups, the optimists and moderate-optimists, regarding the four discursive central themes will be discussed. For each discourse group, a interpretive scheme will be developed. The optimists will be addressed first, followed by the moderate-optimists.

4.2.1. The optimists
4.2.1.1. Customised care

The optimists believed that a customised e-health design will be developed. Assumed was that patients differ in their preferences and abilities to use remote e-health and therefore, e-health provision should be differentiated. *"Physical consultations remain necessary for that type of patient for whom remote care is simply not feasible. Also, for immigrant patients. Compared to the group who really want to move towards remote care, who want to visit the doctor less often"* *(diabetes nurse 5).* It was expected that patient-based profiles, in which the content of care delivery is specified, will enable this customised e-healthcare. This expectation was based on the investigated profile system the OLVG hospital uses. *"They [OLVG] have three profiles in which patients can fall. When these patients fall under chronic basis care, for example, they must have an appointment with the internist, with the diabetes nurse or with the dietician. According to the schedule, those agreements must be followed. They have to follow the path that has been agreed upon in the system"* *(epic specialist, 3).* It was expected that this customised e-health design will increase care effectivity. This expectation was based on the assumption that a customised design, in which some patients will increasingly receive e-healthcare, will lead to more time available for patients who do need physical consultations. *"What I expect that the result [profile plan] will be, is that we will have more time to spare for patients who really need it. More effective. Now, we see many patients four times a year and that is fun and also important for the confidence, but more time could be freed on the outpatient clinic for patients who do really need it"* *(diabetes nurse, 5).* Besides, it was expected that customised care will result in a distinction between complex and simple diabetes care, with associated amount of e-health use. *"A distinction will also be made between simple and more complex diabetes care, whereby simple care may lend itself very well to fewer checks that will partly also run digitally"* *(healthcare specialist, 12).* For this e-health design, doctors were assumed to classify patients into a certain profile. *"And then she [doctor] actually determines the profile which determines whether we are going to see the patient three times a year, or whether patients are in need of more care and will be seen four times a year"* *(diabetes nurse*

7). Additionally, assumed was that the e-health design will allow patients to upload their data, for nurses and healthcare specialists to assess it from remote. It was expected that these remote assessments will lead to less consultations, and/or an increase of patient transitions to the first line of care. *"You can see remotely which value is a normal vale and falls within the limit [upload]. If this is the case, the first appointment does not have to take place at all. This can lead to a situation in which a patient ends up in another profile in which they only have to go to the general practitioner, for example, while they are now actually seen in the hospital" (management member, 1).* This customisation of care, in relation to the amount of consultations, is also preferred by some patients. *"I would rather see that I return blood every three months, for example, and that I would get the results. That would already confirm to me that it is good. And suppose I would be too high one time, that I would make an appointment with her [nurse]" (diabetic patient, 8).*

4.2.1.2. Digitalisation
The optimists expected that diabetes care will become increasingly digitalised. It was assumed that the number of diabetic patients as well as digitalisation possibilities will increase, whereby e-health use will be necessary to meet the increasing demand for diabetes care. *"I expect that digitisation in diabetes care will increase, due to the increase in the number of diabetes patients, better glucose control with the possibility of automation and digital data transmission. In addition, the demand for care will also exceed the supply of care, which means that the possibilities of direct visits to care providers must be dealt with very rationally" (healthcare specialist, 12).* It was assumed that digitalisation innovations will lead to an increase of remote care. This remote care, enabled by e-health use, is expected to replace physical consultations at increasing rate. *"What you see is that we are in the middle of a transition. It used to be quite traditional, with a lot of physical contact and the coaching of patients, now you see quick development of digitalisation and remote care, as well as opportunities for patients to do things" (management member, 2).* An e-health design in which online manuals guide patients in uploading their information was believed to be possible and preferred. It was expected that patients who use glucose injections instead of pumps or sensors, will be guided by online manuals as well. It was assumed that these patients will be able to fill in their daily curves from remote, which was expected to decrease the manual work of nurses and increase the reliability of patient data. *"And that is something that the ict could actually do very easily, that the patient already receives a format at home, developed by the ict, in which the patient can clock in their day curves, and that we can get it directly in our report or copy it without having to enter it manually"(diabetes nurse, 6).* The patient preparations from remote were expected to increase

care efficiency. This expectation was based on the assumption that patients will be able to use e-health for consultation preparations, which can save time during consultations. Ultimately, it was expected that e-health use can allow for a decrease in physical consultations. *"That I can actually use my time much more efficiently. So that I do not have to ask half the consultation how things are, but that I already have that information. That I even know what it should be about in the conversation. With the goal that patients have to come less often"* (healthcare specialist, 11). Besides, it was believed that the use of e-health will increase, due to government stimulations. Assumed was that the government stimulates the reduction of meaningless care, by promoting the use of e-health. *"The government also stimulates e-health, they want to get rid of 'less meaningful care', looking at what can be done less"* (healthcare specialist, 12). It was believed that the quality of care will increase if more patient data is available, due to e-health. This belief was based on the assumption that more patient data leads to better insights into the diabetes regulation of the patient. *"In any case, I think there are increasing opportunities for patients to upload data and for us to view and interpret it. So, you can have much more data and information to really treat patients very well"* (management member, 2). In addition to the expected patient preparations from remote, it was assumed that the use of e-consultations will increase. *"What is also needed, is to schedule regular e-consultations in additional to the regular appointments, apart from the things that patients can enter at home before the start of a consultation"* (epic specialist, 3). The exchange of information between care providers and patients is assumed to be simplified using e-health, as it allows for online platforms. *"If I could organise it myself, I would say 'just make an app for it', that I can easily.. that you can easily share things"* (diabetic patient, 9). In the near future, however, it was expected that video consultations will be implemented, in addition to telephone consultations. *"Much care already takes place by telephone. Well, we would like to add video consultations to that"* (management member, 2).

4.2.1.3. Self-regulation

The optimists believed that the responsibility for the right regulation should shift more to patients. This belief was based on the assumption that many patients do not know how to assess their own data and rely on nurses for their regulation. *"What you really have is that people come to the diabetes nurse with the pump and say: 'here, you can have it, I do not know' [how to operate their pump]"* (healthcare specialist, 11). Assumed was that regular patient uploads and self-assessments will provide patients with more insights into their disease, which is expected to improve their control over it. *"Personally, I would like to encourage even more patients to read their pump regularly, because I have seen that it is positive for their regulation"*

(diabetes nurse, 6). This self-management of patients was expected to be necessary to empower patients in their daily regulation. *"I think that they should have that self-direction. Because they come to us four times a year and all those other 365 days they must do everything by themselves" (diabetes nurse, 5).* To stimulate the self-management of patients, it was believed that consequences must be placed for those patients who do not upload and assess their own data, prior to consultations. *"We would prefer it if someone had read it [pump or sensor data] in advance, since it takes a lot of time if you have to do it on the spot. We should be stricter about that. If you have not read it in advance, we will not do it here and we will not view your upload. We would like to encourage self-management" (diabetes nurse, 6).* To enable for patient preparations, assumed was that it will be possible to design online forms. *". . . defined forms where you [patient] can just indicate it all by clicking. That is where we want to go" (epic specialist, 4).* Additionally, the customised e-health design was believed to enable a balance between the responsibilities of patients and those of care providers. *"Finding that balance between, well, the responsibility of the patient, what can he do himself and when is it good enough for us, compared to the other extreme in which you want to take the patient completely by the hand"(management member, 2).* Yet, it was assumed that the development of this balance will be challenging at first, as the expected increase in available patient data also provides more insight into their disease, which can create time problems for nurses when assessing the data. *"There is also the challenge, for example for diabetes nurses, who say 'oh but I see a lot of things that can be improved and I only have so much time since there are more patients that need to be done' (management member, 2).* Additionally, it was believed that the self-regulation of patients will improve if they receive more information from care providers, for example about the norm values that can serve as a guideline for a good regulation. More information was assumed to provide patients with more control over their own regulation. *"[patients] actually want a range of 'this is normal and if you fall outside of that, then you have to ring the bell' (epic specialist, 4).* Additionally, it was presupposed that more information should be provided to patients who use a pump or sensor, to guide them in their self-regulation. *"A sensor, which is a sticker on the arm, and it measures continuously. Then you get a graph of how the blood sugar has been all day. And if you use that every day continuously. You have to educate the patient, you [patient] can see a lot of things now, but it does not have to drive you crazy" (healthcare specialist, 11).* For patients with pumps or sensors, the wish for 'additional self-regulation tools' was related to e-health possibilities such as online news messages, or an information exchange platform with other patients. *"I would really like if there is a contact group with other diabetic patients, to see how they deal with certain things. And*

that certain circumstances that have an influence [on diabetes regulation], for example when it suddenly gets warmer or colder, that we get some extra information from the hospital about that, simply from those pop-ups" (diabetic patient, 9). Moreover, insights into the meaning of test results was preferred. These insights could be provided online, using e-health. *"I get my result of something, which is for example 2.9, and then you have to be somewhere in between two values. I would like to know what that means. I would prefer if I would get a standard list, with cholesterol levels and so on, that tells you between which values you must be, as with sugar levels" (diabetic patient, 8).* This information provision was expected to be available for patients in the near future, to guide them in regulating their diabetes. *"Information, such as 'how do I use a pump', I see weird values, 'should I contact the hospital or not?' That is a piece of information that could also be available online" (management member, 1).*

4.2.1.4. Future care provision

The optimists believed that future care provision will differ from the current care provision. This was based on the assumption that e-health will enable patients to regulate their own diabetes at increasing rate. *"I think our range of duties will change. We are still needed, but I think in a different way. If the patients can increasingly take control, those who can and do well, for them, we will be needed less, or needed in a different way" (diabetes nurse, 5).* It was expected that future care provision will be more focused on the provision of information from remote, to support patients in their regulation. *"I think that their responsibility [hospital] lies more with calculating the insulin values, how exactly that should be done, that kind of information, so that I can work with it [device] myself" (diabetic patient, 9).* This information provision was believed to enable for more meaningful care. It was assumed this increase of insights will provide patients with more control over their own regulation and will increase their responsibility over this. *"You actually have more meaningful care. So, it [providing insight] is partly empowerment and patients should partly just take more responsibility" (healthcare specialist, 11).* Furthermore, it was believed that the balance between physical care and e-healthcare will shift more towards e-healthcare. This was based on the assumption that some physical consultations can be replaced by e-consultations from remote. *"Part of the care can be provided remotely. Of course, sometimes patients must be seen in the hospital, to perform physical tests, but the balance between physical and digital care could shift more towards the digital" (management member, 2).* It was assumed e-consultations could replace the physical consultations without tests, to simplify care provision and save time. *"I do not live around the corner of Harderwijk. So that is why it is also easy [e-consultation]. And then you do not have to spend that much time on it" (diabetic patient, 9).* Additionally, it was believed that more

insights into the wishes and abilities of patients, due to a customisation of care, might lead to shifts of patients to the first line of care. This was based on the assumption that patients who do not want to improve their own regulation do not need to be seen in the hospital. *"Sometimes we are beating a dead horse, while the patient says, 'well this is what it is' and 'I have no intention of having low blood sugar levels at all'. If you are going to have a conversation about that, then you can transfer people back much sooner"* (healthcare specialist, 11). In the future, it was expected that the right care could be provided at the right moment. This expectation was based on the assumption that the patient-based profiles, as was seen at the OLVG, could enable this. *"The OLVG also had a very smart way to display patients in profiles to ensure that they would receive the right appointment at the right time, and also receive a new follow-up appointment at the right time, according to their profile"* (epic specialist, 3).

Based on the described interpretations about the four discursive central themes, the interpretive scheme of the optimists as discourse group is developed, as displayed in Table 8. From this interpretive scheme, the first future perspective about the design and use of future e-health provision can be derived.

Discourse group the optimists	
Customised Care	A customised e-health design with distinctive patient profiles is expected, in which e-health use differs per profile. This differentiation will be based on the preferences and abilities of patients regarding the use of e-health. Time will be saved on the simple diabetes cases by using e-health, which, in turn, will be spend on the complex cases in the hospital. The use of e-health is expected to lead to an increase of remote assessment possibilities by care providers, which is assumed to decrease the amount of physical consultations in the hospital.
Digitalisation	The e-health design can allow patients to prepare for consultations, by assessing their own pump or sensor data and deliver additional information. The use of e-health will increase among patients and care providers. Besides, physical consultations without tests will be replaced by e-consultations.
Self-regulation	An e-health design that shift the responsibility for a good regulation more towards patients. Consequences will be built-in for patients who do not upload and/or assess their own data regularly. An increase of information provision regarding self-regulation, and stricter agreements with patients on their self-regulation will increase the use of e-health and patients' health.
Future care provision	The e-health design will allow the simple diabetes cases to increasingly regulate their own diabetes. E-health is expected to enable an increase of information that can guide and stimulate patients in their self-regulation. The complex diabetes cases are treated in the hospital and care efficiency will increase.

Table 8 Interpretive schemes of the optimists regarding the design and use of future e-health

4.2.2. The moderate-optimists
4.2.2.1. Customised care
The moderate-optimists believed that future care provision should become more personal since current care provision was experienced as too impersonal. *"More personal. The [consultations]*

sometimes feels a bit of assembly work" (diabetic patient, 9). More attention should be paid to the individual patient and his or her personal care needs. *"Important is the fact that customised holistic care is offered to the individual patient" (healthcare specialist, 12)*. An increase in contact moments with nurses or healthcare specialists were expected to be necessary to enable this personalisation of care. Moreover, during these e-consultations, more attention to the wellbeing of the patient was wished for. *"More online contact, in which the focus is on how I am actually feeling, that it is not just about my values" (diabetic patient, 9)*. A customised e-health design was believed to improve the alignment between the individual patient goals and those of care providers, as it focuses on tailored patient needs about e-health use. *". . . to allow for more tailored care. No standard routines, but care that suits the patient" (management member, 1)*. It was expected that this alignment between goals may increase patient satisfaction. *"Our treatment goals are not always the same as the goals of the patient. I can claim 'you have to have very low blood sugar levels. But maybe the patient has the goal 'as long as I am not too low, I'm okay with it'. And I think that it particularly leads to a greater satisfaction if more attention is paid to what is important to the patient" (healthcare specialist, 11)*.

4.2.2.2. Digitalisation

The moderate-optimists expected diabetes care to become increasingly digitalised, due to e-health possibilities. *"That high-tech will come more and more in our diabetes care" (diabetes nurse, 5)*. Assumed was that these digitalisation options will enable diabetes care to become more automated in which diabetes regulations are simplified. Ultimately, it was expected that a device will occur on the market that regulates diabetes completely automatically. *"I am actually waiting for a pump that automatically controls everything. There are many studies for example about pumps, that can deliver not only insulin but also glucans, which means that the whole process is automated, that you never have to inject insulin again, that the device can regulate everything"(diabetic patient, 10)*. These automation expectations were based on the assumption that manual care is decreasing and can be taken over by digitisation options. *"We go more and more towards situations in which things are automatically measured and based on those measurements. . . that the manual is increasingly removed" (management member, 2)*. However, it was assumed that the ict in the St Jansdal overestimated the automation possibilities, specifically the possibilities to upload pump and sensor data directly into the patient profiles. This belief was based on the assumption that these uploads would require prior filtering in the data, due to the large amount of data. The filtering was expected to hinder care provision. *"They [ict] wants to add those uploads to the file of my St Jansdal, but that is not really possible because it contains so much MB that they have to make a certain selection. But*

then they take the role of the diabetes nurse" (diabetes nurse, 6). Additionally, it was assumed that some doctors overestimate this e-health possibility as well, since they do not assess uploads regularly. *"That the doctor also indicates that it would be nice if we could have it [pump- and sensor uploads] into the patient's file. Then I ask the doctor: 'do you know how big that upload is, that you have to make that selection yourself? And then I notice that the doctor does not know what it means because he also does not fully work with it" (diabetes nurse, 6).* These problems were assumed to occur, due to the specificity of the data and difficulty of understanding exactly how it works. *"If I hear that from everyone about 'oh the ict and the uploads', If that does not work well.. it is also very specific." (diabetes nurse, 5).* Furthermore, the moderate-optimists were sceptical about the expected increase of consultations from a distance, based on the assumption that it will impersonalise the provision of care. *"I am not that into video calling, it will probably be the future, I think so, yes. If that will be the thing in the future, then I will do it. But it is becoming increasingly impersonal" (diabetic patient, 8).* To enable for personal contact between care providers and patients, it was assumed that face-to-face contact cannot disappear completely. In addition, a differentiation between patients was believed to be necessary, to allow for the customisation of e-health use among patients. *"Now that we have had telephone consultations for several weeks, I realise that I miss face to face contact. You observe differently, you don't see body language. A combination of e-health and personal contact seems ideal to me. In what proportion depends on the person who 'sits' opposite you" (diabetes nurse, 5).*

4.2.2.3. Self-regulation
The moderate-optimists believed that the need for self-regulation will decrease, due to the expected automation possibilities for diabetes care. *"If you have such a new device, then it just makes it a lot easier. Then you no longer must focus on your diabetes care, because that device does that for you. So, that concern is completely gone" (diabetic patient, 10).* Patients who do not want to have complete insights into their diabetes, which comes with such diabetes devices, were assumed to be needing insulin injections. *"People now see a lot happening with their blood sugars that they did not know before, they can be stressed about it, then they see the high blood sugars. Sometimes we have a single patient to whom we say, 'that sensor may not be suitable for you, insulin injections are also good for you" (diabetes nurse, 5).* In addition, the expected increase of automation options for diabetes regulation were believed to be supplemented with information provision about the right lifestyle for diabetic patients. Since the automated devices were expected to take over the diabetes regulation, this lifestyle aspect was believed to be of central importance in the future. *"It can be the case that if it is all*

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automatically adjusted that it, that the lifestyle of patients is not really adjusted, while that is the most important thing" (management member, 2).

The moderate-optimists believed that the provision of diabetes care will become more efficient, due to the expected increase of e-health use. However, it was assumed that the increase of e-health use could lead to a situation in which patients become numbers and good conversations, in which the focus is on the patient instead of on his or her values, disappear. *"You can develop a lot of skill. Fast, Effective, which can be detrimental for good conversations in the consultation. That you do not always have to look at the data" (diabetes nurse, 5).* It was believed that, to enable the delivery of good diabetes care, some sort of connection between care providers and patient should be built. Therefore, it was assumed that some physical consultations will be needed for all diabetes patients, to enable the development of a personal connection. *"I think you the patient should be seen normally at least once a year. Then you can also build a kind of bond. I don't think you can create a bond over just phone call" (diabetes nurse, 7).*

Based on the interpretations regarding the four discursive central themes, the interpretive scheme of the moderate-optimists as discourse group is developed, as displayed in Table 9. From this interpretive scheme, the second future perspective about the design and use of future e-health provision can be derived.

Discourse group the moderate-optimists	
Customised Care	An e-health design that allows for a personalisation of care, by enabling more contact moments between care providers and patients in which attention is also paid to the individual patient needs. No standard routines, but e-healthcare that suits the patient.
Digitalisation	E-health design that allows for customisation of e-health use among patients, always combined with some sort of personal contact between care provider and patient. In the far future: an e-health design that regulates diabetes automatically and therefore, will lead to a simplification of diabetes regulation. Soon: an e-health design that replaces certain manual work with e-health but does not hinder the provision of diabetes care by currently impossible automation options.
Self-regulation	An e-health design that allows for an automated diabetes regulation. The need for self-regulation decreases. Additional information about the right lifestyle will be provided online, since the rest of the diabetes regulation is taken care of by the automated device.
Future care provision	An e-health design in which all patients are still physically seen in the hospital at least once a year, to enable the development of a personal connection between care providers and patients. E-health use will increase the efficiency of care but, due to this personal connection, good conversations can still be held with patients in which the focus is not solely on their values.

Table 9 Interpretive schemes of the moderate-optimists regarding the design and use of future e-health

4.3. What are the similarities and differences between users' perspectives on future provision of e-health for diabetes care?

Similarities and differences were found between the two future perspectives, related to the interpretive schemes of the two discourse groups. The potential of each discourse group to realise their future perspective is related to their communicative actions, which stem from the interpretive scheme. These communicative actions can either change or reproduce discursive structures. To investigate this potential, the underlying messages in the communicative actions related to the similarities and differences between the future perspectives will be examined.

4.3.1. Customised care

Both future perspectives expect an customised e-health design to occur. The underlying message was that patients differ in their preferences and abilities about e-health use and that these differences should be incorporated in the e-health design. The first future perspective, however, foresees an e-health design in which e-health is mainly used for simple diabetes care to save time that, in turn, can be spend on complex diabetes care in the hospital. Hence, these remarks are implicitly addressed to diabetic patients. Even though it was assumed that patients will increasingly be able to choose how to receive (e-health) care, the underlying message in their communicative actions was that simple diabetes cases, overall, will have to use more e-health and receive more care from a distant to enable time savings. Though, the second future perspective assumed that an increase of e-health will allow for more contact moments between care providers and patients, with a stronger focus on the individual patient needs. These remarks are implicitly addressed to care providers since the communicative actions about this topic draw on the idea that less 'one size fits all' care should be provided by care providers.

4.3.2. Digitalisation

Both future perspectives foresee an increase in digitalisation possibilities, associated with e-health use. This draws from the underlying idea that more and more manual work in diabetes care will be replaced by e-health. Solely, the first future perspective expect that an increase of e-health use will allow for a higher care efficiency, -quality, and more meaningful care, by replacing certain physical consultations for e-consultations from remote and enabling patient preparations. Communicative actions regarding this topic addressed concerns about the increase in diabetic patients worldwide and the associated need for more efficient diabetes care. The second perspective, however, expected that digitalisation innovations will allow for diabetes regulations to become increasingly automated in the future, which will decrease the need for diabetes care. Yet, concerns were addressed regarding the automation plans and expectations of the St Jansdal in near future. These concerns were addressed to the ICT and doctors

(internists) in the St Jansdal. The underlying message was that the current automation plans require filtering in the data of the patient, which will hinder the provision of care. Additionally, concerns were raised about the development of a personal connection between care providers and patients if e-health use increases. These concerns were implicitly addressed to the management, since they can allow for a design in which there is room for the development of a personal connection between care providers and patients.

4.3.3. Self-regulation

Both future perspectives expected an increase of online information provision. The underlying message was that an increase in information provision will improve the regulation of patients. Nevertheless, major differences could also be found between the perspectives. The first perspective expected that the responsibility of patients and their associated self-management will increase. The underlying message was the responsibility of a good diabetes regulation should shift more towards patients. Concerns were addressed to the epic team about the need for the development of the right forms to allow for patient preparations, and to the management, about the need for defined consequences that care providers can use for those patients who do not prepare for consultations. Furthermore, concerns were addressed regarding adaptability issues surrounding e-health and remote data assessments by diabetes nurses. The underlying message was that the increase of patient data should not lead to an increase of time spend on the assessment of patient data. On the other hand, the second future perspective expected that patients will be less concerned with their own diabetes regulation in the future, due to automation possibilities. The implicit remark was that future care providers will be mainly necessary for the provision of information regarding the automated devices and for additional questions.

4.3.4. Future care provision

Both future perspectives expected that the balance between physical- and digital care will shift more towards digital care. This draws on the interpretation that the way diabetes care is provided will change. A difference between the communicative actions in the first- and second future perspective is, however, that in the second perspective concerns were addressed about impersonal care. The underlying message was that contact between care providers and patients, in which the focus is not on their values, is also of central importance for both patients, and the nurses' job satisfaction. These concerns could implicitly be addressed to the management, and/or the epic team, to ensure that this is taken into account in the design of e-health.

Chapter 5

This chapter addresses the conclusion and discussion of this research. In the conclusion, the research question will be answered, based on the answers of the sub-questions. In the discussion, the following subjects will successively be discussed: reflections on the used theory, methodological limitations, suggestions for further research, practical implications and recommendations, reflexivity, and ethics.

5.1. Conclusion

The objective of this research was *"based on an exploratory study in the St Jansdal hospital, gaining insights into the future perspectives of diabetic patients, healthcare specialists, diabetes nurses, the management, and epic team, in order to contribute to the development of e-health for diabetes care in the St Jansdal hospital."* To be able to achieve this goal, the main research question was:

"What are future users' perspectives regarding the design and use of e-health for diabetes care in the St Jansdal hospital?"

Three sub-questions were formulated to answer the main question. The first sub-question was: *"Which discursive central themes underlie and guide communicative actions of involved human actors about future e-health provision?"* Four discursive central themes were developed that guided the communicative actions of diabetic patients, healthcare specialists, diabetes nurses, the management, and epic team. These central themes were: (1) customised care, (2) digitalisation, (3), self-regulation, and (4) future care provision. First, customised care was related to the provision of customised e-healthcare, based on the preferences and abilities of patients. Second, digitalisation was related to expected technological innovations and associated e-health possibilities. Third, self-regulation was related to responsibility issues regarding the right regulation of diabetes. Fourth, future care provision was related to the expected content of future diabetes care provision.

The second sub-question was complementary to the first. *"Which interpretative schemes construct the perspectives of involved human actors regarding the future e-health provision for diabetes care?"* By analysing how the central themes were manifested at communicative level, interpretations about future e-health provision could be examined. Two discourse groups were developed, based on their shared interpretations regarding the discursive central themes. These discourse groups were referred to as (1) the optimists, and (2) the moderate-optimists. After analysing their interpretations regarding future e-health provision, two distinct interpretive

schemes could be developed. Based on these interpretive schemes of the optimists and moderate-optimists, two future perspectives could be derived.

In the first future perspective, related to the interpretive scheme of the optimists, an e-health design is expected to occur that allows for *customised care provision*. Patients are divided into different patient profiles, based on their preferences and abilities to use e-health. More e-health is used for simple diabetes care, which is assumed to increase care efficiency. The saved time is expected to be spend on complex diabetes care in which less e-health and more physical care in the hospital is provided. Overall, it is expected that physical consultations will decrease, whereas e-consultations will increase. The *digitalisation* innovations are assumed to allow patients to upload their data as well as additional information, and prepare for consultations. Care providers are expected to increasingly assess patient data from remote, as well as remote information provision. To improve and stimulate the *self-regulation* of patients, it is expected that consequences will be built-in the e-health design, such as cancelling consultations, for those patients who do not deliver information and assess their own data. Eventually, this is believed to improve the self-regulation of patients and enable them to control their own diabetes at increasing rate. *Future care provision* is expected to be more focused on the provision of information from remote, whereby patients take more responsibility over their own diabetes regulation.

In the second future perspective, related to the interpretive scheme of the moderate-optimists, an e-health design is expected that allows for more personal care, in which attention is paid to the individual wishes of the patient. *Customised care provision* is assumed to allow patients to increasingly dictate how and when they wish to receive diabetes care. Contact moments between patients and care providers are assumed to increase and become simplified, due to the availability of e-consultations. Additionally, time is expected to be saved by replacing physical consultations without tests for e-consultations. Ultimately, it is believed that *digitalisation innovations* will lead to an e-health design in which diabetes is regulated automatically. It is believed that this will decrease the need for *self-regulation* by patients. Additional information about a right lifestyle will be provided online. The content of *future care provision* in this e-health design is focused on an increased use of e-consultations to increase care efficiency. Yet, this is expected to be done in relation with physical consultations, at least one per year per patient, to allow for the development of a personal connection between care providers and patients.

The third sub-question built on to the second second-sub question. *"What are the similarities and differences between users' perspectives on future provision of e-health for*

diabetes care?'' Both future perspectives expect a customised e-health design to occur in which digitalisation possibilities are increased, more information is provided online, and in which the balance between physical care and digital care will be more on digital care. Yet, the two future perspectives also have clear differences. Whereas the first future perspective foresees an e-health design that allows for time savings on simple diabetes care by an increased use of e-health and self-assessments by patients; the second perspective foresees an e-health design that allows for an increase of contact moments with care providers and an personalisation of care. The first perspective assumes that a future e-health design will increase the self-management and responsibility of patients in which they proactively regulate their diabetes. The second perspective, however, expects that the need for self-regulation will decrease, in which care is simplified and less time needs to be spent on their diabetes regulation. Finally, the underlying messages in the communicative actions that construct the first future perspectives are mainly related to the diabetic patients, whereby the underlying messages in the communicative actions in the second future perspective are mainly addressed to care providers, the management, and epic team.

5.3. Discussion
5.3.1. Theoretical discussion

The theoretical objective of this research was to refine the structurational model of technology with future perspectives, that are expressed in discourse and formed by discourse, to be able to better explain and predict the emergence and changes in both the design and use of technology. Theoretical insights were provided by examining different theories focusing on the interaction of human actors with technology, future perspectives and discourse. This research can provide several confirmations regarding the used theory, as well as contributions to the current academic literature.

Confirmations can be made since some evident similarities between used theories and research findings were discovered. First, the research findings confirm the two tightly coupled design- and use interaction modes of Orlikowski (1992), by showing that human actors assign different meaning to technology which influences their interpretive schemes. This research contributes to this by providing insights in the way human actors assign meaning to a technology which influences their interpretive scheme, prior to their actual engagement with the technology in the design, or use.

Second, the findings in this research affirm the article of Leonardi (2011) that the users of technology perceive it as something that would afford their possibility to reach an individual goal, or as something that would constrain it. This determines their perspective on technology.

This research, however, contributes to that by providing understanding of the way future expectations of a technology, related to their potentially constrain or affordance, influences the perspectives of users. The article of Leonardi (2011) focused on past interconnections between users and technology to explain future actions, whereas this research focused on future perspectives to provide understanding of potential future actions.

Third, the findings of this research confirmed the findings of Swanson and Ramiller (1997) that users of a future technology form expectations about it through discourse, prior to their actual engagement with it. These expectations then become a future image. This research contributed to this by examining how technological expectations were formed in and expressed by discourse, and how this formed different images of the future. Additionally, this research contributed to the findings of Swanson and Ramiller (1997) by examining how the communicative actions in different future perspectives contribute to the potential realisation of this future perspective.

Fourth, the research findings contribute to the current academic literature on 'technology in practice' and the emergence and changes in the design and use of technology, by providing further understanding of the way discourses in the design mode of technology construct and express future technological expectations about its design and use. Knowledge about this is important as these technological expectations influence the development of an emerging technology.

Fifth, the findings in this research contribute to the refinement of the structurational model of technology. The current structurational model of technology explains how human interaction can bring about technological changes. This model also acknowledges that tensions can occur if technologies are differently used than was intended during its design, since it can undermine or transform organisational objectives (Orlikowski, 1992). However, the findings in this research contribute to that by showing that these tensions already exist in the technological expectations of the future users, before the technology is even designed or used. In addition, it was revealed how these technological expectations took shape in different future perspectives that both, discursively, tried to realise their future perspective. The refined structurational model of technology of this research combines looking at the future with looking into the future, to reflexively understand the impact of future perspectives in a present situation. In doing so, the model integrates practice and analysis. The investigation of interpretive schemes that guide future perspectives could enable building in these interpretive schemes in the design of a technology, which might discourage users to bypass technological features and use technology differently than was intended during its design.

5.3.2. Methodological limitations

There are some methodological limitations in this research. The first limitation is related to the representatives of this research. Various groups have been studied in this research, as these different groups all were involved in the provision of diabetes care. Therefore, these groups were important for the investigation of future e-health provision. These groups were: diabetic patients, diabetes nurses, healthcare specialists, management, and epic team. However, each group did not consist of numerous representatives. As a result, less in-depth information has been gathered of each group. It would be recommended in further research to enable groups of the same size, to investigate whether discourse groups and associated interpretive schemes could be linked to the different groups or not. This could potentially allow for further understanding of the way interpretive schemes were constructed in practice.

The second limitation is related to the way participants were recruited for this research. Participants were either directly approached by management members or internist, or indirectly via an general e-mail with information about this research and my contact information. This approach was chosen since the management members and internist had prior knowledge about the participants and therefore, could compile a diverse group of participants. However, it could be the case that the management members and doctor did not (directly) approached those potential participants that were negative towards e-health provision, for example the 'pessimists', to enable for the desired research results to occur. In addition, it could be that the selected participants were afraid to share their opinion as they were selected by a management members or doctor who, therefore, knew that they participated in this research. It is recommended in further research to use a more random sampling method to select participants, such as 'snowball sampling', in which the participants can recruit other's, so that they may feel more anonymous. Furthermore, it could increase the potential of investigating different groups thoroughly by tracking their social networks and their experiences and expectations associated with it (Noy, 2008).

The third limitation is related to the time span of this research. Data was collected in a relatively short period of time, compared to the time that might be needed to examine the deeper discursive structures that guide communicative actions. Situational features in an organisational context as well as daily communications influence the interpretations of human actors, enabling for changes in the discursive structures. Due to these potential temporalities, longitudinal research is needed (Giddens, 1984). An interpretation of texts over time could have further supported and/or supplemented the found patterns of argumentation in the communicative actions of human actors. Moreover, due to the short time span, it was impossible to investigate

potential discursive shifts in both the surface level of communicative actions and the deeper discursive structures, as well as their relation to contextual factors. As a result, it could be the case that some organising mechanisms that guided communicative actions of human actors are undiscovered. Therefore, longitudinal research is recommended in further research.

The fourth limitation is related to the context. The used discourse approaches in this research (Alvesson & Kärreman, 2000; Heraclesous & Barrett, 2001) not only focus on discourses, but also on the context in which discourses take place. Contextual understanding is important to make sense of the multiple perspectives of human actors, and the way they interact with each other. However, due to the corona virus, it was impossible to physically collect data in the St Jansdal hospital after the first outbreaks were identified. In addition, meetings about future e-health provision for diabetes care were cancelled. Therefore, it was impossible to attend meetings, either physically or online, and to conduct observations. The inability to be physically present, or to conduct observations in the St Jansdal complicated obtaining contextual information. Yet, due to the various (physical) meetings with the head of EPD, the conducted focus group and unstructured interviews in the St Jansdal, prior to the corona outbreak, some contextual understanding was obtained. Nevertheless, further research would be recommended to increase understanding of the context in which discourses take place by physically conduct interviews, as well as observations.

The fifth limitation is related to the transcripts of the semi-structured interviews that were conducted. During each interview, as well as after each interview, answers of the participants were summarised, and it was asked whether the interpretation was correct. If this was not the case, further explanations were requested. This was done to ensure that the answers were correctly interpreted and were not misunderstood. However, further research would be recommended to send the transcripts to participants to enable them to review the transcripts and, potentially, provide it with feedback. This could lead to a higher quality of the transcripts (Mero-Jaffe, 2011).

5.3.3. Suggestions for further research

Several suggestions for further research can be made. The first recommendation is related to the research representatives. To increase in-depth information and investigate whether future perspectives, derived from interpretive schemes, are related to certain representative groups, it can be recommended for further research to include more and equal numbers of respondents in each group. Additionally, it can be advised to differentiate between patients using insulin injections and patients using a pump or sensor. This suggestion is based on the encountered differences in perspectives of patients who use insulin injections and patients who use a pump

or sensor. Further examination in the potential differences in future perspectives between these groups of patients could furtherance the e-health design for (customised) diabetes care.

A second recommendation for further research is to perform longitudinal research to enable for the examination of shifts in communicative actions and discursive structures over time, by including temporality in the analytical process. Moreover, longitudinal research could allow for the identification of the contextual factors that are either the consequence, or cause of the encountered shifts. By conducting observations over time, further insights into the situated character of interactions between human actors in time and space could be provided. An awareness of the shifts in communicative actions and discursive structures, as well as their connection to contextual factors could increase our understanding of the future perspectives of human actors.

The third recommendation is related to the theoretical contribution of this research: the contribution to the structurational model of technology with future perspectives. This model is strengthened in this research by providing further understanding of the way discourses in the design mode of technology form future perspectives about the design and use of technology. It would be interesting for further research to examine over time whether building in interpretive schemes in the design of technology results in a smaller discrepancy between the desired and actual use of technology by human actors. By examining this, comprehension of future perspectives and their ability to predict how human actors are going to engage with technology in practice could increase even more.

The fourth recommendation is to recur this research at different hospitals and specialist diabetic clinics in the Netherlands, as the future perspectives of human actors are related to contextual factors. Performing this research in different contexts could increase insights into the different future perspectives of human actors. Moreover, it could lead to a further comprehension of evident future perspectives regarding e-health provision for diabetes care in the Netherlands.

The sixth and final suggestion for further research is to extend this research by presenting the future perspectives to the research participants, after which the research continues. It would be interesting to investigate if the provision of insights into each other's perspectives on the future would change the future perspectives and if so, what these changes will be. As the study of Veenman, Sperling and Hvelplund (2019) suggest that a close cooperation between human actors can create a dominant discourse or self-fulfilling prophecy, it would be interesting to explore whether one dominant future perspective could emerge when

discussing the future perspectives of the participants collectively. Further notion of this could increase our understanding of future perspectives and their potential changes.

5.3.4. Practical implications and recommendations

This research has provided insights into the future perspectives regarding the design and use of e-health for diabetes care. In addition, it has provided insights into the similarities between future perspectives, as well as their differences. Practical implications and recommendations are mainly focused on these encountered similarities and differences between future perspectives as well as the 'hidden' messages in the communicative actions, related to the interpretive schemes.

This research showed that in both future perspectives, a customisation of e-health is expected and preferred, based on the preferences and abilities of patients. A practical recommendation is therefore to investigate what the preferences and abilities of the diabetic patients in the St Jansal are about e-health use, for example by conducting a survey. This research showed that there exists a clear difference between the preferences of patients regarding e-health use, based on their use of either a pump/sensor or insulin injections. This is a difference that could be included in this investigation. Another similarity between the future perspectives was that a digitalisation of diabetes care is expected in which it was believed that, on the short term, certain manual care tasks can be replaced with e-health. A practical recommendation is therefore to investigate which manual care tasks could be replaced by e-health, for example the insulin diaries of patients who use insulin injections. Furthermore, in both future perspectives, it was expected that online information provision will increase to improve the self-regulation of patients. Therefore, a practical recommendation is to increase the online information provision to patients, either as general information, or as patient specific information such as the meaning behind certain test results. Lastly, in both future perspectives, it was assumed that physical consultations without tests could be replaced with e-consultations to save time and increase care efficiency. A practical recommendation is to ask each patient in their next consultation whether he or she would prefer e-consultations over physical consultations if no tests are performed during this consultation. If patients indicate to prefer e-consultations, then this can be adjusted in their patient profile, which can also lead to fewer physical consultations in the hospital. Another option is to include this question in the proposed survey among diabetic patients.

This research also showed that differences exist between the future perspectives. Whereas the first future perspective assumed that time could be saved on simple diabetes cases by using e-health, the second future perspectives expected that e-health use would allow for an increase

of contact moments between patients and care providers. This raises the question whether time can be saved on simple diabetes cases, certainty since the expected customisation of e-health provision will allow patients to choose for themselves if, and how, they wish to receive e-health. Therefore, a survey among diabetic patients in the St Jansdal about e-health provision is recommended once more. Another difference between the future perspectives was related to the expected automation possibilities in the St Jansdal. Differences existed between the assumed possibilities regarding data assessment from remote, related to patients uploads via e-health. A practical recommendation is therefore to organise meetings between the ict and care providers, who work with patient uploads, to discuss what possibilities about this topic are, and how it could be developed. In addition, differences existed between the expected self-regulation responsibilities of patients and their associated consultations preparations. To manage the expectations among both care providers and patients, regarding consultation preparations, a practical recommendation is to come to an agreement among the care staff about the consequences that can be built-in the e-health design, for patients who do not prepare for consultations. An agreement could be established by discussing this topic in meetings. If clear agreements are made, that are also communicated to patients, more consistency could be reached regarding patient preparations. Lastly, differences existed in the extent to which personal contact between care providers and patients was preferred, both on the side of patients and care providers. A practical recommendation is therefore to not only focus on the customisation of e-health use for patients, but also on the customisation of e-health provision from care providers. This could be discussed in meetings as well, or in personal conversations with care providers.

5.3.5. Reflexivity

At the beginning of this research, I had no knowledge of diabetes, let alone diabetes care. However, as a chronically ill patient myself, I had some personal experience with the use of e-health. For some time now, I can view my own healthcare data online, and can contact one of my doctors via online channels. This fascinated me and motivated me to investigate e-health provision further, within diabetes care. Due to my lack of knowledge regarding diabetes, I felt the necessity to investigate diabetes and diabetes care and started to read articles about it. Many actual articles were published about diabetes care in combination with e-health provision. These articles had strong and guiding views on e-health for diabetes care, almost all of which were positive about e-health provision. Moreover, my contact person within the St Jansdal was positive towards e-health provision for diabetes care, and I started to believe that e-health could, indeed, be beneficial for both care providers and patients. However, after writing down my first

version of chapter one and receiving feedback, I realised that I approached e-health use positive and had to approach it more neutral. From that moment on, I tried to constantly focus on this neutrality aspect by asking open questions and rereading my own questions in the transcripts. By doing so, I found out that it was hard not to let the answers of other participants influence my questions. It may be that some questions are somewhat steering which, in turn, might have influenced the answers of other participants.

Due to my lack of knowledge on diabetes care, I could enter interviews open-minded. However, it also resulted in the fact that I had difficulty with understanding diabetes terms at the beginning. I noticed that this made it hard for me to understand what the e-health possibilities were that already existed, since I did not fully understand how the pumps and sensors worked. This lack of comprehension, at the start, might have resulted in some misinterpretations by me, as researcher.

This research has affected me and my opinion on healthcare provision. I share the belief that replacing physical consultations without tests for e-consultations can save time for both care providers and patients, as it diminishes travel and waiting time. However, on the other hand, I now realise that physical consultations are also a luxurious service, that may decrease or disappear in the future. Therefore, I do appreciate it now more than I did before.

5.3.6. Ethics
An ethical consideration of which I was unaware at the beginning of this research, was that the contact person for this research within the St Jansdal, the head of EPD team, was leaving the hospital. His resignation was either unclear, or not communicated to me. Either way, since he was the one who introduced me in the hospital and provided me with knowledge about the subject during the orientation phase of this research, it could be the case that his opinion differentiated from the opinions of the other involved human actors, who are still working in the St Jansdal. I dealt with this situation by increasing my contact with the managing director, the new contact person of this research, and asking him for additional information.

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Appendix

Appendix 1: Semi-structured focus group in Dutch

Introductie

Mijn naam is Luca de Rijck. Ik ben 23 jaar oud en momenteel bezig met mijn Master Organisational Design and Development aan de Radboud Universiteit. Deze Master is een combinatie van het *design* en de *developments* van een organisatie waarbij er naast de structurele en economische factoren van een organisatie ook wordt gekeken naar sociale praktijken en (technologische) veranderprocessen.

Dit onderzoek is gebaseerd op het *structurational model of technology* van Orlikowski (1992) en het idee van *future perspectives*. De *structurational model* beschrijft hoe mensen en technologie met elkaar interacteren. Een technologie is het eigendom van een organisatie, maar is ook iets dat sociaal geconstrueerd wordt: de manier waarop mensen een technologie gebruiken, kan ervoor zorgen dat de technologie verandert. Dit model wordt in dit onderzoek aangevuld met het idee van *future perspectives. Future perspectives* zijn de toekomstbeelden die mensen hebben, gebaseerd op hun verwachtingen, bedenkingen, visies etc. op de toekomst.

In dit onderzoek ga ik onderzoeken wat de *future perspectives* van verschillende betrokken actoren in het St Jansdal zijn omtrent e-health. Kennis over de (verschillende) toekomstperspectieven kan het anticiperen op deze potentiële toekomsten namelijk mogelijk maken.

Alle antwoorden worden geanonimiseerd.

Topic lists

Patients	
1.	Wat zijn potentiële voor- en nadelen van een e-health applicatie voor diabetespatiënten?
2.	Hoe ziet de zorg begeleiding voor diabetespatiënten er, bij gebruik van een e-health applicatie, uit?
3.	Wat zouden de gevolgen van een e-health applicatie kunnen zijn voor het dagelijks functioneren van een diabetespatiënt?
4.	Bij welk type diabetespatiënt zou een e-health applicatie wel/niet kunnen werken? Denk aan verschil in leeftijden, type diabetes etc.

5.	Bij kind patiënten, in welke mate worden ouders betrokken bij de e-health applicatie? Hoe wordt er omgegaan met vertrouwelijke vragen aan het kind? (Bijv. over de thuissituatie)
6.	Wordt de impact van een e-health applicatie voor de naasten van diabetespatiënten meegenomen? Wat als de partners/ ouders van de patiënten er niet op zitten te wachten dat hun man/vrouw/kind mantelzorgbehoeftig naar huis komt?
7.	'Empowert' een e-health applicatie patiënten? (Lees: worden zij zelf de expert/ zelf-managers van hun ziekte waarbij ze zelf de verantwoordelijkheid kunnen nemen?)
8.	Hoe kan er middels een e-health applicatie omgegaan worden met de psychologische aspecten van diabetes?
9.	Wat als patiënten aanvullende informatie willen verkrijgen of vragen hebben over hun ziekte? Bij wie kunnen ze dan terecht?
10.	Vanaf welk punt het proces (na diagnose) wordt er gebruik gemaakt van een e-health applicatie?

Care providers	
1.	Hoe gaat een e-health applicatie het werk van zorg professionals beïnvloeden?
2.	Hoe is de samenwerking tussen huisartsen/ artsen/ verpleegkundigen/ ICT'ers etc. rondom een e-health applicatie?
3.	Hoe kan e-health gecombineerd worden met face-to-face zorg en wie levert deze zorg dan?
4.	Wie gaat data beoordelen/ bewaken/ de terugkoppeling verzorgen? (Artsen, huisartsen, verpleegkundigen etc.?)
5.	Wat zullen de gevolgen van een e-health applicatie zijn op de huidige werkgelegenheid en werkverdeling?
6.	In de Volkskrant stond vermeld dat artsen al 40% van hun werkzaamheden achter het computerscherm spenderen. Hebben zij straks nog wel ruimte voor het echte patiëntencontact? En wat zijn de gevolgen hiervan voor het welzijn van de zorg professional?

7.	De verantwoordelijkheid vanuit het ziekenhuis wordt met een e-health applicatie tot in de huiskamer van patiënten verlengt. Wat zijn de gevolgen hiervan voor de zorgverleners/ het ziekenhuis?
8.	Wie heeft de verantwoordelijkheid als er iets misgaat/ er een ongeval plaatsvindt? (De arts of verpleegkundige, de ICT-er etc.?)
9.	Als mensen meer inzicht krijgen in hun zorggegevens kan het zijn dat ze meer gaan Googelen, zichzelf gaan verdiepen in de materie en in discussie gaan met de zorgverlener. Hoe wordt hier mee omgegaan?
10.	Hoeveel patiënten kunnen er tegelijk in de gaten worden gehouden en door wie zou dit gedaan moeten worden?
11.	Hebben zorgverleners zelf inspraak in de manier waarop zij zorg willen verlenen?

E-health application	
1.	Hoe zou de e-health applicatie voor diabetespatiënten er uit kunnen gaan zien?
2.	Hoe zit het met de autorisatie; tot hoe ver kunnen patiënten hun gegevens inzien?
3.	Wie heeft er allemaal inzage in het dossier?
4.	Hoe kan privacy gewaarborgd worden?
5.	Iedere persoon is anders (andere zorgbehoefte, gewoonten etc.), hoe gaat de applicatie daar mee om?
6.	Hoe wordt er omgegaan met storingen in het systeem?
7.	Is het kostenverlagend?
8.	Hoe leer je patiënten om te gaan met de techniek?
9.	Wat als patiënten weigeren e-health te accepteren?
10.	Wat zijn de risico's van e-health applicatie en hoe kan hier mee omgegaan worden?
11.	Hoeveel zelf monitoring is vereist om e-health succesvol te maken?
12.	Wordt er een verschil aangebracht in de applicatie op basis van leeftijd, type diabetes etc.?
13.	Hoe staan verzekeraars tegenover een e-health applicatie? Hoe zit het met vergoedingen (wordt het opgenomen in de zorgverzekering etc.)?

Intro

Ik ben Luca de Rijck, 23 jaar oud en ik zit momenteel in de laatste fase van mijn Master Organisational Design and Development aan de Radboud Universiteit in Nijmegen. Dit is een bedrijfskunde gerichte master die ingaat op zowel de structurele en economische factoren van een organisatie, als sociale praktijken en (technologische) veranderprocessen.

Dit onderzoek gaat in op de diabeteszorg binnen het St Jansdal en het gebruik van e-health voor diabeteszorg. E-health gaat over systemen en/of apparaten die gekoppeld kunnen worden aan de patiënt, en verschillende functies, waarden, bewegingen etc. kunnen meten buiten het ziekenhuis om. De verzamelde gegevens hieruit kunnen vervolgens (online) gedeeld worden met zorgverleners.

In dit onderzoek ben ik benieuwd naar de verschillende meningen, visies, perspectieven, verwachtingen etc. van zorgpersoneel en managers ten aanzien van e-health voor de diabeteszorg. Ik ben dus vooral geïnteresseerd in uw mening en hoor graag u praten. Alle input is dan ook welkom, dus zeg vooral wat u denkt. Alle antwoorden worden geanonimiseerd. Is het duidelijk voor u of moet ik iets nog een keer herhalen? Hartelijk bedankt voor uw medewerking!

Interview questions

Patients	
1.	Welk type diabetes heb je en wanneer is het ontdekt?
2.	Beïnvloedt diabetes je in je dagelijks functioneren? (Ben je er je vaak bewust van? In welke mate heeft het een invloed op de handelingen die je uitvoert?)
3.	Welke (glucose) metingen voer je nu uit en hoe doe je dit? (Hoe vaak meet je jezelf? Hoe geef je dat door? Wat vind je van deze manier van meten? Krijgt het zorgpersoneel al deze metingen te zien? Kijk je zelf wel eens naar de 'uitslagen' van je metingen? Waarom wel/niet?)
4.	Hoe zien je ziekenhuisafspraken er nu uit? (Hoe vaak vinden deze plaats? Bereid je deze afspraken voor? Zo ja, hoe? Wordt er al gebruik gemaakt van e-health in jouw behandelproces? Hoe ziet je behandelteam eruit en wanneer zie je wie? Wat vind je van

	deze verdeling? Zijn er dingen die je zou willen veranderen aan de insteek van die ziekenhuisafspraken?)
5.	Heeft het hebben van diabetes effect op je mentale gezondheid? (Hoe ga je daarmee om? Waar heb je behoefte aan? Hoe zie je de invloed van e-health hierop?)
6.	Hoe zou de diabeteszorg in jouw ogen verbeterd kunnen worden? (Mis je wel eens wat in je eigen behandelproces? Waarom wel/niet? Hoor je wel eens verhalen van andere diabetespatiënten hierover? Denk je dat (meer) e-health de zorg zou kunnen verbeteren? Waarom wel/niet? Hoe dan?)
7.	Wat zou je er van vinden als er meer gebruik wordt gemaakt van e-health in de diabeteszorg? (Welk beeld heb je daarbij? Welke verwachtingen heb je? Waar zijn deze op gebaseerd? Wat zou je er van vinden als zorgpersoneel al je gegeven zouden kunnen inzien? Waarom? Hoe denk je over de privacy gevoeligheid van een e-health applicatie? Welke invloed denk je dat het op jouw (zorg pad) zou hebben?)
8	Hoe wordt je diabetes door je naasten ervaren? (Maken zij zich zorgen over je ziekteproces? Hoe ga je daarmee om? Vertel je tegen anderen over je diabetes? Waarom wel/niet? Hoe zou een e-health applicatie dat kunnen beïnvloeden?)
9.	Zou je het prettig vinden meer inzicht te krijgen in je eigen gegevens omtrent je diabetes? (Waarom wel/niet? In hoeverre zou je inzicht willen? Wat is volgens jou een fijne balans hierin?)
10.	Hoe zou jij een e-health applicatie voor diabetespatiënten vormgeven? (Waarom zou je het zo vormgeven? Welke problemen voorzie je hierbij? Waarom zou het je helpen? Denk je dat het een realistisch toekomstbeeld is? Waarom wel/niet?)

Healthcare specialists	
1.	Hoe ziet de zorg die je een diabetespatiënt verleent er nu uit? (Hoe vaak zie je diabetespatiënten? Zijn dit zowel type 1 als type 2-diabetes patiënten? Welke

	handelingen voer je uit? Verschilt de zorg per diabetespatiënt? Zo ja, waar ligt dit dan aan?)
2.	Wat vind je van de huidige diabetes zorg? (Wat vind je goed? Wat kan beter? Wat vind je zelf erg belangrijk bij het verlenen van diabetes zorg?)
3.	Hoe is de samenwerking binnen het behandelteam van de diabetespatiënt? (Hoe vindt informatieoverdracht plaats? Wat is de patient journey? Hoe is deze verdeling tot stand gekomen? Wat vind je van deze verdeling?)
4.	Wat stel je, je voor bij een e-health applicatie? (Welke functies heeft die applicatie? Hoe zou jij een e-health applicatie vormgeven? (verschil type en type 2 diabetes daarin?) Hoe gebruikt een patiënt die; hoe zou een interactie verlopen tussen jou en en patient die de applicatie (zoals je die net beschreef) zou gebruiken? Hoe kom je bij dat e-health applicatie idee? Zijn er bijv. elders voorbeelden, demo's, verhalen etc. geweest over een e-health applicatie voor diabetes patiënten waar je weet van hebt? Wordt hierbij ook de huisarts betrokken die buiten het ziekenhuis staat?)
5.	Denk je dat zorgpersoneel door een e-health applicatie meer tijd achter een computer za doorbrengen? (Wat zou je daar van vinden? Wat is een goede balans?)
6.	Hoe zou een applicatie de afstemming tussen artsen en verpleegkundigen kunnen veranderen? (bijv. kunnen beiden de gegevens inzien? Wie verwerkt het in het dossier? Wie is er verantwoordelijk voor de analyse? En hoe gaat dat voor patiënten die teruggezet worden naar de 2^e lijn, naar de huisartsen?)
7.	Wat vind je er van dat patiënten mogelijk meer inzicht krijgen in hun gegevens? Welke gegevens zal een applicatie hun wel geven, die ze nu niet hebben? Hoe denk je dat patiënten dit zullen ervaren? En wat vind je daarvan? Zie je ook nadelen; voorzie je problemen?
8	Een veel gehoord voordeel van e-health applicaties is dat patiënten meer regie en verantwoordelijkheid hebben over hun gezondheid. Wat vind je van die stelling? (Waar blijkt dat uit? Kan je een voorbeeld noemen? Wie is er nu verantwoordelijk/heeft regie?)
9.	Wat zijn jouw verwachtingen ten aanzien van de toekomstige diabetes zorg? En zou je willen dat dit gepaard gaat met een e-health applicatie voor diabetes patiënten? (Wat vind je daarvan? Wat zou je daar zelf aan willen veranderen/toevoegen? Waarom wel/niet?)
10.	[huisarts] Hoe is de samenwerking met het ziekenhuis? (Wat gaat goed, wat kan beter? Denk je dat dit gaat veranderen? Wat/waarom?)

	Management
1.	Wat vind je van de diabetes zorg zoals die er nu uit ziet? (Wat gaat goed? Wat kan beter? Wat krijg je teruggekoppeld vanuit het zorgpersoneel?)
2.	Waar ligt momenteel de focus op? (Welke veranderingen worden er momenteel doorgevoerd en wie zijn hierbij betrokken? Hoe is de interactie met de verschillen betrokken partijen?)
3.	Hoe zie je toekomstige diabeteszorg voor je? (Wat is jullie visie op de diabetes zorg? Wat doen jullie eraan om dit te bereiken? Wat denk je dat allemaal mogelijk is? Welke invloed heeft het Corona virus)
4.	Wat doen jullie allemaal allemaal aan e-health? (Waarom wordt dit gedaan? Hoe vindt je dat het gaat? Waar lopen jullie tegenaan?)
5.	Hoe zou je e-health diabeteszorg idealiter willen insteken? (Waarom? Denk je dat iedereen hiermee akkoord zou gaan? Hoe zou je dit willen introduceren?)
6.	Als er een e-health applicatie komt, hoe kan de privacy dan gewaarborgd worden? (Wie heeft er allemaal inzage in het dossier? Wat als bepaalde patiënten hier niet mee akkoord gaan? Hoe is de samenwerking en uitwisseling van gegevens met de huisarts dan?)
7.	Wie heeft de verantwoordelijkheid als er iets misgaat/ er een ongeval plaatsvindt? (De arts, de diabetesverpleegkundige, de managers? Zijn hier al wetten aan verbonden? Hoe denken jullie hier mee om te kunnen gaan?)
8	Welke moeilijkheden voorzie je bij een e-health applicatie voor diabetespatiënten? (Iedere patiënt is anders, andere zorgbehoefte, gewoon etc., hoe zou de applicatie daar mee om kunnen gaan? Wat als er storingen in het systeem zouden plaatsvinden? Wat als patiënten de applicatie weigeren? Is het efficiënter/kostenverlagend?)
9.	Hoe staan verzekeraars tegenover een e-health zorg voor diabetespatiënten? (Hoe zit het met vergoedingen voor patiënten? Wordt het opgenomen in de zorgverzekering etc.?)
10.	Welke stappen zou jij graag willen zien in de toekomstige diabetes zorg? (En zie je hierbij een e-health applicatie voor je? Hoe zou dit bewerkstelligd kunnen worden? Denk je dat andere mensen dit ook zo zien? Denk je dat dit ook daadwerkelijk mogelijk is?)

11.	Als alle Corona perikelen gedaald zijn en jullie 'het veranderen van de diabetes zorg' weer gaan oppakken, wat verwacht je dan dat er veranderd gaat worden? (Zijn er nu meer dingen al mogelijk doordat bijv. videobellen al moest gebeuren?)

Appendix 3: Central discursive themes

1. Discursive features first attempt	2. Discursive features second attempt	3. Discursive features third attempt	4. Discursive central themes within discursive features, first attempt	5. Discursive central themes within discursive features, second attempt
Maatwerk	Maatwerk	Maatwerk	Maatwerk	Customised care
Diversiteit	Automatisering	Automatisering	Digitalisering	Digitalisation
Flexibiliteit	Lean	Lean	Interactieve zorg	Self-regulation
Netwerk verbondenheid	Zorgversimpeling/ zorgverlichting	Interactieve zorg	Behandel insteek	Future care provision
Substitutie	Interactieve zorg	Behandeldoel	Zelfregulatie	
Verantwoordelijkheid	Behandeldoel	Zelfregulatie	Zorglast	
Efficiëntie	Regulatie	Zorgverzekering	Zorgverzekering	
Gezamenlijk belang/ draagvlak/ collectief	Zelfmanagement	Zorgverlichting		
Inzicht	Zorgverzekeraars			
Consequentie	Stimulatie			
Consistentie				
Controle				
Zelfregulatie/ zelfmanagement				
Transparantie				
Protocollen/ inzicht				
Draagvlak				
Afhankelijkheden				
Interactieve zorg				
Vergoedingen				
Integratie				
Veiligheid				
Werkplezier				
Zelfregie				
Effectiever				

maatwerk Zorgkwaliteit Zorgverandering Zelfregie Zorggemak Inzicht Zorgkosten Nieuws Zorggemak / automatisering Betrokkenheid/ persoonlijke zrog/ contact momenten Vergoeding Informatievoorziening Ziektefonds Digitalisering Verantwoordelijkheid 'Fear of missing out?' Mogelijkheden Tijd Technischer Geautomatiseerder Populatie Wetshandhaving / subsidies				68