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Barriers to technology acceptance in healthcare: Investigating the role of technostress in the acceptance of eHealth among healthcare professionals

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Abstract

The current pressure on the healthcare sector has caused a multitude of problems which are largely related to the understaffing in the sector. Technological innovations in healthcare, called eHealth, are often used to alleviate pressure on healthcare professionals. However, oftentimes the introduction of new technologies can lead to negative stress responses related to the technology, coined technostress, inhibiting the acceptance and use of new technologies. This study investigates how technostress affects the intention of healthcare professionals to accept and use eHealth systems. To answer this question, the study conducted sixteen semi-structured interviews with nurses, physicians, and a clinical physicist from seven hospitals across the Netherlands. The results demonstrate that forms of technostress a healthcare professional experiences when working with current technology affects their view of future eHealth implementations. For instance, healthcare professionals' experience with unreliable technologies affects their view on how new eHealth implementations would assist them, anticipating similar problems and more time required to effectively use and learn the system. Additionally, healthcare professionals' stance on artificial intelligence and other technology replacing parts of their job influenced their expectations of these types of eHealth to impair performance in terms of patient outcome. The study suggests that healthcare professionals' behavioural intention is based on their evaluations of performance expectancy, effort expectancy, and any social influences they experience. When experiencing technostress, healthcare professionals' evaluations of performance expectancy and effort expectancy are affected.

Keywords: behavioural intention, eHealth, technostress, technology acceptance, Unified Theory of Acceptance and Use of Technology (UTAUT)

1. Introduction

1.1 Problem definition

The Dutch population aged 65 or above increased to 20 percent in 2022 from 12.8 percent in 1990 (CBS, 2022a), resulting in increased pressure on the healthcare sector due to their higher demand for medical care. Despite the excellent quality of healthcare in the Netherlands, health expenditures have increased to 14.5 percent of the gross domestic product in 2021 (CBS, 2022b). The additional shortage of healthcare professionals has resulted in increased working pressure, leading to lower job satisfaction, increased care costs, and higher staff turnover rates (Oulton, 2006). To address these concerns, healthcare providers are trying to reduce costs while improving their provided quality of care (Laurenza, Quintano, Schiavone, & Vrontis, 2018).

A popular solution to these issues is eHealth, which attempts to improve care effectiveness and efficiency through digital technologies (World Health Organization [WHO], 2005; Laurenza et al., 2018). Its application can include aspects such as video calls (Daschle & Dorsey, 2015; Moo, Gately, Jafri, & Shirk, 2020), integrated care networks (Fuller, 1997), and the use of big data in healthcare (Weber, Mandl, & Kohane, 2014). However, acceptance of these technologies is crucial for a successful introduction.

Various models based on theories from information sciences, sociology, and psychology aim to explain technology acceptance and use (Venkatesh, Morris, Davis, & Davis, 2003; Oliveira & Martins, 2011). Venkatesh et al. (2003) developed the Unified Theory of Acceptance and Use of Technology (UTAUT) by synthesizing prior technology acceptance research. UTAUT suggests that actual use is determined by a user's intention to use the technology and is determined by four constructs: performance expectancy, effort expectancy, social influence and facilitating conditions. Gender, age, experience, and voluntariness are incorporated as moderating variables.

Several studies revealed barriers to eHealth acceptance among healthcare professionals (Miller & Sim, 2004; Anderson & Robey, 2017), such as unfamiliarity with systems, difficulties using the technology due to complexity, and inadequate support. This resulted in frustration and less effective use of the system. Lapointe and Rivard's (2005) study found that physicians resist a technology when they interpret the consequences as threatening, voiced as 'fear' or 'distress'. Faber, van Geenhuizen, and de Reuver (2017) found that eHealth adoption in Dutch hospitals tends to stagnate at a stage of interest and commitment, rather than progressing towards acceptance and usage.

Introducing new technologies in organizations can significantly impact individuals' stress levels. Healthcare professionals have been found to consider adaptation to new technologies as time-consuming, leading to negative connotations with technological innovations (Miller & Sim, 2004; Johnston, Leung, Wong, Ho, & Fielding, 2002). Brod (1984) named the term technostress, describing it as the inability to healthily cope with new computer technologies. More recently the concept has been referred to as the negative psychological and physiological responses that arise from the use of technology in the workplace (Tarafdar M. , Tu, Ragu-Nathan, & Ragu-Nathan, 2007; Tarafdar, Cooper, & Stich, 2019). Moreover, technostress has been identified as an antecedent for a user's behavioural intention to use a new technology (Chatzoglou, Sarigiannidis, & Diamantidis, 2009; Joo, Lim, & Kim, 2016). Therefore, knowledge of new technologies being implemented could elicit stress responses based on a healthcare professional's current perception of technology.

1.2 Objective and research question

This study aims to understand how technostress influences healthcare professional's acceptance of eHealth, using core concepts from the UTAUT model which have been widely employed in prior academic research (Williams, Rana, & Dwivedi, 2015). The concept of technostress is operationalized through the challenge-hindrance framework as outlined by Tarafdar et al. (2019). The aim of this study is to answer the following research question: *How does technostress affect healthcare professionals' behavioural intention to accept and use eHealth systems?*

1.3 Research approach

Qualitative research methods were used to answer the research question. The data for this study was collected at seven Dutch hospitals that are using and introducing various forms of eHealth in their practices, with all respondents having used forms of eHealth prior to this study. The research can thus be categorized as a multiple case study and uses analytical generalization through replication logic to ensure rigour (Rowley, 2002), utilizing the empirical research cycle to expand the body of scientific knowledge on the phenomena of technostress and technology acceptance in a healthcare context. Semi-structured interviews were conducted using a deductive approach, meaning concepts were operationalized before performing empirical inquiry (Bleijenbergh, 2015).

1.4 Relevance

This study provides an alternative perspective on technology acceptance by performing a qualitative analysis using the concepts of the UTAUT model, which has generally been applied quantitatively (Williams et al., 2015). This opens the possibility to assess the influence of technostress, a complex social phenomenon that favours in-depth linguistic analysis. The research expands the understanding of technology acceptance through examining how its constructs are impacted by technostress among healthcare professionals, in the context of various eHealth implementation initiatives in Dutch hospitals.

Healthcare professionals are considered crucial gatekeepers for eHealth and play a direct role in its implementation and diffusion (Whitten & Mackert, 2005). This study aims to offer practical insights on ways to adjust aspects of eHealth or related practices to reduce technostress and increase eHealth acceptance, ultimately assisting in alleviating the current pressure on the healthcare sector (Oulton, 2006).

1.5 Outline

The rest of this study is structured as follows. Chapter two discusses the theoretical background, including the conceptual model for this study. The third chapter discusses the methodology used, while chapter four describes the results of the collected empirical data. Lastly, chapter five formulates a conclusion for this study, discusses theoretical and practical implications along with the study's limitations, and offers suggestions for future research.

2. Theoretical background

2.1 Defining eHealth

eHealth is an emerging field involving digital innovations within healthcare by providing services, resources, and information to improve quality of care (WHO, 2005). Most commonly, eHealth is defined as:

> An emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve healthcare locally, regionally, and worldwide by using information and communication technology. (Eysenbach, 2001, p. 20)

Various types of eHealth have previously been specified. *Telemedicine* is perhaps the oldest form of eHealth, which involves providing medical care remotely (Bashshur, 1995). Video consultation to monitor patients is a recent example of this (Daschle & Dorsey, 2015; Moo et al., 2020). *mHealth* is concerned with using mobile applications to achieve the same outcome (Nacinovich, 2011), while *pHealth* includes wearables or implantable technologies to assist in healthcare decision-making (Cowie et al., 2016). *Clinical information systems* cover electronic health records (EHR), systems to monitor clinical and institutional practices, and decision support systems (Cowie et al., 2016). *Integrated regional and national information networks* allow healthcare entities to share information to support healthcare over a larger geographic area by sharing treatment information or patient data (Fuller, 1997). *Big data* in healthcare relates to large-scale integration of data sources to offer comparative information for caregivers and patients (Weber et al., 2014). Lastly, Cowie et al. (2016) state that *disease registries and other non-clinical systems* are used for patient behaviour monitoring and educational purposes.

2.2 Technostress

The concept of technostress is defined as “a modern disease of adaptation caused by an inability to cope with new computer technologies in a healthy manner” (Brod, 1984, p. 16). In information systems research, the concept investigates how and why using technologies creates demands that users perceive as threats (Tarafdar, Cooper, & Stich, 2019). Tarafdar et al. (2019) proposed a new perspective on technostress by embedding it into the challenge-hindrance

framework. Threat techno-stressors are negative outcomes resulting from the perception of the technology environment as threatening. Five types of techno-stressors are identified: techno-complexity, techno-insecurity, techno-uncertainty, techno-overload, and techno-invasion (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008), which induce destructive outcomes to the individual and the workplace (Tarafdar et al., 2007; Tarafdar et al., 2019). In contrast, challenge techno-stressors are stress responses that can encourage in positive ways. While this has been conceptualized by Tarafdar et al. (2019), there is little empirical evidence to determine ways to identify challenge techno-stressors.

2.2.1 Threat techno-stressors

Techno-complexity occurs when the complexity of technology makes individuals feel inadequate in their skills to use it, leading to constant learning and abandoning other job duties (Tarafdar et al., 2007). Healthcare technologies are often perceived as highly complex, hindering mental model development (WHO, 2010) and subsequent adoption. Conversely, *techno-overload* relates to users having to work longer or harder due to new technologies, leading to frustration and negative emotions towards the technology (Tarafdar et al., 2007). In healthcare, this could mean spending more time performing administrative tasks to document patient information in additional systems (Gurses, Carayon, & Wall, 2009), causing physicians to work longer or faster which can result in distress towards the technology. *Techno-insecurity* indicates stress caused by the fear of losing one's job to individuals more experienced with IT (Tarafdar et al., 2007). Healthcare professionals experiencing techno-insecurity tend to have negative views towards its use (Kuo, Liu, & Ma, 2013). *Techno-uncertainty* involves stress caused by rapidly changing technologies (Ragu-Nathan et al., 2008) and inadequate communication of important decisions regarding technological changes (Day et al., 2012; Barber & Santuzzi, 2015). This can unsettle users as they must constantly learn to use new technologies, leading to high levels of stress when changes occur simultaneously at multiple levels (i.e., hardware, software, and networks) (Arnetz & Wiholm, 1997). Finally, t*echno-invasion* refers to the expectation of constant availability through technology, invading privacy through monitoring (Tarafdar et al., 2007; Barber & Santuzzi, 2015; Sprigg & Jackson, 2006; Day et al., 2012). Healthcare professionals typically only use eHealth during their shifts (Poissonnet & Véron, 2000), making this techno-stressor unlikely to affect them. Therefore, this threat techno-stressor is not considered for this study.

2.2.2 Challenge techno-stressors

Literature on technostress has defined organizational mechanisms that inhibit technostress (Tarafdar, Tu, Ragu-Nathan, & Ragu-Nathan, 2011). Technical support facilitation, literacy facilitation, and technology involvement facilitation are mechanisms that can encourage user motivation and engagement, resulting in the user perceiving technology as a challenge, rather than a source of stress (Tarafdar et al., 2019). Following this reasoning, these concepts can be considered challenge techno-stressors.

Technical support facilitation relates to professionals assisting users in the use of new technology, which can reduce technostress by solving specific technology-related problems the user has. Ragu-Nathan et al. (2008) found that technical support brings on positive emotions towards technology, as it helps users to complete the tasks they are struggling with faster. *Literacy facilitation* is the concept of sharing knowledge to educate users of the technology. For instance, training and documention aiding in a better understanding of the technology can reduce technostress. *Technology involvement facilitation* describes involving users in the adoption and development process. This may encourage usage through familiarity and a better understanding of the technology (Tarafdar et al., 2011). Early user involvement in a healthcare context was found to create a positive attitude towards the system and a better understanding of how the new system can be helpful (Weckman & Janzen, 2009).

2.3 Technology acceptance models

Constructs from several models and theories can measure technology acceptance, originating from information systems, sociology, and psychology research (Oliveira & Martins, 2011; Alkhwaldi & Kamala, 2017). To determine the core concepts of technology acceptance for this study, this section assesses three theories that have iterated on each other's concepts: the theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980), Technology Acceptance Model (TAM) (Davis, 1986; Davis, 1989), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003).

2.3.1 Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980) is a general model of human behaviour that claims that a person's actual behaviour is determined by their behavioural intention, which "refers to a person's subjective probability that he will perform some behaviour" (Fishbein & Ajzen, 1975, p. 288). This intention is influenced by two determinants, the first being a person's own *attitude* towards a behaviour. Second, a

person's *subjective norms* involve whether other people they deem important think they should perform the behaviour (Fishbein & Ajzen, 1975).

TRA has been criticized for being too general, as it was not designed to be used solely for technology or a specific behaviour (Davis, Bagozzi, & Warshaw, 1989). It also assumes that external variables only affect behavioural intention through attitude or subjective norms, which contradicts findings from later theories such as TPB (Ajzen, 1991) or UTAUT (Venkatesh et al., 2003). However, this theory provided the basis for behavioural intention, the core component in understanding technology acceptance.

2.3.2 Technology Acceptance Model (TAM)

The TAM (Davis, 1986; Davis, 1989) was developed as an adaptation of TRA for information technology adoption research. TAM focuses on two beliefs: *perceived usefulness* and *perceived ease of use*, which influence a person's attitude toward using a system or technology, determining *behavioural intention*. *Perceived usefulness* is the degree to which a person believes that using a system will enhance their job performance, while *perceived ease of use* refers to the degree of effort required to use the system (Davis, 1989).

These two core concepts are widely regarded as important determinants of behavioural intention, with TAM being the most utilized and influential theory to measure technology acceptance (Lee, Kozar, & Larsen, 2003). Nevertheless, the model has been altered when used by other researchers, resulting in inconsistencies in the major relationships across studies (Sun & Zhang, 2006). The model's simplicity allows for it to be expanded easily, but this makes the original model less suitable for this study, as it aims to identify how a related concept (technostress) affects a professional's behavioural intention. Venkatesh and Davis (2000) expanded the model into TAM2 by incorporating social influence processes. Taylor and Todd (1995) attempted a similar extension by combining TAM and TPB (C-TAM-TPB), adding social influences and behavioural control. The successful readdition of social influences, similar to *subjective norms* from TRA, shows its importance as a determinant of behavioural intention.

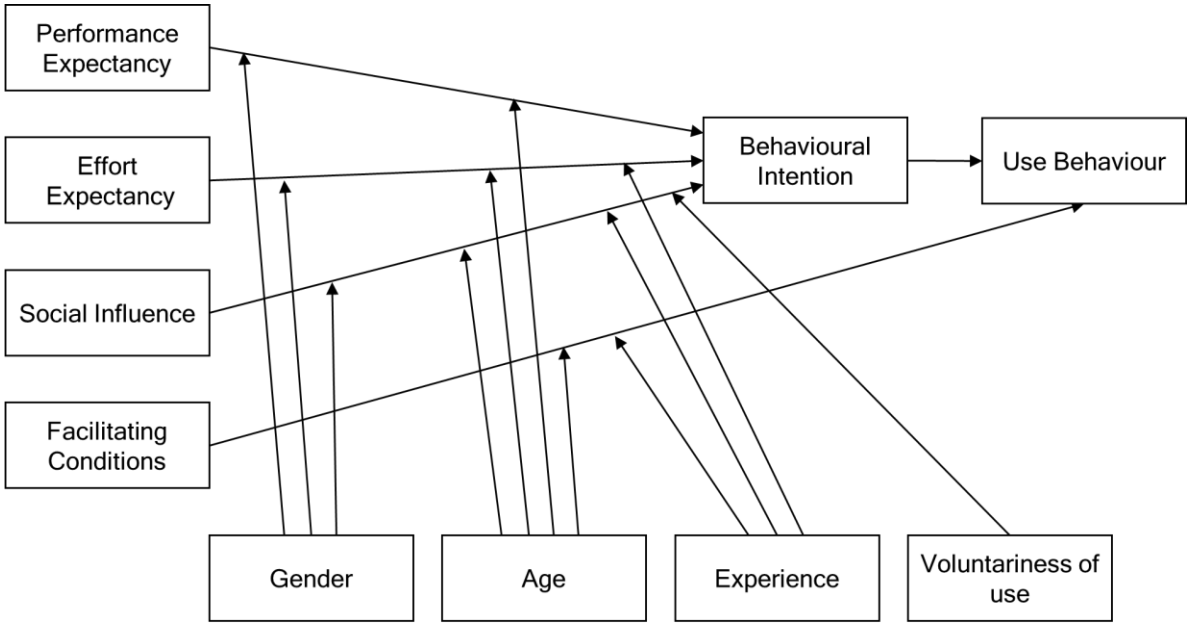
2.3.3 Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) model (Venkatesh et al., 2003) is an integrative theory and incorporates core concepts discussed in previous sections, synthesizing TRA (Fishbein & Ajzen, 1975) , TAM (Davis et al., 1989), TPB (Ajzen, 1991), C-TAM-TPB (Taylor & Todd, 1995) as well as the motivational model (MM) (Davis, Bagozzi, & Warshaw, 1992), Model of PC Utilization (MPCU) (Thompson, Higgins, & Howell, 1991),

Innovation Diffusion Theory (IDT) (Rogers, 2003), and Social Cognitive Theory (SCT) (Bandura, 1986). UTAUT was later expanded into UTAUT2 by Venkatesh, Thong, and Xu (2012). This adaptation focused on technology acceptance in a consumer context, opposing the employee organization context of UTAUT. Since this study's aim is to understand eHealth acceptance in an organizational context, the original model was chosen for this study.

Figure 1

Unified Theory of Acceptance and Use of Technology (UTAUT) model



Note. Adapted from Venkatesh et al. (2003).

UTAUT consists of four main determinants: performance expectancy, effort expectancy, social influence, and facilitating conditions (Figure 1). Additionally, the model suggests four variables that moderate these relationships: gender, age, experience, and voluntariness of use. Compared to previous technology acceptance models, UTAUT can explain a significantly larger proportion of variance at around 70 percent (Venkatesh et al., 2003; Williams et al., 2015), further validating the applicability of the concepts used in this model. The model has also been tested and applied in the context of eHealth applications (Chismar & Wiley-Patton, 2003). However, UTAUT has also received criticism for its inclusion of too many independent variables (Bagozzi, 2007). Ultimately, as this study qualitatively incorporates concepts that determine behavioural intention, limiting the number of variables, this criticism is not an issue. The core determinants of behavioural intention according to UTAUT will be assessed next.

Performance expectancy is referred to as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003, p. 447). The construct is based on previous operationalizations of the same phenomenon: performance expectancy and perceived usefulness (TAM, TAM2, C-TAM-TPB), job-fit (MPCU), relative advantage (IDT), outcome expectations (SCT), and extrinsic motivation (MM). It is hypothesized that higher performance expectancy results in higher behavioural intention. The impact of performance expectancy on behavioural intention may be different in a healthcare context, however. Most technology acceptance models assume that increased job performance results in larger rewards for the user, as is generally the case in the traditional business sector. In contrast, rewards and promotion are rarely tied to job performance in the healthcare sector, as the goal is usually patient outcome (Schaper & Pervan, 2007).

Effort expectancy is explained as "the degree of ease associated with the use of the system" (Venkatesh et al., 2003, p. 450). The construct is derived from perceived ease of use (TAM, TAM2), ease of use (IDT), and complexity (MPCU). Effort expectancy is also considered to positively affect behavioural intention, as people tend to have a higher intention to use the technology when it is easy to use. Previous studies have demonstrated that the influence of effort expectancy on behavioural intention decreases over time, when experience with the technology grows (Venkatesh et al., 2003; Thompson et al., 1991). In a healthcare context, studies suggest that effort expectancy has no significant influence on behavioural intention for healthcare professionals (Chau & Hu, 2002; Chismar & Wiley-Patton, 2003). This was attributed to the fact that physicians tend to possess a higher intellect, making them less likely to base their behavioural intention on the ease of use of a system. Still, given the rising pressure on healthcare capacity (Oulton, 2006) and the resulting increased time demands on healthcare professionals, it could be argued that easily comprehendible technologies would have a positive influence on behavioural intention.

Social influence is defined as "the degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh et al., 2003, p. 451). Social influence is based on the previous operationalizations of the constructs: subjective norms (TRA, TAM2, TPB, C-TAM-TPB), image (IDT), and social factors (MPCU). The construct explains that a user's decision to use a new technology is influenced by how others perceive them for (not) having used the technology. Social influence normally positively influences behavioural intention: a higher social influence results in more behavioural intention (Venkatesh et al., 2003). Contrary to the previous two constructs, this component of behavioural intention does not capture aspects related to the technology itself but covers an external

component influencing behavioural intention. In the context of eHealth implementation, the effects of social influence on behavioural intention of physicians to use the technology were found to be insignificant in a study by Chau and Hu (2002). Physicians tend to develop independent evaluations and could place less weight on the opinion of others. However, given the fact that physicians and nurses in hospitals are often part of multidisciplinary teams, the presence of the effect among other professions could result in social influences having a larger effect in this specific context. Moreover, influences from patients themselves are likely considered more, given their central role in healthcare (Schaper & Pervan, 2007).

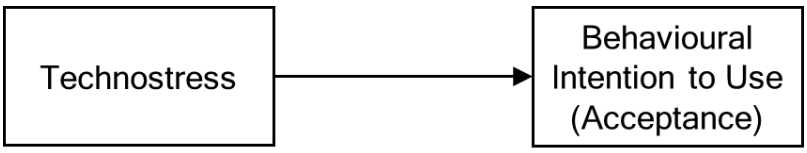
Facilitating conditions is specified as "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003, p. 453). The concept of facilitating conditions is hypothesized by Venkatesh et al. (2003) to not influence behavioural intention. Their reasoning for this is the fact that performance expectancy and effort expectancy already capture aspects of facilitating conditions. Instead, they found that facilitating conditions directly explains technology use. As this study investigates behavioural intention itself, this construct is not further incorporated into the study.

2.4 Linking techno-stressors to technology acceptance

This section explains how technostress affects technology acceptance constructs and behavioural intention to use eHealth systems, through a conceptual model (Figure 2). Based on the literature discussed so far, it is proposed that the forms of technostress a user experiences affects the determinants of a user's behavioural intention to use a new technology.

Figure 2

Conceptual model



First, threat techno-stressors can lower the *performance expectancy* of the user. This can result in a lower behavioural intention to use an eHealth system. *Techno-complexity* can impair job performance when users must spend extended amounts of time to learn a new technology (Tarafdar et al., 2007). Additionally, this construct can be affected by *techno-uncertainty*, as frequent changes or other uncertain developments in the technology can further increase the perception of complexity for users (Ragu-Nathan et al., 2008). *Techno-insecurity* can also

affect performance expectancy. Insecurity about how technology will affect the future of a user's job can influence their perception of job performance related to new technologies. Second, it is argued that techno-stressors can negatively impact a user's *effort expectancy*, as shown in Venkatesh et al.'s (2003) study on UTAUT. This study included computer anxiety, a construct like technostress, that can lead to avoidance or resistance to ICT (Heinssen, Glass, & Knight, 1987). Venkatesh et al. (2003) found that computer anxiety has a direct effect on effort expectancy instead of behavioural intention. *Techno-complexity* and *techno-uncertainty* are likely to affect this construct as they increase the perception of difficulty towards new technologies, similar to the effects of computer anxiety. Third, the final component of behavioural intention, *social influence*, is proposed to remain unaffected by techno-stressors. This component is not directly related to technology itself. As such, stress related to technology is unlikely to affect this external component.

Additionally, it can be argued that the presence of challenge techno-stressors inhibits the effects of threat techno-stressors. *Literacy facilitation* helps in understanding technologies, reducing techno-complexity. *Technology involvement* facilitation reduces techno-uncertainty through increased familiarity with new technologies, while *technical support facilitation* can reduce techno-complexity and techno-uncertainty by assisting in solving problems for users.

3. Methodology

3.1 Research design

To answer the research question (section 1.2), qualitative research methods were employed. These methods involve the collection and interpretation of linguistic material to research social phenomena (Bleijenbergh, 2015) which are best suited for understanding a phenomenon in its social and cultural context surrounding decisions or actions, and for gaining in-depth knowledge of decision-making processes within organizations (Myers, 2020). This study's objective was to examine *how* healthcare professionals experience technostress and how this impacts their intention to accept eHealth, requiring a detailed investigation of social phenomena.

A deductive approach was followed, whereby concepts were operationalized based on existing theory prior to data collection (Bleijenbergh, 2015). Considering this approach, empirical inquiry was aimed at comparing preexisting knowledge to an empirical situation. As such, this study adopts a post-positivistic research paradigm which guides the researcher in the ontological and epistemological foundations that are assumed, through which methodological choices are made. Ontology deals with the properties of reality and what can be known about reality, while epistemology involves viewpoints on how knowledge can be acquired from reality. Post-positivism assumes there to be a reality that is never perfectly comprehendible by human beings. Knowledge inquiry is deemed to be objective, with findings considered true until falsified (Guba & Lincoln, 1994). In line with this study's aim, post-positivism utilizes qualitative techniques, helping the study in "soliciting emic viewpoints to assist in determining the meanings and purposes that people ascribe to their actions" (Guba & Lincoln, 1994, p. 110).

A multiple case study design was employed to assess the use of eHealth across various Dutch hospitals. Case study research involves "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 2009, p. 18). Multiple case design was chosen to realize robust research outcomes through replication logic: the strength of the findings increases with the number of instances that support or contradict theory (Rowley, 2002). The study was able to achieve greater rigour by showing more cases demonstrating the same phenomenon when testing the concepts described in the theoretical background.

3.2 Operationalization

Operationalization encompasses the translation of the largely abstract concepts outlined in theory into empirically measurable concepts. The two concepts of *technostress* and *behavioural intention to use* a technology were unravelled into multiple dimensions, which were subsequently split into indicators to extract the concepts from the data (Bleijenbergh, 2015). Indicators were based on the theoretical background. The entire operationalization is visualized in two tree-diagrams in Appendix A. The interview questions for this study were initially based on the technostress questionnaire by Ragu-Nathan et al. (2008) and the UTAUT questionnaire by Venkatesh et al. (2003) and were further adapted to fit the indicators and this study's context. To assist in the coding process, a codebook (Appendix B) was created to include a comprehensive definition of the dimensions and indicators, further detailing the operationalization of the two concepts.

3.3 Data collection

Non-probability sampling was used for participant selection, meaning that respondents were not selected at random (Vennix, 2019). Purposeful sampling was used (Myers, 2020), with most participants gained through contacts at a central programme office that allowed access to multiple hospitals in the Netherlands. Some participants were contacted through the researcher's network. Additionally, snowball sampling was employed, asking respondents for referral to other colleagues (Myers, 2020). Sampling bias was addressed through selecting respondents based on distribution of gender, function, and organization to achieve better representation. Participants all worked in organizations that were classified as hospitals and were already familiar with eHealth in some capacity.

Empirical data for this study was collected through sixteen interviews across various medical professions. This involved physicians (n=7), nurses (n=8), and a clinical physicist (n=1), working in numerous specialisms across seven Dutch hospitals (Table 1). Some respondents only used eHealth during their operational tasks, while most were involved in digitalization initiatives to varying degrees alongside their normal profession. All interviews were conducted through video calls using Microsoft Teams, as this made scheduling and accessibility to respondents feasible, considering respondents' location and availability. Interviews followed a semi-structured format (Appendix C), ensuring some form of structure while leaving room for new questions that may come up during the interview (Myers, 2020).

Table 1

Case characteristics

Organization	*Number of employees*	*Region*	*Respondent(s)*
Hospital 1	> 2.500	East Netherlands	R1 (Nurse) R6 (Physician)
Hospital 2	> 3.500	East Netherlands	R2 (Physician) R7 (Nurse) R9 (Nurse) R10 (Physician)
Hospital 3	> 2.500	North Netherlands	R3 (Nurse)
Hospital 4	> 5.000	West Netherlands	R4 (Nurse) R11 (Physician) R12 (Nurse) R13 (Nurse) R14 (Physician)
Hospital 5	> 3.000	West Netherlands	R5 (Clinical physicist) R15 (Nurse)
Hospital 6	> 6.000	West Netherlands	R8 (Physician)
Hospital 7	> 1.000	East Netherlands	R16 (Physician)

3.4 Data analysis

Data was analysed using deductive thematic analysis. Myers (2020) describes this as "a qualitative research technique concerned with identifying, examining and recording themes within data" (p. 210). These themes can be understood as patterns that explain certain phenomena. Deductively, themes have been determined a priori, resulting in theory-driven themes that focus on specific aspects of the data that has been collected (Myers, 2020). Considering the descriptive nature of this study, thematic analysis was deemed to be a suitable method to answer the research question.

Recorded interviews were transcribed and interpreted through a coding process, which encompassed the researcher interpreting the transcribed interviews and assigning meaning to passages in the transcriptions. This process was aided by computer-assisted coding (Bleijenbergh, 2015) using ATLAS.ti (Version 23.1.1.0; ATLAS.ti Scientific Software Development GmbH, 2023). Following deductive methods, the operationalized concepts were used as a coding scheme to interpret the data. Indicators were linked to quotes from the transcript, which together form the dimensions of the two concepts. In total, 20 indicator codes were used. Indicators that could have a negative or positive orientation were included as separate codes in ATLAS.ti for each polarity to assist data analysis. This enabled querying coded material

segmented into negative or positive effects on behavioural intention in relation to techno-stressors. Additionally, transcripts were assigned various document groups to segment analysis results into categories of gender, degree of involvement in development, and role. This facilitated detailed comparison of any positive or negative effects among specific types of respondent groups to determine notable differences. Lastly, several methodological and analytical memos were created to note the thought processes of the researcher and aid in the analysis of the results.

3.5 Research ethics

Several ethical concerns were considered for this study. Firstly, informed consent rules were followed. According to Smith (2003), this encompasses informing a participant about the research subject, their voluntary participation that can be withdrawn at any time, and the implications their participation has. This was ensured by having participants read and sign or confirm an informed consent form (Appendix D), as well as informing participants of the subjects mentioned prior to their engagement with this study. To address confidentiality and privacy (Smith, 2003), respondents' data was anonymized for presentation and was not shared without explicit consent. Additionally, findings from this study were communicated with the respondents of this study. The researcher acted responsibly towards scholarship by neither falsifying nor plagiarizing information. This also includes the avoidance of deception and maintaining accuracy throughout the research process, as well as striving for credibility by disclosing the limitations of the current research and addressing methodological quality criteria (Yin & Campbell, 2018). In line with these actions, the researcher has signed the 'Research Integrity Form' adhering to the Radboud University guidelines and signed a nondisclosure agreement with the central programme office through which most of the empirical enquiry was performed.

3.6 Quality criteria

To ensure the quality and credibility of the research design, four tests are commonly used in case study research: construct validity, internal validity, external validity, and reliability (Yin & Campbell, 2018). Construct validity tests whether a theoretical relationship between concepts is also present empirically (Vennix, 2019; Rowley, 2002). To ensure construct validity, triangulation of subjects (Rubin & Rubin, 2005) was applied by collecting information from a variety of respondents with different functions across multiple cases. Furthermore, the draft of this study was reviewed by key informants such as the thesis supervisor and informants from the central programme office.

Internal validity deals with “establishing a causal relationship whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships” (Rowley, 2002, p. 20). To address this criterion, semi-structured interviews were conducted under the same conditions. Thematic analysis was used to analyse the data, accompanied by a codebook, further addressing confirmability.

External validity is concerned with whether the findings of the study are generalizable across other studies (Yin & Campbell, 2018). For case studies this implies analytical generalization (Yin, 2009). Previous theory was used as a template to test empirical findings, with patterns represented in multiple cases (replication logic) deemed generalizable phenomena.

Reliability is tested by addressing the fact that the results of the study are reproducible when another researcher follows the exact same procedures. This was addressed through extensive documentation (Yin & Campbell, 2018; Rowley, 2002) by recording and transcribing the interviews and creating several analytical and methodological memos during the analysis process. Furthermore, the use of computer-assisted coding provided a systematic, standardized approach to the coding process which increased the reproducibility of the study (Bleijenbergh, 2015).

4. Results

4.1 Technostress

Various forms of threat techno-stressors impacted healthcare professionals. They also indicated the effect of threat techno-stressors was reduced by challenge techno-stressors. The following section describes this in more detail, while referencing illustrative quotes from Table 2.

4.1.1 Techno-complexity

All nurses and one physician were found to experience techno-complexity, particularly in relation to electronic health records (EHR). Nurses struggled with understanding these systems due to their multi-layered interfaces and multiple windows (quote 1). The overwhelming number of systems and data available also contributed to this feeling (quote 2). Some physicians (3) and nurses (4) expressed frustration with applications containing overlapping functionalities or felt overwhelmed by the data presented to them. Separate communication systems for external parties or different interfaces for various applications within the organization were mentioned frequently (quote 3). For some, this created a feeling of pressure to learn systems within their already limited available time (quote 4).

> "You see, all those manufacturers all have their own dashboard, a platform that you could then log into then you can easily see certain data and so on. But as a nurse well I also just want, you have the EHR which is say your, your main program, where you work in a day, and you want to have as little as possible around that, actually while all those vendors offer apps and want you to put up a screen in the team station that you can track things and so yeah, a lot of nurses really don't like that." – Nurse (R4)

4.1.2 Techno-insecurity

Neither nurses nor physicians expressed significant insecurity about their own technology proficiency. Instead, two respondents from each group mentioned other colleagues who were less technologically proficient (quote 5). In contrast, both groups showed a prominent fear of job change, primarily driven by concerns about technology replacing parts of their job. Various respondents believed that emerging technologies, particularly artificial intelligence, had the potential to replace certain tasks (quote 6). This fear stemmed from the belief that their profession would transform into something they did not choose. Physicians (6) anticipated a shift towards a more coordinating role and expressed concerns about reduced patient interaction.

Table 2

Illustrative technostress quotes

Techno-complexity		*Techno-insecurity*	
Difficulty understanding eHealth Gr=23 Ph=1, Nu=8, Cp=1	1. "Now now I wouldn't say I'm optimal HIX [EHR system] user, so to speak. I think it could be faster, because you have lots of tabs and then you have to click through to something else and then you have to click through on that and then you get to something you need. So in that respect it could perhaps be a little clearer. But yes, a patient record is complicated." – Nurse (R7)	*Insecure about technology proficiency* Gr=7 Ph=2, Nu=2, Cp=0	5. "... I think with respect to working digitally. Well, I, I am not ahead, certainly not behind, because there are people, I can see around me, who have much more difficulty with it. But I do notice that I didn't grow up there anymore, that the generation your age and younger, they're just more handy with it. That's actually-so yeah, I think I use what is required, but I think it could actually be better, looking at my EPIC patient usage." – Nurse (R13)
Feeling overwhelmed by amount of technologies Gr=21 Ph=3, Nu=4, Cp=1	2. "… diabetic patients sometimes have a Freestyle Libre on their arm with which they can scan. That you get such a load of information that sometimes it's difficult to sort out what you have to assess. … Nowadays you have fourteen days of data, every five minutes a blood sugar, trends, I don't know what for, and then in the same time as I used to get those four blood sugars, I have to make an opinion out of that. But I have a lot more information. Then you can say: yes, but then it's easier, right, to give advice when you have a lot of information? Yes, but sometimes it's a bit much, and I think that's a disadvantage of eHealth." – Nurse (R15) 3. "When you talk about data platforms well, you want, yes, you have for diabetes patients. I think you have as many as eight different data platforms depending on what system the patient is using. Well, that's obviously not doable." – Physician (R2)	*Fear of job change* Gr=41 Ph=6, Nu=5, Cp=1	6. "I I, yes, no, I don't actually think they should start using that [AI] as well, not in the hospital at least, because I do think that there really should be a human aspect to care and that I mean: it's good for you that sometimes the devices can take over things for you. But it's important that patients also get human care. Say you just come in, purely to wash and you go and you don't see anyone the rest of the day because the computers take it all over." – Nurse (R7) 7. "Yes, I think for my job, maybe- well specifically for me. What I do worry about is that with all the remote care being created now is: everything that can't be done remotely comes to me. That means that I will only get the very complicated things for which my knowledge is specifically needed, so I'm a bit worried about doing a nice little polyclinic, I'm not saying that that will happen, but doing a nice little polyclinic, in which every now and then there is someone who thinks: well, what, what are you doing here? That falls away, so you only get things you have to decide on directly, because everything you don't have to do is already in somebody else's hands." – Physician (R14)
Feeling the need to learn constantly Gr=13 Ph=4, Nu=3, Cp=1	4. "Well, you just, you have to keep up with these changes. But if in your work process, if- you build, in a lot of things you build routines, the moment those routines are disrupted by changes then it takes you energy to adjust that. So if you have lots of different work processes with lots of changes, that can cost you too much energy." - Physician (R11)	*Fear of job loss* Gr=7 Ph=2, Nu=0, Cp=1	8. "… but for those pulmonologists in question, they're all in a partnership who are seeing their revenue sources dry up and they're losing grip and maybe their jobs. So those are all real uncertainties that come along with eHealth." – Physician (R6)

Table 2 (Continued)

Techno-overload		*Techno-uncertainty*	
Frustration caused by more tasks Gr=54 Ph=7, Nu=8, Cp=1	9. "So yes, so in that respect I'm just as scared as any other healthcare professional of new things, and that's also true for patients who sometimes have e-consultations via the EHR, yes, that has many advantages. Only what I find very irritating, if you are just finished with the polyclinic on Friday evening, yes, that you then have to answer fifteen e-consults. That, and that's that's not a viable option for the healthcare professional." – Physician (R2)	*Fear/frustration from unreliable technology* Gr=34 Ph=5, Nu=6, Cp=1	13. "Yes, that's kind of now, as I said. Occasionally I-informations disappeared from the system and I didn't know where that where, that- where the hell did this system, left them. I had seen a patient and I didn't have an operation that I could link the information to, so I had just tried to write it in the status like that and then it was there. And then, two weeks later, it couldn't be found. Something like that." – Physician (R16)
	10. "… we're not actually solving anything yet with our new technique, we're just creating another box or we're just creating something else. Yes, then you tire each other out and then you get in each other's way and you disrupt working relationships and you also disrupt understanding of each other." – Nurse (R3)		14. "Yes, I know for example, if the electronic health record is out, then you just panic. Then it's just, then you really don't have anything literally, that's how it is. If it. So if it so the technology doesn't do it, then you do just have a problem. You do always have emergency procedure, but then just everybody's all up in arms, so to say. If it doesn't work, then it's just tricky, let me put it that way…" – Nurse (R9)
	11. Yes, well, that not always, because indeed, I do, you have to record a lot for everything you do, you do have to record something again or click something or things like that. I do find that a lot of work sometimes. So that makes my work a little bit, which I do know, a little bit more to do. … I also like the electronic patient record, but sometimes it is just a lot of recording, a lot of clicking, and things like that, so yes, but it is part of it, I know. Sometimes a lot, yeah." – Nurse (R9)	*Frustration by pace of changes* Gr=24 Ph=4, Nu=7, Cp=0	15. "Well, less nice is that you can't see the forest for the trees. That there's just a lot out there and the developments are very rapid, almost actually can't keep up if you don't really have that kind of function [CNIO/NIO]. I do think that's a disadvantage." – Nurse (R12)
	12. "And and that other thing, what really gets in the way is, is remodeling that house while we're living in it, you know, we just really have to take care of a lot of people and, and and and and and one way that works is the way we're doing it now. huh, do we just keep it up. Do we go home at seven at night? Huh, while at five the whistle blows? No, but we just keep it up. If we have to do other things at the same time, which always take more time at the beginning. Right. So so also that the idea that that all that hybrid care immediately leads to a workload reduction and to resoundingly positive business cases well, that's really nonsense huh…" – Physician (R8)	*Frustration by (lack of) communication* Gr=13 Ph=2, Nu=6, Cp=0	16. "Well not that I know of, no, every once in a while we do get another notification. Then there is something-then I always have to laugh. We've already had it twice now, then all of a sudden you log in in the morning, everything has changed in EPIC [EHR system] and then you get an email notification about it beforehand: they've changed a lot of things to improve it. But then I always wonder: yeah, who said that's useful, because a lot of things that are there then- I find super awkward, I don't find an improvement. So then I always wonder: who thought that this had to be adjusted in this way? But I don't know. But well, we are of course a very large hospital, so I actually have no idea how those flows run, who determines that and how it is determined to change, and what needs to be changed. I don't know." – Nurse (R13)

Table 2 (Continued)

Literacy facilitation		*Technical support facilitation*	
Training and documentation Gr=46 Ph=7, Nu=7, Cp=1	17. "… my nursing-my colleague who is not that proficient who also has no idea that those digicoaches are there, probably, because that's distributed on the intranet. Well, but colleagues who are not digital-savvy, they generally never look on there, because they just start up the EHR at the beginning of the shift and they know how to update their worksheet in Excel but otherwise they hardly ever use it. So I think that the target audience, which need it most, don't get reached with this, so to speak. The idea is good, I think, but I think you're not reaching a lot of people who are not digitally savvy." – Nurse (R4) 18. "And it should just, that should be clear how to use it. Like, when they introduce something there should be a good manual to come with it. I do think that's important." – Nurse (R12)	*Assistance using eHealth* Gr=34 Ph=5, Nu=6, Cp=1	21. "When the new HIX [EHR system] was introduced, there we had a had such a morning training yes, but then you immediately forget that. … But it's never been a problem. It was always then, say, easy or relatively easy. There was always somebody that you-who you could talk to, you know, the hospital had also made sure that it was the contact partners that you could go to directly to resolve things that you didn't understand. Yeah, mostly it was the user anyway, like me or us who just couldn't find those things. Yes, because the system was a little bit different." – Physician (R16) 22. "Well, as far as I'm concerned, I find it moderate, because I sometimes have things that I, that I don't know and I ask superusers but then they don't know either. And then you can do another so-so report in EPIC and ask a question, and then you get another a number and a ticket number and then they look at it but yeah, well, then sometimes you get answers that you think, yeah, that, that doesn't help me then." – Nurse (R13)
Technology involvement facilitation			
User involvement in development Gr=68 Ph=7, Nu=8, Cp=1	19. "… so when you introduce technology, everyone sometimes assumes that people understand what it is about, what the goal is that you can achieve with it, whereas if you do it together with employees and involve them much more from the beginning, the chance of success of new technology is A: much higher. But B: you also educate people as a result and they are more future-proof." – Clinical physicist (R5) 20. "… everything in EPIC has been changed and then you get an email notification about it be-forehand: they've changed a lot of things to improve it. But then I always wonder: yeah, who said that's useful, because a lot of things that are there then- I find super awkward, I don't find an improvement. So then I always wonder: who thought that this had to be adjusted in this way? But I don't know…" – Nurse (R13)		

Note. Gr = Groundedness of codes (number of quotations coded by a code). Ph, Nu, Cp = Number of respondents (physician, nurse, clinical physicist) with quotations coded by a code.

Several nurses (5) expressed a similar sentiment towards a reduction to patient interaction. Interestingly, one physician (quote 7) and nurse worried that eHealth would lower their own job satisfaction. They felt eHealth would reduce their patient interactions to delivering bad news or treating severely ill patients, as other cases could be handled by technology.

> "For myself, I think it's negative, because I like to see people and I like- just seeing problems, then I also get a little despondent at some point. I think, and this is another negative point, that it might even cost jobs. On the other hand, there are such a shortage that we do have to do something to get more work done with the same staff. … On the one hand positive, on the other negative. Not that I think I'm going to get fired, but yes, your job changes. You went into healthcare for the contact with people, the physical contact with people, and that's changing." – Nurse (R15)

Fear of complete job loss due to similar reasons was mentioned by two physicians, anecdotally referencing that this was mostly present among those working in private partnerships. Furthermore, these physicians mentioned certain specialisms to be more prone to being replaced by technology when treatment options for a specialism are homogeneous across patients (quote 8).

4.1.3 Techno-overload

All respondents expressed concern or frustration for eHealth contributing to an increased workload. For some nurses (5) and physicians (4) this was aimed at the technology itself, attributing it to notifications, more information, or additional consults through telehealth, which added to their tasks (quote 9). Additionally, five nurses and three physicians related this to an increase in data registration requirements imposed by their EHR system (quote 10, 11). This also manifested itself as a fear of additional tasks prior to the introduction of new technology due to respondents already perceiving their workload to be high. Oftentimes their current experiences with eHealth involved the implementation of hybrid care pathways (quote 12). Consequently, these eHealth initiatives increased treatment options instead of replacing traditional ones. Nevertheless, respondents that were closely involved in eHealth development (10) expected this to be temporary, anticipating that these solutions would eventually leverage the extra data being registered to decrease overall workload.

> "…as CMIO [Chief Medical Information Officer] I am more like: yes, I try to convince my colleagues of the added value of that new technology, with the idea of: yes, you have to invest a bit now, but look what it will give you in the long run. But of course, that is becoming more and more complicated." – Physician (R14)

4.1.4 Techno-uncertainty

Uncertainty-induced frustration primarily stemmed from the unreliability of technology. Some physicians (5) felt that eHealth solutions were not optimally integrated with their existing systems, resulting in a lack of trust this would change for new eHealth implementations (quote 13). Nurses (6) that previously experienced technical difficulties such as internet outages or software bugs that rendered the systems unusable showed similar responses. Fear of losing control due to potential system failure and becoming overly reliant on technology was a common sentiment (quote 14). Only a few respondents indicated frustration with the pace of technological changes and new implementations. Three nurses that were less involved in eHealth implementations found it challenging to keep up with technological changes (quote 15). In contrast, nurses (4) and physicians (4) that were closely involved in eHealth development showed a reverse response, desiring urgent implementation and showed feelings of frustration as they perceived current implementation efforts to be slower than desired.

> "But actually, that things run smoothly, that's still a long way off. And not without noticing that some things do go well. And it's not all doom and gloom. But you would very much like to expect things to happen much faster and at a larger scale. And that's just more difficult. Project here that's called [redacted], home monitoring. That the patient basically resolves it themselves first. And with an intermediary they then end up with the healthcare professional. Yes, that sounds very nice, but before we have a couple of 1.000 patients in there, that's still quite a way off." – Physician (R11)

Communication about technological changes was not revealed to be a major stressor among healthcare professionals. Respondents involved in development largely expressed satisfaction with how they were kept informed. Two lesser involved nurses stated that changes to technologies sometimes felt out of touch with users (quote 16).

4.1.5 Literacy facilitation

Except for one nurse, all respondents conveyed positivity towards the training options available to them within their organizations. There was some variation in how training was used to educate users. Initial training courses during the onboarding process, primarily focused on EHR systems, were generally seen as valuable in reducing techno-complexity. This did not eliminate the need for additional help during actual system use, despite these respondents indicating preliminary training as helpful. Additionally, it was mentioned that users with less technological experience were not always aware of these initiatives as their availability was usually communicated digitally (quote 17).

Three nurses and one physician also acknowledged the usefulness of instruction manuals in assisting with the use of eHealth applications, reducing techno-complexity (quote 18). Respondents found this most useful when they had already received some form of training. This allowed them to quickly address a specific difficulty in using an application. Extensive reading of manuals was deemed unfeasible when treating patients, as this required large time investments. When significant changes to eHealth systems were made, instruction manuals were seen as ineffective in addressing these sudden changes. Instead, two nurses and two physicians preferred preliminary training sessions that allowed for discussion and interaction with the changes.

> "But we just had our update for example, just this weekend we had our update, of our EHR our EPIC EHR and it was all announced well in advance, and so on, but then I go in on Monday, I have a morning, I have a full outpatient clinic, I open my EHR and then everything is different. … But for me, it's super irritating, because I just can't work, and I and I just want to go back to what I had, because I don't have time to go read through some manual, three quarters of an hour first, to see where I- … Huh, so what they should have done, is actually Friday on the week before should have come to me should have said, gosh, this is the screen how it looks now and this is how the screen will be as the later looks, can we walk through it." – Physician (R14)

4.1.6 Technology involvement facilitation

A small majority of respondents, both nurses (3) and physicians (6), were involved in eHealth development to varying degrees. They simultaneously worked in their medical and digitalization roles, representing their profession in digitalization efforts in collaboration with the ICT department or clinical physicists. This was realized through chief medical information officers

(CMIO) or chief nursing information officers (CNIO). These respondents were well-informed about digitalization initiatives and responsible for communicating them to their colleagues. Their involvement allowed healthcare professionals to gain insight into how their profession would be affected by eHealth. This was shown to inhibit techno-uncertainty, addressing issues related to communication gaps, complexity, and fear of job change due to eHealth (quote 19).

Respondents without specific roles in digitalization were noticeably less engaged in these efforts. For example, two nurses mentioned participating in surveys or felt their input was not fully considered (quote 20), resulting in responses indicating techno-uncertainty (4.1.4). To address this, one hospital recently introduced the role of nursing information officers (NIO) to involve other nurses at lower levels within the organization. A participant in this role positively acknowledged the role's usefulness.

> "I do notice that now that I'm in consultations because of that NIO function. Then you actually find out, because if you're just a nurse working on the floor, you don't really know of all that is going on. … Because, yes, we can transfer that [ICT requirements] to the healthcare sector, but also, so to speak, we can collect information about where, what is actually needed? Like, you can come up with anything from the outside. But yes, is it also asked on the work floor: what are the needs and what would help you to make your work easier?" – Nurse (R12)

4.1.7 Technical support facilitation

Overall, respondents positively acknowledged the existence of support initiatives available to them. Contacting superusers or an ICT helpdesk was mentioned by six nurses and five physicians as the main solution to solve problems related to eHealth (quote 21), thus reducing techno-complexity. Some hospitals were setting up initiatives involving digital coaches to assist users in eHealth and general computer usage, but this was still in its infancy. In contrast, two nurses noted that they were not aware of specific support users or found it difficult to contact superusers (quote 22).

Interestingly, one nurse and physician positively responded to the use of feedback sessions. This involved a support employee monitoring their use of the EHR system, later reporting workflow improvements to the user. This was stated to mitigate feelings of techno-complexity towards a system and the subsequent need to frequently study the intricacies of their EHR system, especially when this feedback was delivered verbally.

> "Well possibly, and I would find it very pleasant to have someone from EPIC sitting next to me once in a while, for example, to look with me at what can be done more efficiently and to demonstrate it immediately." – Nurse (R13)

4.2 Behavioural intention

Technostress was shown to affect behavioural intention through performance expectancy and effort expectancy. While social influences did influence behavioural intention, there was no evidence to suggest that technostress played a role in shaping this construct. The following section presents this in detail, while exemplifying with illustrative quotes from Table 3.

4.2.1 Performance expectancy

All nurses and physicians primarily evaluated eHealth applications based on performance expectancy. They considered an application useful if it improved job performance or enhanced patient outcome. Most participants (seven nurses and five physicians) found both aspects equally important. Interestingly, one nurse focused more on patient outcome, while two physicians focused largely on enhanced job performance. Among nurses, improved job performance meant reducing administrative tasks, increasing job satisfaction, and simplifying operational duties (quote 1). Physicians focused more on the urgency of finding sustainable alternatives to their current practices, expecting eHealth to enable treating more patients with the same or fewer caregivers. Nevertheless, the hybridization of care pathways resulting in techno-overload, caused by respondents experiencing an increase in tasks (section 4.1.3), greatly diminished respondent's expectations of new eHealth initiatives to deliver on their expected performance improvements (quote 2).

Additionally, three physicians mentioned that certain specializations were better suited for eHealth, particularly for patient groups with chronic illnesses such as diabetes or COPD. These are often better suited to telemedicine programmes, due to recurring patterns in treatment options. Several nurses (4) and physicians (7) expressed expectations that artificial intelligence would greatly assist in this regard.

Table 3

Illustrative behavioural intention quotes

Performance expectancy		*Effort expectancy*	
Job performance outcome Gr=147 Ph=7, Nu=8, Cp=1	1. "Well, I, I hope reducing unwarranted tasks also for example and yes, making it more efficient, spending time more efficiently, so to speak so what I would like very much for example with us- also what we don't have yet is tracking medical equipment for example. …if you have such a tracking system, … then you can find something like that quickly which again reduces the search time" – Nurse (R4) 2. "… now in this hospital, also against my will, all of a sudden I'm also going over the hybrid care pathways, oh, that's really, you buy two of those apps and you link them to your hospital EHR and you make agreements on how you're going to work with that. That's not that, that's just not problematic and that's that. I can't make that problematic in my head either. What's problematic is accountability structure, what's problematic is to get someone as far to take the time to introduce that patient into a hybrid care pathway, that's tricky. Huh, the doctor says, I don't have time for it. Even when the nurse says, yeah, but that's an ideal patient to continue to monitor at home, that doesn't need to be in the hospital." – Physician (R6)	*Perceived as easy to use* Gr=25 Ph=4, Nu=7, Cp=1	5. "But of course it's nice that it's [EHR system] one joint environment where you can see everything. So not all separate folders, folders with all patient information but you just have in one file, you have all your information, of your patients of course there." – Nurse (R9) 6. "Yeah, is not complex at all [apps and systems currently in use], that's all nonsense, that's non-complex." – Physician (R6) 7. "Obviously very simply, the easier something is to understand to operate, the easier you are going to use it and address that above all. But what I mostly notice is that: yes, how should I put it, the utilization of new technology is very much related to the ease of use." – Clinical physicist (R5)
Patient outcome Gr=102 Ph=7, Nu=8, Cp=1	3. "Yes, yes, yes, because especially when you look during care, it's a very intimate moment for that patient, where you can sometimes have very good conversations with that patient. Yes, and I wonder if a robot can do that, so to speak. Yeah, it might work, you know, it just might, but I I, I, I find that tricky." – Nurse (R1) 4. "Yes, because you still think that your no- yes that [AI] is of course not validated at all for doctors' advice yet. Surely you then think as a doctor that you can give the best answer as of now. I think you are also a little afraid of: Well, what if such a chatbot will do that wrong. Right, who? Who will be responsible for that? Yeah still, think healthy hesitation though, that's still there." – Physician (R2)	*Perceived as difficult to use* Gr=48 Ph=5, Nu=8, Cp=1	8. "Yes and and also in that, yes, then also not really a clear choice is made. Huh, so with the [external hospital] I have to consult one way. Through [programme office] I have to consult in another way. Internally it is then again via Zoom yes, that also asks something of the care providers that they have so many systems like that …"– Physician (R2) 9. "You see all those manufacturers all have their own dashboard, a platform that you could then log into then you can easily see certain data and so on. But as a nurse I also just want to, you have the EHR which is say your your main program, where you work on a day, and you want to have as little as possible still around that, actually while all those vendors offer apps and you want to put up a screen in the team station that you can track things and so yeah, a lot of nurses really don't want that." – Nurse (R4)

Table 3 (Continued)

Social influence		
Influence by colleagues Gr=38 Ph=6, Nu=8, Cp=0	10. "Well, that nurse, he or she can want it, he or she can also say: gosh, doctor, isn't it better that this patient goes into Sananet [telemedicine app] and is monitored at home. But if that doctor says, yes [R1] nice thought, but we're just not going to do that, we're just not going to do it. Because yes, that's the primary practitioner and not me. Yes, that's crazy, but that's just the way, hierarchically in the hospital anyway that's how it's arranged, unfortunately enough. yes." – Nurse (R1)	11. "Well, I, I do see the people around me changing more and more, where in the past people really thought, gee, stop this crazy stuff, we're just doctors, so we have to be like this, the realization, I think, is with everybody is that in the future it's just going to be really different. So that, that did really change substantially from before." – Physician (R8)
Influence by patients Gr=29 Ph=6, Nu=5, Cp=1	12. "Well and that's also kind of what the problem is for the patient. We shouldn't make it too complicated and that, those commercial apps have pretty much grown into that huh, so you do see that there and that's not that difficult, but you have to enter 400 codes before you get into your app. That has to be done through DigID, all that, that's quite tricky, you know, and then the phone has to connect to the watch or the scale. Or well, what you do notice, is that well, that tech piece, so you have to educate the patient on that and that can be quite difficult for the older generation. I think that we, and then I'll just call us both me young, that we're going to grow up with that. Huh so that that's also a matter of time." – Physician (R6)	13. "Just to think, yes, for patients, you mentioned those as well, of course. That's for me. Those are generally positive about that, say, that development. Have you seen our- there's been a pilot, got a presentation last week about a blood drawing robot, so to speak, and the patients were also really pleased with it that can just replace a person, so to speak. And takes blood automatically. So I think: yes, the patients are pretty favorable to it to me as well." – Nurse (R4) 14. "Well maybe for a specific group: MS patients. These are young people with a chronic disease. Those do feel the need to maybe have a little more control over [their treatment]. But aside from that, no, there's really not one way to put it." – Physician (R8)
Influence by management Gr=14 Ph=2, Nu=7, Cp=0	15. "… Because here in the hospital you not only have a department head but also a [programme office] implementation, implementation manager of [programme office] … He thought it was a very good idea for me to start. But yes, then it became something between the [programme office] implementation manager and my department head, to whom I belong and who pays me. So well, then with things like that I do see, I'm just kind of. Yes, I'm very far below-I do treat the patients, but in these kinds of things I have little say, because then I'm completely dependent on everything that's all above me here in terms of layers and what becomes above me is developed and is determined." – Nurse (R13)	16. "So I think the care management does, they do want the work to really be as efficient as possible. So they do benefit from that. Or yes, I have that- they do benefit from that, also, but I notice that at our hospital as well." – Nurse (R4) 17. "… When I look up the ladder, of course, eHealth is promoted, with all its advantages and disadvantages, but mostly with all its advantages." – Nurse (R14)

Note. Gr = Groundedness of codes (number of quotations coded by a code). Ph, Nu, Cp = Number of respondents (physician, nurse, clinical physicist) with quotations coded by a code.

> "… so EPIC [EHR system] in the US now has a, a GPT-4 plug-in [AI] and what that does basically is that on messages that come in there in in a chat environment and that's then the in- Then in EPIC that's called the, like the work box, the inbox. That algorithm just sets up the response in advance. … But because of that you can, say, use your keyboard a lot less, answers can actually be prepared already and all you as a doctor then have to do is adjust them or or approve them, so that could truly affect the time that you're busy answering these kinds of questions." – Physician (R8)

In contrast, these respondents also expressed concerns with artificial intelligence or robotics replacing aspects of their job. This form of techno-insecurity caused respondents to expect that these forms of eHealth efforts would diminish the caregiver-patient relationship. Nurses attributed their aversion to change to lower job satisfaction and believed that removing the human element from treatment would decrease the quality of care (quote 3). Physicians attributed this wariness to a lack of control over patient treatment (quote 4). Namely independent specialists, whose income depends on the number of consultations, anticipated a decrease in job performance as a result of fear for job change or job loss (techno-insecurity).

> "What will it do to my income? That one is also important. If you have fewer consultations at the outpatient clinic, then yes, then that does something in you- in your LOGEX benchmark and certainly independent specialists are still judged on that. So the revenue model is not right. That did change now. Since January you are allowed telemonitoring, you can declare a DBC [diagnosis treatment combination] for that, so that's going to help a lot in the acceptance by the, by the care providers. So yes, it did require investments that were not yet reimbursed. In fact, you were maybe even going to lose income. So, of course, none of that helps." – Physician (R10)

Both nurses (3) and physicians (3) also indicated their frustration with eHealth systems that would suddenly stop working properly, such as Wi-Fi-outages or personalized settings being reset whenever a system was updated. Previous experiences of techno-uncertainty with technology hindered their ability to provide optimal patient care. Respondents were concerned that new technologies might inherit similar problems, potentially diminishing patient outcomes.

> “Yes, or that the system freezes, so then it doesn't work either. That's irritating too, because then you just want to speed up your search there because you need something at that moment and you're again fiddling with the computer because it doesn't work.”
> – Nurse (R7)

Notably, there was little mention of techno-complexity influencing healthcare professionals’ performance expectancy. Some physicians involved in eHealth development (3) indicated that an overabundance of information or data could become confusing. This did not directly stop them from using a system, however. Instead, a clinical physicist mentioned complexity to inhibit effective usage by nurses and physicians, rather than actual intention to use.

> "For example, the case with certain techniques that we introduce in the hospital, there are a lot of settings and those settings change during surgeries. But what you often see is that there are so many setting possibilities, which interact with each other so much, that often a default mode is chosen, and a choice is made of: well, this is what has always worked, so I still use this. ... So, complexity doesn't have much to do with acceptance. People do accept it, because in its basic form it usually works. But how effectively you can use it, that does have a lot to do with complexity."
> – Clinical physicist (R5)

4.2.2 Effort expectancy

There were fewer indications of the importance of effort expectancy among physicians compared to nurses. Among positive responses, the perception of eHealth being easy to use was largely related to mobile apps. Nurses (7) who had prior experience with mobile apps found them easy to use. Some respondents positively acknowledged their preference for a unified system serving as a one-stop-shop for multiple eHealth solutions (quote 5). Interestingly, one physician indicated to have no issues with eHealth related to its difficulty (quote 6). However, effort expectancy had a more negative orientation among other respondents as a result of two techno-stressors.

Fear stemming from unreliable technology inducing techno-uncertainty was shown to affect physicians’ (2) and nurses’ (2) effort expectancy. Applications not communicating well with the EHR system or system changes causing settings to move contributed to respondents perceiving eHealth as difficult to use. Overall, nurses desired applications that would assist in their work without adding complexity to their existing work habits. They expressed a lack of

time to invest in learning complex systems as they must devote most of their time to treating patients. This sentiment was also shown in the utilization of eHealth by a clinical physicist, as this was higher when new technologies were perceived as easy to use, thus requiring less time to learn (quote 7).

> "Yes, I am open to it, as long as it's not too complicated. That you have to start learning a lot of new things. Say, if it's clear and it works well and it's reasonably quick to learn, then I don't mind it. But if it has to be all complicated, then yes, then I like it less, because then you have to devote attention to that, takes time." – Nurse (R7)

An overabundance of videoconferencing applications also induced forms of techno-complexity (quote 8). Two physicians also pointed out that video calls were difficult to use due to consultations often running late, which would result in patients leaving video calls when they themselves were not punctual. Importantly, all nurses showed some degree of negativity towards the ease of use of systems, mostly aimed at EHR systems. The number of interfaces of these systems increased the perceived complexity of the system, resulting in techno-complexity influencing their effort expectancy of eHealth (quote 9). Additionally, two nurses suggested that a mobile version of the EHR would be beneficial in theory. In practice, the smaller screen only added to the interface complexity.

4.2.3 Social influence

All but one respondent mentioned groups of people that affected their use of eHealth. Overall, they acknowledged both negative and positive influences from colleagues. Notably, there were no indications that forms of technostress affected this influence. When someone in a higher position opposed eHealth, three nurses noted that this could inadvertently limit its use due to the hierarchical structure within the hospitals where respondents worked (quote 10). Several physicians (3) and nurses (3) that were more involved in eHealth developments voiced they took action to motivate their colleagues to use eHealth and that their sentiment is generally positive (quote 11). Lesser involved nurses (5) mentioned that they generally tend to motivate each other within their teams as well. They often discussed their experiences with eHealth in meetings and during training or reported findings on internal communications platforms.

> "… another thing that helps is contact with nurses in the area. Not always, but sometimes we meet them during training or something. And then if someone else is already using an app, and they are very enthusiastic about it and they also explain why they are enthusiastic about it, what it provides, that also helps." – Nurse (R15)

Nurses (6) and physicians (5) also mentioned the influence of patients on the use of eHealth, particularly in the case of two physicians regarding the patients' association's desire for more control over their treatment. Similar to influences from colleagues, technostress did not seem to affect patient influence. Regardless, the impact of patients varied significantly. Some nurses (4) and physicians (3) experienced less digitally inclined patients to struggle with this (quote 12), while the other two nurses and physicians, in addition to the clinical physicist, had positive experiences with patients of all ages engaging with eHealth (quote 13). Some of these nurses (2) and physicians (2), including the clinical physicist, also signalled that young patients in chronic disease care pathways voiced their desire for more control more frequently than other patients (quote 14).

The influence of management was mentioned less frequently, with only a few physicians (2) and nurses (2) being aware of how management communicated their intentions regarding eHealth. Technostress was not found to affect this relationship. Generally, higher management was not regarded as influential in affecting respondents' intention to use eHealth. Interestingly, one nurse did note management's influence, where their own initiatives surrounding eHealth were being restrained by management's own plans (quote 15). There were no indications that management had a significant impact on respondents' use of eHealth, despite respondents' acknowledgements that management benefits from using eHealth to ensure continued operations (quote 16, 17).

5. Conclusion & discussion

5.1 Conclusion

This study shows how healthcare professionals experience technostress and how this shapes their intention to accept eHealth solutions. It highlights the significance of users' previous technology experiences in determining their intention to accept eHealth applications. Moreover, this study shows there to be minor differences in this effect between nurses and physicians.

Performance expectancy emerged as a crucial factor. Healthcare professionals evaluate eHealth in terms of job performance and patient outcomes. They consider caregiver-patient interaction essential and evaluate how technology changes this interaction. Three techno-stressors influenced this construct. Techno-overload generated concerns about hybrid care pathways, which respondents had experienced to increase workload due to simultaneous digital and traditional care approaches. Techno-insecurity impacted job satisfaction and patient outcomes through the belief that AI or other eHealth solutions would replace essential aspects of their roles. Techno-uncertainty arose from past frustrations with unreliable technology, which resulted in concerns that new eHealth applications might inherit similar problems.

Regarding effort expectancy, healthcare professionals preferred eHealth solutions that minimize disruption to their patient-focused time. This effect was slightly more prevalent among nurses. Two types of technostress influenced effort expectancy. Techno-complexity arose from the complexity of eHealth posing a steep learning curve. Their time constraints caused healthcare professionals to favour applications that are easy to learn. Techno-uncertainty emerged from experiences with bugs and sudden changes in eHealth systems, which diminished perceived ease of use as this required additional time from the healthcare professionals to (re)familiarize themselves with applications.

Healthcare professionals closely involved in technology development experienced less technostress, primarily due to its inhibiting effect on techno-uncertainty. While literacy facilitation and technical support alleviate negative responses to techno-complexity, their effects are limited when users lack sufficient time for learning.

The study revealed no evidence of technostress affecting social influences. Still, social influences did impact behavioural intention, particularly through sharing information and experiences among colleagues. This increased healthcare professionals' confidence to accept new eHealth applications. Furthermore, certain patient groups, particularly those with chronic illnesses, displayed interest in eHealth, further promoting its acceptance in those care pathways.

5.2 Discussion

5.2.1 Theoretical implications

The present study expands on previous literature on technostress and technology acceptance in an important way. The current approach reveals a more contextual understanding of technostress among healthcare professionals, as the study offers in-depth, qualitative insights into the concept. While previous studies focused on the two concepts separately, this study relates the technostress concept to technology acceptance and deduces how they interact in a healthcare context. This leads to contributions to literature in three ways.

First, it illustrates how healthcare professionals experience forms of technostress. In contrast with Tarafdar et al.'s (2007) concept of techno-stressors, this study reveals that several of these concepts deviate among healthcare professionals. Techno-insecurity was found to mostly stem from a fear of job change rather than job loss. This demonstrates that in the context of eHealth, healthcare professionals mostly fear that parts of their job will be replaced by technology itself, rather than a more technology proficient colleague.

In addition, the study highlights how healthcare professionals' past encounters with unreliable technology resulting from system or network failures can create feelings of uncertainty similar to those identified in previous studies (Tarafdar et al., 2007; Day et al., 2012; Barber & Santuzzi, 2015). An important difference, however, is that technology involvement facilitation among healthcare professionals resulted in an increased feeling of techno-uncertainty related to the pace of changes regarding eHealth, contrary to findings from Tarafdar et al. (2011). Instead of techno-uncertainty stemming from fast technological changes, involved healthcare professionals experienced techno-uncertainty from changes they deemed too slow. This suggests that technology involvement increased the professional's awareness of the urgent need for technological transformation in healthcare, resulting in this type of techno-uncertainty.

In contrast to previous literature (Tarafdar et al., 2007), techno-complexity was not found to impair job performance. However, it does demonstrate how techno-complexity affects effort expectancy by hindering a healthcare professional's effective use of eHealth. Additionally, this study reveals that techno-complexity can stem from the multitude of overlapping technology options available, which leads to increased perceived complexity due to the confusing array of options for similar purposes.

Second, the study shows how technostress constructs influence constructs from behavioural intention. Venkatesh et al. (2003) indicated in their study that a similar construct to technostress, computer anxiety, only affected effort expectancy. This effect aligns with the results

of this study which shows that effort expectancy is affected by techno-complexity and techno-uncertainty, capturing a similar construct to that of computer anxiety.

Nevertheless, the effects of technostress on performance expectancy in this study indicate its effects on this construct as well. This finding can be attributed to the fact that performance expectancy, as defined by Schaper and Pervan (2007), includes patient outcomes in a healthcare context. Due to this construct behaving differently in this context, factors such as techno-overload and techno-uncertainty, hampering patient interactions and reducing time spent with patients, are shown to influence how a healthcare professional evaluates their intention to use eHealth based on performance expectancy.

Third, it expands the body of work on challenge techno-stressors (Tarafdar et al., 2019) and their ability to induce positive psychological responses that reduce threat techno-stressors. Findings from this study are in line with previous research, showing that the facilitation of literacy, technical support, and technology involvement inhibit feelings of technostress (Tarafdar et al., 2011). However, the study also reveals that the effectiveness of these factors is diminished when healthcare professionals experience techno-overload or a constant need to learn. In such situations, healthcare professionals may be less inclined to allocate time for training, reading manuals, or seeking help from a support desk, as it detracts from their patient care responsibilities.

5.2.2 Practical implications

The present study highlights several practical implications for healthcare organizations implementing forms of eHealth. It emphasizes the need to consider certain factors when implementing eHealth solutions. Previous experiences with increased workload caused by hybridized care pathways lead to forms of techno-overload, which aligns with findings from previous literature (Tarafdar et al., 2007). However, prior studies did not indicate that this overload would result in negative responses towards the performance benefits of new technology (Venkatesh et al., 2003; Tarafdar et al., 2007). As such, practitioners should consider the implications of retaining hybridized care pathways and its effects on healthcare professional's perception of new eHealth implementations going forward. Following this implication, a faster transition towards a completely digital care pathway may prove advantageous.

Furthermore, the study depicts the evaluation of effort expectancy among healthcare professionals, which primarily focused on technology not hindering patient care. This finding contradicts the results of Chau and Hu (2002), indicating a shift in importance of this construct among healthcare professionals due to time constraints (Oulton, 2006). Findings indicate that

healthcare professionals' previous experience with unreliability of systems, including system outages, data transfer issues, and compatibility challenges, induce techno-uncertainty. Organizations should consider addressing these issues to mitigate this barrier to acceptance.

Additionally, it should be recognized that training and support mitigates negative responses to system complexity. Nevertheless, this effect was shown to be more effective when the healthcare professional had sufficient time to dedicate to these efforts, something prior literature on inhibitors of technostress has not investigated (Tarafdar et al., 2011). Practitioners should consider time availability of eHealth users when new applications are introduced or when large systemic changes are made to existing applications. This ensures that large changes do not significantly interrupt the workflow of the healthcare professional, resulting in negative responses to what would otherwise be inhibitors of technostress.

5.2.3 Limitations

Given this study's contributions, it should be noted that it contains several limitations. Non-probability sampling was used to select respondents. Sampling bias was minimized by selecting respondents while considering an even distribution of gender, function, and organization. However, a small majority of participating respondents were involved in eHealth development, potentially misrepresenting the effect of technology involvement facilitation on threat techno-stressors. Therefore, results may not be representative of the population, affecting the external validity of this study. Still, it can be argued that analytical generalization in case study research indicates that this pattern of technology involvement contributes to literature.

The sample size of sixteen semi-structured interviews does not lend itself well to generalizability within this multiple case study research either. The study can therefore be viewed as indicative for physicians and nurses working in hospitals in the Netherlands. Because of this, construct validity, internal validity, and reliability were given considerable attention (section 3.6). Nevertheless, interpretation bias (Vennix, 2019) may have affected internal validity. Particularly in the case of technostress, the researcher may have interpreted participant's responses differently from their intended meaning. However, this form of bias is inherent in empirical inquiry where participant responses are interpreted. Finally, conducting all interviews via video calls made interpreting non-verbal cues more challenging, potentially increasing the chances of misinterpretation when interpreting the results.

5.2.4 Suggestions for future research

Future research related to the current study can explore various directions. The qualitative nature of this study provided a detailed understanding of concepts that are predominantly used quantitatively. To address limitations in generalizability and external validity, future studies can examine the relationship between the same phenomena on a larger scale using quantitative approaches.

Additionally, while this study investigated the concepts of technostress and technology acceptance aimed at healthcare professionals, future research can investigate the implications of these constructs among patients. This study revealed that certain patient groups exhibited preferences for eHealth, affecting healthcare professionals' behavioural intention. Given the patient's central role in the overall implementation of eHealth solutions, future research should consider examining the technostress-technology acceptance relationship for this group. Venkatesh et al.'s (2012) UTAUT2 model suits this approach, given its consumer-oriented nature.

Lastly, future research should examine how other organizational and medical processes within healthcare hinder successful implementation of eHealth. Several respondents signalled their current work processes impeded eHealth implementation. Future studies should examine why healthcare processes are currently not optimized to support new eHealth initiatives. In addition, studies on the impact of regulations and governance surrounding the sharing of patient data and how they affect processes, design, and implementation of eHealth would be relevant.

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Appendix A.

Operationalization of concepts

Figure A1

Operationalization of technostress

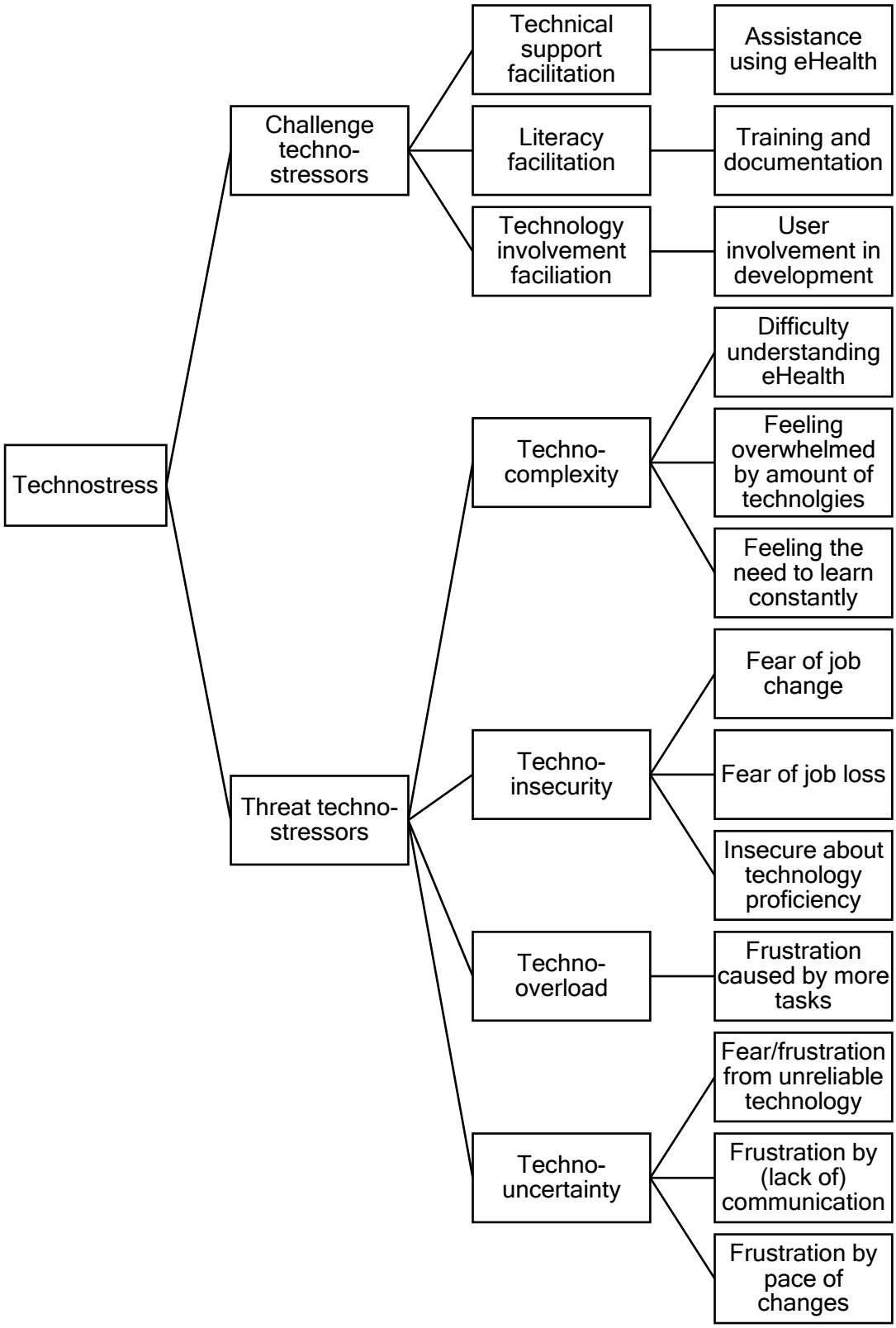
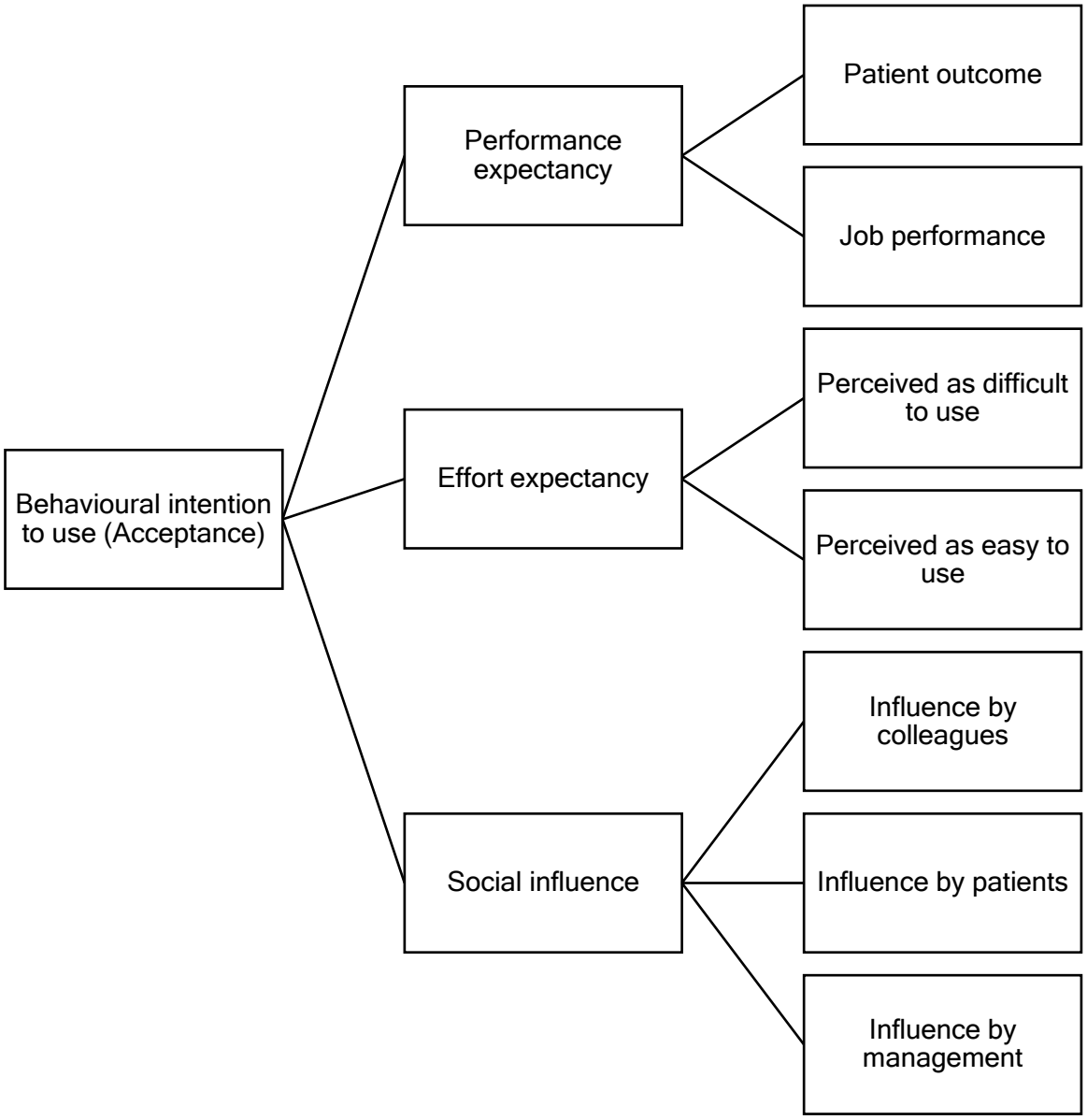


Figure A2

Operationalization of behavioural intention to use (acceptance)



Appendix B.

Codebook

Table B1

Codebook

Dimensional code	Indicator code	Definition
Effort expectancy (Venkatesh et al., 2003)		A healthcare professional's degree of belief that forms of eHealth are easy to use.
	Perceived as difficult to use	The belief that forms of eHealth are difficult to use.
	Perceived as easy to use	The belief that forms of eHealth are easy to use.
Performance expectancy (Venkatesh et al., 2003)		A healthcare professional's degree of belief that forms of eHealth result in increased performance.
	Job performance outcome	The belief that a form of eHealth results in better or worse job performance outcomes such as efficiency, lighter workload, or monetary compensation.
	Patient outcome	The belief that a form of eHealth results in better or worse patient outcomes such as easily accessible care, more treatment time per patient, or more effective personalized treatment.
Social influence (Venkatesh et al., 2003)		The degree to which a healthcare professional feels that influential people believe they should use eHealth.
	Influence by colleagues	Indications that colleagues encourage or discourage the healthcare professional to use eHealth.
	Influence by patients	Indications that patients encourage or discourage the healthcare professional to use eHealth.
	Influence by management	Indications that management encourage or discourage the healthcare professional to use eHealth.

Table B1 (Continued)

Dimensional code	Indicator code	Definition
Technology involvement facilitation (Tarafdar et al., 2011)		The presence of initiatives of involving healthcare professionals in the adoption and development process of eHealth initiatives.
	User involvement in development	Indication whether the healthcare professionals are involved in adoption and development of eHealth initiatives and that this is perceived as stress-inhibiting.
Literacy facilitation (Tarafdar et al., 2011)		The presence of initiatives that aim to educate healthcare professionals to better understand and use eHealth.
	Training and documentation	Indication whether the healthcare professionals know about or use eHealth training and documentation and that this is perceived as stress-inhibiting.
Technical support facilitation (Tarafdar et al., 2011)		The presence of supporting roles to aid healthcare professionals in the use of eHealth.
	Assistance using eHealth	Indication whether the healthcare professionals receive support from other professionals and that this is perceived as stress-inhibiting.
Techno-complexity (Tarafdar et al., 2007)		Techno-stressor caused by a healthcare professional perceiving eHealth systems as complex.
	Difficulty understanding eHealth	Complexity perceived by the healthcare professional through their struggle to understand the eHealth application or system.
	Feeling overwhelmed by amount of technologies	Complexity perceived by the healthcare professional caused through the presence of a large amount of eHealth systems or overabundance of information.
	Feeling the need to learn constantly	Perceived complexity resulting in the healthcare professional feeling the need to keep up with developments through constant learning.
Techno-insecurity (Tarafdar et al., 2007)		Techno-stressor caused by a healthcare professional being anxious about the future of their job due to eHealth influences.
	Fear of job change	Insecurity caused by a healthcare professional's expectation that eHealth will significantly change their job.
	Fear of job loss	Insecurity caused by a healthcare professional's expectation that eHealth will result in losing their job.
	Insecure about technology proficiency	A healthcare professional indicating that they are generally insecure about their skill in using eHealth effectively.

Table B1 (Continued)

Dimensional code	Indicator code	Definition
Techno-overload (Tarafdar et al., 2007)		Techno-stressor caused by healthcare professionals having to work faster or longer due to eHealth.
	Frustration caused by more tasks	Indication that a healthcare professional experiences eHealth initiatives as frustrating, believing this will increase their workload through additional tasks.
Techno-uncertainty (Tarafdar et al., 2007)		Techno-stressor caused by healthcare professionals experiencing eHealth and its development as unpredictable.
	Fear/frustration from unreliable technology	A healthcare professional feeling uncertain about the reliability of eHealth, such as fear for downtime or questioning if the technology is always reliable in its functioning.
	Frustration by (lack of) communication	Frustration stemming from a healthcare professional's experience that they are not updated enough about changes or additions to the eHealth applications.
	Frustration by pace of changes	Frustration stemming from a healthcare professional's opinion that the pace of eHealth development is difficult to keep up with or is not fast enough.

Appendix C.

Interview guide

Nogmaals bedankt voor uw deelname aan dit interview. Mijn naam is Ralf Verdijck, masterstudent bedrijfskunde aan de Radboud Universiteit Nijmegen. Op dit moment ben ik bezig met een onderzoek in het kader van mijn afstudeerscriptie. Mijn onderzoek is gericht op de manier waarop gevoelens die ontstaan door de omgang met technologie bij medisch professionals de acceptatie van eHealth systemen kan beïnvloeden. Mijn vragen zijn gericht op uw persoonlijke ervaring met technologie in het algemeen en uw persoonlijke gedachten rondom de functies en ontwikkelingen van eHealth binnen uw organisatie. Zoals in mijn begeleidende brief vermeld stond worden uw gegevens vertrouwelijk bewaard, bent u akkoord met het opnemen van dit interview?

Onder eHealth versta ik een breed scala aan digitale innovaties in de gezondheidszorg die kunnen bijdragen tot de verbetering van de kwaliteit van zorg. Het gaat hier om toepassingen zoals telemedicine (zorg op afstand), mobiele apps, wearables en big data in de zorg. Maar ook systemen zoals het EPD en andere digitale informatiesystemen die de zorg kunnen ondersteunen.

1. Zou u zichzelf willen voorstellen/wat is uw functie binnen uw organisatie?
2. Hoe zou u uw vaardigheid/affiniteit met technologie omschrijven?
    i. [Optioneel] Maakt u bijvoorbeeld gebruik van smart home toepassingen, slimme apparaten?
    ii. [Optioneel] Was u een voorloper bij het aanschaffen van een smartphone?
3. Hoe gebruikt u eHealth op dit moment bij uw dagelijkse werkzaamheden in deze rol?
4. Wat vindt u van de introductie van nieuwe technologie in de zorg?
    i. Wat vindt u van het tempo waarop dit gebeurt?
5. Hoe ervaart u complexiteit van technologische systemen binnen uw organisatie?
    i. Hoe gaat u hiermee om?
6. Kunt u beschrijven wat er binnen de organisatie gedaan wordt om het gebruik van nieuwe technologisch systemen te ondersteunen?
    i. Bijvoorbeeld een helpdesk of trainingen en documentatie?
    ii. Wordt u bijvoorbeeld betrokken in de ontwikkeling van eHealth?
    iii. Ervaart u dat deze initiatieven werken?
7. Welke gevolgen verwacht u dat eHealth zal hebben voor uw werk?
8. Welke personen in uw werkomgeving vinden het belangrijk dat u eHealth gaat gebruiken?
    i. Hoe maken zij dit duidelijk?
9. Welke aspecten van eHealth spreken u het meest aan en waar ziet u het meest tegen op?
10. Heeft u op dit moment de intentie om eHealth te gaan gebruiken (als er een nieuwe eHealth applicatie wordt geïntroduceerd)?
11. Zijn er nog overige punten die u wilt vermelden welke van invloed zijn op uw intentie om eHealth te gebruiken?
12. Heeft u nog vragen of slotopmerkingen?

Bedankt voor uw medewerking aan dit onderzoek. Het gespreksverslag zal ik u binnen een week toesturen. Mocht u hier nog op- of aanmerkingen over hebben dan kunt u mij hiervoor benaderen.

Appendix D.

Research participant informed consent form and letter

Geachte deelnemer,

Mijn naam is Ralf Verdijck en ik volg de master Organizational Design & Development aan de Radboud Universiteit in Nijmegen. Op dit moment ben ik in het kader van mijn afstuderen bezig met een onderzoek voor mijn masterscriptie. Mijn onderzoek is gericht op de gevoelens die ontstaan door de omgang met technologie en hoe dit de acceptatie van eHealth systemen kan beïnvloeden bij medisch professionals. Vanwege dit onderwerp ben ik via [REDACTED] bij u terecht gekomen. [REDACTED] werkt momenteel aan diverse projecten waarbij eHealth toegepast wordt. In het kader van de inzichten die dit kan opleveren voor zowel mijn onderzoek als de verbetering van deze projecten, zou ik u willen uitnodigen deel te nemen aan een interview.

Het interview zal gericht zijn op uw persoonlijke ervaring met (eHealth) technologie in de zorg alsmede uw persoonlijke gedachten rondom de functies en ontwikkelingen rondom eHealth in uw organisatie. Het interview is opgesteld met een open karakter, waarbij ik als onderzoeker enkel vragen stel om structuur in het interview aan te brengen en te waarborgen dat alle onderwerpen aan bod komen. De tijdsduur betreft ongeveer 30 tot 45 minuten. Uw deelname aan dit onderzoek is volledig vrijwillig. U kunt zonder enige consequenties ten alle tijden besluiten om u terug te trekken uit het onderzoek. Hiervoor kunt u mij per e-mail of telefonisch bereiken.

Vanwege administratieve redenen is het noodzakelijk om uw naam, e-mailadres en eventueel telefoonnummer te bewaren. Gedurende het onderzoek dien ik namelijk met u in contact te kunnen komen om het interview te plannen, u te informeren over het verloop van mijn onderzoek en om de onderzoeksresultaten met u te kunnen delen. Mocht u de gedeelde onderzoeksresultaten niet representatief vinden voor wat u heeft gezegd tijdens het interview, heeft u het recht om mij te verzoeken de gegevens aan te passen of te verwijderen.

Verder is het noodzakelijk om een audio opname te maken van het interview zodat de informatie die u deelt zo accuraat mogelijk kan worden gerepresenteerd en geanalyseerd. Voor de analyse van de interviewopname wordt gebruik gemaakt van assisterende software: Amberscript en ATLAS.ti. De opname zal uitsluitend voor dit onderzoek worden gebruikt. Daarnaast wordt de opname alsmede uw persoonlijke gegevens vertrouwelijk bewaard. Deze gegevens worden alleen inzichtelijk gemaakt voor mij, mijn scriptiebegeleider prof. dr. P.A.M. Vermeulen en de tweede examinator dr. L.J.G. Vermeerbergen. Om uw privacy te waarborgen worden de gepresenteerde onderzoeksresultaten geanonimiseerd en wordt er alleen verwezen naar een respondentnummer. Het respondentnummer zal op geen enkele wijze traceerbaar zijn naar uw persoonlijke gegevens. Uw onderzoeksgegevens worden maximaal 1 jaar bewaard na afronding van het onderzoek. Na het afronden van het onderzoek heeft u de mogelijkheid tot verzoek om uw onderzoeksgegevens vroegtijdig te laten vernietigen. Ook hiervoor, alsmede enige aanvullende vragen, kunt u mij per e-mail of telefonisch bereiken.

Met vriendelijke groet,

Ralf Verdijck

Toestemmingsformulier ten behoeve van interview

Voor deelname aan het interview ten behoeve van het onderzoek in het kader van de masterscriptie van Ralf Verdijck wordt er aan u verzocht dit formulier (digitaal) te ondertekenen. Door te ondertekenen verklaart u dat:

1. U de bijgevoegde begeleidende brief heeft gelezen en zich volledig bewust bent van de aard van uw deelname aan dit onderzoek.

2. U begrijpt dat u geheel vrijwillig deelneemt aan dit onderzoek en u op elk moment de mogelijkheid heeft om u terug te trekken uit het onderzoek.

3. U akkoord gaat met de opname, analyse en gebruik van de resultaten van het interview voor wetenschappelijke doeleinden zoals beschreven in de begeleidende brief.

4. U toestemming geeft voor de inzage van de onderzoeksgegevens (ongeanonimiseerde audio-opname, transcripties en persoonsgegevens) door prof. dr. P.A.M. Vermeulen (scriptiebegeleider) en dr. L.J.G. Vermeerbergen (2e examinator) voor de begeleiding en beoordeling van dit onderzoek.

5. U akkoord gaat met het vertrouwelijk bewaren van de onderzoeksgegevens (ongeanonimiseerde audio-opname, transcripties en persoonsgegevens) voor een periode van maximaal 1 jaar na afronding van het onderzoek, waarbij u de mogelijkheid heeft om deze vroegtijdig te laten vernietigen.

Hierbij stem ik in om deel te nemen aan dit onderzoek en ga ik akkoord met bovenstaande punten.

Handtekening deelnemer	*Handtekening onderzoeker*
X _____	X _____
Naam:	Naam: Ralf Verdijck
Datum:	Datum: