

## ***Digitalisation in Health***

*An Interdisciplinary Report*

*Interdisciplinary Community Service Learning:*

*Defining Challenges In a Multi-Stakeholder Context (AM\_1254)*

*Vrije Universiteit Amsterdam*

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## LIST OF ABBREVIATIONS

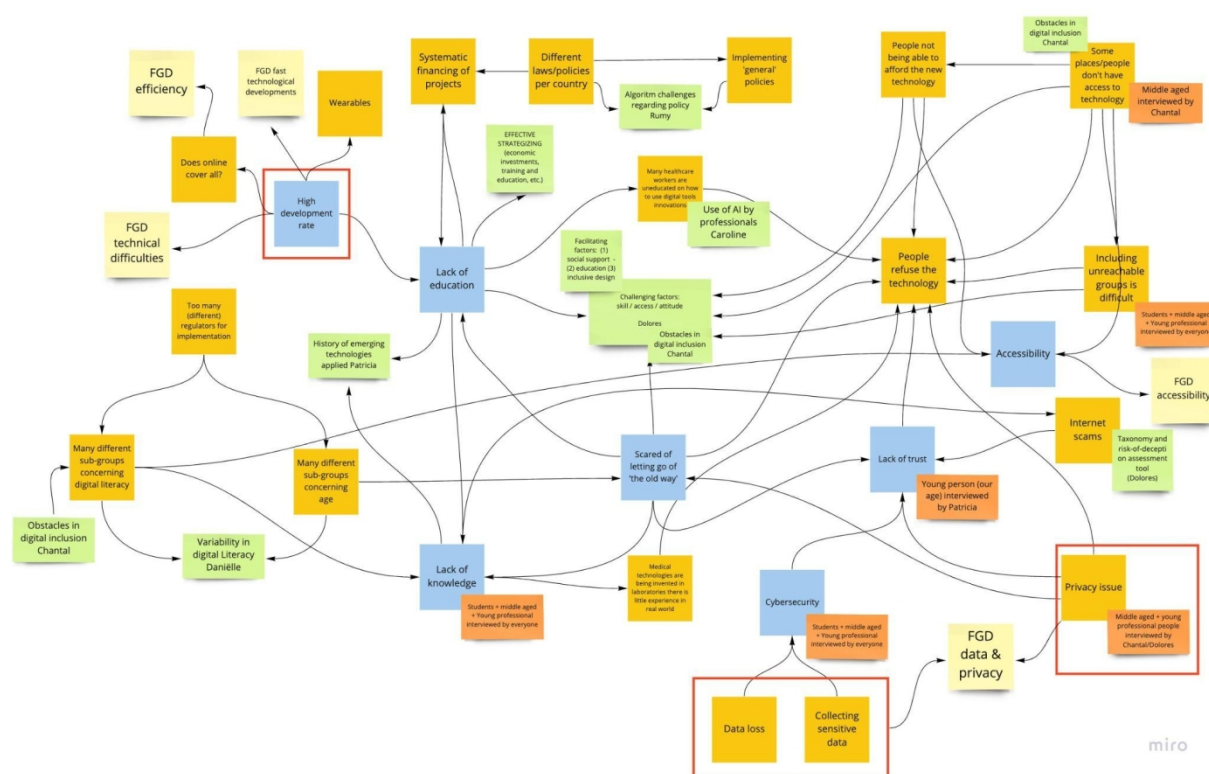
Abbreviation	Description
AI	Artificial Intelligence
e-Health	Electronic Health
FGD	Focus Group Discussion
mHealth	mobile-Health

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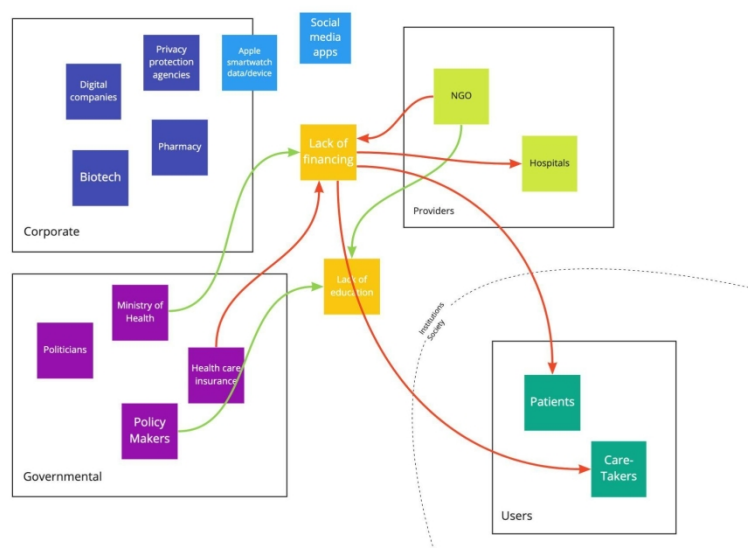
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# Appendix 1. Issue and stakeholder map

## Issue Mind Map



## Stakeholder Mind Map

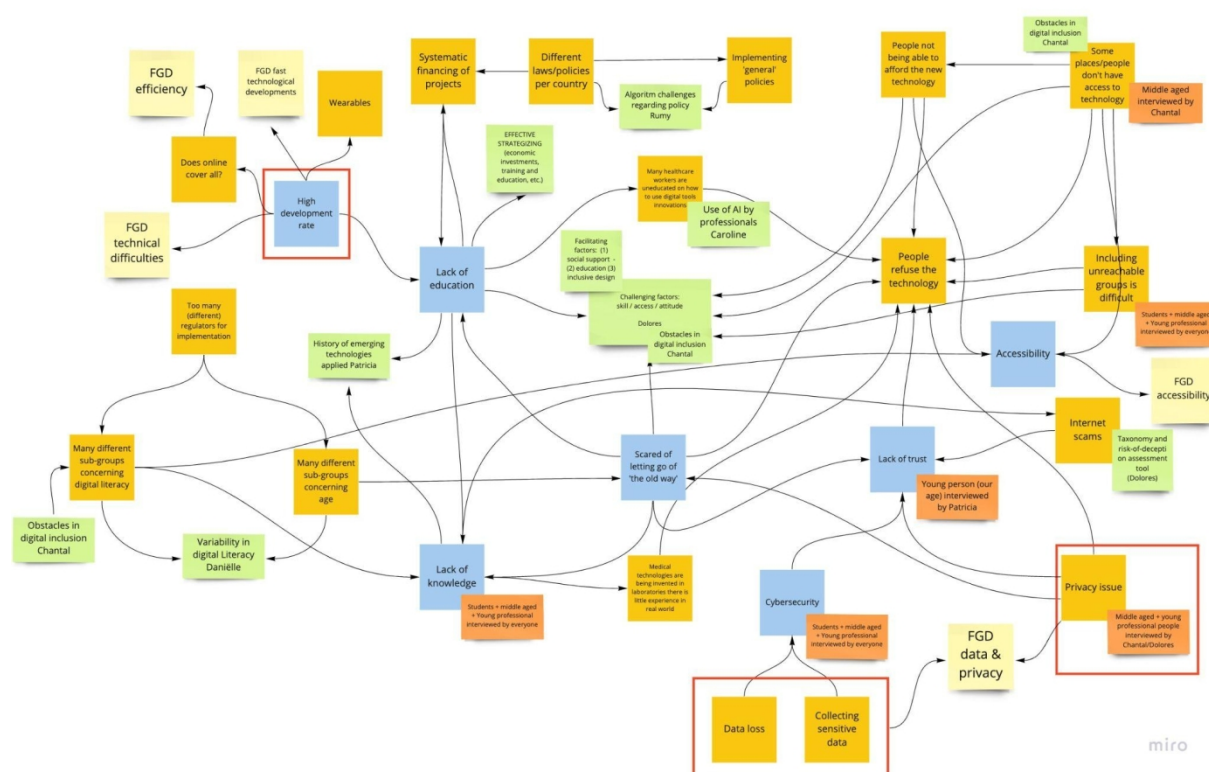


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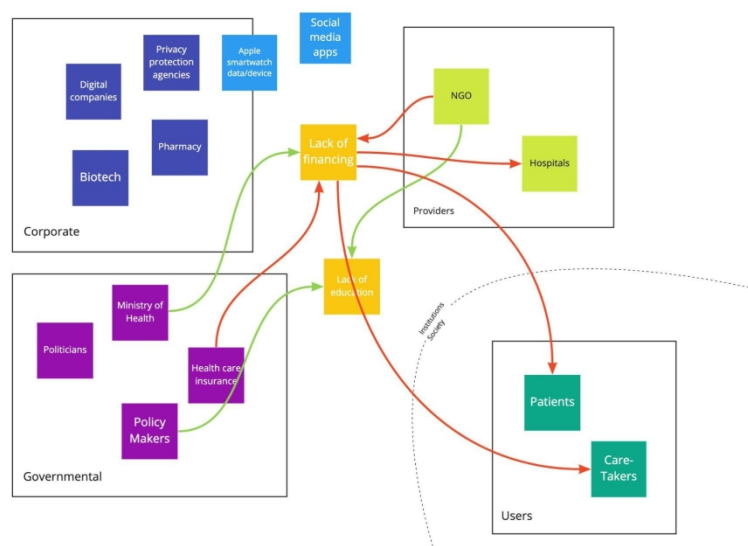
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# 1. INTRODUCTION

In the 21st century, we increasingly face complex societal challenges such as digitalisation in health. This is a complex problem in that it transcends disciplines and involves different actors. This complexity often causes the concepts involved to remain ill-defined, while a universal definition is essential to address them effectively. Digital transformation in health has been exacerbated by the unexpected emergence of the COVID-19 pandemic in 2020, which imposed significant and prompt adaptation in healthcare services by shifting much of the sector's activity to an online environment. In order to investigate the complex challenges of digitalisation in health, one must first define the key concepts and their functionalities, and then investigate them. The aim of this report is to systematically define the challenges in digitalisation in health.

The concept of 'digitalisation' refers to the process of converting analogue operations or assets into digital form, without impacting the actual process or its outcomes (Team, 2021). In today's Digital Age, a vast majority of individuals and companies have access to and use technology on a daily basis. To illustrate, globally the number of smartphone users will soon surpass 2.5 billion, with 48% of them being able to access the internet (Baker, 2018). This technology dominance inevitably influences the health(care) industry, among other sectors.

The influence of new technologies over the health system is known as eHealth. This concept refers to the process of using information and communication technology to improve or enable health and healthcare (Oh, 2005). Due to its significant positive contribution, proven in a large number of studies and trials (Baker J. T., 2018), eHealth is a rapidly emerging practice. The World Health Organization (WHO) has praised eHealth as a means to provide secure and cost-effective care to underserved populations, in which mobile health (implication of mobile technology to improve patients' health) is expected to play a significant role (Smith B, 2019). As such, there has been an increased interest in the use of mobile health applications in an effort to improve patient care (Kim et al, 2019). This is being accomplished, amongst others, by allowing users to easily access and manage their health information, supporting clinical decision making, facilitating interaction between health providers and patients, and providing reliable resources and/or guidelines for users (Glasser, 2013, Kim et al, 2019). Healthcare organizations have also created online portals to facilitate patient participation in clinical care and to offer remote visits via telemedicine services (Smith B, 2019, Kampmeijer R, 2016).

The multiple benefits enumerated above come from a clinical and biomedical perspective, and demonstrate the rapid development of digitalisation in health, as well as its incontestable societal relevance. Concurrently, however, eHealth entails significant challenges that entail more disciplines than the clinical and biomedical fields. First, quality of patient-doctor interaction, including psychological and linguistics fields, has arisen concerns (Udvardi, 2019; Demjén, 2020). Given the increasing use of technology in clinics, researchers warn about possible depersonalisation in healthcare, as patients may be perceived as digital records as opposed to people (Botrugno, 2021). Second, a sufficient digital literacy level (including educational, ethical and psychological views), has been proven to be difficult to acquire due to rapid development of eHealth. This increases the cognitive load in a workplace where high demand and stress are already present (Wong et al, 2021). Also, inclusivity and accessibility to the new technologies takes a part, specially in minority groups of society. To study these concepts, ethical, political and societal perspectives are needed as well. Another main issue is cybersecurity/privacy, that needs to be studied from an ethical point of view. Unfortunately, the healthcare sector has been identified as one of the main targets of cyber criminality (Wright et al., 2016; Khan et al., 2020; Pranggono & Arabo, 2021). Insufficient funds often prevent the improvement of digital security measures in healthcare, and conversely, cybersecurity



issues significantly threaten healthcare accessibility, quality, and costs (Bhuyan et al., 2020). Apart from these, there are more challenges that digitalisation in health is facing, such as user attitude and perception of technology, finance, demographics, etc.

The cause and effect relation between the issues outlined above appears to be very complex and is further complicated by the multi-stakeholder context. As previously noted, all of these issues entail views from several disciplines. In order to investigate each challenge, including every perspective, in a holistic manner and the relations between them, one must analyse the problems in a transdisciplinary matter. To achieve effective problem-solving, it is essential to collect critical insights from multiple stakeholders that are involved in this issue, and disciplines. This report aims to elaborate on the complex problem of digitalisation in health by using qualitative research methods and an inter- and transdisciplinary approach. To accomplish this, we (1) performed a thorough interdisciplinary literature review (Section 3), conducted several stakeholder interviews (Section 4), and facilitated a focus group discussion with community stakeholders from various disciplinary backgrounds (Section 4).

## 2. METHODOLOGY

This chapter describes which methods are used and why, in order to define challenges in a Multi-Stakeholder Context, regarding digitalisation in health. Due to the interrelatedness and complexity of defining those challenges, an inter- and transdisciplinary approach is required. The backgrounds of the authors of this report differ, which make it possible to look at the problem from different perspectives. Also, in order to define the challenges, we included relevant actors that are directly affected by the problem.

### Study Design

In this study, a qualitative, community-based methodology was used. We used an inductive approach in identifying new concepts derived from our data and we used thematic analysis in order to identify certain themes within these concepts. Actor and system mapping, as well as a literature search, were performed in an interdisciplinary manner. The literature research was based on existing knowledge from this group's individuals, master's students from different scientific disciplines (life sciences, politic administration, political sciences and international technology law), including group discussions with other groups studying the same issue. This was then refined by literature findings from different scientific disciplines. Literature resources were selected based on an extensive analysis on two features: which were the challenges that digitalisation in health was facing and who were relevant stakeholders involved on this issue. Based on this, a decision tree was built (Appendix 1) in order to define how these challenges were related to each other and what was the role of stakeholders in each of them. Then, we extracted the relevant fields involved in the interaction of the stakeholders with the challenges. Like that, the literature fields selected were psychology, linguistics, health sciences, biomedical research, artificial intelligence (AI), ethics and politics.

After this extensive literature research, semi-structured interviews were conducted with the aim to achieve a broader perspective on the challenges already defined in the decision tree (Appendix 1). In total, eleven participants (n=11) were interviewed during face-to-face interviews (Appendix 3). Most participants were residents of Amsterdam and some came from other urban areas in the Netherlands. Ages differed between younger adults, middle-aged people and some older people. They were randomly chosen citizens, experiencing digitalisation in their day-to-day lives from their perspectives. Participants were all asked a list of previously defined questions (Appendix 2) in order to have a brief but efficient conversation, where we could obtain the information needed to cover our topics. Informed consent was verbally obtained at the start of each interview.

In addition, one online focus group discussion (FGD) was performed. An FGD is a conducted discussion about a certain topic and they are very useful for gaining in-depth understanding of explicit and implicit needs and attitudes of stakeholders (Daee & Boks, 2015). As this study aims to investigate the topic from a transdisciplinary perspective, the FGD was useful in providing varied, qualitative data from the dynamic discussion between the different stakeholders. Also, given the fact that we were studying a complex issue (i.e. a large number of stakeholders and challenges were involved in the definition of this concept, interacting with each other in a wide variety of ways), a collection of varied perspectives from the stakeholders involved was needed. This was a sensitive topic (health) that needed an in-depth discussion and that could not be generalized. Thus, the FGD enabled us to conduct the discussion in order to generate ideas, and discover other challenges and opinions about a commonly controversial topic. Additionally, it offered the possibility to observe body language and group dynamics, which can be also informative. The FGD was supported by two different group facilitators and one secretary who took detailed notes during the session. In addition, the secretary also performed troubleshooting during the FGD. During the event, participants' perspectives were observed with the help of a script facilitated by the teachers from iCSL

course (Appendix 4). Here semi-structured, open-ended, non-standardized questions were proposed, focusing on identifying barriers of digitalisation in health and how to address them. In order to achieve a transdisciplinary approach to the discussion, participants were asked to work together and answer first, what challenges did they think that digitalisation in healthcare might be facing, and second, how these could be addressed.

Different stakeholders from different organizations were invited to participate in the FGD event. They were five (n=5) participants in total, with different backgrounds (Appendix 3). The participants that were approached were students and professionals of different organisations in Nieuw-West Amsterdam. Given the need of an inter- and transdisciplinary research, participants were selected taking into account their area of expertise and their interest in the topic, attending to the relevance for our study defined in a previously-built decision tree (Appendix 1). Due to the COVID-19 restrictions, the event was moved to an online meeting via Zoom. Before the meeting, participants were given information about the event and were asked to fill in a consent form. In order to make sure that all participants were willing to agree to the terms of the meeting, consent was asked again orally and in the chat function in Zoom. Requesting consent was essential because the Zoom meeting was being recorded for research purposes. After receiving consent, an introduction round was held where participants shared background information (Appendix 3). During the FGD, actors were making use of a brainstorming tool called 'Jamboard'. The 5 participants typed out three main ideas each per topic (ideas from participants were differentiated by assigning a sticky note color to each person). In total, three topics were discussed on three separate slides (Appendix 5). Therefore, 9 sticky notes that stated the participants ideas/answers were shared per participant in total. During the event, a total of 45 sticky notes were collected. After the discussion of ideas, a fourth slide was introduced. In this, the secretary analysed the responses and created a summary slide of the event. To analyse the results of the event, the recording of the event and jamboard data (Appendix 5) were used.

*Note: Two FGD's were planned, but the FGD in Dutch with the topic "Accessibility to e-health; Privacy and Trust" was cancelled a couple of days prior to the event was intended to happen. One of the researchers attended the focus group event on the 7th of December (as a participant) which focused on "Digitization and digital inclusion in daily life".*

### 3. LITERATURE FINDINGS

This chapter addresses the literature findings that were extracted from the literature research. Articles were chosen based on different disciplines and consisted of qualitative and quantitative research articles. Most of them were literature reviews. These disciplines were (forensic) linguistics, psychology, health sciences, AI, biomedical research, ethics, and politics. Based on these article findings, four main issues were identified: (1) inclusiveness, accessibility, and digital literacy, (2) high-rate development (both issues derived from articles related to medical/health sciences, health law and biomedical research with an addition of AI and linguistics in the second issue), (3) cybersecurity and privacy (derived from articles related to AI, ethics and politics), and (4) Lack of Trust (mostly derived from AI, humanities and health science articles). However, an overlap was also noted between the different issues, stressing the need of an inter- and transdisciplinary research for this study. All issues were incorporated into our Issue Mind Map (Appendix 1.).

#### Inclusiveness, accessibility, and digital literacy

Experts in social, behavioral, and health sciences like Borg et al (2019), conducted a rapid review of literature on the topic of inclusiveness and accessibility issues. Digital health communication has a lot of benefits. For example, patients can better manage their health conditions, social networking campaigns in health are easier spread and more. Therefore, access to the internet is increasing and digital devices are more and more used. However, there is a group of people who are not a part of this digital evolution. This results in a digital division, whereby the focus is shifted from not having access to digital devices to the ability and wanting to use digital devices. A rapid review is used to identify the obstacles or facilitators for using digital devices for health purposes by individuals (Borg et al, 2019).

From a communication and social science perspective, three prominent obstacles were identified and added to our Issue Mind Map (Appendix 1.). First, accessibility was identified as an obstacle for some specific groups. Elderly people are generally much less accustomed to technology than younger individuals, since they experienced a very fast and extreme development of technologies difficult to follow. Also, people with poor economic status are not always able to afford usable devices, which are essential to access some technological implementations in healthcare and other fields. Although this is an important factor, the socio-economic background is no longer the main cause for digital exclusion (Schurmans & Mariën, 2013). For instance, some people are demographically isolated, with weak or no internet connection. Similarly, some individuals suffer from certain physical and mental disabilities or health conditions that might impair their ability to use digital devices.

The lack of digital skills also represents a notable obstacle related to digital literacy, self-efficacy, and health topic-specific literacy. Defined as the ability to ‘use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills’ (American Library Association, n.d.), digital literacy is of increasing importance to ensure adequate participation in society (Deursen & van Dijk, 2014). Attitude has been shown to play a significant role in digital literacy levels. Negative attitudes toward using digital devices can be occasioned by feelings of discomfort related to technology, privacy and confidentiality concerns, and lack of motivation. Privacy concerns had a particular influence on the attitude toward using digital devices for health purposes (Borg et al, 2019). This is explained more in depth in the “Cybersecurity and Privacy” section of this chapter.

In healthcare, information technology, health science, and public health specialists identified the following pivotal factors on the lack of digital literacy: insufficient training investment, skill level assessment, targeted training (i.e. training that meets user requirements) (Laramée et al., 2011; McAlearney et al., 2012), and

negative attitude (Chau, 2001). More specifically, a recent study by Public Health experts Kuek and Hakkennes (2020), revealed that users older than 50 used hardware devices/software systems less frequently and also exhibited lower levels of confidence in using digital technology. The authors argue that lower confidence levels negatively impact user engagement with information systems, in consistency with the studies carried out by Borg et al (2019) and Chau (2001). Consequently, low engagement leads to underdeveloped computer skills and low experience, which are ultimately attributed to insufficient and/or inadequate training (ibid.). Similarly, resistance to using technology has also been linked to feelings of anxiety among older user groups. These results are concerning, seeing that digital literacy levels directly impact user engagement (Kennedy & Yaldren, 2017; Kuek & Hakkennes, 2020).

### High-rate development

The emergence of new technologies has been extremely fast-paced over the past few years. The development of artificial intelligence and powerful algorithms has been combined with the huge amount of data collected from the usage of wearables, smartphones and other devices. These combinations have been achieving important applicable solutions in varied areas of health care. Some Clinical Science and Health Services researches showed that mHealth interventions have a significant effect on cardiovascular risk factors' improvement (Smith & Magnani, 2019; Eapen, 2016).

Nevertheless, the applicability of these new technologies is currently more important for patients' self-control of risk factors and health conditions than for clinical practices. An estimated number of 325,000 health-related applications are currently available on the app marketplace (Smith & Magnani, 2019). Neuroscience and pharmacology experts showed that the use of wearables or implantable sensors and devices has made it easier to interact with patients from a distance, which results in less direct face-to-face interaction between doctor and patient (Baker et al, 2018). Yet, these wearables can help with the collection of patient health data on a larger scale, as noted in medical ethics research (Botrugno, 2021). Additional findings from the same field combined with health sciences showed that wearables also stimulate patients to develop or increase body awareness and track their own physical health (Rubeis et al, 2018; Baker et al, 2018). However, some of these applications are promoted despite lacking scientific evidence, due to an absence of regulation in the app market. mHealth services have definite therapeutic potential in cardiovascular disease, where lifestyle modification and self-management of chronic conditions are critical to improving outcomes. Nonetheless, it remains unclear whether these technological improvements have a real effect on clinical outcomes.

In the clinical field, more specifically Augmented Medicine specialization, innovative digital tools have been used in recent years. This field requires new technologies to refine different aspects of clinical practice. However, these new developments need to be validated by qualified organizations prior to being introduced in clinical practice. Currently, this represents a main obstacle for digitalisation in health. Although technological benefits have been published in a wide variety of papers, health and psychology experts stress that limitations are likely to compromise the benefits (Briganti & Le Moine, 2020). A main limitation consists in the resistance to digitalisation in medical practices. This seems to be welcomed by the patients in general, but is met with resistance by healthcare workers (Briganti, 2020). The latter reported a lack of preparation for new technologies due to the high-paced implementation rate (Haag, 2018). Moreover, a public health study by Chaichati (2019) found that healthcare staff deplored the increase in the amount of administrative burden, especially with regard to online health records. The increasing use of (information) technology within healthcare requires constant adaptation, which in turn requires time and attention, therefore increasing the cognitive load in a workplace where high demand and stress are already present (Wong et al, 2021). Second, health law specialists warn that the usage of new algorithms implemented in health systems is still lacking a legal framework and physicians may face potential legal

outcomes when using them (Price, 2019). Furthermore, validation of new methods including state-of-the-art technologies implies research on the comparison of efficiency between AI and clinicians. These are normally unreliable since they lack a solid design and reproducibility. Moreover, sample sizes in these studies usually include a selection bias, inducing an overfitting phenomenon.

Lastly, from a linguistic and ethical point of view, concerns have been raised regarding the quality of patient-doctor interaction (Udvardi, 2019; Demjén, 2020). Given the increasing use of technology in clinics, researchers warn about a possible depersonalisation in healthcare, as patients may be perceived as digital records as opposed to patients (Botrugno, 2021).

### Cybersecurity and privacy

Despite the numerous and notable benefits of eHealth, the healthcare industry has been confronted with important privacy and security issues: data breaches, cyberattacks, email scams, and more. Computer science and cybersecurity experts noted that the coronavirus pandemic accentuated these problems, as cyber criminality increased significantly, targeting an already vulnerable sector such as healthcare (Wright et al., 2016; Khan et al., 2020; Pranggono & Arabo, 2021). The resulting necessity to migrate most of the physical interaction to an online space inevitably puts users at a higher risk (i.e. both patients and staff). With emails representing one of the main communication tools, including Covid-19 official medical updates, cybercriminals did not hesitate to impersonate official organizations such as the World Health Organization (WHO) or the United Nations (UN) when launching phishing attacks (i.e. fraudulent emails aimed at collective sensitive information or malicious software that retrieves sensitive data from a user's device; Wright et al., 2016) in 2020 (Pranggono & Arabo, 2021). However, emails are not the only vulnerable tool, since practically any digital medium of storing sensitive data represents a potential target, such as mobile phone applications (Kim et al. 2019) or patient databases (Wright et al. 2016). The risks associated with storing sensitive data constitutes a common concern for both computer scientists and public health specialists.

The consequences of cyberattacks are far from negligible, as stolen credentials can be used for a variety of fraudulent purposes: identity theft, selling credentials, filing false tax returns, applying for credit, accessing payroll systems and collecting (part of) an employee's salary, amongst others (Wright et al., 2016). Additionally, compromised data often lead to reputational harm, payable damages, and/or regulatory fines for the victim organization (Wright et al., 2016).

Insufficient funds are often cited as the main obstacle to enhancing digital security measures in healthcare. Conversely, however, cybersecurity issues are a considerable threat to healthcare accessibility, quality, and costs, as noted by public health and medical behavioral experts (Bhuyan et al., 2020). Ultimately, the rise in cybersecurity issues (phishing attacks in particular) could indicate that user awareness may also represent a potential area of opportunity in mitigating and preventing cybercrime.

### Lack of trust

Something that also relates to the previous chapter is the lack of trust that users have in the technology. Digital strategies in the health sector have enabled the implementation of digital technology to update clinical and data governance systems, medication management and communication within health districts (Shinners et al., 2020). Furthermore, one of the goals is to have the 'healthcare workforce confidently using digital health technologies to deliver health and care' (ibid., p.1226). In order to fulfill this aim, one must investigate the understanding and experience of the healthcare professional and the impact the technology will have on their ability to deliver care. The implementation of digital tools and systems in healthcare can

potentially redefine the role of healthcare professionals and their underlying beliefs, values and assumptions in the provision of healthcare (ibid.).

An integrative review conducted by health, human science, and AI researchers, Shinnars et al. (2020), investigated healthcare professionals' experiences and perceptions of AI technology in the delivery of healthcare. This review included quantitative and qualitative studies from 2019 to explore the complex phenomenon of healthcare professionals' understanding and experiences of AI use in the delivery of health (ibid.). The results showed that healthcare professionals were less likely to adopt if they did not understand the rationale for digital technology or trust that it would improve the relationship or the quality of care delivered (ibid.). Additionally, findings showed that healthcare professionals were sometimes afraid that the technology would replace them or replace high-quality care delivery, yet no evidence was found to support this perception (ibid.). As noted by the World Health Organization, 'while technology and innovations can enhance health service capabilities, human interaction remains a key element to patients' well-being'", which contradicts the current perceptions of healthcare workers (ibid.).

Overall, the study found that healthcare professionals were less likely to use AI in the delivery of healthcare if they did not trust the technology or understand how it was used. This in turn contributes to the lack of digital literacy issues. No evidence was shown for the perception that AI would replace healthcare workers. This may be due to the fact that AI is not yet at the forefront of technology use in healthcare settings. More research is bound to be done in this field to examine the experiences and perceptions of healthcare professionals, using AI in the delivery of healthcare.

A theory that fits well with having a lack of trust in technology is the monster metaphor theory. This entails that innovative technology is seen as the 'monster' that poses a danger to society (Smits, 2006). This fear comes from being unknown to the subject or the uncertainty of the outcome of this innovation.

#### Link to different disciplines

As previously mentioned, the identified issues are related to various disciplines derived from and beyond our multidisciplinary group. Inclusiveness, accessibility, and digital literacy were commonly covered in disciplines like health, social, behavioral, and communication sciences, as well as biomedical research, with one exception in information technology. However, the issue of high-rate development has been raised in a wider variety of disciplines. In addition to health sciences and biomedical research, relevant stakeholders also emerged from fields like medical ethics, public health, linguistics, health law, psychology, and neuroscience. Inevitably, AI research is also linked to the topic of high rate development, since AI is the generating force behind all digital development. Next, lack of trust has been researched by health and technology specialists and mainly relates to users' concerns regarding cybersecurity and privacy, as suggested by research in AI, ethics and politics. The lack of trust is in turn also influenced by the users' concerns regarding cybersecurity and privacy, an issue derived from AI, ethics and politics research. All of these interrelated issues are further specified and connected in our Issue Mind Map (Appendix 1.).

## 4. INTERVIEW AND PUBLIC EVENT FINDINGS

This chapter contains the findings of the interviews, and the public event that was held on the 7th of December. We present here our qualitative data that we derived from both methods.

### Interview findings

In total 11 short interviews were conducted (Appendix 3). The short interviews revealed an overall positive attitude towards digitalisation in health based on a generally successful experience and significant engagement with digital tools in healthcare. Examples include health-related mobile applications, online platforms that promote/facilitate a healthy lifestyle, or wearables (.e.g Fitbit), purchasing nonprescription medication from vending machines (the respondent argued that this confers them with more control over her own health), online therapy sessions/booking system for medical appointments. Even though the participants did not have disciplinary knowledge about the topic, they were able to provide examples. Thus, when asked whether they were familiar (and what their experience has been) with the topic of digitalisation in health, one of the participants responded:

*“Not per se in a conceptual sense, but I use Youtube for lessons in yoga, meditation and healthier lifestyle. We have apps that track sleep and other, and we have better health administrative services through digitalisation.” (C, Philosophy Master student)*

However, participants also reported several notable challenges. The issue that was reported by most interviewees relates to cybersecurity. Respondents mentioned that they were worried about how the data is collected and stored, i.e. whether the protection of the data is ensured adequately. Specific concerns relate to ‘hacking’ or ‘crashing of technology’. One respondent was worried that the data could go missing and that it would be lost forever. Other respondents explained that if there is a breach in cybersecurity, data can leak and this will impact individuals’ privacy, particularly because health databases contain very sensitive data. Consequently, this has a direct impact on the levels of trust in healthcare data collection systems.

Lack of trust was also mentioned in relation to using digital tools, but the respondents mostly spoke on behalf of other individuals (as opposed to relating directly from their own experience), such as their parents and/or the elderly in general. More specifically, the latter distrust technologies because they are not familiar with digital tools and are accustomed to doing things ‘the old way’ (i.e. non-digitally). In other words, this denotes inexistent/insufficient digital literacy levels. For this reason, some participants believe that it is more difficult for older age groups to be included in the process of digitalisation in health:

*“If digitalisation is broadly implemented in this field, the older part of the population, which is also the one that needs healthcare the most, will be left out. So this could be beneficial to speed up procedures and save time/costs, but it could be seen as a problem for the less digital-friendly part of the population.” (B, International Commerce Graduate)*

Given her background in International Commerce, S is inevitably aware of the importance of ‘saving time and costs’ but she acknowledges that this would only increase issues related to accessibility and inclusivity. A potential solution to the digital literacy issue, according to S, would be to implement “a system of assistance for the elderly” free of charge. Additionally, S mentioned differences related to the degree of implementation of digitalisation in health between countries, as well as an urgency for further digital adaptation of healthcare prompted by the coronavirus pandemic:



*“In my home country (Italy) the health system is not really digitized, so in the past I didn't have much experience with it. I started experiencing it only after I moved to the Netherlands. Here it's possible to do everything online. I think this trend has also been fostered by the lockdown when everything has shifted online (eg. I am having my therapy sessions online).” (B, International Commerce Graduate)*

It is worth noting that the issues illustrated in this section were mostly provided by young adults or middle-aged persons. The specific view of the elderly is therefore not directly evident.

### Public event findings

The findings from the public event helped to get more insight into the potential issues of digitalisation in health. All 5 participants had different backgrounds, such as life science, politics, and international technology law. Three of the members were master students and the other two were working professionals (see Appendix 3).

The first topic relates to participants' prior experiences with digitalisation in health (Appendix 4, Appendix 5). Answers show that all participants had at least one positive experience with digitalisation in health. The technologies in health were found to be useful. For example, one participant stated:

*“There is an app that can help you detect skin abnormalities. One simply just needs to capture a picture of their skin area and then the app processes the visual information. If abnormalities are detected, the app refers you to a dermatologist for a consultation”. (Participant 4, Practicing International Technology Law)*

The second topic that was discussed were the issues that participants encountered in digitalisation in health (Appendix 4, Appendix 5). The results show that participants experienced a variety of issues. Based on the answers, the following five categories were identified: (1) efficiency, (2) data and privacy, (3) fast technological development, (4) accessibility and (5) technical difficulties.

For efficiency, the issues that were discussed were if new health technologies and e-health are effective enough. Participant 1 and 2 suggested that more research should be conducted that compares the efficiency of technologies in health. Participant 1 elaborated on this issue by stating:

*“E-Health is increasing extremely especially in mental health and in COVID times, it has been a good answer. However, because therapy requires a psychologist and is more of a social thing, shouldn't that be face-to-face then? I am uncertain about the effectiveness of online health tools compared to real life approaches.” (Participant 1, PhD student, Health Sciences)*

The issues concerning data and privacy were shared among participants 4 and 5. Concerns were raised about data collection and privacy issues. One identified issue is data collection transparency. Participant 5 stated:

*“More transparency is needed on how data is collected, structured and used. Currently, stakeholders do not know if their data is protected or distributed to third parties. They also do not know where and for what their data is used.” (Participant 5, PhD student, Public Administration)*

Thus, this statement suggests that more transparency is needed for collecting data. Participant 4 supported this by saying that it is difficult to relate cause-effects in real life from online medical data collection. This suggested the potential validity issue of data collection. Participant 4 also shared her views on privacy issues in digitalisation in health. She said:

*"Privacy issues and data collection could relate to one another "*  
*(Participant 4, Practicing International Technology Law)*

Which suggests a potential causal relationship between the issues. Additionally, participant 5 mentioned that she did not trust sharing too much medical information online because it is unknown how the data handling and safety is secured. Which shows the issue of mistrust in data and privacy policies. For the fast technological development issue, participant 1 quoted:

*"There is a lack of time for learning how to use the new technologies. Due to the fast pace of developments, people like me can not keep up with it."*  
*(Participant 1, PhD student with background in health science)*

Which shows the issue faced by users. For the accessibility issue, participant 3 stated that the collections of samples and prescriptions cannot be in digital forms. Participant 2 elaborated on this issue by saying the following quote which draws further importance on the discussed issue:

*"Telemedication is vague and they cannot take responsibility for providing you with recommendations, prescriptions, and they still require you to come there"*  
*(Participant 2, Assistant Professor)*

Lastly, the issue of technical difficulties was introduced by participant 3. The information was based on the participants past experience where he could not access an app for corona exposure alerts. Participant 3 stated:

*"I tried to download the Corona app for my health safety because I travel a lot. I have an old android and found the app on the app store. When I tried to download it, I got a message saying that it can't be installed. This was really upsetting because apps like these should be compatible with any type of smartphone."* *(Participant 3, MBA)*

This given statement describes the issue of technical difficulties. The technical difficulties in digitalized health, such as malfunctioning health apps, affect stakeholders negatively and can be seen as a vital issue.

The third main topic that was covered were solutions (Appendix 4, Appendix 5). The findings show that more research needs to be conducted on efficiency of healthcare technologies. For instance, participant 1 said that a solution to this issue could be found by comparing healthcare efficiency when using technologies and when not using them. For the accessibility issue, participant 2 added that better and more transparent communication to users on how to use specific technologies is needed. Participant 3 quoted:

*"The need to solve the accessibility issue in health is to give the patient the option to choose digital or face-to-face healthcare".*  
*(Participant 3, MBA)*

The statements from participant 2 and 3 are viewed to be potential solutions for the accessibility issue in health. For the data collection and privacy issues, the results suggest that more regulations are needed for collecting, storing and using data. Participant 5 said that "global policies are needed to save mishandling of users' data. Organisations should not implement their own policies but rather have a global data policy that is legally required" showing that legal actions and global policies could be a solution to privacy and data collection issues. Additionally, participant 4 suggested the next quote which suggests that efficient internal and external communication is needed to solve the issue of fast technological developments:

*“Better communication between patients, healthcare organizations and pharmaceutical companies is necessary to deal with the fast development of technology. By staying updated, it will help everyone to use the technologies correctly.”*

*(Participant 4, Practicing international technology law)*

### Issue Map findings

The FGD was simultaneously summarized by the secretary which resulted in six issues (yellow) and six solutions (pink) (Appendix 4, Appendix 5). From the six key issues, five were already incorporated into the Issue Map (Appendix 1). The five issues which were identified from the Issue Map and the Public Event were (1) efficiency, (2) data and privacy, (3) fast technological development, (4) accessibility and (5) technical difficulties. However, based on the public event findings, a new dimension of the accessibility issue was identified. Based on the discussion led by participant 3 who stated:

*“The collections of samples and prescriptions cannot be in digital forms”*

*(Participant 3, MBA)*

A new issue was established and categorized as ‘online does not cover everything’. Participant 2 elaborated on this issue by saying the following quote which draws further importance on the new issue:

*“Telemedication is vague and they cannot take responsibility for providing you with recommendations, prescriptions, and they still require you to come there”*

*(Participant 2, Assistant Professor)*

The ‘online does not cover everything’ issue was added to the Issue map to analyze the connectivity of issues.

## 5. CONCLUSION AND DISCUSSION

The objective of this study was to define the complex challenge of digitalisation in health to better assess current and future implications, as well as applicable solutions. Based on the literature findings, the semi-structured interviews, and the FGD, we were able to define five main challenges:

First, the high-rate of technological development was mentioned frequently. The way in which healthcare is practiced is changing. There is less face-to-face contact, and more with the use of digital tools. It is not always certain if these developments are more efficient (Briganti G, 2020, Kelly CJ, 2019). Due to these developments, healthcare workers need to invest time and energy to keep up with them. Besides the learning part, these developments also increase the administrative burden. Healthcare users can have benefits of the digitalisation of health as more insight into their own health. However, for some people, it is difficult to keep up or even use digital tools. This issue was more related to elderly. Moreover, not everybody might want to use or can use digital tools to take care of their health. This fast rate of development is therefore also strongly related to accessibility.

In order to overcome this challenge, nowadays, an increasing number of medical schools and universities are including doctor-engineering (computational sciences, coding, etcetera) into the curriculum. These new generations of healthcare workers will have both clinical experience and technological expertise, to be able to manage the digital transition and control it as a complement to their work and not as a replacement (Topol EJ, 2019). Moreover, their administrative burden will be released thanks to these technologies that are expected to take care of medical records (Chaiyachati KH, 2019, West CP, 2018). For the current generation of healthcare workers, we propose free courses offered by institutions for healthcare workers on how to use the new technologies implemented. Flyers and information on the webpage/videos on how to use platforms or wearables for patients is a way to take the patients into account.

Second, data and security also came forward as one of the main challenges. Dealing with healthcare data has to be done in a sensitive manner. When this is not done in a safe way, this sensitive data can get accessed by cybercriminals who can use them for fraudulent purposes (Wright et al., 2016). The lack of attention to cybersecurity can have an impact on the quality of healthcare services. Thereby, these issues of cybersecurity can result in a lack of trust. People might not trust that their sensitive and private data is stored safely and therefore do not want to use digital tools to communicate or send health information. Above that, there is a lack of transparency in the way the health data is used and is handled which also impacts the trust people have towards digitalisation in health. The issue towards cybersecurity was mentioned by multiple stakeholders, mostly users of different ages. Cybersecurity is therefore also related to the high-rate developments because cybersecurity has problems keeping up, and with accessibility because it can be a hurdle for people to go and use because of the lack of trust.

In order to overcome this challenge, we propose the establishment of new policies, focusing on transparency on how they collect, store and use data and why. Most breaches in the network happen at the application layer. Therefore time and money needs to be invested in work interaction between developers and protectors of the network to develop a safe network (Bhuyan et al., 2020). First, safe data handling needs to be taken care of before further developments take place.

Third, accessibility was a challenge mentioned often and consists of a lot of sub-challenges. First, some people do not know how to use digital devices, or cannot use them. This can be due to age, but also disability, socio-economic status, and demographic living area. It is not only the lack of knowledge sometimes, but also the attitude towards using digital tools in health which results in not using digital tools. Also, fear or self-efficacy can play a role in accessing digital tools for health purposes (Borg et al, 2019).

Stakeholders who were interviewed did not mention accessibility as an issue specifically for them, but mentioned it as a problem for elderly.

Possible solutions for this challenge are the following. The first one is social support which can increase the use of digital devices when it is present. Secondly, education plays a role. Skills can be taught by education, so a form of collaborative learning would be suitable to enhance skills, knowledge, literacy, and self-efficacy. And lastly, technologies should also be made for end-users and needs, therefore, to be user-friendly. This needs to be kept in mind while developing technologies (Borg et al, 2019). Above this, it is important to keep the non-digital options available for patients that do not feel confident on how to use technology (elderly/certain health conditions) and establish a home-doctor service for people that cannot go to the hospital because of demographic or physical reasons.

Fourth, efficiency was seen to be a key issue in digitalization in health. The findings showed that concerns lie within the efficiency of digital technologies in health. With the rise of e-health, more applications and websites have become available for treating patients (Kampmeijer et al., 2016). However, as there is a lack of face-to-face interaction, concerns about the efficiency of those new technologies were raised. Participants were worried that it would take more effort in order to physically see a doctor and get the right assessment.

The findings of the FGD showed that stakeholders were unfamiliar with the efficiency of health technologies compared to traditional health practices. One factor that plays a key role in the unfamiliarity of digital health efficiently is the lack of conducted research on that topic. Therefore, more research needs to be done that compares the efficiency of technologies in health.

Lastly, technical difficulties were also one of the main challenges. With the fast rate of technological developments and the increasing number of digital health applications, technical difficulties is an issue that comes with it. The findings showed that stakeholders expressed their concerns with accessing digital health resources on their digital device. One result from the FGD explained that a system compatibility error was seen as an issue of technical difficulties. If the digital application is only compatible with some types of software devices, stakeholders who do not have the required software will not be able to use it (Schurmans & Mariën, 2013). As a result, a market gap is created and potential stakeholders are disregarded due to this error. Furthermore, due to COVID, health applications for smartphones are being used to access services and track possible risk areas. However, not one single app has been created that works globally and for all types of digital devices. Furthermore, participants shared that technical difficulties were experienced when trying to implement their vaccination data on their phone. Results showed that the QR code could not be created and the given information could not be processed correctly.

Proposed solutions for the technical difficulty issue were shared in the FGD. One solution would be to update all apps and make them compatible with all types of software. Additionally, the suggestion to also have an offline option for the required health service was offered. This can be beneficial to stakeholders who do not own a digital device but still require the health service.

From a disciplinary (approach) perspective, research by health experts focused mainly on issues like inclusiveness, digital literacy, high-rate development, and lack of trust. Crucially, some interdisciplinary efforts can be noted, as evidenced by the joint effort between health and technology experts in evaluating digital literacy (e.g. Laramée et al., 2011; McAlearney et al., 2012) or lack of trust within healthcare by Shinnars et al. (2020). However, most of the studies by health-related experts reviewed in this report were confined within specific health disciplinary boundaries such as health behavior, public health, neuroscience

and pharmacology, health services, clinical science, and biomedical research, thus suggesting further opportunity for inter/transdisciplinarity. Similarly, Garrett et al. (2019), a multidisciplinary group of health professionals, researched internet health scams and derived a 'taxonomy and risk-of-deception tool', which inevitably raises doubts related to the lack of collaboration with other related fields such as cybersecurity and forensic linguistics.

Likewise, cybersecurity studies conducted exclusively by experts in the field established frameworks designed for increasing data protection in healthcare while also mitigating financial loss. Unfortunately, in the absence of financial analyst and health official/management insight on the topic, it is difficult to understand precisely how effective these frameworks are. Without undermining the value of such cybersecurity studies, or the expertise of the authors, it is evident that an interdisciplinary approach would be ideal in this case.

Based on the findings of the FGD, 5 key issues were identified by different stakeholders. The key issues were (1) efficiency, (2) data and privacy, (3) fast technological development, (4) accessibility and (5) technical difficulties.

For the data and privacy issue, Participant 5 (PhD student, Public Administration) suggested that more transparency is needed for collecting data. Participant 4 (Practicing International Technology Law) agreed with the issue and added that it is difficult to relate cause-effects in real life from online medical data collection. This finding suggests the potential validity issue of data collection. Additionally, participant 5 added that she did not trust sharing too much medical information online because it is unknown how the data handling and safety is secured. This suggests the potential issue of mistrust in data and privacy policies.

For the technical difficulties issues, Participant 3 (MBA student), introduced his experience with malfunctioning health apps. As stakeholders have different types of technical devices, the technological compatibility error is seen to be an issue of technical difficulties. When they can not access the digital health tool due to technical errors, it affects the user negatively and can be seen as a vital issue.

The sub issues (transparency, validity, mistrust, digital compatibility) established from the key issues can be used to further define and investigate the nature of the issue in digitalization in health.

### Strengths and Limitations

First, a literature study was conducted in which articles gathered from a wide range of fields that we selected as relevant (clinical/medical, biological research, psychological, ethical, societal, technological, linguistic, political, and law). The inclusion of articles derived from a wide range of fields has the benefit that it is very likely that concept saturation is reached. Moreover, it limits bias as we look beyond our own discipline. Thereafter, we conducted street interviews to gather more information on digitalisation in health in addition to our literature findings. The street interviews were conducted with randomly selected participants which minimises bias. We found that participants that already had a very strong opinion about digitalisation, were more likely to participate in an interview on the topic. Because we needed to gather as much information as possible this was not recognized as a problem in our study. A limitation of the street interviews is that the sample size was too small to reach concept saturation. Moreover, not all the options for participants' age, gender, nationality and social status were included. Concretely, we lacked perspective from people included in minority groups (i.e. physically/mentally disabled people, homeless, elderly).

Opinions from these stakeholders need to be represented urgently in matters of healthcare. In addition, the interviews were not conducted in the participants' native language and they were not prepared by the participants, which might have caused a limitation on the information shared. The public event was conducted with a certain variety of participants, as they were selected varied on level of knowledge of the field, nationality and age. This gave us a clear representation of society. However, we were only able to conduct one FGD which is very limited and most likely did not lead to data saturation. Also, because the event took place online and we looked at issues regarding digitalisation, a topic that the participants reported to be interested in, it is possible that we could not include stakeholders who were digital illiterate. This may have biased our issues in that we only included digital literate people. Overall, we are confident that these results represent the majority of the society and, thus, we still support the need to address the findings previously noted.

The main strength of this study is, compared to similar publications, that it was interdisciplinary approached with a team composed of researchers with different backgrounds (health sciences, biomedical sciences, artificial intelligence, biology and scientific research, and forensic linguistics). This enabled us to reach different analyzing methods, when working with the information obtained from different perspectives. Also, we conducted this study with a variety of qualitative research methods (previously explained in the methods section) in order to obtain information from all the layers that characterize a complex issue. Working with the same questions in different research methods, such as in street interviews and in FGDs, resulted often in the obtention of repeated information. This worked as a reliability tool. Finally, this study was approached in a transdisciplinary way. Thus, we obtained a broad, holistic view of the concept, and we were able to analyze thoroughly the connections between the different stakeholders involved in the concept of digitalisation in health. We find this an advantage over other publications, as this concept needs an approach that transcends the traditional boundaries of research and integrates all the perspectives in one analysis.

### Implications for future research

For future research we would recommend conducting more extensive qualitative research, by increasing the sample size and the variety in age, gender, nationality and social status of the cohort regarding the interviews and FGDs. Also, representation of the minority groups is urgent, since these are usually the most vulnerable stakeholders and the ones that use the healthcare system the most. For this aim, a broader data collection is needed in the form of interviews and FGDs, preferably in real-life, since these are versatile methods. With these, we can obtain live information from stakeholders directly involved with digitalisation in a dynamic way, conducting the discussion depending on the information needed for the research. This will most likely overcome bias and it is desirable to reach data saturation.

Furthermore, we recommend doing FGDs on the specific issues we identified, in order to get a more in-depth understanding of the issues. A better understanding would help to identify suitable solutions, and maybe even solutions for specific stakeholder groups. The issues we propose to do this on are 'Privacy', 'Trust', 'Accessibility' and 'Efficiency' with regards to digitalisation in health. These will help to have a better understanding of the topic as a whole, and it will help data saturation and eliminate bias.

Additionally, testing the proposed solutions that were derived from the identified issues within the FGD regarding digitalisation in health could be a beneficial solution. one way. To test this, the participants of the FDG would be asked to participate in another FGD in which the solutions are presented. The participants would be able to share their thoughts on the proposed solutions and why they think they would work or not. The data derived from those follow-up FGDs can then be added to the issue maps as solutions. This data can then be seen as validated solutions by different stakeholders. By having the

proposed issues and solutions from the FGD participants, further research can be conducted. The literature findings can be expanded by integrating possible research papers from different disciplines that provide solutions to issues in digitalisation in health. When the findings are integrated from practice to the literature, a more comprehensive definition of the topic of digitalization in health can thus be conveyed.

Future research could investigate digitalisation in health through experiments. For example, by conducting an experiment to identify issues regarding digitalisation in a more natural setting. For this type of research, one would need to have at least 10 participants which are then divided into two groups. The first group would be the control group and the second, the experimental group. Participants should be selected in a way that they are a representation of society. For the study design, the participants are tested beforehand to determine a baseline. The control group would be exposed to non digital health strategies and have to fill out a questionnaire based on their experiences. Thereafter, the experimental group is asked to participate in the digital health strategies. For example, making online appointments, using e-health and health platforms to identify diseases. After running the experiment, participants would have to fill out a survey based on their experiences. After comparing the results of the two groups, the nature of the issues can be identified. This will give more clarity if the issues derive from digitalisation in health or if they are also present in non digital health environments.

After the establishment of issues, a follow-up study can be conducted to further investigate the topic. For instance, investigating the privacy and data collection policies in digital health. By looking at the current policies and the proposed issues, research can analyze their mechanisms and suggest potential solutions for the issue. Digitalisation in health can also be researched from a different angle. For instance, by collecting issues corresponding to different stakeholders. First, key stakeholders need to be identified through literature and interview findings. After, the main issues per stakeholder groups can be identified from experiments. Based on the findings, key issues per stakeholder group are established and gives the opportunity for researching appropriate solutions accordingly. Currently, digitalisation is being implemented in many sectors and the developments are occurring at a fast rate. It is therefore essential to conduct research on new technological developments to analyze if they are prone to be an issue or a solution in specific sectors.



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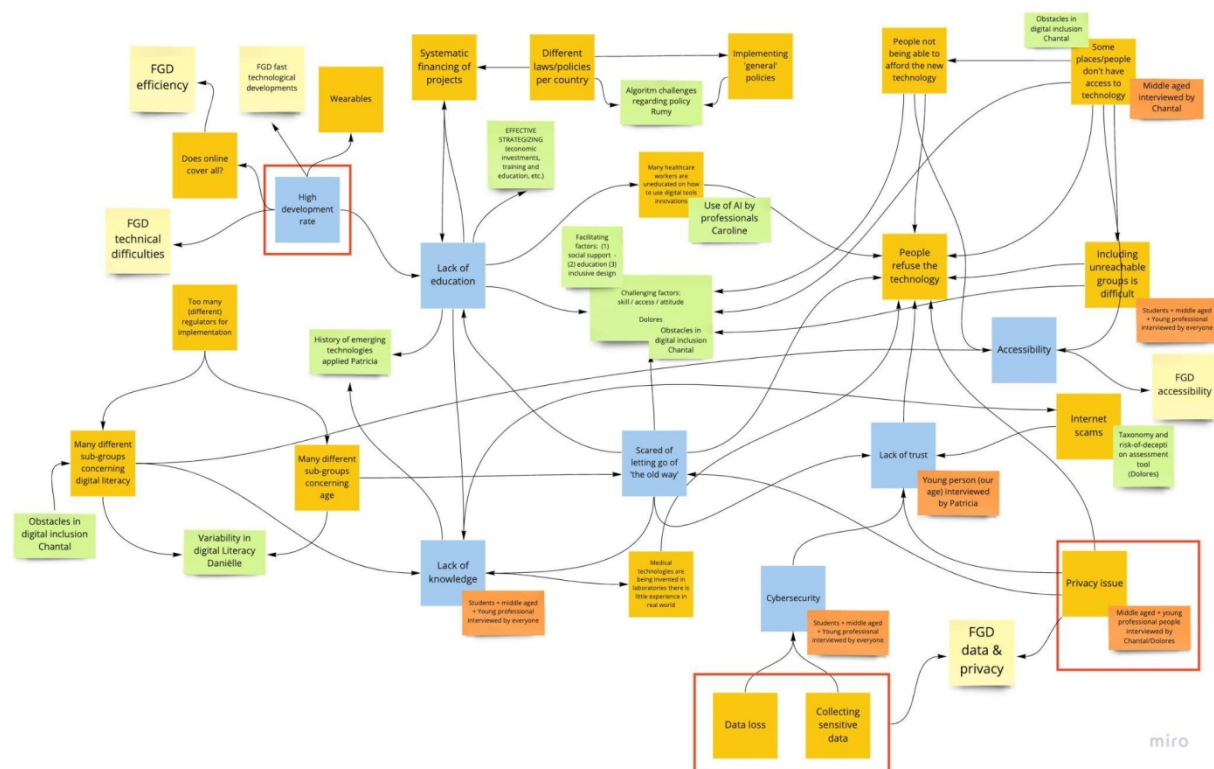
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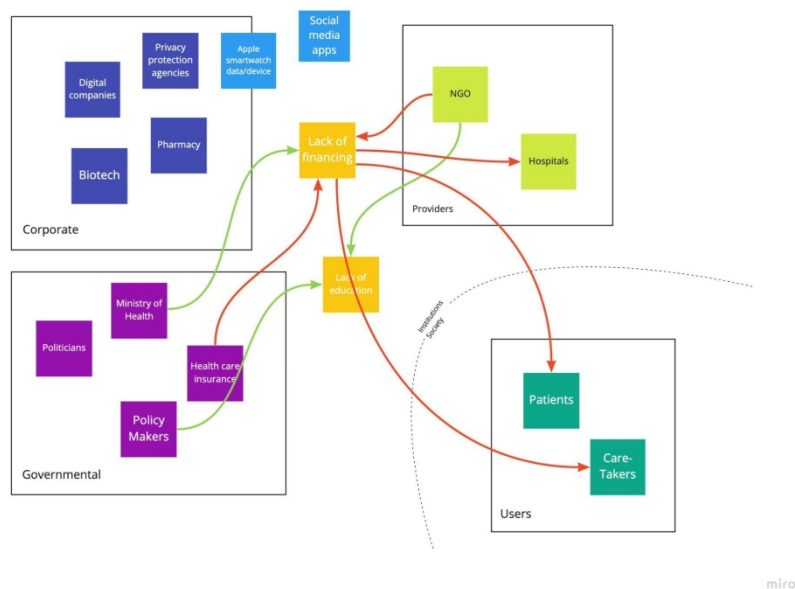
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## Appendix 1. Issue and stakeholder map

## Issue Mind Map



## Stakeholder Mind Map



## Appendix 2. Topic List Semi-Structured Interviews

1. What does 'digitalisation and digital inclusion in health' mean to you?
2. Are you familiar with 'digitalisation and digital inclusion in health'?
3. What are your experiences with 'digitalisation and digital inclusion in health'?
4. What challenges do you experience, foresee or imagine with 'digitalisation and digital inclusion in health'?
5. What do you think could be done to deal with these challenges?

### Appendix 3. Focus Group Discussion Participants

**Table 1.** Participant information

<b>Participants Interviews</b>	<b>Gender</b>	<b>Occupation</b>
A	Female	Economic sector
B	Male	International Commerce Graduate
C	Male	Philosophy Master student
D	Male	Commercial economy
E	Female	Customer service
F	Male	Economics student
G	Female	Lawyer
H	Male	Business owner
I	Male	Unknown
J	Female	Student
K	Female	Student
<b>Participants Public Event</b>	<b>Gender</b>	<b>Occupation</b>
1	Male	Phd student with background in health science
2	Male	Assistant professor
3	Male	MBA
4	Female	Practicing international technology law
5	Female	Phd student with background in public administration

## Appendix 4. Focus Group Discussion Script

### EVENT 16.00-17.30u

Key:

Techniek acties

iCSL teachers=

CSL staff members=

Students =

External speakers=

Still allocate =

*Cursive: literal text to be spoken*

*Straight: instructions and explanation*

EVENT OVERALL				
Programme	Time	Activity	Technology	People
16:00-16.05	5 min	Walk-in	Welcome slide provided by staff (recording permission?)	
16:05-16.20	15 min	Plenary introduction	Share screen + ppt slides (RINKE HEEFT BEELDMATERIAAL)	Floor Rinke (5 min) Video material DI / evt Cybersoek
16:20-17:20	60 min	Parallel breakout sessions	Jam board	Students (see annex for possible team divisions)
17:20-17:35	15 min	Plenary Closing		Floor & Anne EVT Tarrida & Roland (stadsdeel) 1-2 students

#### OPENING

##### - Openingspraatje van Rinke (5 min)

Voedsel en duurzaamheid als middel tot gesprek voor cohesie en gesprek over verbinding

- Voor digitalisering: materiaal van Christine Moser en Nicole Goedhart (5 min)
- Floor brengt alles bij elkaar en noemt ook thema van energietransitie (doet welkom en geeft rinke het woord en doet introductie)

#### CLOSING

- wederom iedereen even korte take away in chat
  - Floor en Anne afsluiting (en wel reactie van stadsdeel vragen; bv Roland en Tarida)
- KA als plek waar duurzaamheidsvraagstukken kunnen landen  
& ICSL2  
en netwerkbijeenkomst 13 januari challenge voor Dlg INcl.



Walk-in (15 min)		16:00-16:05
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**PUT UP INTRODUCTORY SLIDE** WITH WELCOME & GROUND RULES; includes:

- instruction to introduce yourself in the chat,
- this meeting will be recorded,
- welcome,
- starting time,
- mute yourself but camera on]
- 

All **students** & **staff**: [introduce yourself in the chat to give good example]

**iCSL staff**: **GIVE ALL STAFF CO-HOST RIGHTS**

Plenary introduction (15 min)		17:00-17:15
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- Welcome & introduction to event (Who?) *ca 5 min* **Floor Wijnands VoorUit**
  - Last year's event and what happened afterwards (Pictures! Ontwikkeling van event; wat kan je daarvan leren; we ontwikkelen ons zelf, wat is nodig om inclusief te zijn; online event werpt ons terug; vorig jaar aantal bewoners groot, nu inhoudelijke slag kwa partners;
  - Introduces **Barbara Bijlstra** explains how they came up with the topic, introduces HvA students
- **Topic introduction CCA:** **Rinke van Couwelaar**, Groene Kans
- **Topic introduction Digital Inclusion:** (evt iemand van **Cybersoek** en anders digitaal materiaal van Nicole Goedhart (mail))

**iCSL staff**: **{CREATE BREAK-OUT ROOMS WITH 60 MIN TIMER**; BASED ON INDICATED PREFERENCES; SEE ANNEX 1 FOR POSSIBLE SCENARIOS BASED ON THE NUMBER OF PARTICIPANTS AND STUDENTS (IT'S REAL-LIFE RESEARCH, SO THERE IS INEVITABLY UNCERTAINTY INVOLVED AND FLEXIBILITY REQUIRED!)]

[BUT SO AS A SECRETARY/TEACHER KEEP TIME CAREFULLY AND GIVE HEADS UPS AS SECRETARY TIMELY TO PROCEED TO THE NEXT STEP TO KEEP THE PACE - MAKE AGREEMENTS TOGETHER AS A FACILITATOR AND SECRETARY]

**[NOTE; BREAK-OUT ROOMS WILL BE SET WITH A TIMER! YOU CAN AT ALL TIME SEE THE TIMER AT THE TOP RIGHT OF THE SCREEN TO SEE HOW MUCH TIME REMAINS!]**

## 17:15- 18:15h Parallel breakout sessions

Introduction about the break-out session (10 min)	Students	16:20-16:25
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**Wait until break out room is full!**

**Student moderator:**

Introduce yourself & explain roles (moderator, if applicable: 2<sup>nd</sup> moderator, observer/notes).

- *My name is [...] and I am master student at the VU. I am taking the iCSL course because I am interested in [...].*
- *My role today is to be [...]. In this role I will [... describe role, concisely...]*
- *I am doing this together with [names other students]; [other students indicate who they are]*

**Student moderator:**

Explain goals and practicalities of this session.

- *The goal of this session today is to learn about your experiences and identify challenges around*
- **FGD1: NL**
- **FGD 2: NL**

FGD 3: digitalisation in health

FGD 4: digitalisation in health

- Participation in event is voluntary, you are free to leave at any point during the session
- What you explain today will remain confidential and used only for this research project.
- For us to make sure we really capture everything you say during the event while also having full attention for you during our discussion, we will record this meeting. This will only be used anonymously. If you have a problem with this, please indicate this through a (private) chat message.
- You received an online consent form. If you have not yet filled this out yet, please have a look at it right now, by following the link that is copied in the chat now

**Student secretary** asks for consent in chat - see text below - and checks whether everyone gives consent in chat

- We are asking for your own experiences and opinions, so please feel comfortable to say what you really think.
- We would like to hear as many different points of views as possible, so feel free to disagree with someone else and share your own view, but please also respect the opinions of others.
- In order to have a lively discussion, we ask you to unmute your microphone for as long as we are in the break-out room with this smaller group. Only if you have a lot of background noise, it might be better to mute yourself.

**Consent text:** I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and I can withdraw from the study at any time, without having to give a reason

**Staff members:** TURN ON RECORDING IN BREAK-OUT ROOM SESSIONS

Introduction round participants (10 min)	Students	16:25-16:35
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**Student moderator:** We'd like to start with an introductory round. [goal is that participants get to know each other and share their motivations to join, their relation to the topic] As a way to get to know each other we would like to ask everyone to

- FGD1: te delen waar je blij van wordt (in het kader van digitale inclusie in Nieuw-West)

FGD 2:

FGD 3: EN

FGD 4: EN

And introduce yourself

- with that,
- from what role you are here,
- and why you are here
- and what you hope to take with you from today

**Student facilitator:** → comment here if necessary (people with the same background, or different etc.)

**Student moderator:** [name people one by one, start with a student or teacher to lead by example of a concise but complete answer; thank people after sharing and point to the next person]

**Students & staff:** participate

Get acquainted with Jamboard (10 min)	Students	16:35-16:45
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→ You first explain here [show it] how jamboard works, then you give the link and people can try it out for themselves

**Moderating student:** In order to collect your inputs and give everyone a voice, we will use an online tool to collect your opinions and experiences. This tool is called Jamboard and allows you to type as if you put post-its on a large sheet. We will first show you how this tool works and then we will practice with it and move on with the session.

**Moderating student** shares screen with the jamboard that will be used for the first step in the discussion and shows how to create postit, write, make a new one, exit the post-it creation mode, change postit colour, write text that is not on a post-it and draw; end share screen

→ You do that with the Jamboard from 'what are your experiences with digitalisation in health', so we combine that phase with exploring the jamboard.

**Student secretary:** [AFTER explanation is done, shares link to jamboard in the chat]

**Moderating student:** now you can give it a try yourself. We have shared the link to the Jamboard in the chat of Zoom. You'll see a first sheet. Here we would like to ask you to write down:

FGD 1: NL

FGD 2: NL

FGD 3: What your experiences with digitalisation in health are?

FGD 4: What your experiences with digitalisation in health are?

Feel free to write, place a postit, or draw something. If you run into any trouble doing this, feel free to send me a chat message. You can do this privately by selecting my name: [repeat your name]. You can do this during the short break that we will now take. Please be back at 15:35 so we can continue!

**Student secretary:** [while people interact with Jam board, write down already which participant will use which colour post it, name the participants directly, only send this in the chat LATER]

**Facilitating student:** Ask people to briefly tell you about their activities {if you see new things that have not yet been shared in the introduction}

As you can see in the chat, [name student secretary] assigned everyone a color post-it, but I repeat it now: [repeat color distribution posted in chat by secretary student]. [it may be that people have the same color with >5 participants], from now on you can use this color when you write something on a post-it, then we have a bit more overview of who writes or does what.

Then go to the next jamboard slide

Hopefully everyone now understands how jamboard works, let's test that with the next question. I am very curious

FG3: NL

FG4: NL

FG3: what is already going well in this / in your activities. Would you mind sharing that on post it again?

FG4: what is already going well in this / in your activities. Would you mind sharing that on post it again?

**Facilitating student:** Ask people to briefly elaborate on what is going well, and let them respond to each other.

Collecting issues (15 min)	Students	16:45-17:00
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→ In this setting, try to keep the conversation going, ask questions, let the participants respond to each other, you don't have to be too silent. Let people think for a minute about what they want to write down, but not much longer, otherwise it will slow down, and 15 minutes will pass in a minute, otherwise you won't get to discussing what's on the jamboard and the exchange about it and with it deeper understanding.

**Student facilitator:** Het is fijn en leuk om te zien dat er zoveel goed gaat. Maar er zijn vast ook veel uitdagingen.

- FG1: NL

- FG2: NL

- FG3: Therefore, we would now like to explore what challenges you face in your activities or work in digital inclusion?

- FG4: Therefore, we would now like to explore what challenges you face in your activities or work in digital inclusion?

**Students:** [Be quiet and look at the Jamboard: is everyone adding something? How far are they, do we already need to continue, or do people need some more time?]

**Student secretary:** [If someone is not adding anything, message them on zoom to ask if they can use a hand]

**Moderating student:** I can see the board filling up, good! Finish your last thoughts and words, as we will continue soon.

**Moderating student:** [When all/most people are done, continue]

**Moderating student:** I see that you have all added something to the sheet. Good, thank you! Is there anyone who would like to tell a little more about the thing that they have written down?

[If no one speaks up, point someone out and invite them to tell a little more; what did they write down? What do they mean by it? Why did they write that down? Then invite a next person or point out a specific post-it and invite the person who contributed that one to tell more about it. Continue the conversation this way until everyone has contributed something, ask some deepening questions (e.g.: what do you mean by that? How does that affect you? Etc), but also make sure to give everyone a turn and keep an eye on the time. Also invite others by questions such as: did someone else write down something similar? Or maybe something else entirely? While talking already start clustering and structuring the inputs given].

**Student co-facilitator (if applicable, otherwise: student secretary):** [If any new issues come up that were not yet on the board, add those as well, preferably in a different colour still]

**Student secretary:** meanwhile, bring together the key points of this phase on the last (6th or 7th) jamboard slide [summary] (before the end where you briefly present this

Defining needs (15 min)	Students	17:00-17:15
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→ Also here: in this setting, try to keep the conversation going, ask questions, let the participants respond to each other, you don't have to be too silent. Let people think for a minute about what they want to write down, but not much longer, otherwise it will slow down, and 15 minutes will pass in a minute, otherwise you won't get to discussing what's on the jamboard and the exchange about it and with it deeper understanding.

**Student moderator:** First check whether there are any questions. Then:

*Now that we have gained insight in the issues that you come across in your daily work and personal life, we would also like to get an idea of any ideas or suggestions you have on how you would be helped to overcome them. We now all move to the second sheet of the Jamboard, I'll show you how to do that.*

**Student moderator:** [share screen and show how to move to the next sheet of the Jam board; exit share screen]

**Student moderator:** *Now please do the same as we did before, but instead write down what is needed to address what we identified in the last step.*

**Students:** [Be quiet and look at the Jamboard: is everyone adding something? How far are they, do we already need to continue, or do people need some more time?]

**Student secretary:** [If someone is not adding anything, message them on zoom to ask if they can use a hand]

**Moderating student:** *I can see the board filling up, good! Finish your last thoughts and words, as we will continue soon.*

**Moderating student:** [When all/most people are done, continue]

**Moderating student:** *I see that you have all added something to the sheet. Good, thank you! Is there anyone who would like to tell a little more about the thing that they have written down? [*

*If no one speaks up, point someone out and invite them to tell a little more; what did they write down? What do they mean by it? Why did they write that down? Then invite a next person or point out a specific post-it and invite the person who contributed that one to tell more about it. Continue the conversation this way until everyone has contributed something, ask some deepening questions (e.g.: what do you mean by that? How does that affect you? Etc), but also make sure to give everyone a turn and keep an eye on the time. Also invite others by questions such as: did someone else write down something similar? Or maybe something else entirely? While talking already start clustering and structuring the inputs given].*

**Student secretary:** meanwhile, bring together the key points of this phase on the last (6th or 7th) jamboard slide, and see whether you can logically link the challenges and needs identified

Wrap-up of discussion sessions (5 min)	Students	17:15-17:20
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**Student moderator:** *We are now reaching the end of the discussion. Thank you so much for all your contributions, personal experiences, opinions and stories. My colleague [NAME OF SECRETARY] will give a quick summary of what we discussed.*

**Student secretary:** [SUMMARIZE MOST IMPORTANT POINTS] *Does anyone have anything to add to this? [REMAIN SILENT TO SEE IF ANYONE WANTS TO SPEAK UP, AND IF SO, GIVE THEM A TURN]*

**Student moderator:** *Then we will now be summoned back to the main room of the meeting for the plenary closing. When back there you will be asked to post one thing that you took from this discussion, so start thinking already about what you would like to share about this session to the other groups!*

**>> BACK TO THE MAIN ROOM (BREAK OUT ROOMS WILL CLOSE AUTOMATICALLY BASED ON TIME SET IN THE BEGINNING)**

Plenary closing (15 min) in Dutch	1/2 students	17:20-17:35
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**Anne & Floor OF WHICH STUDENT(S)??:** *We hopen dat je een interessant groeps gesprek hebt gehad! We zullen nu heel kort delen en vergelijken wat er in alle verschillende sessies naar voren kwam. Daarom willen we jullie allemaal vragen om in de chat te posten wat jullie uit de discussie in jullie groep hebben gehaald. Houd het bij een paar woorden, of maximaal één of twee zinnen. Plaats het in de chat, zodat we allemaal kunnen zien wat iedereen opschrijft. We zullen een minuut of twee stil zijn zodat iedereen het punt kan formuleren dat ze uit hun discussie hebben gehaald.*

*We hope that you had an interesting group discussion! We will now very briefly share and compare what came up in all of the different sessions. We would therefore like to ask all of you to post in the chat what you took from the discussion in your group. Stick to a few words, or one or two sentences max. Please post it in the chat so we can all see what everyone writes down. We'll be quiet for a minute or two for everyone to formulate the point that they took from their discussion.*

**Anne & Floor OF WHICH STUDENT(S)??:** *[blijf stil, zie dingen binnenkomen; en als de meeste mensen iets lijken te hebben gepost, vermeld dan dat de tijd bijna om is en geef mensen nog wat meer tijd]*

**Anne & Floor OF WHICH STUDENT(S)??:** *Ik zie veel interessante dingen in de chat, bedankt!*

*[zoek een paar dingen uit die in de chat zijn opgeschreven en vraag de persoon die het heeft geschreven om het uit te werken; anderen vragen om door hand-raise (echte hand-raise voor de camera!) aan te geven of ze dit herkennen, of iets soortgelijks ervaren]*

*I see a lot of interesting things in the chat, thank you!*

*[pick out a few things written down in the chat and ask the person who wrote it to elaborate; ask others to indicate by hand-raise (actual hand raise in front of the camera!) if they recognize this, or experience something similar]*

**WHO?:** *E.g Floor/Hassan --or someone from municipality: reflect on all input from the dialogues, what can we learn from this and pick up? → Floor and Anne work on this on monday morning 6-12*

**WHO?:** *[als de tijd bijna om is:] Nogmaals bedankt voor jullie deelname!*

**ICSL staff:** *Mede namens alle partners van VoorUit en het Calvin College en de VU bedankt voor de deelname! Voor nu, zijn er nog vragen? Laat het ons weten als je interesse hebt om in de toekomst met ons samen te werken, bijvoorbeeld in studentenprojecten. We laten de Zoomroom nog enkele minuten open als je op een informele manier met de andere deelnemers wilt kletsen. Binnenkort sturen wij u per e-mail een samenvatting van de bijeenkomst, en kunnen we als er behoefte is, mogelijkheden voor projecten met studenten die hieruit kunnen voortkomen, met elkaar bespreken. Bedankt!*

*Also on behalf of all partners of VoorUit and the Calvin College and the VU, thank you for participating! For now, are there any questions? Let us know if you are interested in working with us in the future, for example in student projects. We will leave the Zoomroom open for a few more minutes if you want to chat with the other participants in an informal way. Soon we will send you a summary of the meeting by e-mail and, if necessary, we can discuss possibilities for projects with students that can arise from this. Thank you!*

## Appendix 5. Focus Group Results from Participants (Raw Data)

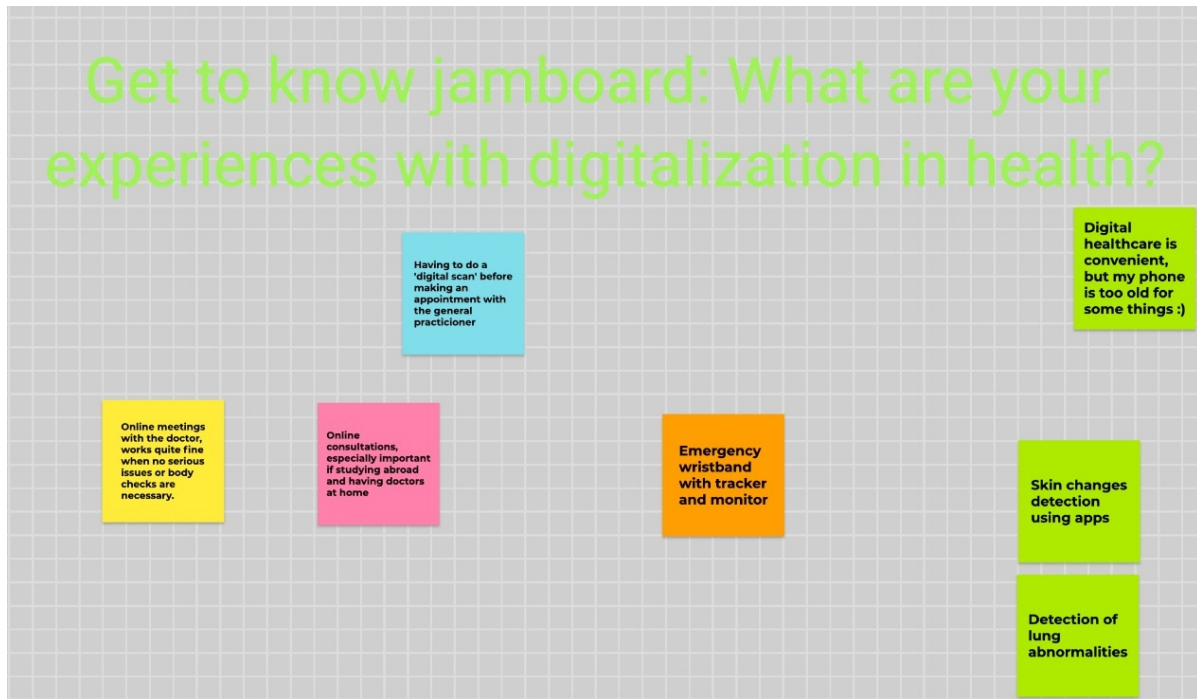


Figure 1. Jamboard results 'Get to know Jamboard: What are your experiences with digitalisation in health?'.

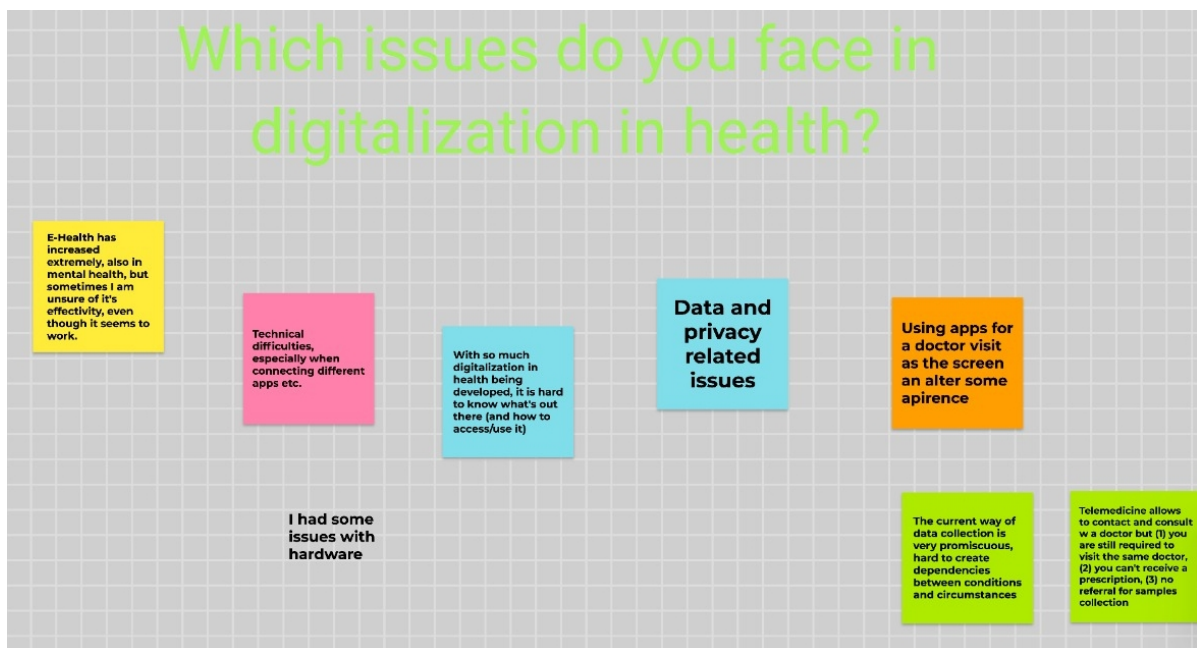


Figure 2. Jamboard results 'Which issues do you face in digitalisation in health?'



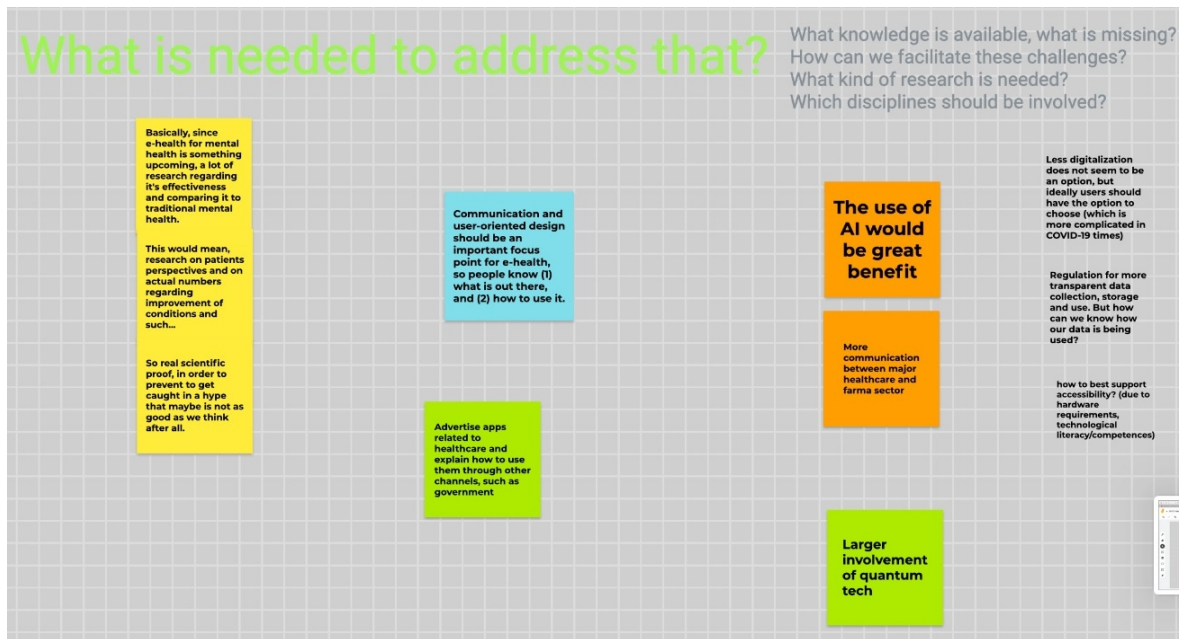


Figure 3. Jamboard results 'What is needed to address that?'

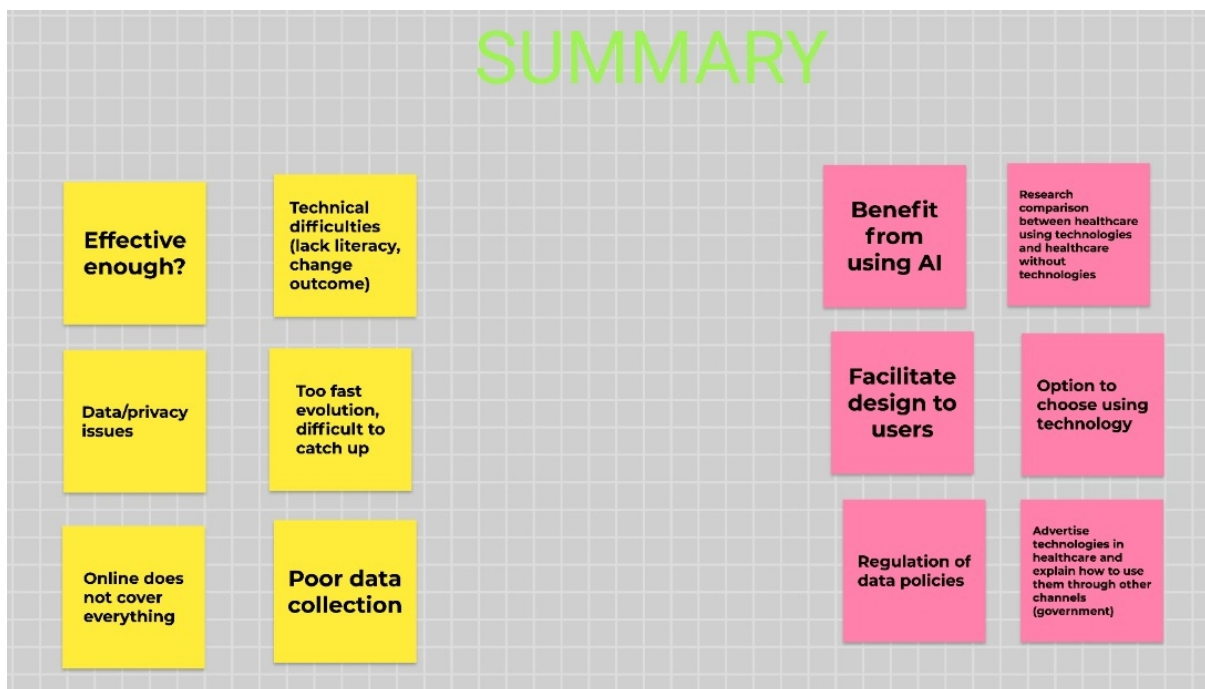


Figure 4. Jamboard Summary made by the secretary.