



EKA

Ane Laande's BA thesis

Co-Creating a Design Fiction with AI
and the elderly of our futures:

Digilugu in 2045

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AI and the elderly of our futures:
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Big thanks

- To my supervisor Nesli, who was always so into the topic every biweekly and the in-between time. Your enthusiasm helped me through sleepless nights.

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Sincerely,

Ane

Table of contents

Glossary	6
Abstract	7
Introduction	8
Background	10
Defining the focus	13
Methodology	15
Findings from the upTIS project	17
Speculating about the future[s]	23
Design fiction creation	27
Alice x Säde: Monthly recap	35
Summary	46
Lühikokkuvõte	47
References	48
Annex 1 - Semi-structured interview plan	51

Glossary

Digilugu - Digilugu, Patsiendiportaal (Patient Portal) and Terviseportaal (Health Portal) are the same. In this paper, Digilugu is referred to as the Patient Portal, which allows Estonian residents to view their medical data, submit statements of intention, appoint representatives for themselves, and act on behalf of the people who have appointed them as their representative (Patient Portal - Patient Portal, 2009). It was first launched in 2009 (Ninn, 2010)

TIS - (Tervise Infosüsteem) a part of the e-health concept published in 2005 and launched in 2008 as a nationwide system planned to consist of four major parts: a digital health record (today more widely known as the central system of the health information system), digital images (Pildipank), a digital registry and two web gateways: a doctor portal for health professionals and a patient portal for patients. (Terviseportaal- Eelanalüüs, 2020)

upTIS - Uue Põlvkonna Tervise Infosüsteem is Estonia's New Generation Health Information System.

TEHIK - The Health and Wellbeing Information Systems Centre is a centre of excellence for information and communication technologies (ICT) in health, social and work-related areas, who create major public sector IT projects, advise other public authorities on new developments and management, and pioneer new technological solutions. (Meist, n.d.)

GPT - generative pre-trained transformer.

ChatGPT - an artificial intelligence (AI) model which interacts in a conversational way. The dialogue format allows ChatGPT to answer follow-up questions, admit mistakes, challenge incorrect premises, and reject inappropriate requests (OpenAI, n.d.)

Abstract

This thesis puts forward a design project in collaboration between (i) a digital product design BA student, (ii) the owners of the upTIS project, (iii) the elderly of the future who are expected to use Digilugu in the year 2045, and (iv) artificial intelligence. The project aims to envision the role of Estonia's patient portal in 2045 and explore ways to empower patients by that time.

During this project, I (the digital product design BA student) have co-created a design fiction about Digilugu in 2045. I first familiarised myself with the foundation of Estonia's health information system. I did this by reviewing analysis documents related to the system's update until 2030 and consulting with experts leading the project. Next, I led individual workshops with 6 people aged 45-55, who will be the elderly users of the system in 2045. The participants were chosen based on the interest in AI, design, or health sports. Those individual workshops prepared the ground for the next step: brainstorming with AI.

The last phase of my co-design session was a bootlegging method where I collaborated with AI to mix familiar concepts, and create juxtapositions that stimulate creativity. I used a self-written prompt for myself and ChatGPT as a brainstorming tool to generate ideas for the technology category in the method. I documented all ideas from the three categories on Post-it notes, which were then randomised and combined to expand my imagination about future possibilities.

The resulting design fiction narrative — grounded in consultation with the owners of the upTIS project, individual workshops with the elderly of the year 2045, and the Bootlegging with AI — provokes thoughts about technological friendliness, privacy, autonomy, and death in the context of future healthcare.

Introduction

As Estonia's population ages, the demand for medical care is rising, putting significant strain on the limited resources of healthcare professionals. To address this challenge, TEHIK aims to **empower patients** by 2030 through a user-friendly patient portal with visual aids and easily comprehensible information. This initiative is designed to become a reliable alternative to searching for medical advice online, such as through "Dr Google." The question remains: how can we continue to support our elderly patients beyond 2030?

In this thesis, I investigated the potential future of Digilugu in 2045, with a particular focus on the patient side of the health information system. My interest in this topic was sparked when I read the vision document for upTIS in 2030, which made me wonder about the developments beyond that year. Specifically, I aim to explore the next priorities for healthcare support systems, emphasising the elderly population in 2045.

I made a design fiction using the futures cone speculative design method. The thesis structure unfolds as my design path inspired by the futures cone. First, you can read more about why I chose this topic besides it being the UN's Sustainable development goal for 2030 - goal nr 3: "Ensure healthy lives and promote well-being for all at all ages," (Martin, 2022). After background information, I concluded the main findings from the upTIS vision for 2030, Nortal analyses for the patient portal for 2030 and semi-structured interviews I made with different stakeholders: upTIS project manager, Health Portals project manager, Professor of Health Behaviour and Sports Biology at Tallinn University and chief specialist on diagnostics and personal medicine at Tervisekassa. The next step was to include the elderly of 2045 in 6 individual workshops to get the patient's view of the future in the mix. I took the ideas and quotes from the workshops and used them in the bootlegging design method (Picture 1). The ideas for the third category were generated using the same prompt by myself and ChatGPT.

When all future dreams and suggestions - quotes, ideas and technologies - were on the table, I picked out the most popular and provocative ones. Based on those, I wrote the design fiction narrative: Alice x Säde: Monthly Health Update.



Picture 1. The bootlegging design method in progress

Background

Even if Estonia is well known for its success story as an e-country, our health information systems are quite outdated. I was led to the health info-systems topic by an offer from a friend at the University of Tartu, who invited me to participate in a seven-week competition organised by a Finnish law firm. The focus of the competition was to design an MVP for European rare disease registry and provide a scalable operating model based on the philosophy of data altruism. The project (ERDR Competition, 2022) launched in the second week of September 2022, when the organisers handed out only a few short videos summarising the topic and did not define any expectations for the outcome, except for what we could understand from the two short videos. Our main takeaways were to somehow take into account the new soon-to-be-released data altruism law, and everything else was left for our imagination to fill in. Thus, the team — Markus Marandi and Karl-Martin Voovere, students of the University of Tartu's Institute of Computer Science, and Helen Bender and I, students of Digital Product Design at the Estonian Academy of Arts (EKA) — decided that we would like to present our vision of the information architecture and clickable prototype of the European Rare Disease Registry as the outcome. After meetings with Estonian rare disease and registry information architecture professionals, we agreed that our main problem was: "The life quality of the patient (and their loved ones) depends on the doctor's ability to first diagnose and then propose the best possible solution for a rare disease." Therefore, we decided to support the doctors and scientists by focusing on their needs while also keeping in mind the patient's needs.

A rare disease is defined at the European Union level as a disease affecting up to 5 out of 10 000 people. Currently, there are an estimated 7000-8000 different rare diseases in the world, so the total number of people with rare diseases is still high. The majority of rare diseases are genetic in origin, but there are also multifactorial and environmental diseases. (Mis on Haruldane Haigus Ehk Harvikhaigus, 2021)

Because rare diseases are so uncommon, often only a few people in an entire country are affected. For the rare disease doctor, treating a patient with a first-time medical history is common. However, this makes diagnosing the disease a complex and lengthy process (Mis on Haruldane Haigus Ehk Harvikhaigus - Harvikhaigused, 2021). Thus, the rare disease physician sometimes needs external advice from another specialist who has treated the same disease. The series of interviews with two of Estonia's rare disease doctor-researchers, Katrin Õunap (Professor in clinical genetics at the University of Tartu) and Sander Pajusalu (Head of the Genetics and Personalized Medicine and Medical Geneticist at the Tartu University Hospital and Associate Professor at University of Tartu) revealed that current methods of storing patients' genetical and other, rare diseases related data is safe, however not suited for sharing. The registry we envision would bring rare disease information exchange into the 21st century and make it as fast and convenient as possible for the doctor, which in turn would help the patient's quality of life.

Towards the end of the competition, we discovered that we had committed to the doctor's side and had forgotten that the patient existed, even though we always told ourselves that we were doing the project so that the patient would have a better quality of life- more accurate and faster diagnosis and a more analytical and understandable treatment journey. To achieve it through our proposed rare disease registry, the doctor had to make time for themselves to use the new registry and the tools that would have come with it with every patient. Not only are the rare disease doctors highly overbooked, but all Estonian doctors are overbooked. So, in the last four days of the competition, we dug up a quote from one of the rare disease doctor-researchers Sander Pajusalu: **"Don't underestimate the patient!"** and quickly refocused our attention on the patient's needs. That focus ended up helping us win the competition in November 2022.

To my astonishment, Estonia's health information system, Digilugu (also known as Patient Portal), was frequently cited as an advanced and futuristic example by the competition organisers and numerous Scandinavian health information system experts during the project. I found this surprising since I had always

associated Digilugu with an outdated 2009 aesthetic and an uncomfortable user experience.

Despite its limitations in user experience, Digilugu is trusted and widely used among Estonians. The portal was essential during the recent pandemic because we could get our immunisation passports only through Digilugu. The technical abilities of this health information system are considered very advanced on the world spectrum - what makes it special is usage of Estonian own built X-tee, which facilitates secure and trusted online data exchange between public authorities and the private sector (Andmevahetuskiht X-tee | RIA, n.d.). However, the user experience and interface of TEHIK's built Digilugu are still in the year 2009. This issue was also noticed by Dmitri Izjumski, who wrote his BA thesis on the topic of "The health information system Digilugu analysis of the usability of the patient portal; and proposals for its improvement"(Izjumski, 2016) and Eliise Talvaru "Patsiendiportaali kasutajaliidese analüüs" (Talvaru, 2015) back in 2015.

Similarly to us BA students, TEHIK has also seen that Digilugu needs updating and has prepared a comprehensive document called "A new generation of health information system (upTIS) - a vision for a health information system". Although the thought of upTIS was put in motion already in 2014, the before-mentioned document was updated last on 11.06.2021 and produced in the framework of the upTIS project ("Uue Põlvkonna Tervise Infosüsteem- Visioon Tervise Infosüsteemile," 2021 and Viljar Pallo, interview, 3.03.2023). After publishing upTIS's vision, between November 2021 and May 2022, Nortal AS conducted an analysis of the Patient Portal, commissioned by the National Institute for Health Development in cooperation with the Centre for Health and Welfare Information Systems, the Ministry of Social Affairs and the Health Insurance Fund (Nortal, 2022). I was thrilled to see that Estonia's patient portal is being thoroughly modernised in the near future and that the work will be done by TEHIK and a cluster of Estonian and Finnish leading Development and Design agencies like Iglu, Industry62, Nortal and DUX (Patsiendiportaali Uued Tegijad, n.d.).

I trust that TEHIK and its partners will do a good job on the 2030 version of

Digilugu - renamed Terviseportaal - and won't underestimate the patient, as is also stated in the 2030 vision document ("Uue Põlvkonna Tervise Infosüsteem- Visioon Tervise Infosüsteemile," 2021). But as a young patriotic Estonian digital enthusiast - **why stop in 2030?**



Picture of my usual workspace at EKA

Defining the focus

As I was so focused on the rare disease patient for many months at the beginning of the last year of my Bachelor's studies, I saw an opportunity to continue with the same focus on the Estonian healthcare landscape. My main goal is to create a design fiction from the eyes of the patient of a possible future of Digilugu in 2045.

What could the vision of Digilugu look like for 2045?

How could the patient be empowered in 2045?

How could AI be part of the design fiction creation for 2045?

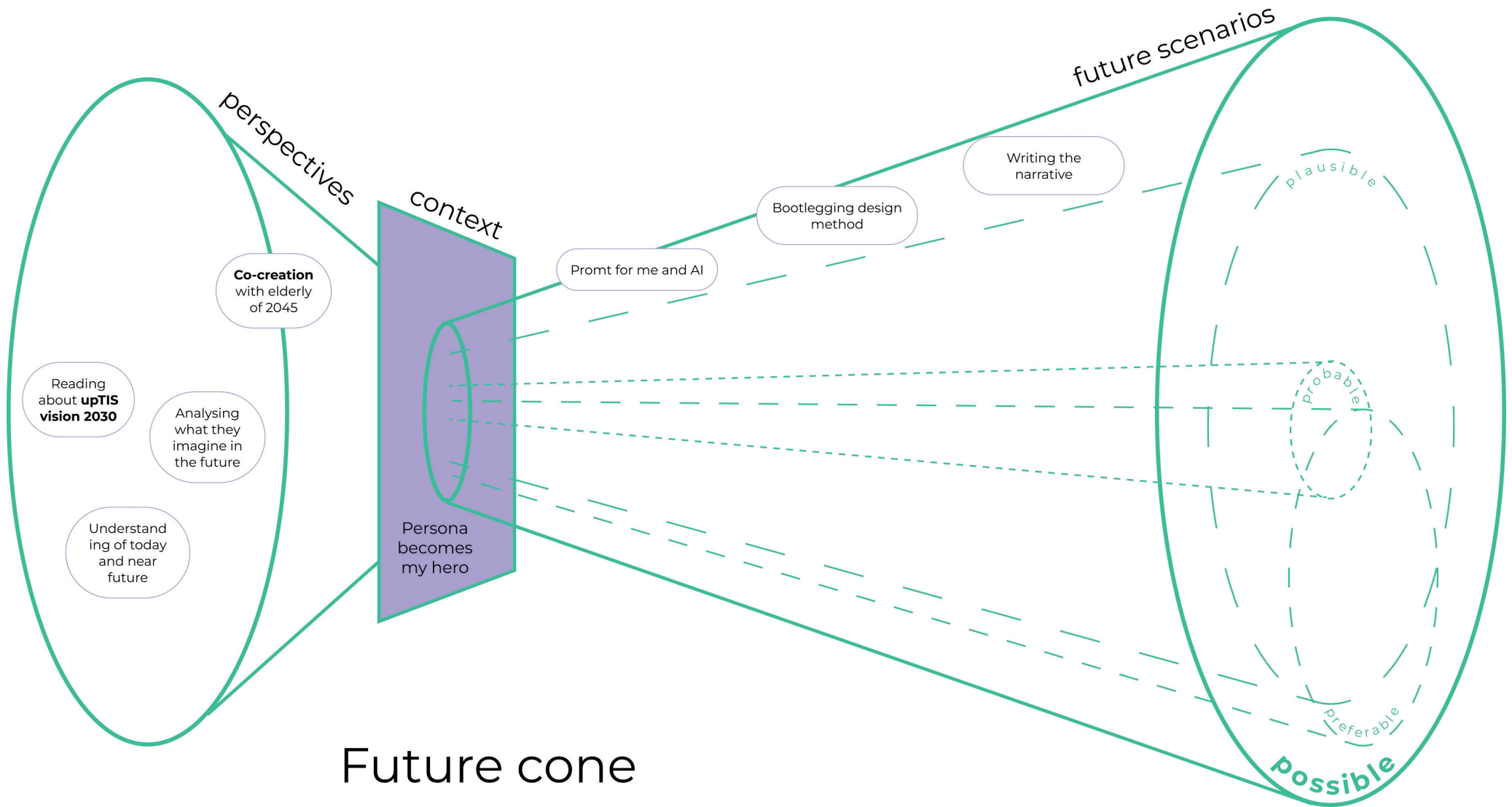
Design Fiction is a literary genre similar to science fiction, but it often involves creating speculative scenarios that explore the social and cultural implications of new technologies and innovations. Design fiction aims to engage readers and viewers in conversations about the impact of emerging technologies and how they might shape our future (Sterling & Wild, 2005).

In the Design Fiction, I aim to explore the future of Estonia's Digilugu service in 2045, focusing on the elderly population aged 65 and older. The goal is to not only consider the potential future of the system but also to envision scenarios that provoke thought and challenge the readers' comfort levels. By doing so, I hope to raise awareness and encourage discussions among stakeholders, including policymakers and healthcare professionals, about the needs and challenges of the ageing population in a digital world. I chose to concentrate on the elderly of 2045 because they represent the generation that did not grow up with technology but had to adapt and learn to use it daily. My assumption was confirmed by Professor of Health Behaviour and Sports Biology at Tallinn University Kristjan Port, who said that the 45-50 year olds today are precisely Dr Google's partners. They know

that they can communicate with their super busy family doctor also by phone, and if they are better informed of their potential disease, that communication will be more informative and useful at the end (Kristjan Port, semi-structured interview, 24.03.23). Additionally, I decided to focus on the elderly due to the global trend of an ageing population, which indicates that there will be more elderly people in the future.

To create the Design Fiction, I conducted individual 1-hour co-creation sessions with today's 45-55-year-olds, who will be the elderly in 2045. I used their futuristic ideas to develop prompts for myself and ChatGPT(4.0) to ideate further using the bootlegging design method. By collaborating with AI as a design companion, I aimed to harness a powerful tool for my work and gain fresh insights that only a system with extensive knowledge of the internet since 2021 could reveal. For example, this last sentence was written by me and then clarified by ChatGPT.

My secondary goal to create a design fiction for my Bachelor's thesis is because of the speculative design course that took place at EKA in 2022. This collaboration with Ülemiste City brought me out of my comfort zone — it was the fastest way I have ever grown as a designer and a person. I feel like I have been very patient-oriented throughout the third year at EKA and would like to continue with the same topic. I have also always loved storytelling, so I would like to create a memorable story to further help our exemplary patient portal through Design Fiction.



Future cone

Figure 1. Future Cone method, scheme taken from the book titled "The Extrapolation Factory Operator's Manual" (2016) by Chris Woebken, Elliott P. Montgomery. Available at: <https://epmid.com/projects/Extrapolation-Factory-Operator-s-Manual>

Methodology

As mentioned earlier, I trust that TEHIK and its partners will successfully create the 2030 version of Digilugu. However, as a young digital enthusiast, I can't help but wonder, why stop in 2030? Therefore, my goal is to speculate on alternative futures of Digilugu, specifically focusing on its relationship with the elderly population in 2045. To achieve this, I will create a Design Fiction of Digilugu in 2045, drawing from the existing 2030 vision documents, co-creation ideas with the elderly of our futures and ChatGPT.

My design fiction is inspired by Dunne and Raby's A/B manifesto. I used design as a medium. Fiction designs for debate, for how the world could be. It is provocative and plays with ethics (Dunne & Raby, 2013).

For my design method, I will employ the Futures Cone (Figure 1), which helps classify and explore future possibilities from a specific perspective. My perspective was shaped by studying the 2030 vision for Estonia's health information systems, engaging with project managers of upTIS and the new patient portal projects, and consulting with a personal medicine professional and a professor of health behaviour and sports biology at Tallinn University, and the chief specialist on diagnostics and personal medicine at Tervisekassa. After gathering this foundational information, I conducted six individual hour long workshops with today's 45-55-year-olds, who represent the elderly of our future. In the context phase of the method, the ideas gathered from these workshops resulted in a persona who becomes the protagonist of my Design Fiction story. I aimed for this future scenario to reside within the possible cone of the futures cone, as I wanted the story to provoke thought and challenge expectations rather than fitting neatly into a more predictable or predetermined outcome.

AI as a design tool

We live in a fast-paced tech innovation world, which can sometimes lead to concerns about the future, such as whether the latest cutting-edge tools could replace our jobs. Fortunately, human interaction remains essential, as AI has not yet fully mastered this aspect of our lives. As Tanel Kärp, associate professor of interaction design mentioned during a discussion at EKA's AI coffee morning, "ChatGPT is just another tool to use, although it may be the most capable tool known to humankind yet." I opted for ChatGPT 4.0 from the recently introduced selection of chatbot tools, as it delivers the most human-like responses, making it the most advanced option available. ChatGPT is trained on a large corpus of text data and uses deep learning techniques to understand the context and meaning of language. It can answer a wide variety of questions and engage in open-ended conversations on a range of topics.

I have a personal interest in harnessing this new tool, which gained popularity in October 2022. I am particularly intrigued by the perspectives that a tool with knowledge from the entire internet up to 2021 can offer.

It's crucial to clarify that using ChatGPT does not constitute plagiarism. Andres Karjus, a researcher in cultural data analysis at Tallinn University, explains that ChatGPT is a chatbot that responds to every question. The more precise the prompt, the better the answer. However, there is no inherent knowledge in its responses, just suggestions based on its vast training data. While we can assume that its training data is derived from the entire internet up to 2021, we don't know for certain. Since the tool generates answers based on prior training, there is nothing to cite. ChatGPT doesn't produce original content; it merely offers educated guesses based on the input it receives from human users.

In this project, I am using ChatGPT as a design buddy. Yes, I asked it to generate ideas for the bootlegging method. But I feel like it most helped me throughout the project — I asked the chatbot for synonym words, to rewrite some confusing

sentences or paragraphs and to tell me, for example, what should be in an abstract of a BA thesis. Communicating with the chatbot made the process faster; it was easier to ask than google.

Findings from the upTIS project

To understand the upTIS project better and to interpret what could the vision of Digilugu look like for 2045, I have interviewed Viljar Pallo (upTIS project manager at TEHIK), Kersti Vaikmaa (Health Portalt's project manager at TEHIK), Tiina Österman (Chief specialist on diagnostics and personal medicine at Tervisekassa) and Kristjan Port (Professor of Health Behaviour and Sports Biology at Tallinn University). This section will present my findings and how they informed my design fiction creation process.

upTIS present and near future until 2030

There are many things to this day we Estonians can be very proud of in our Health Information System, like the extensive re-use of the national base-infrastructure X-road; transparency to the patient in the form of data usage logs; strongly managed standards and strong and effective cooperation between hospitals and IT-people. For example, in 2019, Estonia was a world leader when we made the family benefits applications automatic. To launch the service, a legal amendment and a comprehensive survey of new parents were necessary. However, since 2019, the automated application system has been operating seamlessly. (Antson, 2019 and Kersti Vaikmaa, semi-structured interview, 8.03.23).

Today, many things can be improved in Estonian TIS. For example, Patient Portal is outdated in its usability, accessibility, looks and data output standards.

Estonia's population is ageing, leading to an increase in healthcare needs, which leads to The Health Insurance Fund's budget deficit constantly worsening ("Uue Põlvkonna Tervise Infosüsteem- Visioon Tervise Infosüsteemile," 2021). The data exchange system is lagging behind worldwide and is still document-based (Viljar Pallo, semi-structured interview, 3.03.23).

The challenges faced by the Estonian healthcare system are not solely due to an ageing infrastructure but also involve an ageing workforce of family doctors. In 2020, almost a quarter of family physicians in Estonia were over 65 years old, meaning older than the retirement age in Estonia, reflecting a critically high average age among these professionals (Bns, 2020). In addition to their advanced age, these doctors are burdened with excessive workloads, making their time extremely valuable. To address these issues, it is crucial to develop and implement new services that are faster and more efficient, reducing administrative tasks and paperwork. This would enable family doctors to focus on their primary responsibility: providing direct patient care (Kersti Vaikmaa, interview, 8.03.23).

In what follows, I will provide a deeper insight into the situation of the Patient Portal currently and an outline of the fundamental principles of the new generation of TIS and a closer look at the vision for the Patient Portal.

Patient portal Digilugu today

Digilugu is a self-service health data service with a wide range of functionalities. The patient portal Digilugu has changed little over the past decade. The concept and design of the portal have remained the same since 2013, when the last major development of the portal was carried out. Its usability and ease of use have been repeatedly analysed by university students in their theses and by government officials in bigger projects. The main issues pointed out by the users stay the same - vague and unintuitive website name, complex navigation and design, limited functionality and complex language both in website elements and in the content of documents - which means that the service does not offer enough added value to the user. (Nortal, 2022)

upTIS vision 2030

The main focus of the New Generation Health Information System (upTIS) currently is optimising all forms of cooperation and strengthening the role of the patient. Cooperation is meant to be optimised mostly on the data exchange side but also in sharing inter-agency knowledge. For example, to optimise doctors' time with the patient, the system needs to be quick and easy to use while also having the patient come to the doctor's office for the doctor to do their job - but sometimes the patient forgets the appointment since there is no reminder system at play. The Transport Administration, however, has a working reservation notification system that could be altered to work for doctor visit reminders (Kersti Vaikmaa, interview, 8.03.23). Technically, upTIS aims to transition from a monolithic to a microservices approach, which entails viewing upTIS development as individual puzzle pieces rather than a single, complete product (Viljar Pallo, interview, 3.03.2023). The microservices concept also acknowledges that not all new services can be launched simultaneously (Kersti Vaikmaa, interview, 8.03.23).

Also, the data transference will change from document-based to event-based (FHIR) standard ("Uue Põlvkonna Tervise Infosüsteem- Visioon Tervise Infosüsteemile," 2021). The new standard will help to optimise data exchange between different agencies in Estonia. As a result, we will be able to retrieve more data from the TIS service and display it in a more flexible way. For example, search- in the future, a search bar will be added to the Health Portal, so thanks to the new information architecture and data exchange standard FHIR, one can find the needed information quicker. As an example, users can search for haemoglobin in the blood, and the search result would be the specific reading, not the entire blood analysis document. The transition to the FHIR data standard is essential for future advancements, as it will enhance data accessibility and enable more efficient processing by AI systems (Kersti Vaikmaa, interview, 8.03.23).

A big part of the upTIS vision is to strengthen the role of the patient by giving the patient the opportunity and means to lead their health journey more independently by using the new Health Portal.

Health Portal vision 2030

“Everyone knows you need to eat healthily and exercise, but it’s not that easy,” Kersti Vaikmaa.

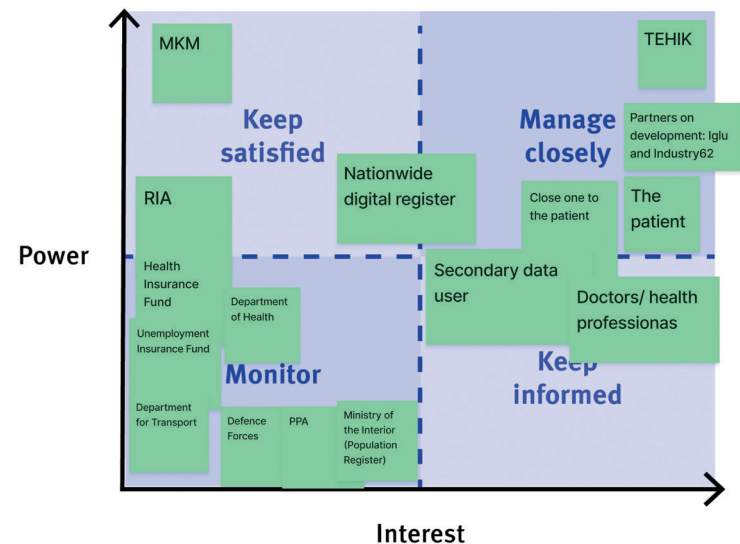
“There is a need for a trigger event, “ Kristjan Port.

The goal is to transform the Patient Portal from its current treatment-centric focus to a health-centric one. The updated patient portal will be a tool to help Estonian citizens get the health information they need and organise their health and treatment (Nortal, 2022). In the updated patient portal, the emphasis is placed on empowering patients to take responsibility for their own health. The new Health Portal will be addressing the user with a friendly personal tone and an attitude that encourages healthier behaviour (Kersti Vaikmaa, interview, 8.03.23). The portal will have three goals: a personalised health platform, a secure communication channel with a health professional and a channel for important health information.

This vision has several stakeholders (Figure 2). The subsequent two are the most important ones from the user’s perspective. Below is a summary of Nortal’s analysis.

The healthcare providers proposed (thinking about how the patient would use it) that Patient Portal could be used to inform people with specific diagnoses about the existence of patient-representative associations - that change brings us back to the background of my thesis. It potentially could also help rare-disease patients while their own registry is still under development. There are also overall expectations from health policymakers and health and social care providers that having a nationwide patient portal could simplify their work, support prevention, and reduce duplication and workload through consistent care, collaboration and rapid data exchange on the portal. The vision doesn’t match everywhere with the technical capabilities of today - for example; the health care providers don’t see the importance of video consultation as it is difficult to get it to work smoothly

The Power-Interest Matrix



NNGROUP.COM NN/g

Figure 2. Stakeholder analysis of my project, adapted from Nielsen Norman Group’s matrix. Available at: <https://www.nngroup.com/articles/stakeholder-analysis/>

From the analyses, I saw that even tho so many different stakeholders are involved, it is clear that those who will be most affected by the new TIS are also the most informed and connected. This was confirmed by Viljar Pallo, who said that such large projects had been successfully completed before and that many stakeholders are not an obstacle (Viljar Pallo, interview, 3.03.2023).

between parties. In summary, the first priority that healthcare providers expect from the new patient portal is a reduction in their workload by giving more means to the patient to help themselves.

The patients, also known as the users, would like a better name for Digilugu or Patient Portal. They want systematic referral to the patient portal by health professionals because today, patients are unaware of some information about

them on the Patient Portal. Patients want personalised support. Information on prescription expiry and visiting times were most requested. In the case of people with chronic illnesses, one of the expectations for patients (and health care providers) was to be in touch with patient-representative organisations through Patient Portal. Users would like to search for health-related information from a trusted source, not “Dr Google”. Users also worry about their loved ones. The desire is to manage/support through PP not only their own health journey but also that of a loved one, for example if they cannot do so themselves. They want to see health data in a simplified way - visualised and in chronological order, so that they can use it to adjust their health behaviour and/or diet. The Patient Portal could provide an easy-to-understand treatment scheme, which in turn would support consistency, transparency and awareness. The PP tone is expected to acknowledge, highlight the positive and leave the negative in the background. Users also did not attach too much importance to video responses, also pointing out the technical difficulties related to that. Rather, finding a contact and reaching the doctor was important. In conclusion, end-users first expect fast and logical access to their critical health data, expect the patient portal to be a credible alternative to ‘Googling’ and want to be able to contact a primary care provider through the portal (Nortal, 2022).

Some of the above has already been solved in an existing solution in Estonia. The e-Perearstikeskus is a private solution, which a family doctor centre can join and thus also offer services to its patients through the e-Perearstikeskus. The environment provides a secure communication channel between the patient and the family doctor. In addition, the patient can renew prescriptions, open and close medical records, register for appointments, produce medical certificates and keep a health diary (e-Perearstikeskus Patsiendile, n.d.).

Achieving the vision of the Health Portal by 2030

Talking with Kersti Vaikmaa, it turned out that some of the new vision parts could be seen to the public as soon as April 2023. They have finished some of Health Portals’ visual rebranded updates and want to get users’ feedback on the new views using users’ actual data. So after the last security checks are passed,

they will add a button to Digilugu, where users can see their health data on the new-looking page. The users can not do anything else than leave feedback to TEHIK and then exit to the old Digilugu’s view. She explained: “As we develop using mock-up data, the true test lies in the performance with actual users’ data.” (Kersti Vaikmaa, interview, 8.03.23).

Potential obstacles to achieving Patient Portal vision for 2030

After asking Kersti Vaikmaa if she thought they had forgotten something out of the vision, she said that she was certain they had. But that will not matter because the whole development is done as an agile project, she said: “We know best the next four to six weeks. Those weeks have been rigorously analysed. But from there on, it’s kind of a blank. It’s like at the edge of the sea, you pick up rocks and see what’s underneath.” This was confirmed by Viljar Pallo: “Documents are not set in stone!”

“Often innovation is held back by the regulatory environment,” Kersti Vaikmaa. For example, a new service estimating breast cancer risk using genetic data faces delays in Estonia due to pending legislation and incomplete service design. The IT development is ready, but the service awaits official state notice for legality and agreements on genetic testing locations. This situation emphasises the need for a more coordinated approach to implementing innovative healthcare solutions, promptly addressing legal and operational aspects (Kersti Vaikmaa, semi-structured interview, 8.03.23 and Tiina Österman, semi-structured interview, 4.04.23).

After the stakeholder mapping based on the Health Portal analyses from Nortal, I was afraid that the inter-agency bureaucracy could be a stumbling block in the Health Portal development. So I asked Viljar Pallo what he thought of the possibility of the vision not reaching the end because of my assumed bureaucratic stopper. And to my somewhat surprise and joy, he answered that people often over-emphasising this bureaucracy, thinking it is a killer of innovation. “There can always be hurdles in projects, but multi-partner projects have been done before

and have succeeded before,” said upTIS-s project manager firmly (Viljar Pallo, interview, 3.03.2023). Kersti Valkmaa also thought that it wouldn't be an issue - yes, there will not be one coherent wave of new services, but all agencies will come up with their own microservices and have them go live in their own time. So, in the end, the job will get done, just not all at once (Kersti Valkmaa, Annex 2).

Speculating about the future(s)

With hopes of understanding healthcare systems' future trends beyond 2030, I asked the health professionals interviewees about their hopes and dreams and predictions for the future of Digilugu.

Tech - the convergence of AI and personalised medicine

Viljar Pallo, upTIS project manager at TEHIK thought that the future would likely be related to AI and decision support. Decision support predicts what the user needs and offers the most likely options in advance. Already today, family doctors are using the first decision support system, where the system itself helps display some information in advance, which is important for helping the patient. That technology will most likely keep on evolving (Viljar Pallo, interview, 3.03.2023).

Kersti Vaikmaa envisions a future where AI and personalised medicine are combined. Tiina Österman, a Chief Specialist in Diagnostics and Personal Medicine at Tervisekassa, anticipates that innovations in personalised medicine will primarily stem from AI's ability to enhance the precision of genetic segmenting tools. This increased accuracy will result in more targeted risk assessments, ultimately improving preventive healthcare measures.

AI and personalisation in healthcare

Today, AI is already showing an important role in healthcare. For example, outside Budapest in Bács-Kiskun County Hospital, Dr Éva Ambrózay, a radiologist with more than two decades of experience, is assisted by artificial intelligence software that has flagged with red circles (meaning potential cancerous spots) in a mammogram that Ambrózay had diagnosed breast cancer free (Satariano & Metz, 2023).

Similar solutions can be found in the Estonian start-up landscape. A company called Better Medicine says on their website that they build AI-powered tools for radiologists. The company was established in 2020, and just in March 2023, they went to Arab Health Expo to gain insight for further development. I couldn't find any example of the product being tested or used already, but it's nice to see Estonians also testing the waters in the AI healthcare field (Better Medicine, n.d.).

Grey area

All of this new technological support on the AI and personal healthcare side would result in well-managed prevention work. At first, that seems ideal - it seems like AI and personal healthcare innovations would lessen the amount of sick people because the technologies have prevented their diseases. At least what I dreamed would happen, but Kristjan Port's view on the topic brought me back to earth.

To this day, clinical medicine has not done any prevention work at all. "Why hasn't the health system tackled prevention? We all know that prevention makes sense - it prevents problems. But when people find out about a propensity towards an illness, approximately a third of them start acting like they are already sick, when in reality, if there is a 10% chance of falling ill, then 90 out of 100 people will be okay if they can get the preventative treatment. In a society, we can't ensure that people who can tolerate at least some risk are going to use healthcare services. That's one problem that's not solved yet," noted Kristjan Port.

The evolution of humanity cannot be done in 22 years

Kersti Vaikmaa, Health Portals project manager at TEHIK, would like the user to want the Health Portal to help them make decisions and warn you and/or inform users before they find some disease for themselves. Kersti reiterated a quote from one of the initial visioning workshops for me. A girl had said that her dream was that the health portal would let her know she was pregnant before she found out herself. She said that at first, they were surprised and laughed at the quote but then thought about and really liked the concept of it (Kersti Vaikmaa, interview, 8.03.23).

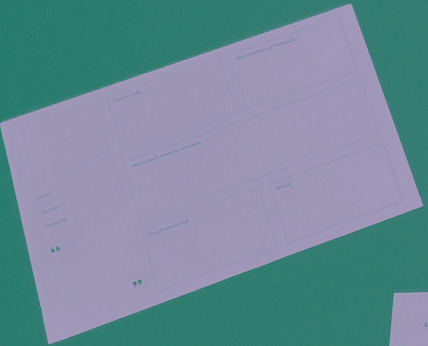
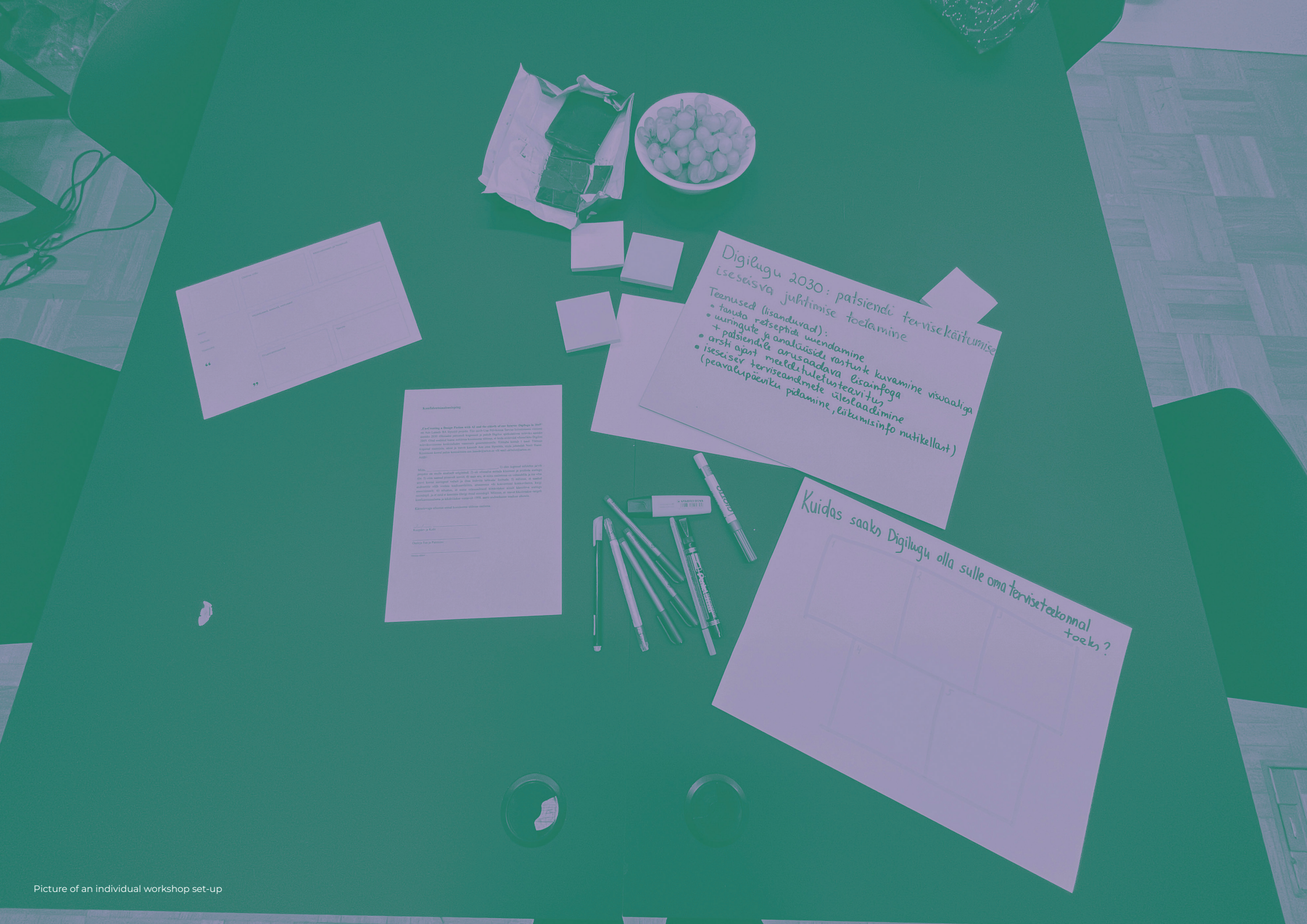
When I shared that story with Kristjan Port, Professor of Health Behaviour and Sports Biology at Tallinn University, he answered that it isn't even that utopian. Kristjan gave an example of an incident in 2012 when a father made a furious call to a Target manager because the company was sending pregnancy ads to his teenage daughter. The father had to apologise a few days later, though- because it turned out that Target had predicted the daughter's pregnancy just by analysing the change in her shopping habits. Imagine what you could do with a person's actual health data in 2030. But Kristjan Port asked an intriguing question: why does one need to know they are pregnant through the Health Portal? What value does it add? I thought about it and could not think of the answer - rather, the exotic utopianism of the idea began to fade. (Kristjan Port, interview, 24.03.23 and Hill, 2012) The Health Portals project manager Kersti Vaikmaa also adds to her idea that she knows that there are many health-anxious people for whom it could cause paranoia, so new, very personal and insightful information like that would not be the best.

Kristjan Port aptly highlights the role of emotional partnership between people. He does not believe that there will be a future when the importance of communicating with another person will fade and be replaced with a lifeless machine. As far as data goes, he agrees that it is already seen that machines can

notice markers that humans miss. K.Port makes an example of IBM-s Dr Watson project, based on the same technology that won Kasparov at a chess match, was tested in many universities and hoped that the artificial intelligence could summarise all the science and learn a great deal of diagnostic information that no human can analyse to provide better diagnostic decisions. And it happened that the machine started to provide working solutions to treat patients with complex medical histories that the doctors would never have thought of. But from time to time, the AI-s solution would have straight up killed the patient. So the doctor's judgement had to step in. Kristjan Port continues to say something that really stuck with me: "Let's say a hundred people have been treated for a serious illness, but one of them died, the next 100 will say "No, no, I'm still going to see a human doctor". About half of them will die because of the human doctor's treatment. But it's very different. People can make mistakes." (Kristjan Port, interview, 24.03.23).

Kersti Vaikmaa and Kristjan Port both emphasise the importance of system security. Vaikmaa ensures that 10% of the total development budget of the Health Portal is meant purely for security issues because she knows that if any data would leak, then the trust would be lost, and the whole service would be shut down. Port brings in a darker scenario where far away in the future, we would be so dependent on the health information system that it could be compromised for war purposes - one doesn't have to pollute the environment, can just get rid of the biomaterial (Kersti Vaikmaa, interview, 8.03.23 and Kristjan Port, interview, 24.03.23).

The most visionary concept presented by Health Portal's project manager, Kersti Vaikmaa, involves users being able to design their future selves, much like creating an avatar in a video game. In such a scenario, strict legal measures would be essential to prevent potential misuse, which could lead to an overemphasis on specific traits, such as blue eyes and blond hair, in the creation of future generations (Kersti Vaikmaa, interview, 8.03.23).



Konkreetseid tegevusi

„Lisateave ja teave“

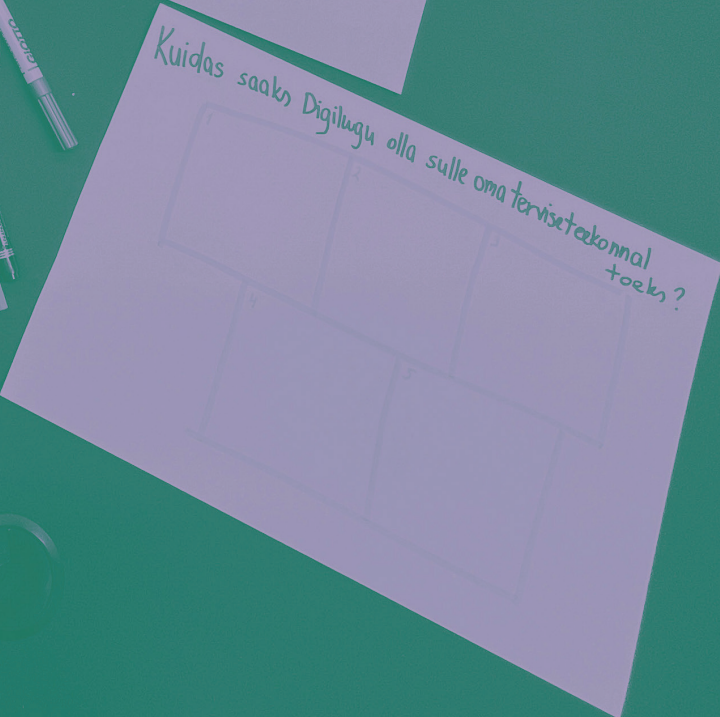
Tegevused (lisanduvad):

- tervise teavitamine
- uuringute ja analüüside vastuste kuvamine visuaalselt
- patsiendile arusaadava lisainfoga
- arsti ajast meeldetuletusteavitus
- iseseisv teriseandmete ülevaadimine
- peavalupäeviku pidamine, liikumisinfo nutikellast)

Digilugu 2030: patsiendi tervisekäitumise iseseisva juhtimise toetamine

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- peavalupäeviku pidamine, liikumisinfo nutikellast)



Picture of an individual workshop set-up

Design fiction creation

After having a clear picture of what 2030 would look like in Estonian health info systems and having asked what professionals in the field think of the future, I went and asked the user — the elderly of 2045 — what they think they need.

Individual workshops with the elderly of our future

I led individual workshops with six 45-55-year-olds (Table 1) with strong interests in the following categories: AI, design and health. These three categories are a cross-cutting theme in my thesis- so the group was balanced. The participants included individuals who were either directly known to me or were connected through a mutual acquaintance.

AI interest		Health interest		Design interest	
Participant 1: IT company owner	Participant 2: VR company owner	Participant 3: Secondary school PE teacher	Participant 4: Owner of a Pilates studio	Participant 5: User Researcher and Service Designer	Participant 6: Educational designer and lecturer

Table 1. Individual workshops participants

All workshops were individual because I instructed the participants to think deep into the future and their health. A person's health is a delicate topic, and I wanted my participants to feel safe sharing that information. I constructed the agenda to focus on the future and the individual's personal needs (Figure 3). The workshop lasted around an hour and unfolded in 6 phases: 1) Introduction to the co-creation workshop and quick overview of my thesis, 2) Context and Digilugu backstory

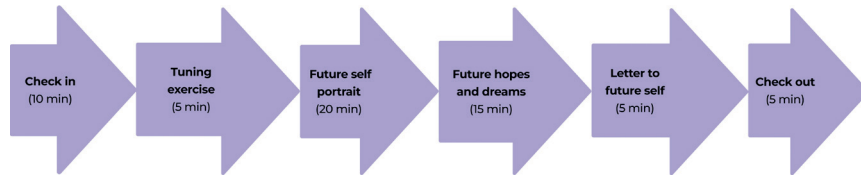


Figure 3. Individual workshop timeline with 6 participants.

until 2030, 3) Tuning exercise, 4) Future hopes and dreams - self-portrait, 5) How does Digilugu support your hopes and dreams in 2045?, and 6) Check out.

Phase 1: Check in

The session started with an introduction of my thesis and a confidentiality agreement to assure them that the session was a safe space. Then I explained what Digilugu would look like in 2030. After that, we moved on to phase 2 more insightfully.

Phase 2: Tuning exercise

I asked my participant to close their eyes and imagine the year 2045 - what do they see? The goal of the exercise was to tune the participant to the future topic. I also wanted them to calculate their age 22 years in the future on their own, without saying straight away that they most probably are retirees. This exercise opened up many different directions. Some spoke more on the micro level - their own life, some on a more macro level - thoughts and feelings about the society.

Phase 3: Future self-portrait

While always keeping in mind that this visioning is ideal, I let them go deeper with their future in 2045 and fill out a future self-portrait template (Picture 2) - based on a persona template.

Phase 4: Hopes and dreams of Digilugu in 2045

When my participant thought thoroughly about their future - needs, hopes, dreams, motivations, frustrations and health predictions - I explained to them the

Crazy 5 design method and gave them the prompt and main question to start ideating on. The prompt was: "What if the Digilugu tells you when it's the optimal time to make a positive change in your health behaviour? How can Digilugu support you on your health journey? Remember, you're age is ... , and it's 2045. Digilugu may no longer exist as a website - but it may." The prompt was inspired by two insights on human behaviour: kairos ("Communicate to users in situations that are the opportune moment for change") and triggers ("Use small nudges to cue users to take action - directly or through learned associations") (Toxboe, n.d.) This exercise went on for 5 minutes. Every minute they had to fill one box on the template paper with a new idea (Picture 2).

After the exercise, I let the participant explain to me what idea from the five they generated they think would be the most important to them in the future and why.

Phase 5: Letter to future self in 2045

In phase 5 we continued with another insightful exercise. I invited the participants to write a letter for themselves in the future of 2045 - hoping to consolidate ideas and maybe find some other personal importance in themselves.

Phase 6: Check out

I concluded the workshop with a good-old check-out "What ideas would resonate with you the most?"

*The next two pages are dedicated entirely to my **persona and protagonist** - Alice - who was put together from the individual workshops.*



Kuidas saada tervislik ja sulle oia parivõetunneid teha?

1	Erinevad tõi valikud • erinevad toidud • erinevad toidud • erinevad toidud
2	Erinevad tõi valikud • erinevad toidud • erinevad toidud • erinevad toidud
3	Erinevad tõi valikud • erinevad toidud • erinevad toidud • erinevad toidud
4	Erinevad tõi valikud • erinevad toidud • erinevad toidud • erinevad toidud
5	Erinevad tõi valikud • erinevad toidud • erinevad toidud • erinevad toidud

ingkautes

- Uudine info "olea laiapõhjalisel"
- dan praeguse loodus (majas)
 - väike keer (või kan)
 - 2-3 lapselast
 - hobid, millega muudat tegeled

- Motivatsioon ja hoiakud
- motiveerib tegutsemise ja tunne et saan endga hakkama
 - positiivne mõtlemine, #
 - muhtumise
 - humoor!

Vajadused, soovid, ootused

- Tervis talutav
- Vajadus ise hakkama saada
- Lastega hea ja tihke läbi saamine
- Olla maailma asjadega kurnis
- võimalus olla puhtas looduses

Frustratsioonid

- inimesed on öelad, negatiivsed
- lollid ei näke seda
- öda ja hirm
- den vana ja hädine

Tervis

- liigun aktiivselt, üldjoontes terve
- ennetan terviseprobleeme
- näen, kuulen

Minimimine:
• teha akt D-taast
• simeat

10 künge

Picture 2. During an individual workshop

Alice

a 68 year old
actively retired
grandmother.

**“I have wrinkles
but they are laugh
wrinkles.”**

“Some people
are addicted to
nicotine or alcohol,
I am addicted to
carbs.”

“Retired but is
always gone
somewhere”

General info

- Lives at Tiskre townhouse
- 2 children - Tom and Kati, 3 grandchildren
- Owns a cat
- Hobbies: cycling, traveling, gardening, choir singing, visiting the theatre
- Loves a sweet treat

Motivations and beliefs

- The feeling "I can do it myself"
- Lives for grandchildren
- Values being useful
- Enjoys leisure activities
- Feels curious and lively

Needs, wants, wishes

- Stability and security
- To spend time with grandchildren - play with them
- Social connections
- Good enough health
- To see the world - travel a lot
- Wishes that society is still developing as a free world, with free will
- Wishes that the planet is cleaner and healthier than years ago

Frustrations

- Life is expensive
- People keep on making the same historical mistakes
- People are ignorant and negative
- Too individualistic society
- Health issues
- Food quality is poor

Health

- A few extra kilograms
- Eyesight and hearing is fine
- Mind is overall sharp but a bit forgetful sometimes
- Have replaced some discs in the back - back problems need to be kept an eye on
- Overall active lifestyle - walks and cycles
- Occasionally constipated - that is disturbing especially while traveling

Co-creating with ChatGPT

After concluding the individual 1h co-creation sessions with my 2 designers, 2 AI enthusiasts and 2 well-being devotees, I could write up a persona based on my participants.

I chose to use the Bootlegging design method to ideate further. Bootlegging is a creative brainstorming technique that involves mixing familiar concepts to create new and interesting juxtapositions. This method encourages designers to think along unconventional paths, thus stimulating their creativity and has been used as a design fiction creation tool. (Holmquist, 2008)

I had a bunch of ideas to use in the Bootlegging design method. I made 3 categories for myself: quotes from co-creations, Crazy 5 ideas from co-creations and technologies - means to realise the ideas. I already had the quotes and ideas from the co-creations. I just had to combine some of them. Only thing me and my design buddy ChatGPT had to add to the Bootlegging were the ideas for the technologies category. Then I gave myself 10 minutes to think and write on post-it notes on every possible technical equipment or other resources. I also did my ideation based on the same prompt I wrote for ChatGPT ideation.

The prompt is as follows:

"I will provide you with the following background text. This text is necessary for the next steps." The text provided was the whole "Findings from the upTIS project" chapter

To test if the chatbot understood the key insights correctly, I asked it to repeat them back to me.

"Next step: Please generate as many ideas as possible for me to use in

my design bachelor's thesis. Please generate ideas for potential technical equipment or other resources in 2045 that could fulfil the same purpose as Digilugu today. The technical equipment or other supporting resources are meant to be used by the following persona: Alice- 68 years old, retired. Alice lives in a townhouse in Tiskre, Estonia. She has 2 kids and 3 grandchildren. Alice has a cat. Her hobbies are cycling, travelling, gardening, choir singing and visiting the theatre. She also enjoys a sweet treat. Alice is motivated by the feeling that she can do everything herself. She loves being useful somehow. She is curious and lively. Alice also lives partly for her grandchildren. She needs stability and security. She enjoys being social. She wants to spend quality time with loved ones. It is important to her that the planet would be healthier and that society is still further developing as a free world. She is frustrated by life's expenses. She thinks it's stupid that people keep on making the same historical mistakes and are ignorant, negative and too individualistic. She is frustrated by the poor food quality. Her mind is sharp but sometimes a little forgetful. She enjoys being active but still has a few extra kilograms of weight. She has replaced some disks in her back. Her stomach is also sometimes constipated."

The chatbot generated 15 ideas.

"Final step: please elaborate and be more specific on ... ideas. If possible, give me specific technologies to support that idea."

I let it elaborate on 3 previous ideas and combine two of them.

A lot of ideas that the chatbot thought of were already written down. But some were new - something neither I nor my co-creation participants had considered. For example: "Remote Support from Family and Caregivers: The IPH²A system can enable Alice's family and caregivers to remotely monitor her health, activity levels, and well-being, providing them with peace of mind and giving Alice a sense of security. This support can motivate Alice to continue using the system and maintain her health." I added that and some other ideas to my Post-it collection on the table.

The last step was for me to generate combinations by randomly pulling one note from each category and sticking them together- making stacks which combined of one quote, one Crazy 5 idea and one technology or other resources.

The method was most helpful for me to categorise and think my findings through. Before the method, I had no idea how to technically solve my personas needs in 2045. But even though I read and considered the combinations I was left with after the bootlegging, I chose the most important quotes, Crazy 5 ideas and technologies out of them, because, to be honest, a storyline had been cooking for some previous days now.

After the bootlegging method, I defined my main findings and decided on my leading topics: **technological friendliness, privacy, autonomy and death.**

The final step was to write a narrative to bring my design fiction to life.



The Design Fiction narrative
Alice x Säde: Monthly recap



Alice gets back from choir practice. She parks her electric bicycle in her Tiskre townhouse yard. The sun is shining. The bicycle sends her vitals to Säde for analysis. Today is the time for the monthly health recap. Alice has a good feeling about it. The weather has been excellent for the past two weeks, and she has been outside a lot- gardening, cycling and playing with her grandkids.

When she steps inside the house, Radio 2 starts playing. She stubs her toe into her grand-daughters toys she left lying around. She shakes her head and picks it up to place it on the cupboard. Alice goes to the kitchen and takes a mango from the fridge. She peels it and sits on the couch.

The music gets quieter, and a voice says: “Good evening, Alice. It’s time for your monthly health update. Would you like to talk about it?”



ALICE

Hey, Säde. Yes, I do feel this will be a positive talk. I've been feeling great this month. Besides last Tuesday, you remember right, when my back could not stop hurting.¹ Thanks for notifying Tom, by the way. It was so nice to hear from him, it kept my thoughts away from the pain when he called.

SÄDE ² (V.O.)

I do agree with you. Your vitals have been stable, I would recommend eating more strawberries and pomegranate. Your blood haemoglobin level is the only thing I would bring out that has fallen from normal. Do I add the fruits to your shopping list?

ALICE

Oh, okay then. Please add pomegranate juice instead of the fruit, I don't like the seeds in them a lot.

SÄDE (V.O.)

Done! Pomegranate juice and strawberries added to your shopping list. I'll also add a renewal of your daily vitamins. The pill dispenser ³ notified me in the morning that it was almost empty.

ALICE

Thanks, I'll go shopping tomorrow.



SÄDE (V.O.)

Tom and Kati both looked at your health vitals ⁴ this month and sent you some of their health points ⁵ so you could take a SPA day. Do we book that to your calendar?

ALICE

That is lovely of them. I think I would like to go after next week's choir practice, can you put it on the calendar?

SÄDE (V.O.)

Yes, of course, it's added for Tuesday, the 21st of April. I have noticed that you have not been sleeping well this month⁶, is something bothering you?

ALICE

Haven't I? I didn't even notice. Although I have been feeling a little more tired, but I just thought it was spring tiredness. I don't think something particularly is bothering me, maybe Tom's divorce,¹ but otherwise, I can't think of anything. Do you have some suggestions to improve my sleep quality?

SÄDE (V.O.)

I would recommend that you turn the electric support on your bicycle down a bit so you would be more tired at the end of the day. Also, I think it would help to turn the home temp down a notch.

ALICE

Oh, okay, cool. *Giggling* Make it a bit cooler, then.



SÄDE (V.O.)

And my last suggestion would be to visit Tom; he probably needs the support from his mother right now. When looking at his health vitals,⁷ I see that he has been feeling anxious and not eating healthy for some time now. I think your super creamy casserole would brighten his day right now. But maybe use the cholesterol-reduced cheese this time — he needs to watch that.

ALICE

Yes, that probably is a good idea.

SÄDE (V.O.)

Alice, do you have any more questions for me?

ALICE

No, I don't think so.

SÄDE (V.O.)

Okay. So lastly, if you keep this great movement up also in the future, like these past few months, I would suggest moving the death date a year.⁸ So from May 15th of 2065 to May 15th of 2066.

What do you think about that?

Direct inspiration - the legend

As mentioned earlier, the design fiction is created in collaboration between (i) a digital product design BA student, (ii) the owners of the upTIS project, (iii) the elderly of the future who are expected to use Digilugu in the year 2045, and (iv) artificial intelligence. In this section, I highlight and explain the direct inspiration from this collaboration.

The narrative plays with the notions of technological friendliness, privacy, autonomy and death. We all have different biases and backgrounds. I will let you decide which specific dilemmas you see in this design fiction.

¹ Alice can talk to Såde like a friend. “Let’s do an MRI or let’s do ... — talk to me normally,” quote from one workshop participant explaining their expectations from a doctor.

² I named Digilugu of the future Såde, because it came out clearly from the workshops that people want a personal and friendly doctor. Digilugu or Health Portal doesn’t sound very personal or friendly, and I wouldn’t like to casually talk with them.

³ “Internet of things” suggestion from individual workshops and “Medication Management: A smart pill dispenser or connected medicine cabinet could help Alice manage her medications, ensuring that she takes the correct dosages at the right times and alerting her Personal Health Assistant if a dose is missed.” suggestion from ChatGPT.

⁴ People with authorisation can access your health data today already. This is particularly highlighted in the vision of Health Portal 2030 as a helpful resource for the older generation.

⁵ “The Digilugu could also offer something to the not-so-sick”, “The Haigekassa

has become the Tervisekassa, but healthy people still don’t get anything from it”, “You should also get some kind of support from the state for having good health, just like you get support when you are ill.” All quotes from different participants of the individual workshops.

⁶ “Sleep Monitoring: A non-invasive sleep monitoring system, such as a pressure-sensitive bed pad or a contactless sensor placed near the bed, could track Alice’s sleep patterns and quality, providing data to her Personal Health Assistant for analysis and personalised recommendations.” suggestion from ChatGPT.

⁷ Såde talks about Tom’s (Alices’s son) health vitals to Alice like a friend.

⁸ “By 2045, we should be able to design death,” a quote from a participant of the individual workshop. The participants pointed out they “want stability and security” when working on their future portraits. And when talking about their hopes and dreams, the participants shared that their death is the only thing that isn’t planned and supported. They may not have a chance for a proper goodbye.

My bias and reflections

Dear reader, I have to be honest with you. Even though I see the various ethical problems in my design fiction, it truly is my ideal future.

I find it really challenging to see my grandfather's health decline, especially since he was in good shape just a year ago. Watching him fade away is difficult, and it's even harder when my family avoids discussing the situation. I believe that talking about this openly would help us all deal with the uncertainty and inevitability of the end. I feel that this is exactly the part of stability that is missing from the future right now - certainty of the end.

Design is supposed to solve problems by finding the right one to solve. I love that in this thesis, I could find problems and suggest some solutions. Now I just have to wait and see if any of them become reality and how to avoid them..

My experience with AI, like other technologies, has been filled with immense enthusiasm. Throughout my project, chatbots and image-generation tools proved to be valuable assistants, helping me edit text for clarity, generate ideas using the bootlegging method, and find suitable synonyms. Initially, I was concerned about not having a second pair of eyes and ears during the project, but ChatGPT eased my worries. Fortunately, I also had wonderful course companions and a supportive mentor by my side.

As I witness the rapid evolution of AI tools, I am confident that I will continue to incorporate them into my future projects. Having participated in numerous discussions about AI and design, I can see that these technologies are here to stay. Soon, the knowledge of AI tools will be as essential for a designer as proficiency in Adobe tools.

Summary

In my speculative design thesis, I explored the future of Digilugu in the year of 2045. The design process was guided by the following questions: What could the vision of Digilugu look like for 2045? How could the patient be empowered in 2045? How could AI be part of the design fiction creation for 2045?

The design process started with familiarising myself with the present and near future plans of Estonia's TIS and Digilugu. I read the vision documents for 2030 and talked to the specialists in the field. The next step was to co-create with the elderly of 2045. My participants were acquaintances of mine who were 45-55 years old today and were interested in one of the three categories: AI, design or health. I led them through an hour-long future-oriented session using the brainstorming and Crazy 5 method with them. The overall theme of the co-creations was "insightful". The ideas and quotes gathered from the co-creations went into the Bootlegging design method. The third category in the method was technology - where ChatGPT and I both generated different ideas by using the same prompt. The method was really good for me to see all of the different future possibilities in front of me on one table. From these options, I selected the most provocative direction and developed a cohesive narrative, incorporating numerous ideas. The resulting design fiction narrative explores themes of technological friendliness, privacy, autonomy, and death.

The elderly of the future left me with the following main points that I explored in my design fiction.

- They want health control to be automated.
- They are anxious to imagine that they will be the elderly of our future.
- They want the future Digilugu to provide clear (understandable) and actionable guidance by conversing with it.

It is essential to consider the distant future when developing the immediate

future. I hope this thesis is not only engaging and influential for Digilugu's owners but also leaves every reader with thought-provoking insights.

Now I would like to leave you with a question. **To what point should we empower the patient and humanize the technology?**

Lühikokkuvõte

Käesolevas lõputöös esitatakse disainiprojekt, mis on valminud i) digi-tootedisaini bakalaureusetöö üliõpilase, ii) upTIS-projekti omanike, iii) 2045 aasta eakate, ja iv) tehisintellekti koostöös. Uuringu eesmärk on kujutada Eesti patsiendiportaali rolli aastal 2045 ja uurida võimalusi, kuidas patsiente selleks ajaks võimestada.

Aasta 2045 Digiloo disaini ulme koosloomiseks tutvusin ma lähemalt Eesti terviseinfosüsteemiga. Vaatasin läbi süsteemi ajakohastamisega seotud analüüsidokumendid aastani 2030 ja konsulteerisin projekti juhtivate ekspertidega. Seejärel viisin läbi individuaalsed tunni aja pikkused töötoad kuue inimesega vanuses 45-55, kes on 2045. aastal Digiloo eakad kasutajad. Osalejad valisin välja vastavalt huvile tehisintellekti, disaini või tervisespordi vastu. Individuaalsed töötoad valmistasid ette disainiprotsessi järgmise sammu: ajurünnaku kaasates tehisintellekti.

Minu koosloome viimane etapp oli Bootlegging disaini meetod, kus ma tegin tehisaruga koostööd, et segada tuttavaid kontseptsioone ja luua loovust stimuleerivaid vastandusi. Kasutasin enda ja ChatGPT jaoks kirjutatud prompti ajurünnaku vahendina, et genereerida ideid tehnoloogia kategooria jaoks bootlegging disaini meetodis. Teised kaks kategooriat meetodis olid kogutud tsitaadid töötubadest tuleviku vanuritega ning nende poolt välja pakutud ideed Digiloo tulevikuks. Dokumenteerisin kõik ideed kolmest kategooriast märkmepaberitele, mille ma kombineerisin juhuslikkuse alusel, et avardada oma kujutlusvõimet tuleviku võimaluste kohta.

Bakalaureusetöö tulemiks valmis disaini ulme, mis mängib autonoomia, privaatsuse ja surma teemadega. Töö valmis koosloomena upTISE projekti omanike, tehisaru ja tuleviku eakatega.

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Annex 1

Semi- structured interview plan

The interview plan varied widely depending on the person I was interviewing. But the following topics were key elements in the interviews:

1. I introduced myself and the goal of my thesis.

2. I asked some general questions about the knowledge of upTIS and their involvement in the project.

3. Questions about the project timeline

4. Potensial hotspots:

What is Digilugu's success story? What is the ideal future for Digilugu?

What is the worst-case scenario for the development of Digilugu?

5. Future:

What do you think will be the main focus of the next generation of health information systems?

6. Do you have any questions for me?

**To what point should we empower
the patient?**

Authors' declaration

I confirm that:

1. this thesis is the result of my own personal work. It has not been written by anyone else and has not been submitted (for defence) by anyone else before;
2. all the works of other authors used in the preparation of the thesis, important statements and data from any other sources have been duly cited in the thesis.

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